The State, Determinants, and Consequences of Skills Mismatch in the Ethiopian Labour Market

Berhe Mekonnen Beyene and Tsegay Gebrekidan Tekleselassie

Ethiopian Development Research Institute (EDRI), Ethiopia
ABOUT EDRI

Founded in August 1999 as a semi-autonomous government development research institute, EDRI’s primary mission is to conduct quality research on the development of the Ethiopian economy and disseminate the results to key stakeholders within and outside of Ethiopia. EDRI is sponsored by the Ethiopian government, UNDP, IDRC-TTI and IFPRI/ESSP. For more information, as well as other publications by EDRI staff and its affiliates, see http://www.edri.org.et/

Ethiopian Development Research Institute (EDRI)
P.O. Box 2479
Tel: 251-11-550-6066
Fax: 251-11-550-5588
Email: info@edri.org.et
Website: http://www.edri.org.et

ABOUT THESE WORKING PAPERS

The Ethiopian Development Research Institute (EDRI) Working Papers contain peer-reviewed material from EDRI and/or its partners. They are circulated in order to stimulate discussion and critical comment. The opinions are those of the authors and do not necessarily reflect those of their home institutions or supporting organizations.

Editors in Chief: H.E. Mekonnen Manyazewal, with the Rank of Minister, Executive Director of EDRI
Bart Minten, Program Leader of IFPRI–ESSP II

Managing Editor: Gebrehiwot Ageba, Director of Programs, EDRI

Editorial Board: Abebel Bayrau, Mulu Gebreyesus, Biniam Egu, Girum Abebe, Berihu Assefa, Tigabu Degu, Gebrehiwot Ageba (EDRI), Alemayehu Seyoum (IFPRI-ESSP), Tassew Weldehanna (AAU)


About the Author(s): Berhe Mekonnen Beyene is a Consultant and Tsegaye Gebrekidan Teklesellassie is a Research Fellow at EDRI.
The State, Determinants, and Consequences of Skills Mismatch in the Ethiopian Labour Market

Berhe Mekonnen Beyene and Tsegay Gebrekidan Tekleselassie

Ethiopian Development Research Institute (EDRI), Ethiopia
# Table of Contents

Abstract .................................................................................................................................................. 1

1. Introduction ....................................................................................................................................... 2

2. Skills Mismatch: Conceptual Framework and Measurement ......................................................... 3
   2.2. Measurement Methods of Labour Market Mismatch ............................................................ 5
      2.2.1. Micro (Individual Level) Mismatches .......................................................................... 5
      2.2.2. Aggregate Labour Market Mismatches ........................................................................ 5
   2.3. Data Sources and Methods Selected ......................................................................................... 6

3. Overview of the Labour Market in Ethiopia ..................................................................................... 7
   3.1. Urban labour force and unemployment ................................................................................... 7
      3.1.1. Labour Force and Economically Active Population ...................................................... 7
      3.1.2. Unemployment ............................................................................................................... 8
      3.1.3. Characteristics of the employed .................................................................................... 10
   3.2. Overview of Labour Market Frictions ....................................................................................... 11
      3.2.1. Ease of Finding Workers ............................................................................................... 11
      3.2.2. On-the-Job Training ..................................................................................................... 12
      3.2.3. Labour Mobility ............................................................................................................. 12

   4.1. Measuring Skills Mismatch Indicators in Ethiopia ................................................................. 14
      4.1.1. Variation in Employment Rates across Skills (Education) Levels (Dispersion Measure) .. 14
      4.1.2. Proportion of unemployed versus employed ............................................................... 15
      4.1.3. Empirical (Statistical) Mismatch Indicator ................................................................. 16
   4.2. Determinants of Skills Mismatch in the Ethiopian Labour Market ......................................... 20
   4.3. Skills Mismatch and Well-being .............................................................................................. 23
      4.3.1. Skills Mismatch and Job Satisfaction ............................................................................ 23
      4.3.2. Skills Mismatch and Wages .......................................................................................... 24

5. Conclusions and Policy Implications ............................................................................................... 27

6. References ......................................................................................................................................... 28
List of Tables

Table 1: Types and Definitions of Labour Market Mismatch: A Glossary of Terms ................................................. 4
Table 2: Trends in urban population, labour force and economically active population........................................... 7
Table 3: Unemployment rate (percentage) by education level....................................................................................... 9
Table 4: Degree of Difficulty to find workers with the specific skill attributes ......................................................... 12
Table 5: Determinants of Education Mismatch: Marginal Effects from Probit Regressions .................................... 22
Table 6: Probit regressions: Satisfaction and Mismatch............................................................................................... 24
Table 7: OLS regressions: Wage and Mismatch........................................................................................................... 26

List of Figures

Figure 1: The economically active population by education level in different years .............................................. 8
Figure 2: Trends in unemployment rate: total and youth ............................................................................................ 9
Figure 3: Employment by sector: 2003 ..................................................................................................................... 10
Figure 4: Employment by sector: 2014 ..................................................................................................................... 10
Figure 5: Industry employment by education: 2006 ............................................................................................... 11
Figure 6: Industry employment by education: 2014 ............................................................................................... 11
Figure 7: Reasons for not Providing Formal Training to workers ........................................................................... 12
Figure 8: Reasons for changing employer ............................................................................................................... 13
Figure 9: Relative dispersion of employment rates by skill level, 2003 -2014 for urban Ethiopia ...................... 15
Figure 10: Trends in Unemployment –Employment Ratio by Level of Education .................................................. 16
Figure 11: Skills/Education Mismatch .................................................................................................................... 17
Figure 12: Education Mismatch by Gender ............................................................................................................. 18
Figure 13: Over-Education Mismatch by Gender ..................................................................................................... 18
Figure 14: Under-Education Mismatch by Gender .................................................................................................. 18
Figure 15: Education Mismatches by Age Group ..................................................................................................... 19
Figure 16: Over-Educated Mismatch by Age Group ................................................................................................. 19
Figure 17: Over-Educated Mismatch by Age Group ................................................................................................. 20
Abstract

The study analyses the incidence of labour market mismatch, identifies the correlates of skills mismatch that shed light on the causes of the problem, and investigates its consequences on well-being. It is the first attempt to formally study skills mismatch in the urban labour market in Ethiopia. Using several indicators of qualification mismatch, we find that about a quarter of employees are mismatched with over-qualification being the more prevalent problem. In comport with findings for developed countries, our analysis reveals overqualified worker report lower job satisfaction compared to the well-matched. We also find that skill-mismatch, particularly over education lowers wages; while education is positively and significantly associated with wage, overeducated workers earn less than those well-matched for their level of education. This implies a wage penalty associated with over-qualification even in a developing country context. Our study highlights that labour market mismatch is not only a phenomenon of the developed world but also the developing countries. Hence, skills mismatch needs to be a key aspect of labour market policy making along with issues of decent and productive work.
1. Introduction

In the last decade, Ethiopia has registered impressive economic growth. The average growth between 2004 and 2014 has been close to 11%. This growth was largely driven by substantial public investment on infrastructure and a strong performance of the service sector that benefitted from a modest shift of labour from the agricultural sector. Agriculture is still dominant while industry’s contribution to the economy remains low.

However, for a sustainable and inclusive aggregate productivity growth that can significantly improve living standards and reduce poverty, industry in general and manufacturing, in particular, has to play a leading role (Gollin et al., 2002; Gollin et al., 2014; Bustos et al., 2016). Manufacturing exhibits not only faster growth in productivity but also higher potential to absorb surplus labour from other sectors (Rodrik, 2011). While the government has been trying to boost the manufacturing sector by putting in place different policies, strategies and incentives, there are still various factors limiting the growth of the sector including lack of skilled labour force (World Bank, 2015).

