ERF Working Papers Series

Education-Occupation Mismatch among Vocational Secondary and University Graduates in Egypt

Rania Roushdy and Nouran ElKhouly

ECONOMIC RESEARCH FORUM
منتدى البحوث الاقتصادية

Working Paper No. 1757
November 2024

EDUCATION-OCCUPATION MISMATCH AMONG VOCATIONAL SECONDARY AND UNIVERSITY GRADUATES IN EGYPT

Rania Roushdy and Nouran ElKhouly[1]

Working Paper No. 1757

November 2024

We acknowledge the financial support of the International Labour Organization through the Government of the Netherlands and the Swedish International Development Cooperation Agency, the World Bank Poverty and Equity Global Practice supported by the UK-funded Strategic Partnership for Egypt's Inclusive Growth trust fund (SPEIG TF), and World Bank MENA Chief Economist office, Agence Française de Développement (AFD), Ministry of Planning, Economic Development and International Cooperation, Egypt, and UNICEF for the Egypt Labor Market Panel Survey 2023, on which this paper is based.

Send correspondence to:
Rania Roushdy
The Department of Economics, The American University in Cairo
rania.roushdy@aucegypt.edu

[1] The Department of Economics, The American University in Cairo

First published in 2024 by
The Economic Research Forum (ERF)
21 Al-Sad Al-Aaly Street
Dokki, Giza
Egypt
www.erf.org.eg

Abstract

There is a vast literature on conceptually formulating education-occupation mismatch and on measuring over- and under-education as compared to the job skills required. Fewer studies are focused on identifying the correlates and consequences of such a mismatch, particularly in the developing world. Accordingly, the main objective of this paper is to contribute to the limited literature on education-occupation mismatch in Egypt and compare the extent of the mismatch using two different approaches: (1) the self-reported and (2) the statistical/realized match approaches. Using data from the Egypt Labor Market Panel Survey 2023, this paper sheds light on the nature of the education-occupation mismatch phenomena in the Egyptian labor market. The paper compares the characteristics of the overeducated, undereducated, and well-matched workers, wage penalties for over- or under-education, and their sense of job satisfaction. Analyses are focused on vocational secondary and university education graduates as these are the two terminal educational tracks in Egypt.

The results show that undereducation is not prevalent in the Egyptian labor market, while overeducation is very common among both vocational secondary and university graduates. Job satisfaction was least prevalent among the overeducated. As compared to the well-matched group, overeducation was generally associated with a wage penalty, but undereducation was associated with a wage premium among vocational secondary graduates and with a wage penalty among university graduates. Mismatch was also associated with skills acquisition and job-skill requirements. The results of the skills analysis confirm the previous literature highlighting the importance of acquiring skills over credentials to effectively address the existing education-occupation mismatch in the Egyptian labor market.

Keywords: Education-Occupation Mismatch, Skills, Egyptian labor market, Wages, Employability, Job Satisfaction.
JEL Classifications: E24, J10, I23, I26, O12, O15.

ملخص

تعددت الأدبيات حول الصياغة المفاهيمية لعدم التوافق بين التعليم والمهنة وقياس الإفراط في التعليم ونقص التعليم مقارنة بالمهارات الوظيفية المطلوبة. ويركز عدد أقل من الدراسات على تحديد الروابط والعواقب المترتبة على عدم التطابق هذا، لا سيما في العالم النامي. وبناء على ذلك، يتمثل الهدف الرئيسي لهذه الورقة في المساهمة في المؤلفات المحدودة عن عدم التوافق بين التعليم والمهنة في مصر ومقارنة مدى عدم التطابق باستخدام نهجين مختلفين: (1) نهج التبليغ الذاتي و (2) نهج التطابق الإحصائي/المنجز. باستخدام بيانات من المسح التتبعي لسوق العمل في مصر 2023، تسلط هذه الورقة الضوء على طبيعة ظواهر عدم التوافق بين التعليم والمهنة في سوق العمل المصري. تقارن الورقة خصائص المشتغلين المتعلمين بشكل مفرط وغير المتعلمين والمتطابقين جيدًا، وعقوبات الأجور على التعليم الزائد أو الناقص، وشعورهم بالرضا الوظيفي. تركز التحليلات على خريجي التعليم الثانوي المهني والجامعي حيث أن هذين هما المسارين التعليميين النهائيين في مصر.

تظهر النتائج أن نقص التعليم ليس منتشرًا في سوق العمل المصري، في حين أن التعليم المفرط شائع جدًا بين خريجي التعليم الثانوي المهني والجامعي. ويظهر أن الرضا الوظيفي أقل انتشارًا بين المتعلمين بشكل مفرط. بالمقارنة مع المجموعة المطابقة جيدًا، كان التعليم المفرط مرتبطًا بشكل عام بعقوبة الأجور، لكن قلة التعليم تكون مرتبطة بعلاوة أجر بين خريجي المرحلة الثانوية المهنية وعقوبة الأجور بين خريجي الجامعات. ارتبط عدم التطابق أيضًا باكتساب المهارات ومتطلبات المهارات الوظيفية. تؤكد نتائج تحليل المهارات ما تم مناقشته في الأدبيات السابقة والتي سلطت الضوء على أهمية اكتساب المهارات بدلا من الاعتماد على الشهادات لمعالجة عدم التوافق القائم بين التعليم والمهنة في سوق العمل المصري بشكل فعال.

1. Introduction

Education-occupation mismatch is a global issue where there is a substantial disparity between workers' educational levels and the educational requirements of their occupations. A broad definition of an education-occupation mismatch is workers having higher or lower qualifications than required for the job (OECD, 2017). More than 935 million employees across 114 countries are mismatched, 72 percent of whom are overeducated and 28 percent are undereducated (ILO, 2020).

This mismatch is an imperative issue in economic development discussions, particularly concerning youth due to increasing global competition and rapid technological shifts. The mismatch leads to economic and social costs, including wage disparities and reduced job satisfaction, which could lead to lower productivity, higher resignation rates, and unemployment (McGuinness et al., 2018; Haorei, 2012; Mont, 2015; Clark, et al., 2014). On the macro level, a low-skill equilibrium can trap low- and middle-income countries, leading to inefficient human resource allocation. While human capital development is generally beneficial, investing in education without corresponding to labor market demand can hinder productivity and economic growth (Adely et al., 2021).

This paper emphasizes the importance of addressing the education-occupation mismatch phenomena, to improve the synchronization between education and labor market needs. It examines the incidence and consequences of the education-occupation mismatch in Egypt, using data from the 2023 Egypt Labor Market Panel Survey (ELMPS). The primary aim of the paper is to shed light on the nature and evolution of the education-occupation mismatch phenomena in the Egyptian labor market, as well as compare the characteristics of the overeducated, undereducated, and well-matched workers, their skills, wage penalty, and their sense of job satisfaction. The analysis focuses on vocational secondary and university education graduates. We focus on these two education levels specifically because they are the two primary terminal educational degrees in Egypt, and they remain among the most predominant educational degrees.[2]Analyses use two different measures: (1) the subjective self-reported approach and (2) the statistical/realized matching method (RM).

Following this introduction, the paper proceeds as follows; Section 2 provides a brief conceptual framework and discusses the relevant theoretical and empirical literature. Section 3 explains the data and methods. Section 4 discusses the empirical findings, and Section 5 concludes and provides policy recommendations.

[2]The above intermediate level (two-year higher education following the three years of secondary education) is also another terminal degree, but not as common as vocational secondary and university education. In this paper, university education includes also any four-year higher institutes following the three years of secondary education. For the details of the education system in Egypt see Krafft et al. (2019).

2. Theoretical and empirical considerations

2.1. The mismatch phenomena

Education-occupation mismatch has been explained through various theories, starting with the human capital theory which was first coined in the 1960s highlighting the importance of aligning education with labor market needs (Becker, 1964). However, Duncan and Hoffman (1981) were the first to distinguish between an individual's achieved level of education and the educational requirements of their job. They developed approaches to measure over- and under-education, analyzing how mismatches impact wages and skills.

Afterwards, many studies examined the education-occupation mismatch phenomena, showing that numerous factors collectively influence the alignment between individuals' educational attainment and the skills demanded by their occupations. These factors can be categorized broadly as follows: demographic factors such as sex, marital status, and geographic residency; socioeconomic indicators encompassing individual and parental social characteristics; educational variables including program type and quality, educational progression factors like repeating a school year; and labor market dynamics such as economic activity and firm size (see Leuven & Oosterbeek, 2011; Tanrayen-Ragoobur, 2020; Diem & Wolter, 2014; Lu, 2017; Caroleo & Pastore, 2015; Aina & Pastore, 2012).

2.2. Measurement of the education-occupation mismatch

There are two main classifications of education-occupation mismatch: vertical mismatch (misalignment of education level) and horizontal mismatch (misalignment of educational field) (McGuinness et al., 2018). This paper focuses on the vertical education-occupation mismatch. Measuring this vertical mismatch is complex and varies across studies depending on data availability and context. It can be measured by using either objective or subjective approaches, or a hybrid of both approaches.

There are also two types of objective measurement of the education-occupation mismatch, the normative job analysis method (JA) and the statistical/realized matching method (RM) (Flisi et al., 2017). The JA uses a professional evaluation of job requirements imposing an unrealistic assumption of homogeneity of education requirements for an occupation. However, it is considered a favorable approach assuming the continuous updating of the job requirements (Hartog, 2000; Verhaest & Omey, 2006; Leuven E. & Oosterbeek, 2011). While the RM approach compares educational attainment within the same job by benchmarking against either the mean or modal level of education (McGuinness et al., 2018). Hence, it allows only one educational level to be well-matched with each job, which might not reflect reality (Verdugo & Verdugo, 1989; Bauer, 2002; Mendes de Oliveira et al., 2000).

