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Education and labour market mismatch

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Abstract

This paper analyses the relationship between education and employment by examining various indicators related to education and labor market mismatch. It explores the education levels of the working-age population and their distribution among the employed and unemployed individuals. Additionally, it analyzes the extent of educational mismatch in terms of the status in employment and identifies the prevalence of informal employment among different educational groups. Furthermore, the paper sheds light on the skills needed on the labor market, highlighting the demand for specific skill sets. By examining these indicators, we can assess the alignment between education and employment opportunities and identify potential areas of concern or improvement.

***Keywords*:** *labor market, education, employment, employment rate*

1. Introduction

Education and employment are two of the most important factors in an individual's life. Education is the process of acquiring knowledge, skills, values, beliefs, and habits, while employment refers to the state of having a paid job. Both education and employment play a crucial role in shaping a person's future and overall well-being. Education provides individuals with the skills and knowledge necessary to succeed in the workforce, while employment provides individuals with financial stability and a sense of purpose. The two are closely linked as a good education often leads to better employment opportunities and vice versa. A good education system and strong job market is essential for a healthy economy and society.

The labor market refers to the supply and demand of labor, for which employees provide the supply and employers provide the demand. The labor market should be viewed at both the macroeconomic and microeconomic levels because both levels offer important insight into the employment of factors of production and the economy as a whole. Based on these two views, the perspectives, policies and activities of governments and the business community regarding employment are built. At the macroeconomic level, labor supply and demand are influenced by domestic and international market dynamics, as well as by other factors such as immigration, the age structure of the population, and the level of education and qualifications. On the other hand, at the microeconomic level, individual firms interact with employees, hire them, fire them, and increase or decrease wages and hours. The relationship between supply and demand affects the number of hours employees work and the compensation they receive in wages and other employment benefits. Indeed, most people are able to choose whether they will work or not, and sometimes whether they will work or at least how much effort they will put into their work (Burda & Wyplosz, 2001, p. 144). Uncertainty in the labor market (as well as uncertainty in any other market) can lead to a reduced demand or increased supply of labor with certain qualifications, which would cause an expected monetary loss associated with becoming and remaining unemployed, and thus a loss of previous earnings. Another disturbance in the labor market that is completely opposite to the above is the lack of adequate labor force, i.e. increased demand and decreased supply of labor. Such a disruption of the labor market should raise the price of labor, but due to a number of different factors, there is not a completely proportional relationship here.

The specificity of the labor market is that it is not a "standard market". Workers are not identical, it is difficult to determine the quality of the services offered, and it is even more difficult to express it qualitatively. It is relatively easier to numerically and quantitatively express the number of workers, the number of workers with certain qualifications, working hours, etc., but it is very difficult, almost impossible to numerically and quantitatively express the quality of the

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employees. Quality can mostly be explained descriptively, but in addition to the quality of professional qualifications that a person possesses, the overall quality also depends on personal qualities of each individua (does the person possess personal qualities, respect for ethics and morality, ambition, values, ability to respect authority, leadership skills, communication skills, readiness for teamwork, etc.). A special characteristic of the labor market is that it is a dynamic market, that is, labor providers enter and leave it (that is, they move from employment to unemployment and vice versa) with great dynamics. Such dynamics of the labor market is closely related to the problem of unemployment as one of the biggest macroeconomic problems. The dynamics of the labor market results, among other things, from the fact that the volume of labor that is engaged in the economy can change quite quickly. Firms can fire workers or hire them overtime in various circumstances. Workers can choose to quit, be unemployed, or choose to re-employ. Such movements in the labor market can lead to a change in employment. If the marginal cost of hiring an additional employee, or of hiring existing employees to work more hours, exceeds the marginal revenue, it will reduce the firm's earnings, and logically the firm would theoretically reject that option. If the opposite is true, it makes rational sense to hire more labor (Browning & Zupan, 2020). All these changes in the labor market are closely related to the education and qualification structure of the working-age population.

The most common cause of unemployment in the end is inflexibility of wages, and inflexibility of wages is caused by many reasons. The main reason is the fact that the labor market cannot have the same characteristic as auction markets, that is, the price of labor cannot change quickly under the influence of demand/supply (Karadjova & Simonceska, 2005). On the other hand, labor market mismatches reflected in unemployment cause unemployment costs. Although the costs of unemployment vary depending on the level of development of the country, high unemployment means a low level of utilization of available resources, which causes a decrease in output, a decrease in individual income, increased poverty, etc. Such processes, in addition to major macroeconomic problems, also cause emotional stress and disturbed family life. The economic importance of employment and the serious losses caused by unemployment are significant for any national economy, given the fact that periods of high unemployment are periods when realized gross domestic product is below potential GDP. This means that as a result of the incomplete exploitation of production factors, part of the GDP and part of the national wealth is lost forever (Karadjova & Simonceska, 2005). If unemployment in Macedonia and the surrounding (Serbia, Montenegro, Albania and Bosnia and Herzegovina) is traced in the period 1996-2022, it is noticeable that unemployment has a decreasing trend in all analyzed countries, although there are periods of cyclical increase or decrease that differ from country to country. In 1996 unemployment was the highest in Macedonia, and in 2022 there are no big differences in unemployment rates between countries in the region (however, the highest rates are observed in Montenegro and Macedonia). The unemployment data refers to the section from the workforce that is unemployed but is available and looking for employment. Taking into account the correlation between the labor market mismatch, unemployment and education, it is important to pay attention to the level of education of the working-age population. In that sense, an important data is the % of unemployed with advanced education. According to this data, advanced education consists of a short-cycle higher education, a bachelor's degree or an equivalent level of education, a master's degree or an equivalent level of education, or a doctoral degree or an equivalent level of education according to the International Standard Classification of Education 2011 (ISCED 2011). This indicator is important for every country because it shows the potential of a highly skilled labor force that is available and is unable to contribute to progress due to unemployment. The following table provides an overview of this data for the already mentioned countries in the period from 2010 to 2022.