To achieve a successful industrial transformation, a well-functioning labour market that offers productive employment for the people and the necessary technical and soft skills to enhance productivity and competitiveness of the manufacturing sector is necessary. Without a well-functioning labour market, it is difficult to achieve structural transformation and labour could even be diverted to the wrong sectors –sectors with low productivity and potential (De Vries et al., 2015). However, the current state of urban labour markets in Ethiopia is characterized by high unemployment rates - 17% as opposed to about 5% in rural areas (World Bank, 2016), high job search-cost (Franklin, 2016) and poor technical and soft skills resulting in low labour productivity. Hence, a closer look at the problems of the labour market in general and the urban labour market in particular is important. A case in point is skill-mismatch, which refers to the discrepancy between the skills possessed by a worker and those required by his/her job. Skill-mismatch can be vertical or horizontal; a vertical skill-mismatch exists when the skills or educational qualifications of a worker are higher (over education) or lower (under education) than what is required for the job while horizontal mismatch is present when the skills or qualifications of a worker are different from the ones required by the job (Kupets, 2016).

Skill-mismatch can have various adverse consequences. For workers, it is associated with low wages, job security and job satisfaction (Allen and Van der Velden, 2001). From the supply side, addressing skills mismatch plays a crucial role in reducing unemployment and underemployment. For employers, it represents low productivity and high turnover (Benfield, 2010; McGowan and Andrews, 2017) and hence addressing it has significant benefits from the demand side as well; firms’ abilities to find suitable labour enhances their productivity and competitiveness in a more and more globalised world. Skill mismatch also decreases overall productivity and competitiveness of the economy (Davos-Klosters, 2014) and further decreases the quality of the human capital by discouraging investment on education and training by individuals (Restrepo, 2015). At aggregate level, the extent to which skills supply and demand are matched is a major factor shaping economic growth, productivity, and competitiveness (ILO, 2013).

Though skill-mismatch is often considered to be a problem of developed economies, it can as well be an important issue for developing countries. For example, over education, which is just one form of skill mismatch, affects about 20% of workers in SSA (Herrera and Merceron, 2013). There is also some indicative evidence that skill-mismatch exists in the Ethiopian labour market. According to World Bank’s Ethiopia Skill Module survey, about half of the firms surveyed have
difficulty in finding workers with required technical skills. On the other hand, unemployment among
technical school graduates is very high (World Bank, 2015). In this study, we aim to investigate the
extent, causes, and consequences of skill-mismatch in Ethiopia, focusing on the urban labour
market. In light of the difficulty in measuring skill, we use education as a proxy as is common in
the literature.

While there is a growing literature on skill-mismatch, most studies focus on the developed world.
There is a paucity of research on skills-mismatch in Africa. We are not aware of any published
work focusing on skill-mismatch in Ethiopia. The study aims at contributing to bridging the
research gap in the area of skills mismatch in developing countries. It also has important policy
implications by identifying the types and causes of skill-mismatch and their consequences. The
study can help the structural transformation endeavour of the country by addressing one of the
key challenges of the functioning of labour market, namely skills mismatch. Skills-mismatch is
considered one of the causes of low productivity and high unemployment.

Specifically, the study analyses the incidence of labour market mismatch using several methods.
Then it aims at identifying the correlates of skills mismatch that can shed light on the causes of the
problem. Finally, it investigates the consequences of the mismatch on well-being focusing on its
impact on wages and job satisfaction.

Our main data source for this study is Urban Employment Unemployment survey (UEUS) of
Democratic Republic of Ethiopia conducted the survey. We also use World Bank’s Skills Module of
Ethiopia conducted in 2013 to accompany its enterprise survey to complement our analysis.

The rest of the paper is organized as follows. Section two discusses the conceptual framework
and measurement (methodological) issues related to skill mismatch. It also presents the different
data sources used for the paper. Section three gives an overview of the urban labour market.
Section four which is the main part of the paper presents empirical analysis and discussion of
skills mismatch and its consequences. In order to have a broader understanding of the skill
mismatch that exists in the urban labour market in Ethiopia (including types of mismatch and
causes), an attempt is made to include several measures of mismatch given the data limitations.
The last section provides conclusions and policy implications.

2. Skills Mismatch: Conceptual Framework and Measurement

2.1. Conceptual Framework, Definitions, and Measurements of Mismatch

At aggregate level the extent to which skills supply and demand are matched is a major factor
shaping economic growth, productivity, and competitiveness (ILO, 2013). At micro level skill
mismatch affects labour market outcomes such as workers well being measured by wages, job
mobility, and satisfaction (see for example Allen and Van der Velden, 2001). Moreover, labour
market mismatches can adversely affect firms (see for example, Benfield, 2010). While temporary
mismatch is inevitable due to changes in technology, persistent mismatch is concerning as it can
cause real economic and social losses (CEDEFOP, 2010).

Hence, studying the state and trend of labour market mismatch can inform policy makers to take
corrective actions in the event of high mismatch between the skills available in the economy and
the skill required by the economy. On the one hand, skills mismatch can arise due to mismatch on
the availability of skills and the one required by the economy. On the other hand, despite
availability of skills in the economy, mismatch can occur as a result of absence or poor labour market information system, high search cost, and the density networks among others.

The main explanations for Labour market mismatch are the ‘assignment models of labour market’, ‘Search/Matching Theory’, and ‘Human Capital Theory’. The positive role of education on wages is a theoretical and empirical regularity. However, actual impact of education on productivity depends on the extent of matches between educational level and the job level. This is the underlying idea behind the ‘assignment model’ of labour market (Sattinger, 1993). According to search and matching theory, temporary mismatches follow due to imperfect information. This can typically be observed in the form of higher over-education among the school to work transition phase of employees (Hartog, 2000). The human capital theory argument explains the incidence of mismatch specially over-education arising from lack of work experience among school-leavers (Groot and Maassen van den Brink, 1996). For a detailed review of the causes of labour marker mismatch, see Allen and Van der Velden (2001).

There is no universally agreed one catchall definition of skills mismatch. It is a term that refers to the imbalance in the available skills and the ones required by the economy. Skills mismatch can be viewed from a macro or micro perspective (Johansen and Gatelli, 2012). At the aggregate level, the economy may suffer from overall skills shortage or surplus. For example, the economy may suffer from over-supply or shortage of mechanical engineers. At the micro level, the issue becomes skills or qualifications mismatch. At micro-level, it may be that the firm that requires a mechanical engineer may not find one due to, say lack of information or high search costs, despite the existence of mechanical engineers.

Another important issue worth noting is qualification (education) mismatch is one type of skills mismatch. Qualification is obtained through formal education, while a skill-set includes some practical aspects needed to perform a job in addition to formal education. Hence, while qualification/education mismatch can be an approximate indicator of skills mismatch, it is by no means a substitute (CEDEFOP, 2010; Johansen and Gatelli, 2012; ILO, 2013). The various types of mismatch or imbalance in the labour market and definitions are provided in Table 1. For a detailed review of the types and measurements of labour market mismatch, see CEDEFOP (2010), Johansen and Gatelli (2012), and ILO (2013) among others. Due to data limitation, most empirical work has focused on Educational/Qualification mismatch. We do the same in this study.

<table>
<thead>
<tr>
<th>Skill Shortage (Surplus)</th>
<th>Demand (supply) for a particular type of skill exceeds the supply (demand) of people with that skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill Gap</td>
<td>Type or level of skills is different from that required to adequately perform the job</td>
</tr>
<tr>
<td>Vertical Mismatch</td>
<td>The level of education or qualification is less or more than required</td>
</tr>
<tr>
<td>Horizontal Mismatch</td>
<td>The type/field of education or skills is inappropriate for the job</td>
</tr>
<tr>
<td>Over-Education (Under-Education)</td>
<td>Workers have more (less) years of education than the job requires</td>
</tr>
</tbody>
</table>

Table 1: Types and Definitions of Labour Market Mismatch: A Glossary of Terms
2.2. Measurement Methods of Labour Market Mismatch

As discussed above at aggregate level, the economy may suffer from skills shortage or surplus. At the micro level, the issue becomes skills or qualifications mismatch. A number of methods have been used in the literature to measure labour market mismatch at micro (individual) level. Three alternative methods have been used in literature: worker self-assessment (subjective measure), systematic job evaluation, and empirical method (CEDEFOP, 2010). The empirical method is used where data sets do not contain a direct question on the skills/education requirements of jobs.