On the other hand, subjective approaches include direct and indirect self-assessment, where workers report their perceptions of the education requirements for their job. Subjective

methods are easier to observe but may be biased. Biases could arise because individuals might exaggerate their social status to improve their socioeconomic standing. Also, with adynamic market, laborers might not be well informed about the new requirements of the job.

2.3. Earnings, job satisfaction and the education-occupation mismatch

Mismatch, especially over-education, is often associated with a wage penalty, reduced job satisfaction, and lower productivity. The job competition model argues that wages are determined by the requirements of the job rather than the worker's education; hence, overeducation raises the potential competitiveness of the individual but not necessarily his/her wage rate (Duncan & Hoffman, 1981; McGuinness & Bennett, 2007). This suggests that an extra year of schooling beyond those required for a job may not always be rewarded. Several studies also found that an extra year of over- or under-education causes wage penalties in different country settings (El-Hamidi, 2009; Leuven & Oosterbeek, 2011, Diem & Wolter, 2014; Clark et al., 2014).

Job satisfaction is a subjective matter and is highly heterogeneous due to expectation differentials among workers with different socioeconomic characteristics. Satisfaction is often lower among mismatched workers due to unmet expectations and limited career progression opportunities. Studies indicate that overeducation negatively affects job satisfaction more than undereducation (Pita and Torregrosa, 2021;Verhofstadt et al., 2007). Nevertheless, some studies suggest that overeducation may increase job satisfaction if it allows for better work-life balance (Chevalier, 2003; Verhaest & Omey, 2006).

2.4. Skills and the education-occupation mismatch

Several studies considered the relationship between skills and education concluding that both phenomena are related but are not interchangeable depending on the different approaches and the statistical methods used (Allen & Van der Velden, 2001;ILO, 2018). Allen and van der Velden (2001) and Green and McIntosh (2007) argue that a skill mismatch does not necessarily indicate an education-occupation mismatch.

The lack of required skills impedes economic growth and productivity, as well as increases production costs for businesses when paying for job training (Almeida & Aterido, 2011). High unemployment rates among recent university graduates are attributed to the oversupply of jobs that mandate skills and a lack of these required skills (Dimova & Stephan, 2020; Chester & Baffour, 2015). As a result, youth resort to self-employment or informal jobs (Dimova & Stephan, 2020; Amer, 2015). Synchronizing the skills of students with labor market needs enhances the likelihood of a successful transition from school to the labor market (Dimova & Stephan, 2020; Manacorda et al., 2017).

3. Data and methods

The data used in this study is from the 2023 Egypt Labor Market Panel Survey (ELMPS).[3] The ELMPS is a nation-wide survey conducted by the Economic Research Forum (ERF) in partnership with the Central Agency for Public Mobilization and Statistics (CAPMAS). The first wave of the ELMPS was conducted in 1998, then 4 follow-up waves were carried out in 2006, 2012, 2018, and the most recent one in 2023. The ELMPS provides very rich information on individuals and households demographic characteristics and labor market dynamics.[4]

The data used in this paper is from the most recent wave, 2023 which covers 70,636 individuals (35,030 men and 35,606 women). The analysis of this paper, however, focuses on 7,596 individuals who were aged 15-64 (the working age population), were working for a wage (during the three months preceding the survey interview), and had either vocational secondary education (4,499 individuals; 4,013 men and 486 women), or a university degree and above (3,097 individuals; 2,169 men and 928 women).

In this paper, the main variables of interest included in the data are the highest level of education attained, the self-reported education level required by the job based on the question "What is the highest level of education required for your current job?," the hourly wage, and job satisfaction. Information regarding job satisfaction is based on the individual's response to the question "Are you satisfied with your current job?" with responses of either "rather satisfied, fully satisfied, neither satisfied nor dissatisfied, rather dissatisfied and fully dissatisfied." There is also a battery of questions asking about satisfaction regarding various aspects of one's job, with the same five categories of responses. Those aspects include job security, earnings, workplace, working hours, working schedule, working conditions, location/commuting, and matching with one's qualifications.

Moreover, ELMPS 2023 includes two large modules providing information on the individual's own acquired skills, as well as on the skills required for his/her job. The list of skills included core academic skills, technical, and soft skills (see Appendix A for the full list). The acquired skills questions ask: "To what extent do you have the following skills?," with responses of either: "not at all, very weak, weak, strong and very strong." The skills required by the job questions ask: "Does your job require any of the following specific abilities?," with responses of "yes, no and do not know."

In this study, our methodological approach entails a descriptive comparison between the subjective, indirect self-assessment, and objective, statistical, approaches to measure the vertical education-occupation mismatch. The subjective approach follows Duncan and Hoffman (1981), who developed the over-education, required education, under-education

[3] The ELMPS 2023 data is expected to be publicly available through the ERF's Open Access Microdata Initiative (OAMDI) by October 2024. For previous waves of the ELMPS, see http://www.erfdataportal.com/index.php/catalog/LMPS.

[4] For detailed information on the ELMPS, see Assaad and Krafft (forthcoming).

(ORU) Model. We developed a self-reported mismatch status variable by comparing each employed graduate's attained education level to the self-reported required level for his/her job and grouping them depending on the identified shortage or surplus in education level. Individuals with more education than that required for their job are referred to as "overeducated" (O), the same level of education is referred to as "well-matched" (M), and those with less education than the required level are referred to as "undereducated" (U).

On the other hand, in the objective statistical approach, we used the mode of education method to develop a proxy for the required education (see ILO 2021; Flisi et al., 2017 for a similar approach). The mode of education attained for the job was computed by generating the most common educational level in each three-digit ISCO group by individuals' graduation decade.[5] We then compare each individual's educational attainment with the mode level of education of their occupation-graduation group. Depending on how their degree of education compares to the occupation-graduation mode for their line of work, each person is assigned one of the above three statuses: O, M, or U (ILO, 2021). We created two different mode variables: the first using the categories of education level and the second using years of schooling.[6]

Hence, we ended up with three sets of dummy variables—for over-education, well-matched, and under-education— using each of the three mismatch approaches: two sets using each of the two mode variables (level vs. years), while the third set using the self-reported approach. Moreover, following Verdugo and Verdugo (1989), we created a large list of dummy variables for being "satisfied" if the individual reported being "fully satisfied" with his job overall, and with each of the job aspects included in the questionnaire. Also, the acquired skills are transformed into a set of dummies if the individual reported having a strong or a very strong level of each skill questioned. Finally, the required skills for a job are transformed into a set of dummies if the individual reports "yes" if the job requires the questioned skill.

The analysis of this paper also employs several background characteristics, including years of work experience, sex, geographical location (divided into the main six regions of Egypt), marital status, fathers' education, household's wealth quintile, and the occupation, economic activity, sector, and firm size of the current job. We divided the marital status into two categories; ever married including those who are divorced, or widowed, and those who were never married (including those who have been contractually married).

[5]If more than one mode exists for any group, the smallest value was the one used. It is important to highlight that, as expected, the sample of graduates in some of the three-digit occupation groups by graduation decade were very small. On such occasions, we used the two- or one-digit ISCO classification instead of the three-digits when calculating the mode of education. More specifically, if the number of graduates within a three-digit ISCO occupation/graduation decade group was less than 10 individuals, the two-digit occupation/graduation group was used instead if it encompasses 10 or more individuals; otherwise, the one-digit occupation/graduation group was used.

[6] The mean years of schooling, and its one-standard deviation from the graduates' years of schooling, were also computed and compared with the mode variable. Both the mean and the mode years of education methods provided quite similar results. Hence, for simplicity in the results section, we focus on the mode method results.

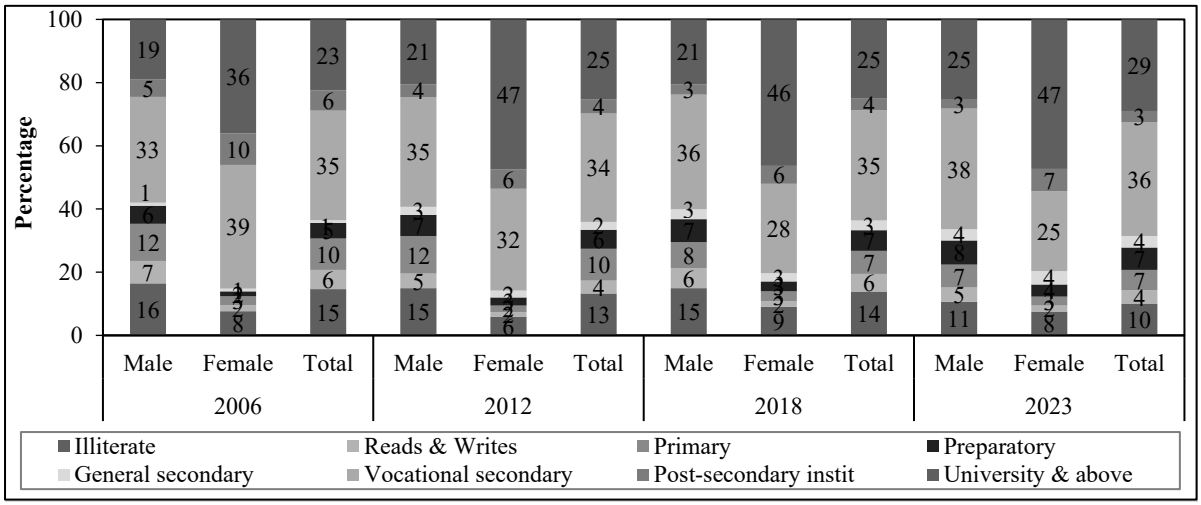
We generated a new variable for economic activity, combining the economic activity that consisted of eighteen different categories into three main categories: agriculture, industry and construction, and services and others. Additionally, we classified the employment sector based on the sector of employment and formality status into three categories: the government or public sector workers, working formally[7] in the private sector (including private, international, investment, and other sectors), and working informally in the private sector. Regarding the firm's size, we grouped it into four 4categories: outside of the establishment, small (1-9 workers), medium (10-49 workers), and large firms (50+ workers).[8]

4. Results

4.1. Educational attainment

Figure 1 shows the distribution of educational attainment among the employed working-age population (15-64) during the period 2006-2023. As the figure shows, vocational secondary education was the most common attainment compared to other educational levels in Egypt throughout the past two decades, with only a slight increase from 35 percent in 2006 to 36 percent in 2023. In contrast, university attainment was less than a quarter of the employed working-age population in 2006, but has increased by more than six percentage points from almost 23 percent in 2006 to 29 percent in 2023. Women who are employed are particularly likely to be highly educated. About 47 percent of women have university education in 2023, as compared to about a quarter (25 percent) among men.