Table 1. Unemployment with advanced education (% of total labor force with advanced education) (2010-2022)

	2010	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*
N. Macedonia	22.5	22.9	22.5	23.45	22.7	21.2	19.6	18.9	17.9	14.3	13.8	11.7	9.6
Serbia	13.1	15.9	16.9	18.3	15.4	15.3	13.9	12.3	10.8	8.3	7.9	8.5	..
Albania	14.1	15.6	15.8	14.9	17.8	19.3	17.1	13.7	15.1	14.9	..	..	..
Bosnia and Herzegovina	15.5	14.6	19.1	16.9	21.1	20.5	21.4	16.7	15.4	13.2	12.7	11.6	..
Montenegro	..	13.5	11.0	9.9	10.0	10.3	11.9	10.9	10.3	11.4	13.2	..	..

Created by: World Development Indicators
Series: Unemployment with advanced education (% of total labor force with advanced education)

Source: (The World Bank, 2023)

From the data presented in Table 1, it is noticeable that the highest unemployment among the population with advanced education at the beginning of the analyzed period was in Macedonia. In 2019, these data are almost equal in all analyzed countries, and in Macedonia the decline is most noticeable, considering the highest starting point. For 2020, 2021 and 2022, data are not available for some of the countries under analysis.

Taking into account everything previously stated, this paper analyzes the education and labor mismatch indicators in Macedonia, such as: Working age by level of education, Employment-to-Population Ratio by education, Unemployment rate by education, Combined rate of time-related underemployment and unemployment by education (LU2), Combined rate of unemployment and potential labor force by education (LU3), Composite rate of labor underutilization by education (LU4), Time-related underemployment by education, Informal employment rate by education, Expected employment by occupation and level of education. We want to emphasize that the results presented in this paper are part of a more

extensive analysis of the labor market in N. Macedonia, which is part of the ENTEG-YCCBT-05 project and authored by some of the authors of this paper.

3. Education and Labor Mismatch Indicators

First, the analysis focuses on the working-age population and education. **Working age by level of education** provides insight into the education levels of the working-age population, which can be an important determinant of labor market outcomes such as employment rates, income levels, and productivity. For the purposes of the analyze we took data of population age 25 and over as it is considered as an appropriate age to complete the formal education.

Table 2. Working-age population (thousands), N. Macedonia, 2011 – 2022

				Level of education				
Country	Age	Time	Total	Less than basic	Basic	Intermediate	Advanced	Level not stated
MKD	25+	2011	1379.486	149.874	409.385	559.523	222.579	38.126
MKD	25+	2012	1405.84	138.153	413.227	581.806	233.142	39.513
MKD	25+	2013	1415.772	127.77	413.876	609.844	224.879	39.403
MKD	25+	2014	1422.313	112.724	419.458	614.105	234.705	41.322
MKD	25+	2015	1442.643	107.742	418.494	615.632	253.164	47.612
MKD	25+	2016	1453.861	101.492	407.746	620.638	274.571	49.413
MKD	25+	2017	1462.149	93.054	395.82	647.224	277.504	48.547
MKD	25+	2018	1475.885	89.287	394.988	664.994	274.31	52.306
MKD	25+	2019	1485.673	92.316	380.942	673.194	286.043	53.178
MKD	25+	2020	1494.397	84	372.405	671.379	312.106	54.507
MKD	25+	2021	1497.28	75.368	364.285	687.246	316.144	54.236
MKD	25+	2022	1311.741	64.885	305.206	604.708	280.397	56.546

Source: ILO, Indicator catalogue, https://ilostat.ilo.org/data/#, accessed on 12.03.2023

The data for this indicator can be collected through household surveys, censuses, or administrative records. It can be used to identify potential skill shortages or surpluses in the labor market, as well as to target policies and programs aimed at improving education and training opportunities for the working-age population. Governments, international organizations, and researchers use this indicator to track changes in the education levels of the working-age population over time and across countries. It is also used to assess the effectiveness of education policies and programs aimed at improving the education levels of the population. The working-age population and education indicator is a useful tool for policymakers, analysts, and researchers in understanding the educational attainment of the working-age population and how it may affect labor market outcomes.

Analyzing the data in-depth for the population age 25+ and with emphasis on the level of education leads to following conclusions:

1. Less than Basic Education Level: The number of individuals in the "Less than basic" education category has consistently decreased over the years, indicating progress in educational attainment. In 2011, there were 149.874 individuals in this category, which decreased to 75.368 in 2021. This suggests that efforts to improve access to basic education and reduce illiteracy have been successful. However, there is still a significant portion of the working-age population with limited educational qualifications, which may pose challenges for employment and economic opportunities
2. Basic Education Level: The "Basic" education level category represents the largest segment of the working-age population throughout the years. In 2011, there were 409.385 individuals with basic education, which increased to 687.246 in 2021. This indicates that a substantial number of individuals have acquired at least a basic level of education, reflecting improvements in primary and secondary education access. It suggests that the majority of the working-age population possesses fundamental literacy and numeracy skills.
3. Intermediate and Advanced Education Levels: The numbers of individuals with intermediate and advanced education levels have shown fluctuations over the years. In 2011, there were 222.579 individuals with intermediate education and 38.126 individuals with advanced education. These numbers increased to 316.144 and 54.236, respectively, in 2021. This indicates progress in higher education enrollment and the development of a skilled workforce. Individuals with intermediate and advanced education levels are more likely to have specialized skills and knowledge, making them valuable contributors to economic growth and innovation.
4. Unspecified Education Level: The presence of the "Level not stated" category indicates that there is a portion of the working-age population for which education information is not available or unspecified. It is crucial to improve data collection methods and ensure comprehensive reporting to capture the full picture of educational attainment.