At aggregate level, labour market mismatch focuses on the imbalance between overall supply and demand for skills. Three of the more common methods in this regards are Dispersion Measure, Proportion of unemployed versus employed, and the Beveridge curve. Below we briefly discuss the micro and aggregate labour market mismatches.

2.2.1. Micro (Individual Level) Mismatches

**Subjective Measures of Mismatch:** This approach asks employees whether their education or qualification is appropriate for the job. Typically the questions asked include “how much education is required to obtain a job like yours?”, “Do you think your qualification is too high, appropriate, or too low for your job”, “what level of education is required to perform this job?” and so on. Since it is a subjective measure there may be biases in responses.

**Systematic Job Evaluation:** It is based on expert evaluation of required qualification for a particular job. One way to determine suitable level of education for a specific occupation is using ISCO classification. However, this approach fails to allow more than one education level to be a match for particular occupations, especially if they are broadly defined (CEDEFOP, 2010).

**Empirical Method:** Most labour market surveys do not contain direct questions on skill/qualification levels required for occupations, which prompts reliance on the empirical method to determine mismatches. This is a statistical method, which depends on the distribution of skills within occupational groups. Mismatching appears when the level of education is more than one standard deviation above (over-education) and below (under-education). While this approach is convenient to compute, the choice of one standard deviation in the level of educational aggregation is random and subject to biases. More detailed discussion is provided in the empirical section.

2.2.2. Aggregate Labour Market Mismatches

**Dispersion Measure:** This is a measure of the variation in employment rates across skill (education) levels. It is the relative dispersion of employment rates across skill categories. A high level of variation between employment rates of the various skill categories suggests that there is a large gap between the supply of skills and the skills demanded by the economy (European Union, 2015). We will discuss this method in more detail in the empirical section of this paper.
**Proportion of Unemployed versus Employed:** The dispersion indicator discussed above shows the state of overall labour market mismatch. It does not indicate mismatch by education categories. The ratio of unemployed people with a particular level of education with that of employed people with the same level of education is one measure of skill-mismatch to determine the state of mismatch by education levels (Johansen and Gatelli, 2010; Bartlett, 2013). The higher the ratio (more the size of the unemployed relative to those employed), the larger the mismatch for that particular level of education is. This method will be discussed in more detail in the empirical section.

**The Beveridge Curve:** This compares unemployment rate and vacancy rates over time. It is a downward sloping hyperbolic curve with vacancy rates on the vertical axis and unemployment rate in the horizontal axis. If the curve moves outward overtime, it indicates higher unemployment for given levels of vacancy rates and hence implies increasing mismatch. The data requirement for this indicator is heavy and the reliability of vacancy rates is crucial for this method to be useful. For more detailed analysis, see Johansen and Gatelli (2012).

### 2.3. Data Sources and Methods Selected

Our main data source for this study is the Urban Employment Unemployment survey (UEUS) of Ethiopia for the period 2003 – 2014. We use the UEUS for 2003, 2006, 2009, 2012, and 2014, which enables us to see the trends and dynamics over time. Central Statistical Agency (CSA) of the Federal Democratic Republic of Ethiopia conducted the survey. We also use World Bank’s Skills Module of Ethiopia conducted in 2013 to accompany its enterprise survey for the descriptive analysis part.

As discussed above qualification is obtained through formal education, while a skill-set includes some practical aspects needed to perform a job. Nonetheless, while qualification/education mismatch is not a perfect substitute for skills mismatch, it can be an approximate indicator. Due to data limitations, we use qualification mismatch as a measure of skills or labour market mismatch. For the incidence of skills mismatch we use three indicators, namely variation in employment rates across education/skill levels (relative dispersion of employment rates across education/skill levels), the proportion of unemployed versus unemployed across skill levels, and an empirical (statistical) measure of mismatch. The first two are macroeconomic measures of labour market mismatch while the third (empirical) measure is at employee/micro level. Each method is described in detail in the empirical analysis section.

To study the determinants of mismatch and job satisfaction we use marginal effects of probit model estimated by maximum likelihood. For the wage equations we run Mincerian type regressions by estimating OLS. Each method is described in detail in the empirical analysis sections.

---

1 The UEUS was not conducted in 2005 and 2013 as the national labour force survey which includes rural areas was held. We excluded data 2007 and 2011 as they didn’t show much variation from 2006 and 2012 respectively.

2 Unless stated otherwise, despite the distinction among ‘skills mismatch’, ‘education mismatch’, ‘qualification’, and ‘labour market mismatch’, we use them interchangeably in this study.
3. Overview of the Labour Market in Ethiopia

3.1. Urban labour force and unemployment

3.1.1. Labour Force and Economically Active Population

In order to understand the trends in the urban labour market, it is essential to first have a look at the trends in the total urban population, the labour force and the economically active population (EAP). As can be seen from Table 2, the total urban population in 2003 was estimated to be 8.5 million of which the labour force constitutes 6.7 million (79%). In 2014 the urban population reached 16.1 million while the labour force increased to 13 million (81%). The size of EAP population was 3.9 million in 2003 and more than doubled in the 11 year period reaching 8.2 million in 2014. The share of the EAP out of the total urban labour force increased from 58 per cent to 64 per cent during the same period implying that proportionally more and more people are participating in the labour market. The share of the youth (15 to 29 years old) out of the EAP ranges from 48 per cent to 51 per implying that the urban labour market is dominated by the youth.

Table 2: Trends in urban population, labour force and economically active population

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total urban population (in mls)</td>
<td>8.5</td>
<td>10.0</td>
<td>12.1</td>
<td>14.0</td>
<td>16.1</td>
</tr>
<tr>
<td>Total urban labour force (in mls)</td>
<td>6.7</td>
<td>7.9</td>
<td>9.6</td>
<td>11.1</td>
<td>13.0</td>
</tr>
<tr>
<td>Economically active population (EAP)*</td>
<td>(58%)</td>
<td>(59%)</td>
<td>(60%)</td>
<td>(63%)</td>
<td>(64%)</td>
</tr>
<tr>
<td>Youth’s share of the EAP</td>
<td>0.51</td>
<td>0.49</td>
<td>0.48</td>
<td>0.47</td>
<td>0.48</td>
</tr>
</tbody>
</table>

Source: Authors’ computations using Ethiopian UEUS 2003-2014
* Value as a percentage of total urban labour force given is in parenthesis

Another important aspect of the labour market is the educational composition the EAP. Figure 1 presents the distributions of the labour market by educational level in 2003 and 2014. In 2003 primary school graduates had the highest share with 59 per cent followed by secondary level graduates (29%); the two groups combined constitute more than 85 per cent of the EAP. The shares for TVET (and post-secondary certificate), diploma and degree (and above) graduates are three per cent, five per cent and one per cent respectively. Individuals who have post-secondary education constitute only nine per cent of the total EAP signifying the potential shortage for middle and high-level management positions. Two per cent of the EAP didn’t have any formal education.

The huge investment in higher education and TVET colleges across the country over the last several years, however, seems to have shifted the composition of the EAP towards higher education levels. Though the primary and secondary level graduates still dominate the active labour force, the share of those with post-secondary education increased significantly between 2003 and 2014 (increased from 9% in 2003 to 19% in 2014). Particularly, the shares for TVET (and certificate) and first Degree (and above) graduates, have shown a significant increase. The

---

3 The labor force includes those who are 10 years and above following official (CSA) definition while the EAP refers to those in the labor force who are currently employed or actively looking for job.
proportion of the EAP without formal education has also increased but it is still low (4%) in 2014. The majority of this population group belongs to the age of 30 and above suggesting lack of alternative education system for older people in urban areas.