Figure 1. Education attainment by sex and wave, employed individuals ages 15-64, (2006-2023) (percentage)



Source: Authors' compilation based on ELMPS 2006-2023

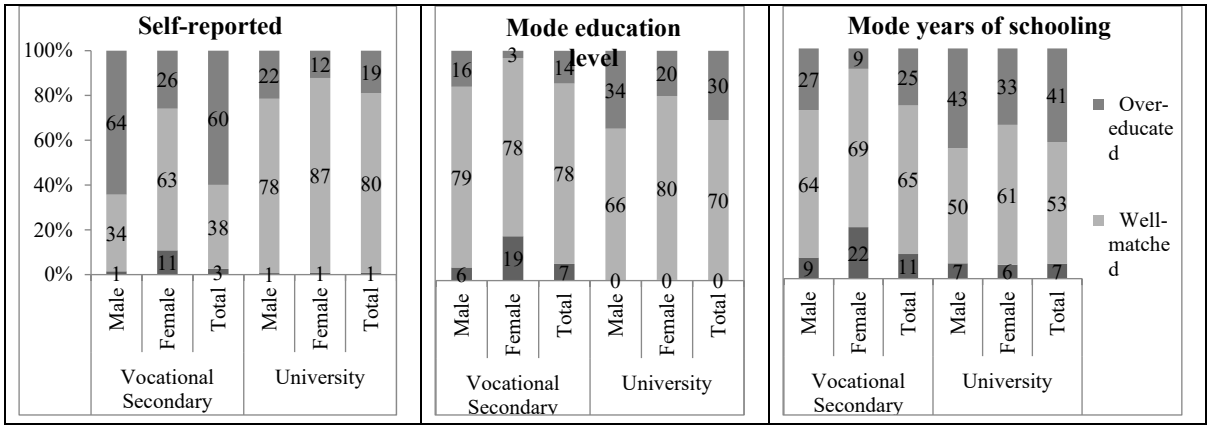
[7] Formality is defined as having social insurance associated with their job.

[8] The classification is based on the ILO (2019) classification of business size of enterprises.

4.2. Education-occupation mismatch

Figure 2 shows the prevalence of overeducation, well-matched, and undereducation among vocational and university graduates. The figure shows that the self-reported measurement method exhibits dissimilar results compared to the other two mode measurements, particularly, among male vocational graduates.

Figure 2. Prevalence of mismatch among vocational and university graduates using the different measurement approaches, by sex (percentage)



Source: Authors' compilation based on the ELMPS 2023

According to the self-reported method, only 38 percent of the vocational graduates were well-matched, and 60 percent were overeducated. In contrast, the two mode methods indicated that over two-thirds of the same group were classified as well-matched and only 14 percent were overeducated as per the mode of education level and 25 percent per mode of years of schooling. However, among university graduates, all three measures agreed that the majority were well-matched (e.g., 80 percent per self-reported method), with lower percentages (53 percent) provided by the measure employing the mode of the years of schooling.

The observed large discrepancies among the rates of the three mismatch measures should not come as a surprise. As highlighted in the previous literature, various methods of mismatch may not necessarily produce similar results, because each method captures the mismatch from different dimensions (Wen & Maan, 2023; Schweri, Eymann, &Aepli, 2019). As mentioned above, the RM does not fully account for the variation in the demand and supply within the labor market. Hence, this method may inaccurately classify individuals under the assumption that their attained education level corresponds to the most prevalent educational requirement in available jobs; while in fact, many individuals with higher educational qualifications may be unable to secure positions that match their education. Therefore, the higher education level mistakenly appears as the mode of education for the job; contributing to observed discrepancies between self-reported and RM mismatch rates. Accordingly, in the following discussion, we will primarily focus on the self-reported results.

Nevertheless, it is interesting to note here that undereducation does not seem to be a major problem in the Egyptian labor market among both vocational and university graduates regardless of the mismatch measure used. Figure 2 also shows that university graduates were considerably more likely to report themselves as being well-matched, as compared to their vocational secondary graduate peers. Almost 80 percent of university graduates self-reported being well-matched and 19 percent were overeducated, compared to only 38 percent well-matched and almost 60 percent overeducated among vocational graduates.

Moreover, the mismatch phenomenon appears to be less prevalent among women in Egypt. Across all the three mismatch measures, female university graduates were over nine percentage points more likely to be well-matched than their male peers, and at least ten percentage points less likely to be overeducated. Similarly, about 63 percent of female vocational secondary graduates self-reported being well-matched compared to only34 percent among their male peers, and only 26 percent reported being overeducated versus 64 percent among men. This should not come as a surprise, as it is well-known from the Egyptian labor market literature that educated women in Egypt either wait for a suitable employment opportunity that matches their educational qualifications or just choose to exit the labor market, while men generally face greater pressure to avoid prolonged unemployment duration due to their traditional role as primary breadwinners and/ or their need to save to finance their future marriage expenses (Selwaness & Roushdy, 2019).

4.3. Self-reported mismatch by background characteristics

Focusing on socioeconomic factors, Table 1 shows that those aged 20-39, primarily youth and young adults, were more likely to be overeducated than their elder counterparts. Overeducation was more prevalent among the younger cohorts of both vocational secondary and university graduates, with a substantially higher percentage among vocational secondary graduates. About 75 percent of the vocational secondary graduates aged 20-29 were overeducated compared to only 26 percent among their university graduate peers.

The results also show that the mismatch substantially declined with age; 59 percent of vocational and 80 percent university graduates who were 50 years and above were well-matched. This fits well with expectation, because as an individual ages, s/he would have more experience and better information about the jobs that match his/her educational qualifications, and hence be less susceptible to the mismatch.

As expected, similar to age, among both secondary and university graduates, the higher the experience the less the prevalence of overeducation, and the higher the likelihood of being well-matched (Figure 3). Overeducation was most prevalent among early career vocational secondary graduates, with less than 2 years of experience, affecting about 74 percent versus only 47 percent among those with 20 or more years of experience. Also, 21 percent of the university graduates who are in their early careers (<2 years experience) reported being

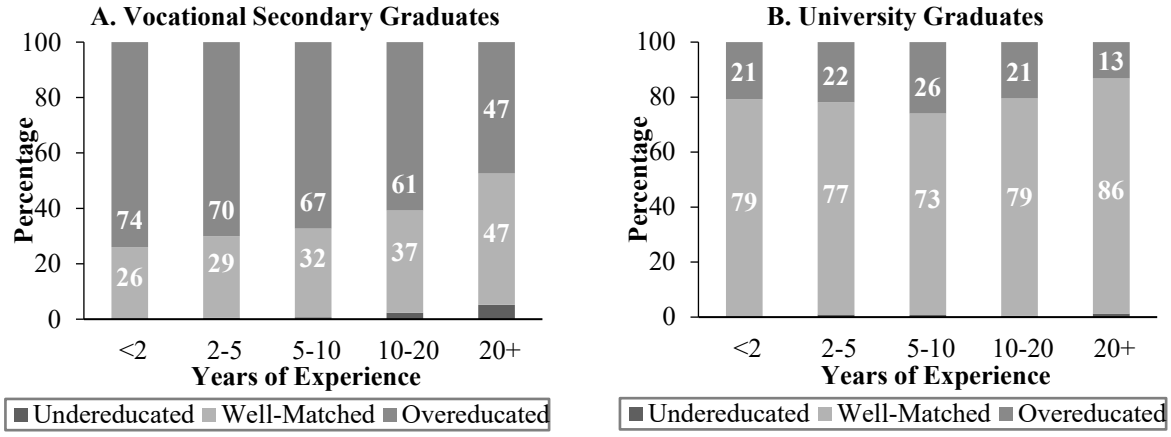
overeducated, as compared to only 13 percent among their peers with 20 or more years of experience.