In-depth analysis of the data reveals both positive trends and areas that require attention. The increase in individuals with basic, intermediate, and advanced education levels demonstrates progress in education. However, there is still a need to address the population with limited educational qualifications and ensure equitable access to quality education across regions.

Secondly, the Employed by education is analysed. **The Employment-to-Population Ratio by education** is a measure that indicates the proportion of a specific population group, categorized by their level of education, who are employed. It provides insights into the employment outcomes of different educational groups within a population.

Employment-to-Population Ratio by education (%) = (Number of Employed Individuals in the Education Group / Total Population in the Education Group) * 100

By calculating the Employment-to-Population Ratio for different educational groups, we can compare the employment outcomes and understand how employment is distributed across various education levels in a population.

Table 3. Employment-to-population ratio (%) by level of education, N. Macedonia, 2011 – 2022

				Level of education			
Reference area	Age	Time	Total	Less than basic	Basic	Intermediate	Advanced
MKD	25+	2011	43.18	15.6	30.25	54.13	65.41
MKD	25+	2012	42.73	14.69	28.64	53.57	64.53
MKD	25+	2013	44.37	14.75	30.96	55.43	63.66
MKD	25+	2014	45.06	13.1	32.26	55.61	63.63
MKD	25+	2015	45.32	13.92	31.47	55.66	64.97
MKD	25+	2016	46.6	13.87	29.68	57.76	66.99
MKD	25+	2017	47.24	14.1	29.93	57.47	67.43
MKD	25+	2018	47.83	15.19	30.56	57.99	67.82
MKD	25+	2019	49.93	17.8	31.33	60.14	70.29
MKD	25+	2020	49.65	15.14	30.37	58.97	70.56
MKD	25+	2021	50.02	12.48	28.59	59.68	71.23
MKD	25+	2022	49.53	16.52	27.58	57.84	73.13

Source: Calculation based on ILO data, Indicator catalogue, https://ilostat.ilo.org/data/#, accessed on 12.03.2023

The table provides data on the Employment-to-Population Ratio (%) for different levels of education in N. Macedonia, categorized by age and time. The Employment-to-Population Ratio has generally shown an upward trend from 2011 to 2022. The ratio increased from 43.18% in 2011 to 49.53% in 2022.

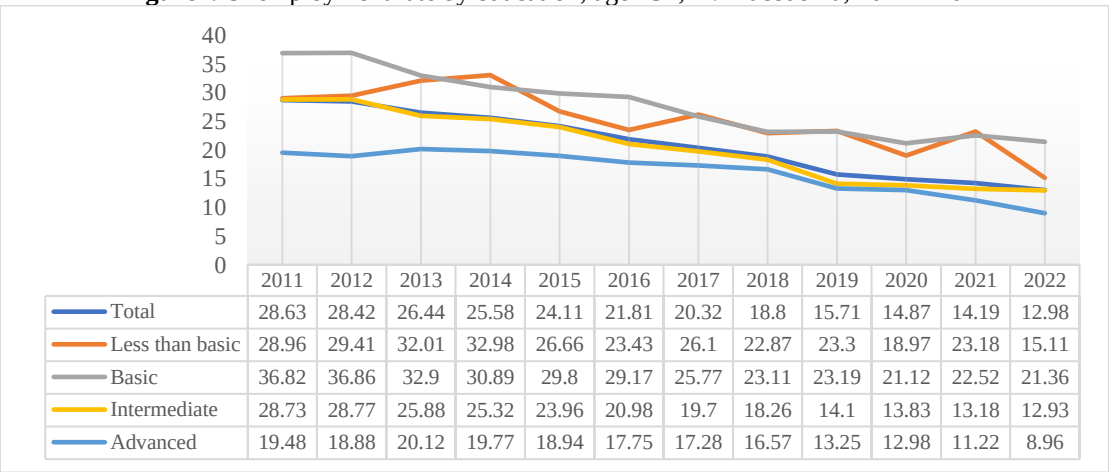
Comparison by Education Level:

1. Less than basic education: The Employment-to-Population Ratio for individuals with less than basic education has varied throughout the years, ranging from 12.48% in 2021 to 17.8% in 2019. It is the lowest among all education levels, indicating lower employment opportunities for this group.
2. Basic education: The Employment-to-Population Ratio for individuals with basic education has remained relatively stable, with a range of 27.58% in 2022 to 32.26% in 2014. This group generally has a higher employment rate compared to those with less than basic education but lower than those with intermediate and advanced education.
3. Intermediate education: The Employment-to-Population Ratio for individuals with intermediate education has shown a consistent increase over the years, ranging from 55.43% in 2013 to 57.99% in 2018. This group has a moderate employment rate compared to other education levels.
4. Advanced education: The Employment-to-Population Ratio for individuals with advanced education has consistently been the highest among all education levels, with a range of 63.63% in 2014 to 73.13% in 2022. This group demonstrates the highest employment rate, indicating better employment opportunities for individuals with higher educational qualifications.

Based on the analysis, it can be concluded that higher levels of education generally correspond to higher employment rates. It highlights the importance of education in improving employment opportunities and emphasizes the value of advanced education in securing higher levels of employment. Policymakers and individuals can use this information to understand the relationship between education and employment and make informed decisions regarding educational attainment and workforce development initiatives.