**Figure 1: The economically active population by education level in different years**

![Bar chart showing the economically active population by education level in different years.](image)

*Source: Authors’ computations using Ethiopian UEUS 2003-2014*

### 3.1.2. Unemployment

Unemployment is also an important aspect of the labour market. The trends in unemployment for the whole population and the youth are given in Figure 2. The overall unemployment rate decrease from 26.1 per cent in 2003 to 17.4 per cent in 2014 which represents a decline of unemployment by about a third. While the decrease in unemployment is significant, the pattern was not smooth. While the unemployment rate decreased from 26.1 per cent to 16.7 per cent between 2003 and 2006, it increased to 20.4 per cent in 2009; it went down to 17.6 per cent in 2012 and was more or less the same in 2014. The trend of unemployment for the youth is significantly higher and follows a similar pattern like that of the overall unemployment. In 2003, the youth unemployment rate was 35 per cent while the corresponding overall unemployment is 26%. In 2014 the youth unemployment and the overall unemployment declined to 22.8% and 17.4% respectively.

The decline in unemployment in the face of the rise in the EAP may suggest the increasing availability of job opportunities for the growing labour force. However, the urban unemployment rate is still high, particularly for the youth. Thus, the labour market has a long way to go to absorb the increase in labour supply and keep the unemployment rate at the desired level. Addressing the problem of youth unemployment is therefore important to use this productive resource effectively and reduce the risk of poverty and income inequality.
Table 3 presents the trend in unemployment by level of education. Unemployment rate and its trend significantly varies across levels of education. In 2003, the unemployment rate was the highest for secondary education graduates (38%) followed by those who completed primary education (27%). The unemployment rate for those with no formal education was about 20 per cent. The lowest unemployment rate was observed for those with a university degree and above (5%) followed by those with TVET or post-secondary certificates (12%).

While the pattern of unemployment rate is not smooth for all the educational groups, significant reduction of unemployment is observed between 2003 and 2014 for the three lowest educational levels (no primary education, primary education and secondary education). The change in the other educational levels is not as positive; the unemployment rates significantly increased for TVET (and certificate) graduates and those with university degree. This may partly be explained by the expansion in TVET and higher education; the growth in demand is not in par with the growth in supply for those highly educate people. However, it may also be due to a more serious problem of the educational system and/or the labour market. This may suggest the existence of educated unemployment problem due to a mismatch between the education and training skills available and the requirements of the labour market. This can be attributed to, as described by GIZ (2016), lack of appropriate qualification by vocational schools and universities graduates to meet the requirements of Ethiopia’s burgeoning economy due absence of suitably qualified teaching staff, quality standards and lack of practical relevance of the education system in Ethiopia.

Table 3: Unemployment rate (percentage) by education level

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No formal education</td>
<td>20.44</td>
<td>12.62</td>
<td>11.95</td>
<td>14.06</td>
<td>11.67</td>
</tr>
<tr>
<td>Elementary</td>
<td>26.52</td>
<td>16.23</td>
<td>20.60</td>
<td>16.65</td>
<td>17.78</td>
</tr>
<tr>
<td>Secondary education</td>
<td>37.09</td>
<td>25.50</td>
<td>26.34</td>
<td>23.29</td>
<td>22.37</td>
</tr>
<tr>
<td>TVET and Certificate</td>
<td>11.64</td>
<td>19.90</td>
<td>13.39</td>
<td>19.20</td>
<td>16.18</td>
</tr>
<tr>
<td>Diploma</td>
<td>-</td>
<td>10.26</td>
<td>-</td>
<td>7.95</td>
<td>9.59</td>
</tr>
<tr>
<td>Degree and above</td>
<td>4.97</td>
<td>4.29</td>
<td>5.33</td>
<td>7.37</td>
<td>6.32</td>
</tr>
</tbody>
</table>

Source: Authors’ computations using Ethiopian UEUS 2003-2014
3.1.3. Characteristics of the employed

Figures 3 and 4 show the sectoral distribution of the employed in 2003 and 2014, respectively and the result reveals that there hasn't been significant change during the eleven years. The combined share of services (whole sale and retail trade and other services) was 70.5 per cent in 2003. Industry contributed only 22.3 per cent of the total employment in the same year while agriculture had the lowest share with 7.2 per cent. The picture hardly changed in 2014 though the share of industry slightly increased and that of services declined marginally. This shows that the huge focus of the government on industry, notwithstanding, the urban economy is still dominated by the service sector.

**Figure 3: Employment by sector: 2003**

![Pie chart showing sectoral distribution of employment in 2003](image)

*Source: Authors’ computations using Ethiopian UEUS 2003-2014*

**Figure 4: Employment by sector: 2014**

![Pie chart showing sectoral distribution of employment in 2014](image)

*Source: Authors’ computations using Ethiopian UEUS 2003-2014*

Given the huge emphasis given to the industrial sector by the government, it is important to have a closer look at the dynamics of employment in the sector. More specifically, it is desirable to look into the distribution of industrial employment by level of education overtime. Figures Five and Six present the distribution of industrial employment by education in 2006 and 2014, respectively. While elementary school graduates constitute the highest employment share followed by secondary education graduates in both periods, there is in general a shift in favour of those with post-secondary education; the share of those with post-secondary education increased from 29 per cent in 2006 to 40 per cent in 2014.
3.2. Overview of Labour Market Frictions

In this section we explore some preliminary indicators of skills mismatch in Ethiopia from employers (demand) and workers (supply) side using the World Bank’s Skills Module of 2013 and the UEUS of 2014.

3.2.1. Ease of Finding Workers

According to World Bank’s Ethiopia Skill Module survey, about half of the firms report difficulty in finding workers with required technical skills as shown in Table 4. Similarly, about 43 per cent the of sampled firms indicate difficulty of finding workers with essential ethics and commitment attributes while more than a quarter struggle finding workers with adequate computer skills. Among the 102 firms surveyed more than a quarter of them (27 firms) reported having vacant positions. For about 67 per cent of them (18 firms) the vacant positions were unfilled for more than four months. Among 21 firms that provided a reason for failing to fill vacancies, 12 (57%) mention
lack of applicants for the unfilled vacancies while eight (38%) cite a dearth of adequately qualified applicants. One firm indicated delay due to labour regulations. Despite high unemployment in urban Ethiopia, the high level of unfilled vacancies is a sign of labour market mismatch.

### Table 4: Degree of Difficulty to find workers with the specific skill attributes

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Easy to Find (%)</th>
<th>Neither easy nor difficult (%)</th>
<th>Difficult to find (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethics and Commitment</td>
<td>23.81</td>
<td>33.33</td>
<td>42.86</td>
<td>100</td>
</tr>
<tr>
<td>Computer Skills</td>
<td>33.87</td>
<td>38.71</td>
<td>27.42</td>
<td>100</td>
</tr>
<tr>
<td>Technical Skills</td>
<td>23.81</td>
<td>30.16</td>
<td>46.03</td>
<td>100</td>
</tr>
</tbody>
</table>

*Source: Authors’ computations from World Bank Ethiopia Skills Module (World Bank, 2013)*

#### 3.2.2. On-the-Job Training

About a third of the firms surveyed report providing formal training to permanent workers. About half (47%) of the 68 firms that did not provide formal training mention that they did not require. The rest 24% and 29% cite high cost and unavailability of training programs (trainers) as reasons for not providing training as shown in Figure 7. Among the 102 firms interviewed in the survey, only about 17% had formal contact with TVET institutions. The low level of interaction between firms and TVET institutions can contribute to higher labour market mismatch.