Table 1. Self-reported mismatch among vocational secondary and university graduates, by age group (percentage)

	Vocational secondary graduates			University graduates		
Age Group	Undereducated	Well-Matched	Overeducated	Undereducated	Well-Matched	Overeducated
15-19	0	25	75	--	--	--
20-29	0	24	75	0	74	26
30-39	1	34	65	1	80	19
40-49	3	44	53	1	81	18
50+	9	56	35	1	88	11
Total	3	38	60	1	80	19

Source: Authors' compilation based on ELMPS 2023

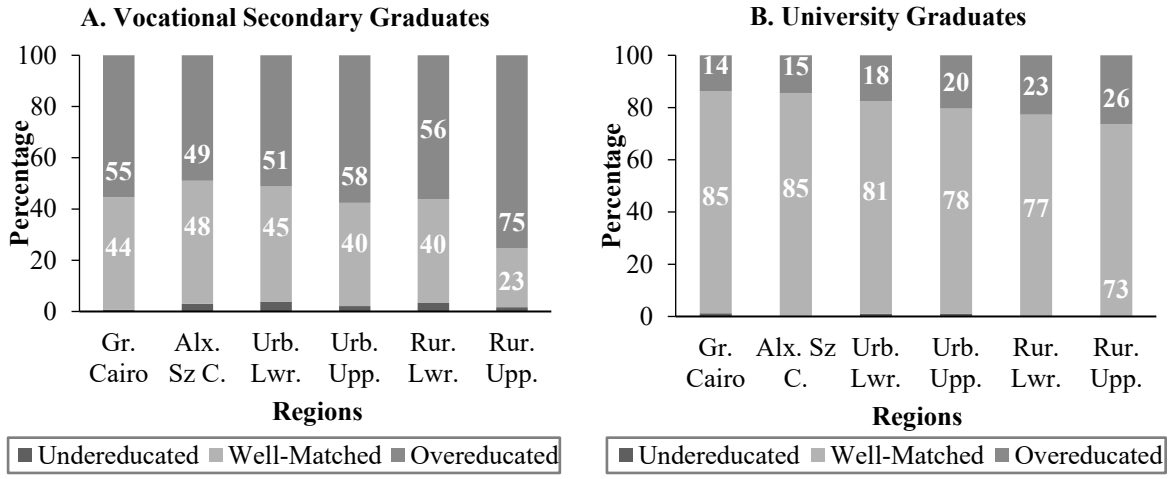
Figure 3. Self-reported mismatch among vocational and university graduates, by years of experience (percentage)



Source: Authors' compilation based on ELMPS 2023

Regarding the region of residence, Figure 4 shows that the highest percentage of overeducation is found in rural Upper Egypt where 75 percent of vocational secondary graduates and 26 percent of university graduates working in that region were overeducated. In contrast, the highest percentage of well-matched workers among both vocational secondary and university graduates was observed in the Alexandria and the Suez Canal governorates followed by Greater Cairo and urban Lower Egypt. These results fit expectations, as outside the metropolitan regions fewer jobs are generally available for highly educated labor market entrants, causing higher competition and hence a higher probability of being mismatched.

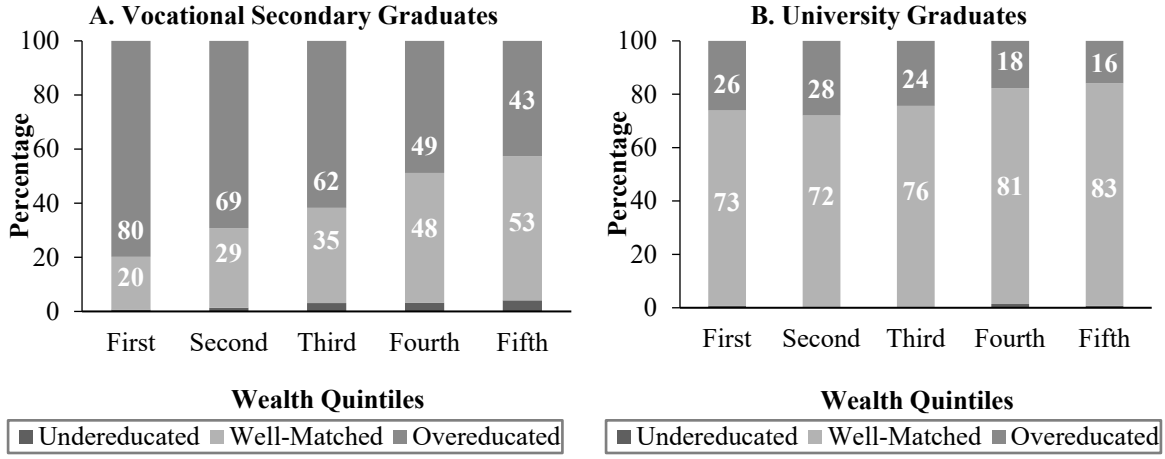
Figure 4. Self-reported mismatch among vocational and university graduates, by region of residence (percentage)



Source: Authors' compilation based on ELMPS 2023

Moreover, as Figure 5 shows, the prevalence of overeducated graduates from both education tracks substantially increases as household wealth declines, particularly among vocational secondary graduates. About 80 percent of vocational secondary graduates and 26 percent of university graduates belonging to the lowest wealth quintile households reported being overeducated, as compared to only 43 percent among vocational secondary graduates and 16 percent of university graduates from the highest wealth quintile households. Nevertheless, these results should be taken with caution, since wealth and mismatch are potentially endogenous, as mismatch can cause lower income and wealth, and, at the same time, as mentioned above wealth is likely to shape mismatch status.

Figure 5. Self-reported mismatch among vocational and university graduates, by household wealth quintile (percentage)



Source: Authors' compilation based on ELMPS 2023

Father's education appears to also influence the mismatch of university graduates, as it is generally a good proxy of household wealth statutes, networks, connections, and children's

career paths. The results show that the higher the father's education level, the more likely the individual is to be well-matched (Table 2). Almost 84 percent of university graduates and 48 percent of vocational secondary graduates who had a university or higher-educated father were well-matched, compared to less than 79 percent of university graduates and 33 percent of vocational secondary graduates, respectively, among graduates whose fathers are illiterate.

Table 2. Self-reported mismatch among vocational secondary and university graduates, by father's education (percentage)

	Vocational secondary graduates			University graduates		
	Under-educated	Well-Matched	Over-educated	Under-educated	Well-Matched	Over-educated
Father's education attainment						
Illiterate	3	33	64	0	79	21
Reads & Writes	4	42	54	1	79	20
Less than Intermediate	3	37	60	2	79	19
Intermediate	1	45	53	1	81	19
Above Intermediate	2	38	60	0	76	24
University or above	3	48	49	1	84	15

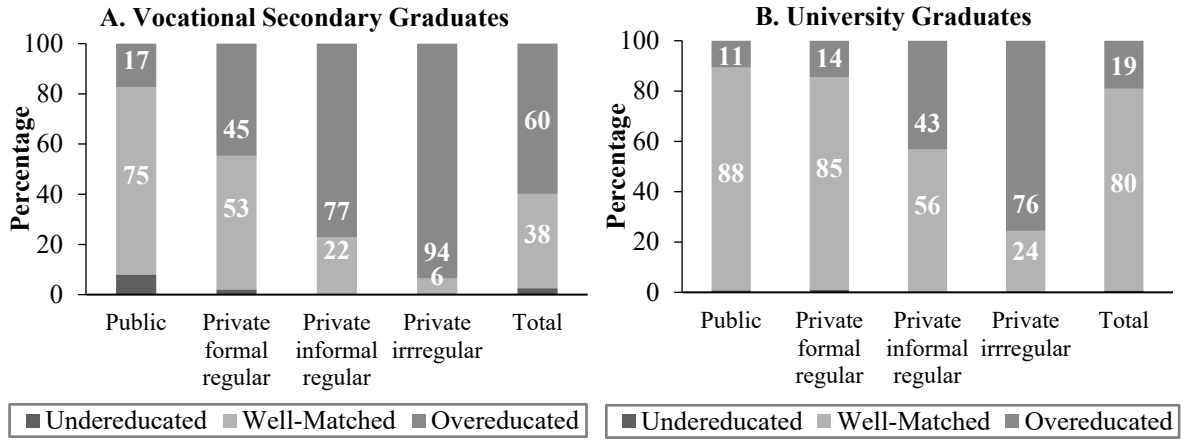
Source: Authors' compilation based on ELMPS 2023

4.4. Self-reported mismatch by job characteristics

In this section, we investigate the interlinkage between the mismatch and the individual's job characteristics. As expected, education-occupation mismatch is more prevalent in the informal sector of the Egyptian labor market (Figure 6). In particular, the largest proportion of mismatched workers is observed in private irregular sector, where over 94 percent of vocational secondary graduates and 76 percent of university graduates reported being overeducated. In contrast, among public sector workers, only 17 percet of vocatinal secodnary gradautes and 11 percent of university graduates reported being overeducated. Also, in the formal private sector, a large percetnage of university graduates reported being well matched and only 14 percent were overeduacated, compared to over 45 percent among vocational secondary gradautes.

Moreover, the percentage of overeducation considerably declines with firm size and increases with working outside an establishment. Table 3 shows that the highest percentage of overeducation was observed among vocational secondary (87 percent) and university (54 percent) graduates who work outside of an establishment, followed by those working in small firms (68 percent vocational secondary and 35 percent university graduates). In contrast, the percentage of overeducation is only 30 percent among vocational graduates and 12 percent for university graduates working in large firms. Moreover, a higher rate of overeducation is observed among both vocational and secondary graduates working in the agricultural sector followed by the industry and construction sectors.