Very important indicators relating to the connection between education and labor market mismatch are those that measure the unemployed by education. Several indicators are used to analyze unemployment by education. For more insight and more real analysis of the impact of skills and education on unemployment data for the age 25+ population are used. By that age it is real to consider that most of the population have completed formal education and data can be more comparable by level of education. Analyze have been done using several indicators as **Unemployment rate by education, Combined rate of time-related underemployment and unemployment by education, Combined rate of unemployment and potential labor force by education and Composite rate of labor underutilization by education.**

Figure1. Unemployment rate by education, age 25+, N. Macedonia, 2011 – 2022



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Total	28.63	28.42	26.44	25.58	24.11	21.81	20.32	18.8	15.71	14.87	14.19	12.98
Less than basic	28.96	29.41	32.01	32.98	26.66	23.43	26.1	22.87	23.3	18.97	23.18	15.11
Basic	36.82	36.86	32.9	30.89	29.8	29.17	25.77	23.11	23.19	21.12	22.52	21.36
Intermediate	28.73	28.77	25.88	25.32	23.96	20.98	19.7	18.26	14.1	13.83	13.18	12.93
Advanced	19.48	18.88	20.12	19.77	18.94	17.75	17.28	16.57	13.25	12.98	11.22	8.96

Source: Authors calculation and interpretation based on ILO data, Indicator catalogue, https://ilostat.ilo.org/data/#, accessed on 12.03.2023

Detailed analysis of the data on the **Unemployment rate by the education level (LU1)** for the population aged 25 and above with different levels of education in N. Macedonia (Figure 10) introduces to us following conclusions: The unemployment rate for individuals with less than basic education is generally higher than other education levels. It ranged from 28.96% in 2011 to 23.18% in 2021, with a low of 15.11% in 2022. This suggests that individuals with lower educational qualifications face higher unemployment challenges. The unemployment rate for individuals with a basic level of education ranged from 36.82% in 2011 to 21.36% in 2022. While it has decreased over the years, it remains relatively higher compared to intermediate and advanced education levels. Individuals with an intermediate level of education experienced lower unemployment rates compared to those with less than basic and basic education. The unemployment rate ranged from 20.98% in 2016 to 12.93% in 2022. Those with advanced education consistently had the lowest unemployment rates. The rate ranged from 19.48% in 2011 to 8.96% in 2022, indicating that individuals with higher educational qualifications have better employment prospects.

(1) Overall Trend: The unemployment rate for the population aged 25 and above in N. Macedonia has shown a declining trend from 2011 to 2022, reflecting improving labor market conditions. The overall unemployment rate decreased from 28.63% in 2011 to 12.98% in 2022.
(2) Differences among Education Levels: The disparities in unemployment rates among education levels highlight the importance of acquiring higher levels of education for better employment opportunities. Individuals with less than basic and basic education face higher unemployment rates, indicating the need for educational and skill development programs to enhance their employability.
(3) Limitations: It's important to consider that the unemployment rate is influenced by various factors such as economic conditions, industry-specific dynamics, and structural factors.

The combined rate of time-related underemployment and unemployment **(LU2)** is a measure that combines the rates of underemployment and unemployment to provide a comprehensive view of labor market challenges. It includes individuals who are unemployed and actively seeking work, as well as those who are employed but working part-time or in jobs that don't fully utilize their skills and qualifications. The combined rate of time-related underemployment and unemployment (LU2) is calculated by summing the percentages of time-related underemployment and unemployment for a specific reference area, age group, and time period. Calculating the LU2 rate helps us understand the extent of both unemployment and underemployment, giving policymakers and researchers a more holistic understanding of labor market conditions and the need for policies that address job creation and quality of employment.

The table 3 presents the combined rate of time-related underemployment and unemployment (LU2) for the population aged 25 and above in N. Macedonia, categorized by different levels of education.

(1) Overall Trend: The overall LU2 rate in N. Macedonia for the population aged 25 and above has shown a general declining trend from 2014 to 2022. It decreased from 27.5% in 2014 to 14.7% in 2022, indicating an improvement in labor market conditions.
(2) Differences among Education Levels: Individuals with less than basic education consistently experienced the highest combined rate of time-related underemployment and unemployment throughout the years. The LU2 rate for this group ranged from 35.5% in 2014 to 22.5% in 2022, demonstrating that individuals with lower levels of education face higher challenges in terms of securing adequate employment. The LU2 rate for individuals with a basic level of education ranged from 33.8% in 2014 to 26.3% in 2022. While individuals with basic education faced relatively lower rates compared to those with less than basic education, the rates were still considerable, indicating the need for further improvements in their employment situations. Individuals with intermediate education experienced lower

LU2 rates compared to the previous two education groups. The rates ranged from 27.1% in 2014 to 14.2% in 2022, suggesting better employment prospects for individuals with intermediate educational qualifications. Those with advanced education consistently had the lowest LU2 rates among the different education levels. The rates ranged from 21.1% in 2014 to 9.8% in 2022, indicating that individuals with higher levels of education generally have better employment outcomes.

Table 4. Combined rate of time-related underemployment and unemployment (LU2) (%), N. Macedonia, 2014 – 2022

			Level of education				
Reference area	Age	Time	Total	Less than basic	Basic	Intermediate	Advanced
MKD	25+	2014	27.5	35.5	33.8	27.1	21.1
MKD	25+	2015	25.6	29	32.3	25.2	19.9
MKD	25+	2016	23.6	30.9	32	22.3	19.1
MKD	25+	2017	22	33.8	29.2	20.8	18.4
MKD	25+	2018	20.2	29	26	19.2	17.7
MKD	25+	2019	17.3	27.9	26.2	15.3	14.5
MKD	25+	2020	16.7	22.8	24.4	15.5	14.3
MKD	25+	2021	15.9	29	26.2	14.5	12.4
MKD	25+	2022	14.7	22.5	26.3	14.2	9.8

Source: Calculation based on ILO data, Indicator catalogue, https://ilostat.ilo.org/data/#, accessed on 12.03.2023

The Combined rate of unemployment and potential labor force (LU3) is a measure that combines the unemployment rate with the potential labor force. It provides a broader perspective on the labor market by considering not only the unemployed individuals but also those who are available and actively seeking work. The LU3 rate is calculated by dividing the sum of the unemployed individuals and those in the potential labor force by the total population and multiplying by 100 to express it as a percentage. The potential labor force includes individuals who are not employed but are actively seeking work and available for work.