#### 3.2.3. Labour Mobility

Another feature of labour market that is associated with skill mismatch is mobility. In a well-functioning labour market, it is easy for workers to move from one employer to another (either enter or intra sector), which promotes skill matching and productivity (Banerji et al., 2010). But mobility of labour is typically not easy in developing countries due to various problems including
asymmetric information and in flexible labour laws and institutions.

The 2014 UEUS also includes a question on whether those who are currently employed are still working with their first organization/employer and if not, there reasons for changing their work place/employer. 65 per cent of them are still working with their first organization. However, without further information on the spell of employment, it is difficult to conclude whether the Ethiopian labour market is characterised by high or low mobility. Some studies such as Blattman and Dercon, 2016; Abebe et al., 2016 have actually shown high labour turnover especially in the manufacturing sector. Hence the high percentage of workers reporting to be in their first job may indicate that most of them are fresh workers and may not show low mobility.

More than a quarter of individuals (35 per cent) worked in more than one organization and the reasons for leaving their first organization are summarized in Figure 8. The most common reason for changing organization is better salary/wage (40%) followed by end of job or contract (16%) and working environment related reasons (16%) while 9 per cent of them moved to another organization to get better job satisfaction. Only three per cent of them said they changed their organization to work in their profession. This may suggest that skill mismatch is a less important reason for labour mobility. However, this may not reflect the true impact of skill mismatch on labour mobility as it likely to be correlated with the other reasons such as low wage and less satisfaction. Moreover, unless jobs that suit individuals’ skills are available elsewhere one cannot conclude that skills-mismatch is not an issue. In addition, the mere unavailability of more suitable jobs could explain why there is overall low mobility and those who moves did so for other reasons.

Figure 8: Reasons for changing employer

![Reasons for changing employer](source)

Source: Authors’ computations using Ethiopian UEUS 2014

4. Skills mismatch in Ethiopia: Empirical Analysis and Discussion

This section is divided into three parts. The first part focuses on various measures of skills mismatch. The second part analyses the determinants of skills mismatch. Finally, the third part analyses the link between skills mismatch and well-being of employees in terms of wages and satisfaction. As indicated in the introduction, educational qualification is used as a proxy in the current study using the Ethiopian UEUS surveys (2003-2013).
4.1. Measuring Skills Mismatch Indicators in Ethiopia

We analyse the state labour market or skills mismatch using three main approaches, namely variation in employment rates across education/skill levels (relative dispersion of employment rates across education/skill levels), the proportion of unemployed versus employed across skill levels, and an empirical (statistical) measure of mismatch. The first two are macroeconomic measures of labour market mismatch while the third (empirical) measure is at employee (micro) level.

4.1.1. Variation in Employment Rates across Skills (Education) Levels (Dispersion Measure)

This skills mismatch indicator (SMI) is the relative dispersion of employment rates across skill categories. A high level of variation between employment rates of the various skill categories suggests that there is a large gap between the supply of skills and the skills demanded by the economy (European Union, 2015).

We categorise skill (education) levels into six categories. These are no-formal education, elementary level, secondary level, TVET, diploma, and degree levels. Following European Union (2015) we compute the relative dispersion of employment as:

\[
SMI_v = \frac{1}{E_T} \sum_{i=1}^{6} \left| \frac{P_i}{P_T} (E_i - E_T) \right|
\]

Where \( SMI_v \) is the skills mismatch indicator based on employment dispersions, \( E_T \) represents overall employment rate, \( E_i \) refers to employment rates in each skill category in urban areas, \( P_i \) is the number of individuals in the working age population of skill group, \( P_T \) is the total number of working age population in urban areas. Hence, this indicator is the mean of absolute deviation of each group’s employment rate from the national employment rate weighted by population shares of each skill groups (European Union, 2015). Studies that use this approach to study skills mismatch include European Union (2015) for several EU countries, Estevao and Tsounta (2011) for the US, Arpaia el al (2014) for EU members, and Johansen and Gatelli (2012) for Turkey.

The main weakness of this indicator includes inability to address unmet labour demand (vacancies) from employer’s side (European Union, 2015). Moreover, since it is a single index of the overall education mismatch in the economy, it doesn’t identify individuals that are mismatched and matched. However, it is a useful indicator of the overall labour market mismatch in the economy and its evolution over time. It can also be used to conduct cross-country comparison of the level of labour market match/mismatch. Hence, it is a useful complementary to other indicators of mismatch.

Figure 9 provides the evolution of skills mismatch in urban Ethiopia based on the dispersion measure for the period 2003- 2014. It clearly shows a downward trend from 2003 to 2014 indicating that skills mismatch has been declining. Between 2003 and 2014, the level of mismatch measured by the dispersion indicators declined by half. This points to improvement in matching of labour supply by the labour force and labour demand by the economy.
4.1.2. Proportion of unemployed versus employed

The dispersion indicator discussed above shows the state of overall labour market mismatch. It does not indicate mismatch by education categories. The ratio of unemployed people with a particular level of education with that of employed people with the same level of education is one measure of skill-mismatch to determine the state of mismatch by education levels (Johansen and Gatelli, 2010; Bartlett, 2013). The higher the ratio (the more the size of the unemployed relative to those employed), the larger the mismatch for that particular level of education will be. This measure of education mismatch helps to compare the relative extent of mismatch across various educational levels or for a particular level of education over time.

Figure 10 shows the trend in the ratio of unemployed to employed for various levels of education over time (2003 to 2014). The graph shows that there are variations across educational levels and over time. The ratio is the highest for secondary education for the entire period though it decreased over time; it fell from 59 per cent to 29 per cent. This shows that while the mismatch in secondary education improved significantly between 2003 and 2014, it is still the highest relative to other levels of education. ILO (2013) finds similar result for some Latin American countries. The potential reason for this is faster demand for tertiary graduates than secondary school graduates (Filho, 2013). The second highest ratio was observed for those with elementary education in 2003 with 36 per cent; it decreased to 22 per cent in 2014 which is still the second highest. The ratio for those with no formal education was about 26 per cent in 2003 and decreased by half in 2014. The ratio is in general very low for those with diploma and degree. The pattern for TVET graduates (and those with certificates) exhibits higher fluctuation; it was 13 per cent in 2003 and increased to 25 per cent in 2006, which may be due to the increase in TVET graduates. It decreased to about 16 per cent in 2009 and then increased again to 24 per cent in 2012. It is 19 per cent in 2014.

---

4 In the literature it is considered that there is excess supply or surplus (for that particular level of education) if the ratio is greater than one and excess demand (shortage) if the ratio is less than one (Johansen and Gatelli, 2010; Bartlett, 2013).
4.1.3. Empirical (Statistical) Mismatch Indicator

The two mismatch measures discussed above namely the dispersion and the ratio of unemployment to employment indicate the level of the mismatch at macro-level without providing information about which individuals are mismatched or not. In this section, we adopt a mismatch measure at individual (micro) level. This indicator enables to identify those individuals who are matched and those who have jobs that do not match their skill levels. By comparing characteristics of individuals who are matched with those mismatched can shed light on the factors affecting the level of labour market mismatch.

This measure of mismatch is statistical by its nature as it relies on the distribution of the skill (education) of workers in specific occupations. It assumes that the mean or mode level of education in each occupation is representative of the appropriate skill (education) level required by that specific occupation. The workers whose educational qualification measured by years of education is more than or less than one standard deviation from the mean or mode education level are considered mismatched. Those whose qualification is higher than the mean or mode by more than one standard deviation are classified as “over-educated/over-qualified”. The workers whose education level is less than the mean or mode by more than one standard deviation are classified as “under-educated/under-qualified”.  