Figure 6. Self-reported mismatch among vocational and university graduates, by sector of employment and formality status (percentage)



Source: Authors' compilation based on ELMPS 2023

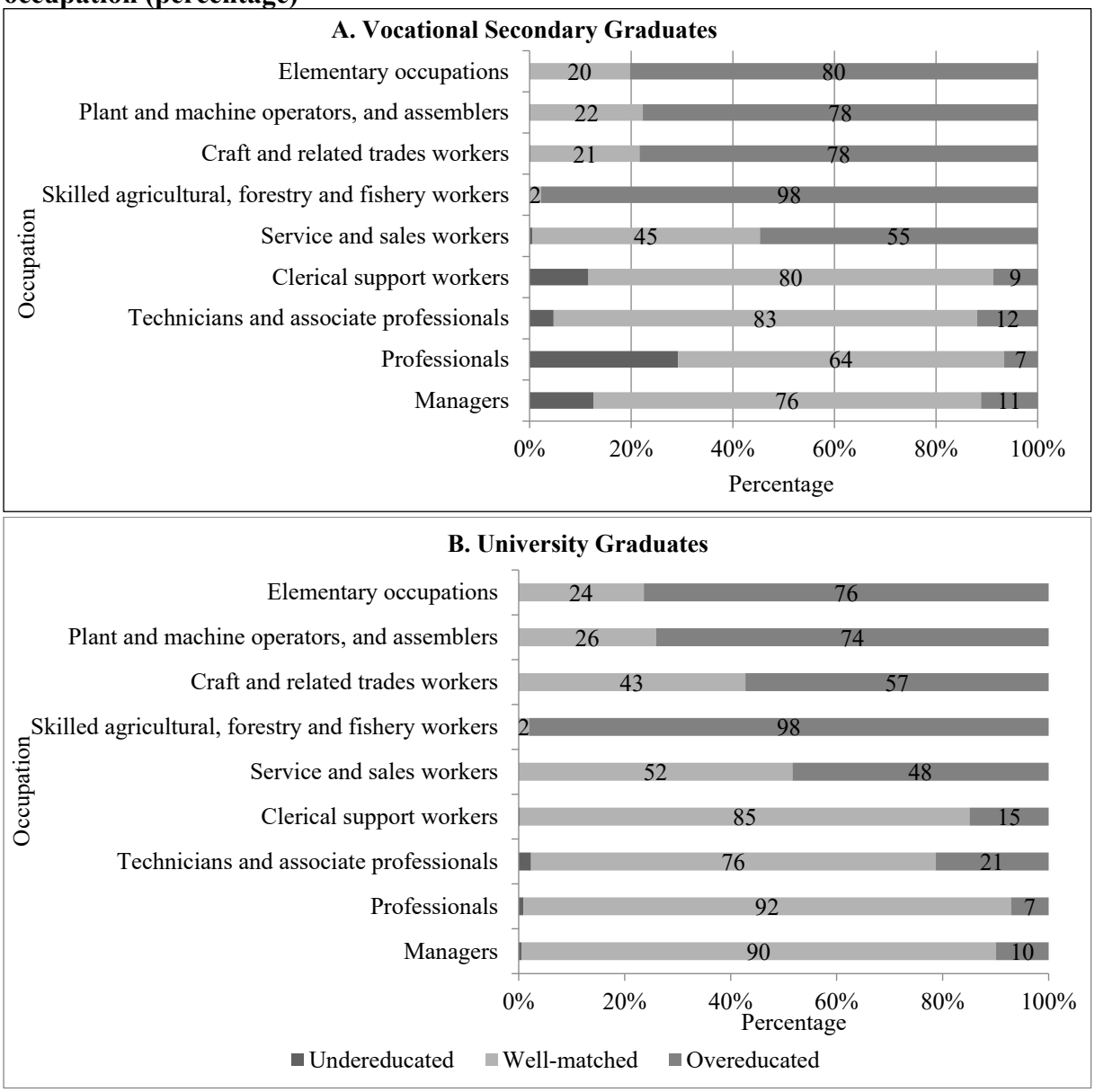
Table 3. Self-reported mismatch among vocational secondary and university graduates, by firm size and economic activity group (percentage)

	Vocational secondary graduates			University graduates		
	Under-educated	Well-Matched	Over-educated	Under-educated	Well-Matched	Over-educated
Firm size						
Outside of establishment	0	13	87	0	46	54
Small	1	31	68	1	65	35
Medium	8	53	38	0	87	12
Large/do not know	3	66	30	1	87	12
Economic Activity						
Agriculture	0	8	92	0	34	66
Industry/ Construction	1	32	67	1	74	26
Services and Others	4	47	49	1	83	16
Total	3	38	60	1	80	19

Source: Authors' compilation based on ELMPS 2023

Regarding occupations, consistent with the above sector results, almost 98 percent of both vocational secondary and university graduates working in the skilled agricultural, forestry, and fishery workers reported being overeducated (Figure 7). Overeducation is also widespread among elementary occupations (80 percent of vocational secondary and 76 percent of universitygraduates), plant and machine operatorsand assemblers (78 percent of vocational secondary and 74 percent of universitygraduates), and craftand related trades workers (78 percent of vocational secondary and 57 percent of university graduates). In contrast, professionals and managers were the least likely to report being overeducated.

Figure7. Self-reported mismatch among vocational and university graduates, by occupation (percentage)



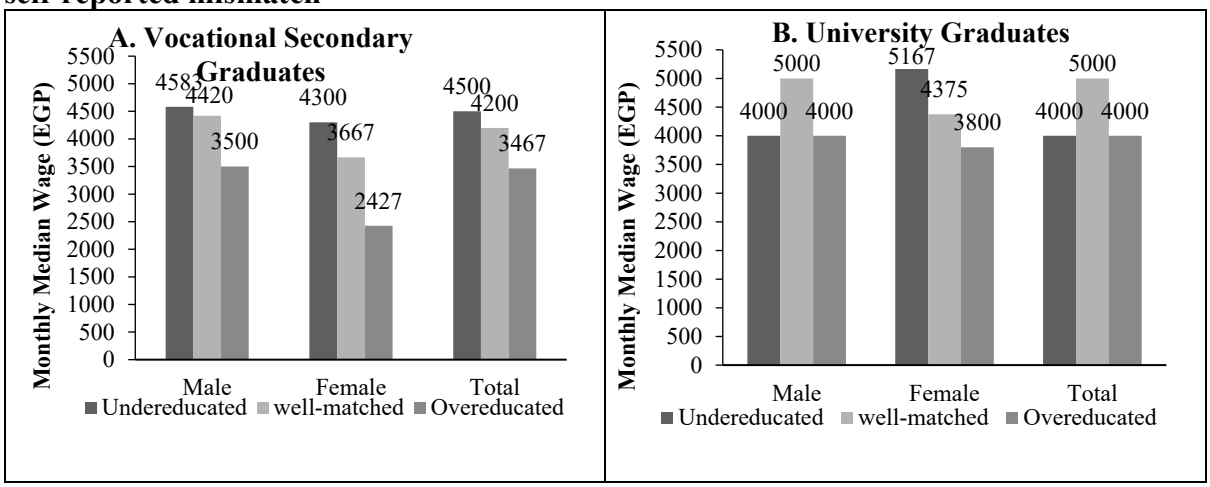
Source: Authors' compilation based on ELMPS 2023

4.5. Education-occupation mismatch and earnings

Median monthly wages varied substantially by self-reported mismatch status among both men and women (Figure 8). It is interesting to note that the highest median monthly wage is observed among (the small group of) undereducated women university graduates (5167 EGP), followed by their well-matched male peers (5000 EGP). On the other hand, consistent with the mismatch literature, overeducation was associated with a wage penalty, as compared to the well-matched group; yet undereducation was mostly associated with a wage premium. Among vocational secondary graduates, overeducation was associated with a wage penalty of about 733 EGP (3467 vs. 4200 as compared to the well-matched group), while a wage premium of about 300 (4500 vs. 4200) was observed among the undereducated group. In contrast, among

university graduates, both over- and under-education was associated with a wage penalty of about 1000 EGP (4000 vs. 5000 for the well-matched).

Figure 8. Median monthly wage in EGP among vocational and university graduates, by self-reported mismatch



Source: Authors' compilation based on ELMPS 2023

We also see a substantial variation when analyzing the magnitude of the wage premium/penalty by gender. The small group of undereducated women (a small group) received the highest wage premium among both education groups, relative to their well-matched peers, but at the same time, overeducated women vocational secondary graduates suffered from the highest wage penalty. More specifically, among university graduates, undereducated women received a wage premium of about 792 EGP (5167 vs. 4375 for the well matched), and overeducated women suffered from a wage penalty of about 575 EGP (3800 vs. 4375), as compared to almost a 1000 wage penalty for both their under- and over- educated men peers. Similarly, undereducated secondary graduate women enjoyed almost a four times larger wage premium (4300 vs. 3667= 633 EGP), than that of their undereducated male peers (4583 vs. 4420=163 EGP). In contrast, overeducated male vocational graduates suffered from a lower wage penalty (3500 vs. 4420 well-matched= -920 EGP) than their overeducated women counterparts (2427 vs. 3667= -1240 EGP).