By including the potential labor force, the LU3 rate offers a more comprehensive view of the labor market, capturing individuals who may be discouraged from actively seeking work or facing other barriers to employment. It helps policymakers and analysts understand the overall labor market dynamics and the extent of labor underutilization in an economy. A higher LU3 rate indicates a higher proportion of individuals facing labor market challenges, including unemployment and underemployment. Conversely, a lower LU3 rate suggests a more favorable labor market situation with a smaller proportion of individuals experiencing difficulties in finding suitable employment opportunities.

It's important to note that the LU3 rate should be interpreted in conjunction with other labor market indicators and factors influencing employment and labor force dynamics to gain a comprehensive understanding of the labor market conditions in a particular reference area.

Table 5. Combined rate of unemployment and potential labor force (LU3) (%), N. Macedonia, 2011 – 2022

			Level of education				
Reference area	Age	Time	Total	Less than basic	Basic	Intermediate	Advanced
MKD	25+	2011	32.5	37.4	40.8	32.7	21.5
MKD	25+	2012	32.8	35.2	42.4	33.1	21.2
MKD	25+	2013	30.1	39.6	37.5	29.4	22
MKD	25+	2014	28.9	42.2	34.8	28.4	21.9
MKD	25+	2015	27.4	33.8	34	27.2	20.7
MKD	25+	2016	25.4	32.8	34.3	24.4	19.7
MKD	25+	2017	23.8	33.5	31.1	23.1	19.1
MKD	25+	2018	23	32.4	29.9	22.1	18.8
MKD	25+	2019	20.7	32.5	29.8	19.3	15.9
MKD	25+	2020	20.8	30.7	29.6	20.2	16.1
MKD	25+	2021	20.2	34	32	19.2	14.6
MKD	25+	2022	17.3	21.2	29.1	17.4	10.9

Source: Calculation based on ILO data, Indicator catalogue, https://ilostat.ilo.org/data/#, accessed on 12.03.2023

The table presents the combined rate of unemployment and potential labor force (LU3) for the population aged 25 and above in N. Macedonia, categorized by different levels of education.

(1) Overall Trend: The LU3 rate in N. Macedonia for the population aged 25 and above has shown a general declining trend from 2011 to 2022. It decreased from 32.5% in 2011 to 17.3% in 2022, indicating an improvement in the labor market situation.
(2) Differences among Education Levels: Individuals with less than basic education consistently experienced the highest combined rate of unemployment and potential labor force throughout the years. The LU3 rate for this group ranged from 37.4% in 2011 to 21.2% in 2022, indicating a relatively high level of labor market challenges. The LU3 rate for individuals with a basic level of education also remained high, although relatively lower than those with less than basic education. The rates ranged from 40.8% in 2011 to 29.1% in 2022, suggesting ongoing difficulties in finding

suitable employment opportunities for individuals with basic education. Individuals with intermediate education had lower LU3 rates compared to the previous two education groups. The rates ranged from 32.7% in 2011 to 17.4% in 2022, indicating a relatively better labor market situation for individuals with intermediate educational qualifications. Those with advanced education consistently had the lowest LU3 rates among the different education levels. The rates ranged from 21.5% in 2011 to 10.9% in 2022, suggesting that individuals with higher levels of education generally faced fewer challenges in terms of unemployment and potential labor force.

The Composite rate of labor underutilization (LU4) is a measure that combines various forms of labor underutilization, including unemployment, time-related underemployment, and potential labor force. It provides a comprehensive assessment of the overall extent of labor market slack or inefficiency. The formula to calculate the Composite rate of labor underutilization (LU4) takes the average of Unemployment Rate, Time-Related Underemployment Rate and Potential Labor Force Rate. This allows for a comprehensive assessment of the overall extent of labor market underutilization by considering multiple dimensions of labor market slack.

Table 6. Composite rate of labor underutilization (LU4) (%), N. Macedonia, 2014 – 2022

			Level of education			
Country	Time	Total	Less than basic	Basic	Intermediate	Advanced
MKD	2014	34	47.4	39.8	33.8	26.3
MKD	2015	31.5	41	37.4	31.8	23.9
MKD	2016	30.1	41.8	38.6	29.6	23
MKD	2017	28.4	44.8	36.4	27.8	22.1
MKD	2018	27.1	40.6	34.5	26.6	21.5
MKD	2019	24.3	38.6	33.2	23.5	18.4
MKD	2020	24.8	36.4	33.7	24.9	18.3
MKD	2021	23.9	41.3	36.1	23.6	16.3
MKD	2022	21.3	31.2	34.9	21.8	12.3

Source: Calculation based on ILO data, Indicator catalogue, https://ilostat.ilo.org/data/#, accessed on 12.03.2023