The assumption that the mean or the mode qualification levels are the matching qualifications levels for the specific occupation may be problematic as in some cases all workers may be mismatched. For example, a specific occupation may require graduate degree, however, in actual terms all workers may only have under-graduate education (Johansen and Gatelli, 2012). Despite this potential weakness this measure has been extensively used in the literature in cases where data on skill-requirements of specific occupations are non-existent (See for example, Verdugo and Verdugo, 1989; McGoldrick and Robst, 1996; Kiker et al., 1997; De Oliveira et al., 2000; Bauer, 2002; Kler, 2005). Moreover, since this measure relies on educational qualification

5 For example, if the mean education level of an occupation category is 8 years of education with standard deviation of 3, then individuals with years of education of more than 11 years are considered over-educated while those with less than 5 years of education are considered under-educated. Individuals with years of education between 5 and 11 are considered matched.
alone not accounting for other skills, the measure may under-estimate mismatch levels. Hence, the level of mismatch we compute using this method should be taken as lower bound of the actual mismatch level existing in the economy. In this study, we use the mean education as a match and greater or less than one standard deviation from the mean as over-education and under-education respectively. We use International Standard Classification of Occupations (ISCO) two-digit minor occupation classification (ILO, 2012).

The results of the empirical mismatch indicators are provided in Figures 11-17. Figure 11 provides the percentage of workers mismatched (the sum of both over and under-educated), over-educated, and under-educated for the period 2003 – 2014. Overall, about a quarter of workers in the Ethiopian urban labour market are mismatched. The proportion of mismatched workers declined from about 26% in 2003 to 21.5% in 2014. While fluctuating, the percentage of over-educated also declined from about 18% in 2003 to 12% in 2014. However, the percentage of under-educated while generally less than the proportion of over-educated has shown the smallest change between 2003 and 2014.

**Figure 11: Skills/Education Mismatch**

![Skills/Education Mismatch Graph](image)

*Source: Authors’ computations using Ethiopian UEUS 2003-2014*

Generally, mismatch due to over-education is more prevalent than under-education (by a factor of two or more in most years) in our data. This is in comport with findings in related studies (For example, McGoldrick and Robs, 1996; Handel et al., 2016). One explanation for the lower prevalence of under-educated could be the higher chance of employment for over-qualified than otherwise (See, for example, Handel et al., 2016). However, it is important to stress that our measure of skills mismatch doesn’t capture the type of skills but rather the years of education. Hence, the current study doesn’t capture skills-mismatch due to type of training required. It is possible that skills-mismatch due to the type and quality of training can be the more prevalent problem as reported in World Bank (2015). Future work that uses a comprehensive measure of skills above and beyond the years of education can provide a more thorough picture of the issue.
Figure 12: Education Mismatch by Gender

Source: Authors’ computations using Ethiopian UEUS 2003-2014

Figure 13: Over-Education Mismatch by Gender

Source: Authors’ computations using Ethiopian UEUS 2003-2014

Figure 14: Under-Education Mismatch by Gender

Source: Authors’ computations using Ethiopian UEUS 2003-2014
Figure 12 reports mismatch by gender. The level of mismatch (over and under-educated combined) between men and women is comparable for the period 2003-2014 except men exhibit slightly higher mismatch in 2009 and 2012. As shown in Figure 13, women are slightly more over-qualified for their jobs than men. However, as Figure 14 reports men are more likely to be under-educated for their jobs than women. This could reflect the difficulty women face to find jobs unless they are matched or over-educated compared to men due to a number of factors such as gender biases and increasing roles in households chores (See, for example, ILO, 2013).

**Figure 15: Education Mismatches by Age Group**

![Education Mismatches by Age Group](image1.png)

*Source: Authors’ computations using Ethiopian UEUS 2003-2014*

**Figure 16: Over-Educated Mismatch by Age Group**

![Over-Educated Mismatch by Age Group](image2.png)

*Source: Authors’ computations using Ethiopian UEUS 2003-2014*
Figure 17: Over-Educated Mismatch by Age Group

Source: Authors’ computations using Ethiopian UEUS 2003-2014

Figure 15 reports mismatch by age group. The youth (aged 15-29) and the rest of individuals have a comparable likelihood to be mismatched except for 2012 when the youth had significantly higher likelihood to be mismatched. On the one hand, the youth are slightly more likely to be over-educated for their jobs as shown in Figure 16. On the other hand, the youth are less likely to be under-educated for their jobs as shown in Figure 17. This could be explained by the fact that younger people are more likely to compensate for their lack of experience by more qualification than their older counterparts. Moreover, since younger people have a higher unemployment rate, they are more likely to take jobs even if they are over-qualified than older more experienced individuals (See, for example, ILO, 2013).

4.2. Determinants of Skills Mismatch in the Ethiopian Labour Market

The supply of and demand for skills in an economy depends on a range of factors such as the level of economic development, technological change, and demographic structure (ILO, 2013). In this section, we analyse the role of the individual (worker), institutional (the type of contract) and industry characteristics (sector of the job) on skills mismatch. The literature on the incidence and determinants of skills mismatch in general and education mismatch, in particular, focuses on developed countries. Recently, there have been some attempts to study the issue in developing country contexts. Examples of studies that find a significant incidence of education mismatch in developing countries include Mehta et al (2011), Sparreboom and Staneva (2015), Handel et al (2016).

This study attempts to shed light on the determinants of skills-mismatch in urban Ethiopia using the 2014 UEUS. We specify a probit model for educational mismatch as:

\[ M_i = \gamma + \boldsymbol{\theta}' \mathbf{X}_i + \epsilon_i \]  

(2)

Where \( M \) represents a measure of educational mismatch (a binary variables whether an individual is overeducated or undereducated), \( \gamma \) is the intercept, \( \mathbf{X} \) is a vector of covariates associated with mismatch based on literature.

We model the determinants of over-education and under-education separately. We measure mismatch using the empirical method defined and discussed in the previous section. An individual is identified as over-educated if their education level is higher than the mean education level in
their occupational group by more than one stand deviation. Conversely, an individual is categorised as under-educated if their education level is lower than the mean education level of their occupational group by more than one stand deviation.

We estimate model (2) by maximum likelihood. The marginal effects of the results of a probit regression of the probability of being over and under-employed are reported in Table 5. Columns 1 and 2 report correlates of over-education while columns 3 and 4 show correlates of under-education. In column 1 the over-educated are compared to everyone else (those matched and under-educated). In column 2 the over-educated are compared to those matched. Similarly, in column 3 the under-educated are compared to everyone else (those matched and over-educated). In column 4 the under-educated are compared to those matched. The results of columns 1 and 2 are qualitatively similar. In the same way, the results of columns 3 and 4 remain qualitatively similar.

The likelihood of Over-qualification increases with age up to a point and then declines suggesting individuals are more likely to get suitable jobs at a later stage of their career. Sparreboom and Staneva (2015) find a similar result for Mozambique. Women are found to be less likely to be under-qualified consistent with the descriptive result presented above; given that the women face a higher incidence of unemployment, this could indicate the narrower opportunities for employment in urban Ethiopia.

Compared to those never married, those who are married, divorced, widowed, and separated are less likely to be over-qualified and more likely to be under-qualified. This could indicate that those who are never married may be investing in their human capital and eventually ending up being over-qualified compared to their married, divorced, and widowed counterparts.