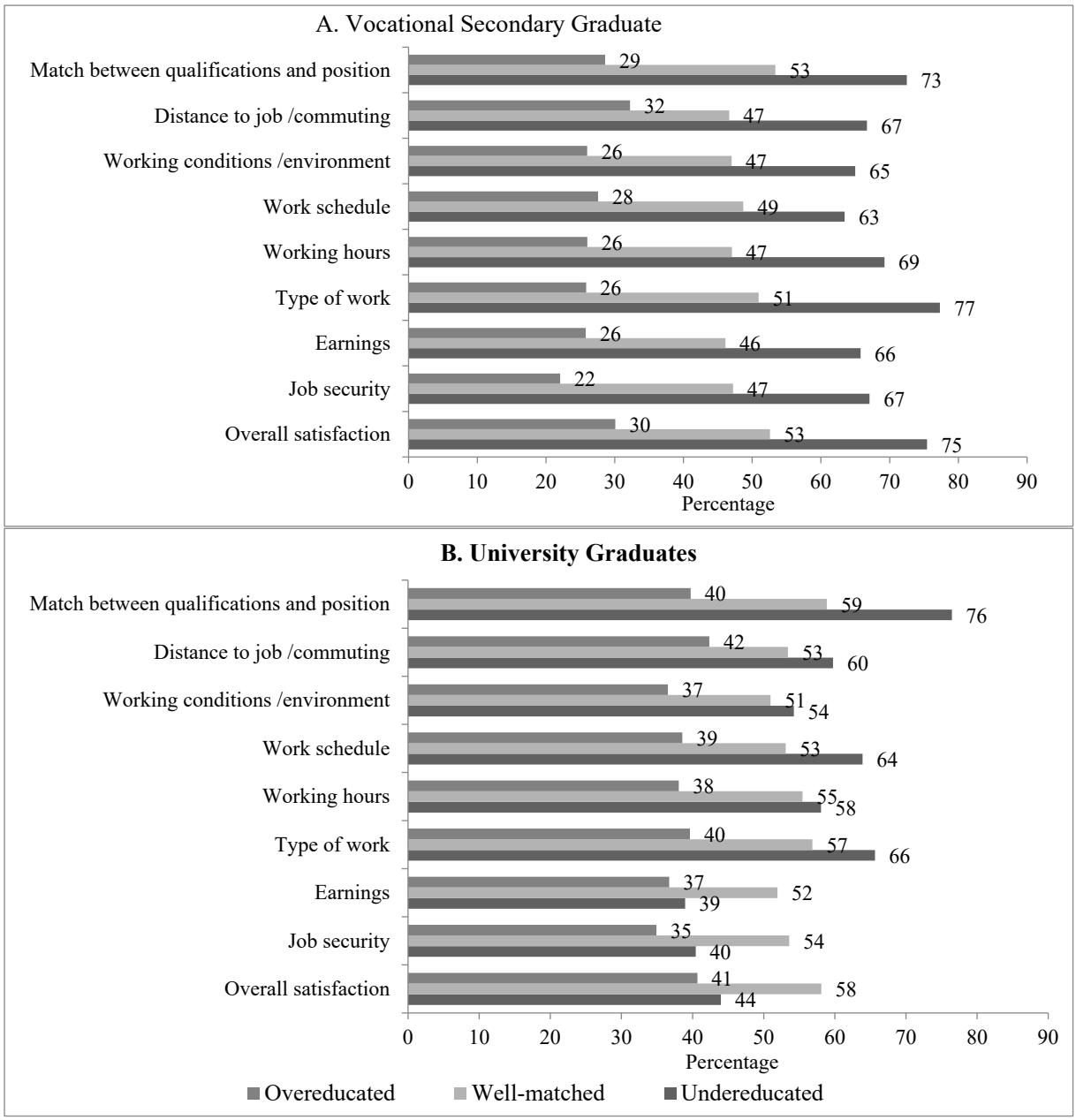
4.6. Education-occupation mismatch and job satisfaction

Full satisfaction with one's job was somewhat common among employed university and vocational secondary graduates in 2023, where 55 percent of currently employed university graduates and 40 percent of vocational secondary graduates reported being fully satisfied.[9] Women graduates were more likely to be fully satisfied among both education tracks. More specifically, about 66 percent of university educated women and 59 percent of vocational

[9] Moreover, when adding up those who reported being "rather satisfied" to the "fully satisfied", we end up with about 93 and 87 percent among university and vocational secondary graduates, respectively, who are generally satisfied with their jobs (see Figures A1 and A2 in Appendix for a comparison of satisfaction by different job aspects).

secondary educated women were fully satisfied with their jobs, as compared to 51 percent of their university educated male peers and 37 percent of their vocational secondary educated male peers.

Figure 9. Percentage fully satisfied with different job aspects, by self-reported mismatch among vocational secondary and university graduates



Source: Authors' compilation based on ELMPS 2023

Satisfaction varied substantially among employed graduates by self-reported mismatch status. Figure 9 shows that the undereducated and well-matched university and vocational secondary graduates were generally more fully satisfied with their jobs than their overeducated peers. More specifically, the highest rates of full satisfaction with one's job were observed among undereducated vocational secondary graduates (75 percent), followed by the well-matched

university graduates (58 percent). The lowest rates of full satisfaction were prevalent among the overeducated vocational secondary (30 percent) and university (41 percent) graduates.

The figure also shows the prevalence of full satisfaction for several different aspects of one's job by self-reported mismatch status and education level. Overeducated vocational graduates were consistently the least likely to be fully satisfied with all the various aspects of their job, as compared not only to their undereducated and well-matched peers but also to their overeducated university graduate counterparts. In contrast, the small group of undereducated vocational secondary graduates remains to be the most fully satisfied with all aspects of the job followed by their well-matched counterparts.

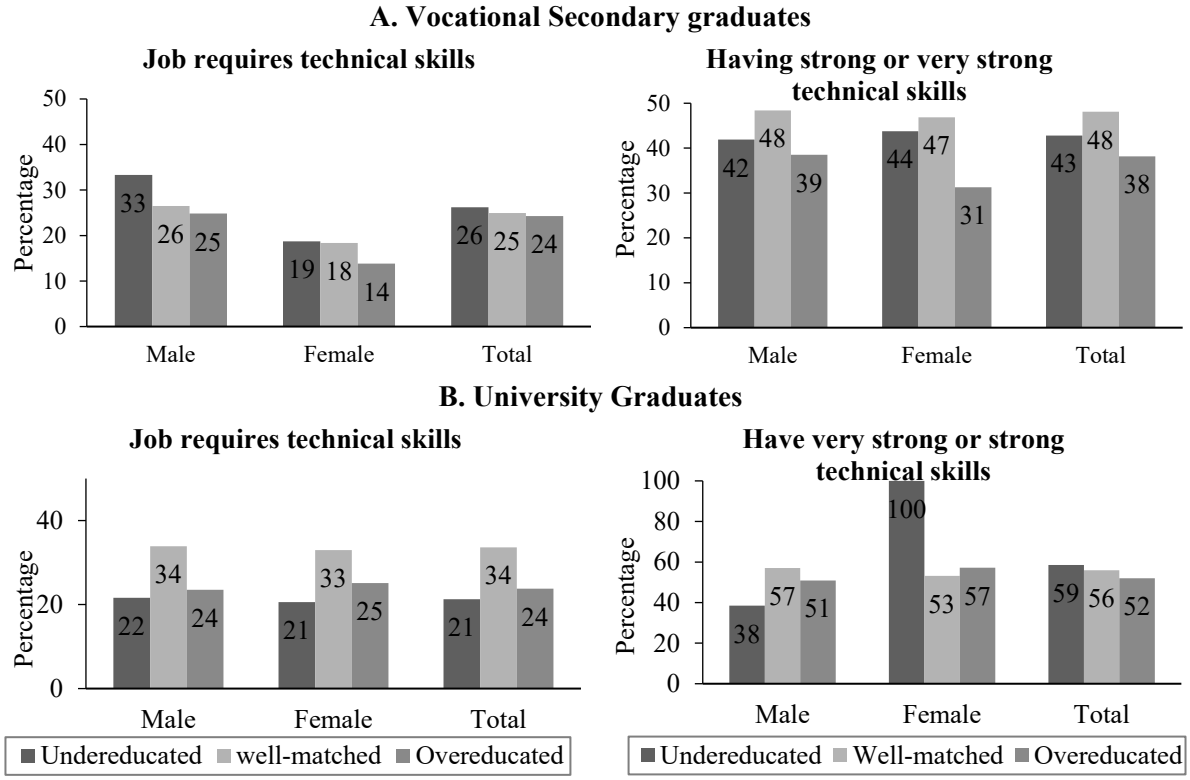
In terms of the job security and earnings aspects of the job, once again, the undereducated (40 percent security and 39 percent earnings) and overeducated (35 percent security and 37 percent earnings) university graduates were less likely to be fully satisfied with those two aspects of their jobs, as compared to their well-match peers (54 percent security and 52 percent earnings). However, for the remaining aspects of the job depicted in Figure 9, the university graduates followed a similar pattern as that of the vocational secondary graduates. Overall, the highest percentage of full satisfaction was reported by both the vocational (77 percent) and university (66 percent) undereducated graduates for the match between qualification and position (73 percent vocational and 76 percent university) and the type of work aspect (77 percent vocational and 66 percent university).

4.7. Education-occupation mismatch and skills

This section explores the relationship between education-occupation mismatch, skills acquisition, and the skills required for the jobs of vocational secondary and university educated graduates. We begin by examining the prevalence of technical skills among our sample of graduates. While vocational secondary education is supposedly designed to provide its students with technical skills, the data reveals that only 42 percent of vocational graduates reported having strong (strong or very strong) technical skills, which were 13 percentage points lower than the rates reported by university graduates (55 percent). Additionally, only about a quarter of vocational school graduates, compared to 32 percent of university graduates, reported working in jobs that require technical skills.

Furthermore, Figure 10 illustrates that strong technical skills was most prevalent among the undereducated university graduates (59 percent), followed by their well-matched peers (56 percent vs. 52 percent for the overeducated). Among vocational secondary graduates, the well-matched group had the higher prevalence of individuals with strong technical skills (48 percent), followed by their undereducated graduate peers (43 percent). Similar gradients are observed among both male and female vocational education graduates, though no clear pattern emerges among male and female university graduates.

Figure 10. Percentage having strong technical skills or a job requiring technical skills by self-reported mismatch among vocational secondary and university graduates



Source: Authors' compilation based on ELMPS 2023

In terms of job requirements, overall, the likelihood of working in jobs requiring technical skills did not vary much by mismatch status among vocational secondary graduates. However, some variation exists among men, where vocational secondary undereducated men were the most likely to work in jobs requiring technical skills (33 percent), compared to their well-matched (26 percent) and overeducated (25 percent) peers. In contrast, among university graduates, the likelihood of working in a job that requires technical skills substantially varied by mismatch status. The well-matched group had the highest prevalence of working in such jobs (34 percent), followed by the overeducated group (24 percent), and the undereducated group (21percent). Similar patterns were observed here among men and women university graduates.