(1) Overall, Labor Underutilization Trend: The LU4 rate in N. Macedonia shows a gradual decline from 34% in 2014 to 21.3% in 2022. This indicates a general improvement in labor market conditions and a reduction in overall labor underutilization during this period.
(2) Differences Among Educational Levels: Individuals with less than basic education consistently has the highest LU4 rates, ranging from 47.4% in 2014 to 31.2% in 2022. This suggests that individuals with lower levels of education face higher levels of labor underutilization. Individuals with basic education also experience relatively high LU4 rates, ranging from 39.8% in 2014 to 34.9% in 2022. Although the rates are lower compared to those with less than basic education, they still indicate significant labor underutilization among this group. As the educational level increases, the LU4 rates decline. Individuals with intermediate and advanced education exhibit lower rates of labor underutilization, ranging from 33.8% to 12.3% in 2022.
(3) Year-to-Year Changes: The LU4 rates fluctuate annually, indicating variations in labor market conditions and underutilization over time. In some years, such as 2016 and 2021, there are notable decreases in the LU4 rates, signifying improvements in labor market conditions and reduced labor underutilization. However, there are also years, like 2017 and 2020, where the rates show smaller declines or even slight increases, suggesting some challenges in reducing labor underutilization during those periods.
(4) Recent Trends: In the most recent years (2020-2022), there is a consistent downward trend in the LU4 rates, indicating positive developments in the labor market and a decreasing level of labor underutilization. Notably, the LU4 rate for individuals with advanced education shows a substantial decline from 18.4% in 2019 to 12.3% in 2022, reflecting a significant improvement in labor market outcomes for this group.

Overall, the table demonstrates the varying levels of labor underutilization among different levels of education in N. Macedonia. It highlights the importance of educational attainment in reducing labor underutilization and suggests a positive trend of improving labor market conditions over the years, with more significant progress observed for individuals with higher levels of education.

Status in employment and educational mismatch is another inpotrant issue. **Time-related underemployment** refers to a situation where a person who is employed is not able to work the desired or full hours they would like to work. In other words, they have a job but are not working as many hours as they would like or need to work to earn the income they need or to fully utilize their skills and abilities.

This can happen for a variety of reasons, such as a reduction in available work hours, a change in work schedule, or a decrease in demand for their services. Time-related underemployment can also occur when an employee is not given enough hours by their employer, or when they are unable to find additional work to supplement their income. Time-related underemployment can have negative impacts on individuals and their families, including reduced income, financial stress, and difficulties in meeting basic needs. It can also have broader economic consequences, such as reduced productivity and decreased consumer spending.

Table 7. Time-related underemployment (thousands), N. Macedonia, 2014 - 2022

				Level of education			
Reference area	Age	Time	Total	Less than basic	Basic	Intermediate	Advanced
MKD	25+	2014	16.905	0.559	5.65	8.187	2.51
MKD	25+	2015	12.817	0.481	4.604	5.753	1.979
MKD	25+	2016	15.141	1.381	4.848	5.937	2.975
MKD	25+	2017	14.26	1.368	5.468	4.952	2.473
MKD	25+	2018	12.229	1.084	4.498	4.225	2.421
MKD	25+	2019	14.085	0.985	4.729	5.445	2.925
MKD	25+	2020	16.326	0.607	4.682	7.642	3.395
MKD	25+	2021	15.191	0.715	4.885	6.477	3.115
MKD	25+	2022	13.078	0.936	5.326	4.997	1.819

Source: ILO, Indicator catalogue, https://ilostat.ilo.org/data/#, accessed on 12.03.2023

Detailed analysis of the table on time-related underemployment in N. Macedonia, broken down by the level of education, along with recommendations is as follows:

(1) Less than basic education: The number of underemployed individuals in this category ranged from 0.559 thousand to 1.084 thousand throughout the years. It is important to focus on providing skill development and training programs targeted at individuals with less than basic education. These programs can help improve their employability and provide them with opportunities for better employment prospects.
(2) Basic education: The number of underemployed individuals in this category ranged from 4.225 thousand to 7.642 thousand throughout the years. Encouraging vocational training programs and promoting entrepreneurship among individuals with basic education can help them acquire specialized skills and explore self-employment opportunities. Additionally, initiatives to enhance their access to job opportunities and promote job matching can be beneficial.
(3) Intermediate education: The number of underemployed individuals in this category ranged from 4.952 thousand to 8.187 thousand throughout the years. Enhancing the relevance of intermediate education programs by aligning them with the needs of the labor market can improve the employability of individuals in this category. Additionally, fostering partnerships between educational institutions and industries can facilitate work-integrated learning opportunities and internships.
(4) Advanced education: The number of underemployed individuals in this category ranged from 1.819 thousand to 3.395 thousand throughout the years. Promoting research and innovation-driven industries can create more opportunities for individuals with advanced education. Encouraging entrepreneurship and supporting the establishment of startups can also provide avenues for individuals to utilize their advanced skills and knowledge.

It is important to address the underlying factors contributing to time-related underemployment across all education levels. This includes strengthening the linkages between education and the labor market, promoting skill development programs, and fostering an enabling environment for entrepreneurship and job creation. Additionally, improving the quality and relevance of education programs can help individuals acquire the necessary skills to meet the demands of the labor market.

Informal employment is another important issue that have to be exmined in relatiot to the labour market and the level of education. The International Labor Organization defines informal employment as employment that is not regulated, protected or taxed by the government. In other words, informal employment refers to jobs that are not covered by labor laws, social protection schemes, or other forms of employment regulation.

To measure informal employment, the ILO uses a set of criteria that includes the following:

- The nature of the job: Informal jobs are usually characterized by low productivity, low wages, and poor; working conditions. They may be temporary, part-time, or seasonal, and may offer limited or no job security;
- The type of employer: Informal jobs are often provided by small, unregistered, or informal enterprises, which are not subject to labor laws, social security regulations, or taxation;
- The absence of social protection: Informal workers typically do not have access to social security benefits such as health insurance, unemployment insurance, or pension schemes;
- The lack of legal and regulatory protection: Informal workers are often not covered by labor laws and regulations, which means they have little recourse to legal protection in cases of exploitation or abuse.

To calculate the informal employment rate, the ILO uses household surveys to collect data on the employment status of individuals and their working conditions. The survey questions are designed to identify workers who are not covered by labor laws or social protection schemes, and who work in informal jobs. The informal employment rate is then calculated as the percentage of the working population that is engaged in informal employment.