In comparison with government civil servants, those who work for government development organizations are more likely to be over-qualified. On the other hand, workers in the private sector and NGOs are more likely to be under-qualified. This could indicate the private and NGO sector giving more attention to other skill sets acquired through experience while the government civil service mainly relies on educational qualification as a signal for performance. As expected compared to permanent full-time workers, temporary and casual workers are less likely to be over-qualified. Our analysis does not detect a significant difference in the level of educational mismatch by sector.
Table 5: Determinants of Education Mismatch: Marginal Effects from Probit Regressions

<table>
<thead>
<tr>
<th>Reference group</th>
<th>Over-Educated Compared to Everyone else (1)</th>
<th>Over-Educated Compared to Everyone else (3)</th>
<th>Under-Educated Compared to Everyone else (2)</th>
<th>Under-Educated Compared to Everyone else (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dep. Variable</td>
<td>Age</td>
<td>Age Square</td>
<td>Female</td>
<td>Marital Status</td>
</tr>
<tr>
<td></td>
<td>0.006***</td>
<td>0.007***</td>
<td>0.0090</td>
<td>Married</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.048***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.083***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.077***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.064**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>live together</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.0490</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Government-Dev't Org</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.033*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Private Org.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.0060</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0350</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Others</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0350</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other Specify</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.0190</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not Stated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.0250</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sector</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Manufacturing, Mining, Construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.0230</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Whole sale and Retail Trade</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0230</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Services</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.0010</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Other services</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.0150</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Observations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13356</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11987</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13338</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11561</td>
</tr>
</tbody>
</table>

***, **, * ==> Significance at 1%, 5%, 10% level

Source: Authors’ computations using the Ethiopian UEUS of 2014

In summary, our analysis reveals that individual and institutional factor affect educational mismatch in the urban labour market in Ethiopia.
4.3. Skills Mismatch and Well-being

At the aggregate level, the extent to which skills supply and demand are matched is a major factor shaping economic growth, productivity, and competitiveness (ILO, 2013). At micro level skill, match/mismatch affects labour market outcomes such as workers well being measured by wages, job mobility, and satisfaction (see for example Van der Velden and Velden, 2001). Moreover, labour market mismatches can adversely affect firms (see, for example, Benfield, 2010).

We focus on the impact of skills mismatch on job satisfaction and wages. We formulate similar specifications to model job satisfaction and wages as:

\[ Y_i = \alpha + \beta' X_i + \eta M_i + \varepsilon_i \]  

(3)

Where \( \alpha \) is an intercept term, \( Y \) is the dependent variables (job satisfaction or log of wage), \( X \) is a vector of covariates that affect job satisfaction or wages. \( \eta \) captures the effect of the variable of interest, i.e., educational mismatch on job satisfaction or wages. \( \beta \) captures the effect of other covariates that potentially affect job satisfaction and/or wages. For job satisfaction we adopt a probit model estimated by maximum likelihood estimator. For the wage equation we rely on Mincerian type earning model estimated by OLS. The results are provided in Tables 6 and 7.

4.3.1. Skills Mismatch and Job Satisfaction

Job satisfaction is an important dimension of well-being. Several studies have investigated the determinants of job satisfaction. Notable examples include Clark (1996), Clark and Oswald (1996), Blanchflower and Oswald (1999), Argyle (2013) among others.

Several studies in developed country contexts have found an adverse impact of skills mismatch on jobs satisfaction. Examples include Johnson and Johnson (2000), Allen and Van der Velden (2001), Belfield and Harris (2002), Vieira (2005), Korpi and Tahlin (2009), and McGuinnes and Sloane (2011).

The estimated results for the job satisfaction model are reported in Table 6. In the first column, we exclude wages while in the second column we exclude education. In the third column, we include all control variables. In all specification, overeducated individuals are significantly less satisfied than individuals with matching jobs.

Wages is positively and significantly associated satisfaction. Excluding wages, education level is associated with job satisfaction. However, including wages in the model washes away the significance of education implying that in our data the role of education on job satisfaction is mediated through income.

Additional factors associated with job satisfaction are marital status, type of jobs, and sector of jobs.
### Table 6: Probit regressions: Satisfaction and Mismatch

<table>
<thead>
<tr>
<th>Dep. Variable</th>
<th>Job Satisfaction (1)</th>
<th>Job Satisfaction (2)</th>
<th>Job Satisfaction (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overeducated</td>
<td>-0.192***</td>
<td>-0.090***</td>
<td>-0.088**</td>
</tr>
<tr>
<td>Undereducated</td>
<td>0.174***</td>
<td>0.041</td>
<td>0.044</td>
</tr>
<tr>
<td>LWAGE</td>
<td></td>
<td>0.378***</td>
<td>0.388***</td>
</tr>
<tr>
<td>Age</td>
<td>0.004***</td>
<td>0.002</td>
<td>0.001</td>
</tr>
<tr>
<td>Female</td>
<td>-0.108***</td>
<td>0.019</td>
<td>0.018</td>
</tr>
<tr>
<td><strong>Marital Status</strong> [Reference: Never Married]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>0.009</td>
<td>-0.049*</td>
<td>-0.053*</td>
</tr>
<tr>
<td>Divorced</td>
<td>-0.119**</td>
<td>-0.147**</td>
<td>-0.152**</td>
</tr>
<tr>
<td>Widowed</td>
<td>-0.047</td>
<td>-0.087</td>
<td>-0.094</td>
</tr>
<tr>
<td>Separated</td>
<td>-0.074</td>
<td>-0.123</td>
<td>-0.123</td>
</tr>
<tr>
<td>Live together</td>
<td>-0.193</td>
<td>-0.236*</td>
<td>-0.236*</td>
</tr>
<tr>
<td>Not stated</td>
<td>-4.998</td>
<td>-4.930</td>
<td>-4.940</td>
</tr>
<tr>
<td><strong>Employment Type</strong> [Reference: Government]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government-Development Org</td>
<td>0.113**</td>
<td>0.133***</td>
<td>0.137***</td>
</tr>
<tr>
<td>Private Org.</td>
<td>-0.121***</td>
<td>-0.062</td>
<td>-0.070*</td>
</tr>
<tr>
<td>NGOs</td>
<td>0.426***</td>
<td>0.341***</td>
<td>0.334***</td>
</tr>
<tr>
<td>Others</td>
<td>0.125***</td>
<td>0.281***</td>
<td>0.271***</td>
</tr>
<tr>
<td><strong>Sector</strong> [Reference Agriculture and Related]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing mining and construction</td>
<td>0.121*</td>
<td>0.024</td>
<td>0.022</td>
</tr>
<tr>
<td>Whole sale and retail trade</td>
<td>0.097</td>
<td>0.091</td>
<td>0.090</td>
</tr>
<tr>
<td>Services</td>
<td>0.212***</td>
<td>0.173**</td>
<td>0.173**</td>
</tr>
<tr>
<td>Other services</td>
<td>0.111</td>
<td>0.125</td>
<td>0.133*</td>
</tr>
<tr>
<td><strong>Education</strong> [Reference: No Formal Education]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary Education</td>
<td>0.234**</td>
<td></td>
<td>0.051</td>
</tr>
<tr>
<td>Secondary Education</td>
<td>0.396***</td>
<td></td>
<td>0.065</td>
</tr>
<tr>
<td>TVET and Certificate</td>
<td>0.513***</td>
<td></td>
<td>0.007</td>
</tr>
<tr>
<td>Diploma</td>
<td>0.786***</td>
<td></td>
<td>0.200</td>
</tr>
<tr>
<td>Degree and above</td>
<td>0.735***</td>
<td></td>
<td>-0.009</td>
</tr>
<tr>
<td>cut1</td>
<td>0.282**</td>
<td>2.459***</td>
<td>2.552***</td>
</tr>
<tr>
<td>Observations</td>
<td>13359</td>
<td>13359</td>
<td>13359</td>
</tr>
</tbody>
</table>

***, **, * ==> Significance at 1%, 5%, 10% level

Source: Authors’ computations using the Ethiopian UEUS of 2014

### 4.3.2. Skills Mismatch and Wages

The impact of labour market mismatch on wages and salaries has been extensively studied for developed countries. The negative consequence of skills mismatch on earnings has become an empirical regularity. The return to each additional over-education is substantially lower than the return to additional years of schooling to the well-matched. Overall, a dummy variable for over-
education is found to have a significant negative sign implying that the over-educated earn less for their level of education. Examples of studies that find the negative impact of mismatch on earning include Dolton and Vignoles (2000); Allen and Van der Velden (2001); Chevalier (2003); Rubb (2003); Korpi and Tåhlin (2009); Benfield (2010); Nordin et al (2010); McGuinness and Sloane (2011); Irondo and Pérez-Amaral (2016) among others.