Turning to the other skills included in the ELMPS 2023 questionnaire, as outlined in Tables A1a and A1b, we observe a similar pattern across both education levels for all the acquired and required skills by (mis)match, which differs slightly from the pattern observed above for the technical skills. Among both university and secondary-educated graduates, a strong proficiency in a specific skill was more prevalent among the well-matched and undereducated compared to the overeducated group. This is once again not surprising, as undereducated individuals are more likely to seek additional skills to bridge the gap between their education level and job requirements. On the other hand, the overeducated group does not share this urgency since they are already employed in positions that do not fully utilize their educational qualifications.

Under the same analogy, this is why we see the prevalence of working in jobs which require a specific skill higher among the well-matched and the undereducated graduates. The undereducated individuals had likely acquired the necessary skills to attain these positions, regardless of their education mismatch. Overall, consistent with previous literature (Krafft et al. 2019; Assad and Krafft 2018) the results of this section provide compelling evidence that the likelihood of securing a job is more closely related to one's skills rather than to their level of education in the Egyptian labor market. Hence, to effectively address the existing education-occupation mismatch, the education system in Egypt should work towards prioritizing skill development over mere credentials.

5. Concluding remarks and policy implications

The education-occupation mismatch is a prevalent phenomenon globally and in Egypt, in particular. It poses substantial challenges to the country's economic development and social stability. Despite rising educational attainment, many graduates, whether vocational or university graduates, find themselves mismatched and their talents are underutilized, consequently affecting their productivity, job satisfaction and earnings.

The main objective of this paper is to contribute to the limited literature on education-occupation mismatch in Egypt using recent data from the ELMPS 2023 to compare the extent of mismatch among employed vocational secondary and university educated graduates. The paper employs the two approaches for measuring the education-occupation mismatch: the subjective self-reported approach and the objective statistical/realized matching methods (RM). The analysis primarily focuses on investigating the main background and job characteristics of the overeducated, undereducated, and well-matched workers, as well as their skills, wage penalty, and their sense of job satisfaction.

Consistent with the literature, our findings show that the subjective and objective methods of measuring the mismatch yield quite distinct results as each captures the mismatch from different dimensions. According to the self-reported method, around one-third of the vocational graduates were well-matched, and around three-fifths were overeducated. In contrast, the statistical/realized approach indicated that over two-thirds of the same group of graduates were classified as well-matched and less than a quarter were overeducated. However, it is important to highlight that both mismatch measures agreed that undereducation does not seem to be a major problem in the Egyptian labor market among both vocational and university graduates, and that the mismatch phenomenon appears to be less prevalent among working women in Egypt.

Focusing on the self-reported measure, the data show that graduates from vocational secondary schools were more likely than university graduates to report being mismatched. Moreover, earning differentials among graduates from both university and vocational secondary education were observed by mismatch status and gender. Job satisfaction was generally higher among the undereducated group followed by their well-match peers. Individuals who reported having

strong skills were more prevalent among the well-matched and undereducated graduates. Finally, the findings of the job-skill requirements analysis support the previous literature highlighting that importance of acquiring skills over credentials in the Egyptian labor market.

The results of this paper point to the need for a comprehensive multi-stakeholder approach focusing on both the supply and demand sides of the labor market to address the mismatch. Recent studies highlighted that the existing education-occupation labor market mismatch among the educated graduates in Egypt, as in several other countries in the MENA region, has been due to a long-lasting misalignment between public education institutions output and labor market demand, primarily driven by a large public sector employment focusing on credentials over skills, compounded by the private sector's inability to provide clear signals about skill needs (Krafft et al. 2019; Assad and Krafft 2018; Assaad 2014; Salehi-Isfahani 2012).

Hence, on the supply side, the alignment of educational outputs with labor market needs is crucial. Career guidance should be taken more seriously and to be integrated into the education system from high school onward. National campaigns led by employers can raise awareness of job market needs. Furthermore, curricula should be updated to emphasize practical skills, and stronger labor market-academia ties must be established and frequently updated based on the fast-changing requirements of the labor market. The emphasis on acquiring practical skills should be fostered by offering more classes that provide hands-on practical experience such as having more work-related components, project-based learning, and academic institutions collaborating with the private and public labor market to offer students planned internships, and apprenticeships for vocational students within their specializations. This practice has proved to lower the likelihood of a mismatch in first employment in several developing countries (see McGuinness, Bergin and Whelan, 2015; Schweri, Eymann & Aepli, 2019; Dimova & Stephan, 2020). Finally, involving parents in the educational process would also certainly help in shifting perceptions about the value of skills versus credentials.

On the demand side of the labor market, policymakers should focus on formalizing the large informal and irregular sector of Egypt. This includes providing incentives for private sector firms to grow and formalize their workers, leveraging labor unions to enhance working conditions, and reevaluating high social insurance contribution rates, which deter formalization. Public awareness campaigns about social insurance benefits are essential to inform workers of their rights and options.

By implementing these strategies, Egypt can reduce unemployment, maximize the efficiency of the labor force and their competitiveness, as well as harness the potential of its educated youth who are evolving with the current fast paced and dynamic markets, contributing to more sustainable economic growth and social progress.

References

Amer, M. (2015). Patterns of labor market insertion in Egypt, 1998–2012. The Egyptian Labor Market in an Era of Revolution. Oxford University Press, Oxford, 70-89.

Assaad, R. & Krafft, C. (2024). Introducing the Egypt Labor Market Panel Survey 2023.*Economic Research Forum Working Paper No. 1748*

Bauer, T. K. (2002). Education mismatch and wages: A panel analysis. Economics of Education Review, 21(3), 221–229.

Becker, G. (1964). Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education. *Chicago, IL: University of Chicago Press*

Caroleo, F. E., & Pastore, F. (2015). Overeducation: A disease of the school-to-work transition system. Available at SSRN 2606902.

Chester, J., & Baffour, B. (2015). School-to-work transitions during volatile economic times. *Australian Journal of labor Economics*, 18(3), 307-327.

Chevalier, A. (2003). Measuring over-education. *Economica*, 70(279), 509-531.

Clark, B., Joubert, C. & Maurel, A. (2014). The career prospects of overeducated Americans. IZA J Labor Econ, 6 (3).

Diem, A., and Wolter, S. C. (2014). Overeducation among Swiss university graduates: determinants and consequences. J labor Market Res. 47, 313–328.

Dimova, R., & Stephan, K. (2020). Inequality of opportunity and (unequal) opportunities in the youth labor market: How is the Arab world different? *International labor Review*, 159(2), 217-242.

Duncan, G. J., and Hoffman, S. D. (1981). The incidence and wage effects of overeducation. Economics of education review, 1(1), 75-86.

El-Hamidi, F. (2009). Education-occupation mismatch and the effect on wages of Egyptian workers. Handbook on international studies in education, 123-138.

Flisi, S., Goglio, V., Meroni, E. C., Rodrigues, M., & Vera-toscano, E. (2017). Measuring occupational mismatch: Overeducation and over skill in Europe—Evidence from PIAAC. Social Indicators Research, 131(3), 1211-1249.

Green, F., & McIntosh, S. (2007). Is there a genuine under-utilization of skills amongst the over-qualified?. Applied Economics, 39(4),427-439.

Haorei, W. (2012). A study on job satisfaction and its consequences on work productivity in textilemills. Journal of Business Management and Social Sciences Research, 1(3), 50-56.

Hartog, J. (2000). Over-education and earnings: where are we, where should we go? Economics of education review, 19(2), 131-147.

International Labour Organization (2018). Measurement of qualifications and skillsmismatches of persons in employment

International Labour Organization (2019). Small matters: Global evidence on the contribution to employment by the self-employed, micro-enterprises and SMEs.

International Labour Organization (2020). 258 million workers in the world are over-educated for their jobs. Retrieved from: https://stat.ilo.org/blog/258-million-workers-in-the-world-are-over-educated-for-their-jobs/

Krafft, C., Elbadawy, A., & Sieverding, M. (2019). Constrained school choice in egypt.*International Journal of Educational Development, 71*, 102104. https://doi.org/10.1016/j.ijedudev.2019.102104

Leuven E., & Oosterbeek H., (2011). Overeducation and mismatch in the labor market. In Handbook of the Economics of Education. 4: 283-326

Lu, M. (2017). A Study on the Phenomenon of Overeducation in China and Its Trend Analysis. *Open Journal of Social Sciences*, 5(1).