Table 8. Informal employment rate (%), N. Macedonia, 2011 – 2022

		Level of education				
Reference area	Time	Total	Less than basic	Basic	Intermediate	Advanced
MKD	2011	14.8	50.3	33.3	9.9	3.6
MKD	2012	12.4	44.8	25.7	9.7	3.4
MKD	2013	22.2	85.1	49.9	15.8	5.1
MKD	2014	28.1	86.2	59	21.5	9.6
MKD	2015	19.2	73.3	48.4	13.3	3.3
MKD	2016	17.3	75	46	12.8	2.9
MKD	2017	16.9	75.3	46.3	12.5	3.6
MKD	2018	16.2	72.5	43.4	11.9	3.8
MKD	2019	13.8	58.6	35.2	11	3.5
MKD	2020	11.5	60.3	32.9	8.9	2.5
MKD	2021	9.9	60.4	32.7	7.4	2
MKD	2022	10.1	63.2	33.1	7.9	2

Source: ILO, Indicator catalogue, https://ilostat.ilo.org/data/#, accessed on 12.03.2023

Analyzing the data from the table on the informal employment rate (%), we can gain more detailed insights:

(1) Overall Informal Employment Rate: The table shows the percentage of individuals engaged in informal employment in MKD over the years. The rates range from 9.9% in 2021 to 28.1% in 2014. This indicates that a significant proportion of the workforce is involved in informal jobs.

(2) Education Level and Informal Employment: The data is segmented by education level, allowing us to examine the relationship between education and informal employment. Across all years, individuals with less than basic education consistently have the highest informal employment rates, ranging from 33.1% in 2022 to 85.1% in 2013. As education level increases, the informal employment rate decreases, with individuals with advanced education consistently having the lowest rates.

(3) Yearly Variations: There are fluctuations in the informal employment rate from year to year. For example, there is a notable increase in the rate from 2012 (12.4%) to 2013 (22.2%), followed by a gradual decline in subsequent years. These variations may be influenced by economic factors, policy changes, or other factors affecting the labor market dynamics in each specific year.

(4) Education Gap and Informal Employment: There is a significant gap in the informal employment rates between different education levels. For instance, in 2022, individuals with less than basic education have an informal employment rate of 33.1%, while those with advanced education have a rate of only 2%. This highlights the importance of education in reducing the likelihood of engaging in informal employment.

(5) Potential Implications: The high rates of informal employment, particularly among individuals with lower education levels, may indicate challenges such as limited access to formal job opportunities, insufficient labor market regulations, and a lack of social protection measures. Informal employment often entails lower wages, limited benefits, and precarious working conditions, which can contribute to income inequality and hinder overall economic development.

From the provided table, the importance of a workforce with a high level of education can be inferred in the several ways. The data suggests that industries and sectors such as processing industry, information and communications, financial activities, professional and technical activities, and health and social care activities have a significant demand for workers with intermediate and higher education and high-level education. These sectors require specialized skills, advanced knowledge, and expertise, making a highly educated workforce crucial for their success and development. Detailed analyze for the need for skills on the labor market in different sectors can be made based on the data given in table 8.

- Processing industry: The processing industry has the highest expected employment of 4,534, and it requires a significant number of workers with intermediate and higher education (350) and high-level education (334). This indicates that industries involving complex manufacturing processes and technology-intensive operations demand a skilled and educated workforce.
- Information and Communications: The information and communications sector, with an expected employment of 564, heavily relies on workers with intermediate and higher education (518) and high-level education (31). This sector encompasses technology, telecommunications, and software development, emphasizing the need for a highly educated and specialized workforce.
- Financial activity and insurance activities: With an expected employment of 298, this sector requires workers with intermediate and higher education (120) and high-level education (137). The financial industry deals with complex financial transactions, risk assessment, and analysis, highlighting the importance of a well-educated workforce capable of handling intricate financial operations.
- Professional, scientific, and technical activities: This sector, which includes professional services such as legal, engineering, and scientific research, requires workers with intermediate and higher education (44) and high-level education (52). The nature of these professions demands specialized knowledge and skills acquired through higher education.

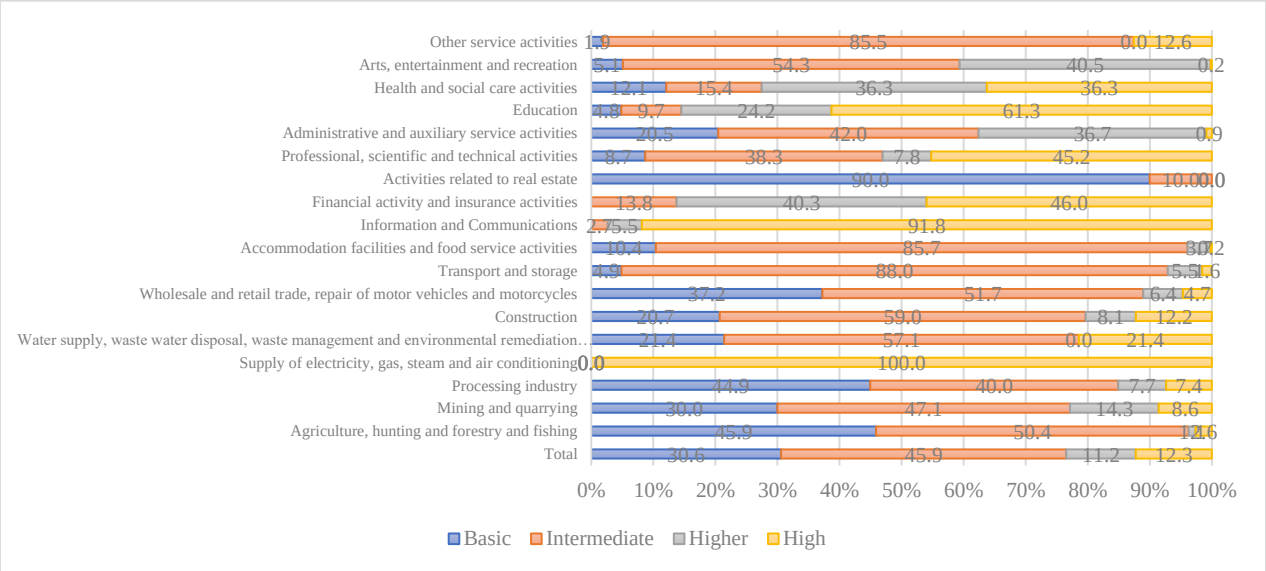
Table 9. Expected employment by occupation and level of education, N. Macedonia