In this section we analysis the impact of educational mismatch on wages controlling for other covariates that affect earning.

Table 7 reports the results of a Mincerian type wage regression. Our focus is the role of over-education and under-education on wages. Column 1 is a simple Mincerian wage model that involves age as a proxy for experience and education as explanatory variables. In the second column, in addition to the variables in column 1, we include marital status, type of job, and sector. In the third column, we include dummy variables for over-education and under-education in addition to all the covariates in column 2.

All specifications show a concave relationship between age and earning. This could indicate that up to a point experience brings more and more income, but eventually the return to additional year of experience declines. This is in line with Iriondo and Pérez-Amaral's (2016) finding about the adverse impact of depreciation in human capital. Education has a robust positive effect on earnings. Married individuals earn more than those never married. Government employees in the civil service earn more than those working in government – development organizations and the private sector, but earn significantly less than those who work for NGOs. Employees in the manufacturing and service sector earn more than those in agriculture and related sectors.

As reported in column 3 of Table 7, on the one hand, controlling for potential covariates including education, age, and institutional factors, on average over-educated individuals earn less than those well matched. This is in line with most previous studies that find penalty for over-education discussed above. On the other hand, under-educated employees earn more than those well-matched for their level of education.
Table 7: OLS regressions: Wage andMismatch

<table>
<thead>
<tr>
<th>Dep. Variable</th>
<th>LWAGE (1)</th>
<th>LWAGE (2)</th>
<th>LWAGE (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.094***</td>
<td>0.064***</td>
<td>0.060***</td>
</tr>
<tr>
<td>Age_Square</td>
<td>-0.001***</td>
<td>-0.001***</td>
<td>-0.001***</td>
</tr>
<tr>
<td>Education [Reference: No Formal Education]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary Education</td>
<td>0.139**</td>
<td>0.121**</td>
<td>0.387***</td>
</tr>
<tr>
<td>Secondary Education</td>
<td>0.526***</td>
<td>0.425***</td>
<td>0.740***</td>
</tr>
<tr>
<td>TVET and Certificate</td>
<td>0.864***</td>
<td>0.802***</td>
<td>1.184***</td>
</tr>
<tr>
<td>Diploma</td>
<td>0.962***</td>
<td>0.930***</td>
<td>1.399***</td>
</tr>
<tr>
<td>Degree and above</td>
<td>1.487***</td>
<td>1.356***</td>
<td>1.798***</td>
</tr>
<tr>
<td>Female</td>
<td>-0.322***</td>
<td>-0.312***</td>
<td></td>
</tr>
<tr>
<td>Marital Status [Reference: Never Married]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>0.093***</td>
<td>0.090***</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>-0.014</td>
<td>-0.009</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>0.016</td>
<td>0.032</td>
<td></td>
</tr>
<tr>
<td>Separated</td>
<td>0.039</td>
<td>0.039</td>
<td></td>
</tr>
<tr>
<td>live together</td>
<td>0.015</td>
<td>0.046</td>
<td></td>
</tr>
<tr>
<td>Not stated</td>
<td>-0.259***</td>
<td>-0.215*</td>
<td></td>
</tr>
<tr>
<td>Employment Type [Reference: Government]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government-Development Org</td>
<td>-0.042**</td>
<td>-0.037*</td>
<td></td>
</tr>
<tr>
<td>Private Org.</td>
<td>-0.129***</td>
<td>-0.097***</td>
<td></td>
</tr>
<tr>
<td>NGOs</td>
<td>0.309***</td>
<td>0.323***</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>-0.368***</td>
<td>-0.287***</td>
<td></td>
</tr>
<tr>
<td>Sector [Reference Agriculture and Related]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing mining and construction</td>
<td>0.249***</td>
<td>0.249***</td>
<td></td>
</tr>
<tr>
<td>Whole sale and retail trade</td>
<td>0.011</td>
<td>0.015</td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td>0.135***</td>
<td>0.109***</td>
<td></td>
</tr>
<tr>
<td>Other services</td>
<td>-0.019</td>
<td>-0.050</td>
<td></td>
</tr>
<tr>
<td>Mismatch [Reference: Matched]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undereducated</td>
<td></td>
<td>0.328***</td>
<td></td>
</tr>
<tr>
<td>Overeducated</td>
<td></td>
<td>-0.260***</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>4.563***</td>
<td>5.341***</td>
<td>5.071***</td>
</tr>
<tr>
<td>Observations</td>
<td>13377</td>
<td>13359</td>
<td>13359</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.457</td>
<td>0.531</td>
<td>0.550</td>
</tr>
</tbody>
</table>

***, **, * ==> Significance at 1%, 5%, 10% level
Source: Authors’ computations using the Ethiopian UEUS of 2014
5. Conclusions and Policy Implications

The study has analysed the incidence of labour market mismatch, identified the correlates of skills mismatch that shed light on the causes of the problem, and investigated its consequences on well-being. It is the first attempt to formally study skills mismatch in the urban labour market in Ethiopia. Using several indicators of qualification mismatch, we find that about a quarter of employees are mismatched with over-qualification being the more prevalent problem.

Our study use qualification mismatch as a proxy for skills mismatches due to data limitation. Such a measure not only disregards specific skills required by jobs, but also the type of education required as it merely depends on the number of years of education. Therefore, the extent of mismatch that our results convey should be taken as lower bound estimates.

In comport with findings for developed countries, our analysis reveals that overqualified workers report lower job satisfaction compared to the well-matched. As expected in welfare metrics typically, wage is a significant determinant of job satisfaction. We also find a difference in job satisfaction by sector and type of employment. Significant predictors of wage include age as a proxy for experience, education level, sector and type of employment. While education is positively and significantly associated with the wages, overeducated workers earn less than those well-matched for their level of education. This indicates a wage penalty associated with over-qualification even in a developing country context.

Our study highlights that labour market mismatch is not only a phenomenon of the developed world but also the developing countries. This implies a wage penalty associated with over-qualification even in a developing country context. Hence, skills mismatch needs to be a key aspect of labour market policy making along with issues of decent and productive work.

To aid proper analysis of skills mismatch, it is important to collect and consolidate data on the skill needs of the economy. There is a critical shortage of data on the types and levels of skills the economy requires. Hence, to guide education and training policies of the country, a timely data on skills needs of the economy by conducting surveys on firms focusing on their skill needs, vacancy rates, and the rate of filling of vacancies is necessary. There is no such data in the country except the one conducted by the World Bank on a few firms in 2013, which is not detailed.

Data on the available labour supply can be obtained from the national labour force and urban employment-unemployment surveys. While the collection of urban employment-unemployment survey is reasonably frequent, the national labour force of Ethiopia is conducted roughly every five years. Hence, to conduct timely studies on labour market mismatch at the national level, it is desirable that the labour force surveys be conducted more frequently.

As mentioned above, owing to data limitation our analysis focused on qualification mismatch. Future studies can complement this by studying more specific measures of skills if the national statistical agency or others start collecting data on skill requirements of firms in the spirit of World Bank’s ‘Skills Toward Employment and Productivity (STEP) Skills Survey’ that has been conducted in selected countries (see for example Handel et al., 2016 for analysis of skills mismatch using the STEP data). Such datasets can provide a more accurate measure of labour market mismatch in the country. They can also help explain whether labour market mismatches in the country emanate from surplus/shortage of skills or weak labour market information system reflected in high search cost (see for example Abebe et al., 2016).

Moreover, the urban employment-unemployment surveys and the national labour force surveys can be enriched by adding modules on the subjective evaluation of whether workers skills fit their jobs or not. Such data can complement related surveys on skill requirements of firms.
6. References


Sparreboom, T., & Staneva, A. (2015). *Structural change, employment and education in*