Manacorda, M., Rosati, F. C., Ranzani, M., & Dachille, G. (2017). Pathways from school to work in the developing world. IZA Journal of Labor and Development, 6(1), 1-40.
McGuinness, S., & Bennett, J. (2007). Overeducation in the graduate labor market: A quantile regression approach. Economics of Education Review, 26(5), 521-531
McGuinness, Bergin & Whelan (2015). Recruitment Methods & Educational Provision effects on Graduate Over-Education and Over-Skilling
McGuinness, S., Pouliakas, K., & Redmond, P. (2018). Skills mismatch: Concepts, measurement and policy approaches. Journal of Economic Surveys, 32(4), 985-1015.
Mendes de Oliveira, M., Santos, M. C., & Kiker, B. F. (2000). The role of human capital and technological change in overeducation. Economics of Education Review, 19, 199206.
Mont, G. (2015). The cause and consequences of field-of-study mismatch: An analysis using PIACC. OECD Social, Employment and Migration Working Papers. 167 (2017), Getting Skills Right: The OECD Skills for Jobs Indicators, OECD Publishing, Paris. Skills and Work website
OECD/ILO/UNDP (2024), *Informality and Structural Transformation in Egypt, Iraq and Jordan: A Framework for Assessing Policy Responses in the MENA Region*, OECD Publishing, Paris, https://doi.org/10.1787/efb16d0b-en.
OAMDI (2024). "Labor Market Panel Surveys (LMPS). Version 1.0 of Licensed Data Files; ELMPS 2023."- to add when introducing the data
Pita, Cristina & Torregrosa, Ramón. (2021). Education and Job Satisfaction. 10.13140/RG.2.2.21579.72481.
Selwaness, I., & Roushdy, R. (2019). Young people school-to-work transition in the aftermath of the Arab spring: Early evidence from Egypt. International Journal of Manpower, 40(3), 398-432. https://doi.org/10.1108/IJM-02-2018-0041
Schweri, J., Eymann, A. & Aepli, M. (2019). Horizontal Mismatch and Vocational Education.
Schweri, J., Eymann, A., & Aepli, M. (2020). Horizontal mismatch and vocational education. *Applied Economics,* 52(32), 3464-3478https://doi.org/10.1080/00036846.2020.1713292
Verdugo, R. R., & Verdugo, N. T. (1989). The impact of surplus schooling on earnings: Some additional findings. Journal of human resources, 629-643.
Verhaest, D., & Omey, E. (2006). The impact of overeducation and its measurement. Social Indicators Research, 77(3), 419-448.
Verhofstadt, E., De Witte, H., Omey, E. (2007). Higher educated workers: better jobs but less satisfied? *International Journal of Manpower*, *28*(2): 135–151.
Wen, L.; Maani and S. A. (2023) : Earnings Penalty of Educational Mismatch: A Comparison of Alternative Methods of Assessing Over-Education, IZA Discussion Papers, No. 15943, Institute of Labor Economics (IZA), Bonn.

Appendix A

TableA1a: Skills required among vocational secondary and university graduates, by mismatch (percentage)

Does your job require any of the following specific abilities?	Vocational Secondary			University		
	Under-educated	**Well-Matched**	**Over-educated**	**Under-educated**	**Well-Matched**	**Over educated**
Basic literacy	99	91	37	100	97	75
Mathematics or statistics	81	60	25	82	73	54
Physical fitness	79	75	68	57	62	64
Management skills	83	63	30	80	80	54
Customer service skills	51	52	32	37	61	48
Foreign language skills	27	14	2	56	51	24
Basic book-keeping or accounting skills	61	40	20	47	53	36
Problem-solving	81	76	50	98	83	64
Communication and presentation	77	66	48	86	79	65
Manual dexterity	55	55	63	60	43	54
Teamwork skills	83	77	59	82	81	70
Computer skills	29	13	2	60	48	19
Setting up and protecting computer systems	3	2	0	9	11	2
solving computer problems	4	2	0	5	13	4
Computer systems programming	3	2	0	5	12	3
Use of electronic services	13	5	0	38	27	7
Use the application interface	14	5	0	35	26	5
Maintenance and management of information and communication technology systems	1	2	0	5	8	2
Using digital tools to control machines	2	3	0	5	15	3
Browse, search, and filter digital data	8	4	0	27	19	2
Digital data management and analysis	11	3	0	27	18	2
Use of computer-aided design &drawing tools	4	2	0	27	12	1
Using digital tools to process sound and images	2	2	0	27	10	1
Using digital tools to create content	8	2	0	27	13	1
Use digital tools for collaboration & productivity	6	2	0	24	12	1
Use of word processing software	8	4	0	2	20	4
Spreadsheet skills	21	5	0	33	32	6
Digital video/photo editing skills	2	2	0	10	11	3

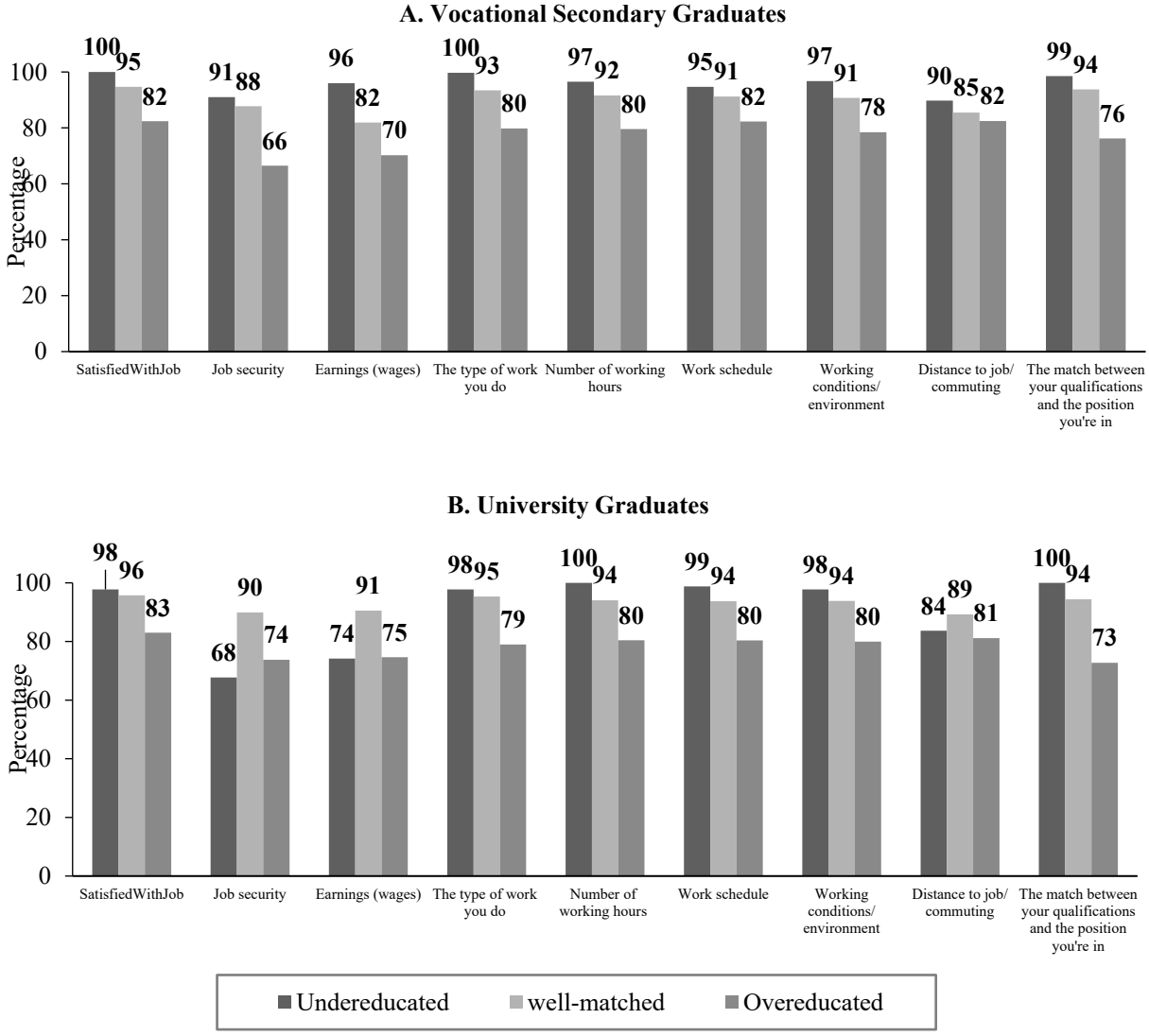
Source: Authors' compilation based on ELMPS 2023

Table A1b: Skills acquired by vocational secondary and university graduates by mismatch status (percentage)

To what extent do you have the following skills?	Vocational Secondary			University		
	Under-educated	**Well-Matched**	**Over-educated**	**Under-educated**	**Well-Matched**	**Over-educated**
Basic literacy	98	97	90	100	99	99
Mathematics or statistics	69	62	55	89	80	74
Physical fitness	58	74	71	79	74	78
Technical skills	43	48	38	59	56	52
Management skills	69	60	44	86	76	66
Customer service skills	48	53	36	61	60	55
Foreign language skills	14	13	5	55	59	43
Basic book-keeping or accounting skills	60	44	36	89	64	55
Problem-solving	73	71	58	93	78	70
Communication and presentation	72	64	51	95	78	72
Manual dexterity	52	55	58	52	50	55
Teamwork skills	80	74	64	86	81	75
Computer skills	13	10	4	47	46	29
Setting up and protecting computer systems	5	3	2	10	17	9
solving computer problems	3	3	1	9	17	8
Computer systems programming	4	2	1	9	14	6
Use of electronic services	6	8	5	28	34	15
Use the application interface	6	8	5	31	35	16
Maintenance and management of information and communication technology systems	3	2	1	5	11	6
Using digital tools to control machines	3	3	1	16	18	7
Browse, search and filter digital data	5	4	1	35	23	9
Digital data management and analysis	6	2	1	27	21	8
Use of computer-aided design & drawing tools	4	2	1	6	16	6
Using digital tools to process sound & images	5	2	2	5	16	7
Using digital tools to create content	7	2	1	5	18	7
Use digital tools for collaboration & productivity	5	2	1	2	13	6
Use of word processing software	4	4	2	8	25	13
Spreadsheet skills	6	6	3	16	37	18
Digital video/photo editing skills	2	3	2	8	20	9

Source: Authors' compilation based on ELMPS 2023

Figure A1: Percentage fully or rather satisfied with different aspects of current job among vocational secondary and university graduates, by mismatch status (percentage)



Source: Authors' compilation based on ELMPS 2023