Occupation	Expected employment 2022	Basic	Intermediate	Higher	High
Total	11476	3511	5273	1285	1407
Agriculture, hunting and forestry and fishing	268	123	135	3	7
Mining and quarrying	70	21	33	10	6
Processing industry	4534	2038	1812	350	334
Supply of electricity, gas, steam and air conditioning	4				4
Water supply, waste water disposal, waste management and environmental remediation activities	14	3	8		3
Construction	792	164	467	64	97
Wholesale and retail trade, repair of motor vehicles and motorcycles	2371	883	1226	151	111
Transport and storage	451	22	397	25	7
Accommodation facilities and food service activities	461	48	395	17	1
Information and Communications	564		15	31	518
Financial activity and insurance activities	298		41	120	137
Activities related to real estate	30	27	3		
Professional, scientific and technical activities	115	10	44	9	52
Administrative and auxiliary service activities	572	117	240	210	5
Education	62	3	6	15	38
Health and social care activities	182	22	28	66	66
Arts, entertainment and recreation	529	27	287	214	1
Other service activities	159	3	136		20

Source: Employment Service Agency of The Republic of N. Macedonia, Yearly report 2021, Skopje, 2022

Health and social care activities: The health and social care sector, with an expected employment of 182, places importance on workers with intermediate and higher education (66) and high-level education (66). This sector includes healthcare professionals, nurses, and social workers who require extensive education and training to provide quality care and support.

Figure 2. % of expected employments by education, N. Macedonia, 2022



Source: authors calculation based on data retrieved from the Employment Service Agency of The Republic of N. Macedonia, Yearly report 2021, Skopje, 2022

As seen from the figure, importance of a highly educated workforce can be highlighted for certain sectors in N. Macedonia:

1. Information and Communications: This sector heavily relies on workers with a high level of education, as 91.8% of expected employment falls in the high education category. This indicates the need for specialized knowledge and skills in this field.
2. Financial activity and insurance activities: Similarly, this sector places a significant emphasis on workers with a high level of education, with 46.0% of expected employment in this category. This highlights the importance of a strong educational background in finance and related fields.
3. Professional, scientific, and technical activities: In this sector, 45.2% of expected employment requires a high level of education. This indicates the need for specialized expertise and knowledge in professional and technical fields.

4. Health and social care activities: In this sector, 36.3% of expected employment falls in the high education category. This underscores the importance of highly educated healthcare professionals to provide quality healthcare services.
5. Water supply, waste water disposal, waste management, and environmental remediation activities: This sector also has a significant demand for workers with a high level of education, with 21.4% of expected employment falling in this category. This suggests the need for expertise in environmental sciences and waste management.
6. Activities related to real estate: While not explicitly mentioned in the table, the sector shows a high percentage (90.0%) of expected employment in the basic education category, indicating a potential lack of emphasis on high education. However, it's worth noting that the real estate sector can benefit from professionals with high-level knowledge in areas such as property valuation, urban planning, and real estate finance.

These findings emphasize the importance of a highly educated workforce in sectors such as Information and Communications, Financial activities, Professional and scientific activities, Health and social care, and Water supply and waste management. Investing in education and fostering a skilled workforce can contribute to the growth and development of these sectors in N. Macedonia.

3. Conclusion

The degree of acquired education and employment are key factors in the life of each individual, and it is undeniable that there is a strong correlation between these categories. Education equips individuals with the necessary skills for the labor market, while employment provides financial stability and expediency. The mismatch between education and employment can have negative consequences for individuals and society, leading to underemployment, skills shortages and social inequality. Addressing this mismatch requires aligning the education system with the needs of the labor market and providing opportunities for training and lifelong learning.

Education and labor market indicators highlights the connection between education and the labor market in N. Macedonia. Data suggests a correlation between education and employment opportunities. The numbers of individuals with intermediate and advanced education levels have shown fluctuations over the years. This indicates progress in higher education enrollment and the development of a skilled workforce. Continued investment in tertiary education and professional development opportunities can further strengthen the pool of skilled workers. However, there is still a need to address the population with limited educational qualifications and ensure equitable access to quality education. The employment-to-population ratio by education indicates that individuals with higher levels of education tend to have higher employment rates, emphasizing the importance of education in securing employment.

To strengthen the connection between education and the labor market, the research offers several recommendations. These include enhancing basic education, improving skills development programs, and expanding higher education opportunities. Addressing disparities in education and ensuring equitable access to quality education are also crucial steps. Additionally, promoting lifelong learning and supporting individuals with limited educational qualifications can help bridge the education-employment gap. Regarding the status in employment and educational mismatch, time-related underemployment is highlighted as a situation where employed individuals are unable to work desired or full hours, leading to reduced income and economic consequences. Recommendations include skill development and training programs for individuals with less than basic education, vocational training and entrepreneurship promotion for those with basic education, relevance enhancement of intermediate education programs, and promotion of research and innovation-driven industries for individuals with advanced education. In terms of informal employment and education, the concept of informal employment is defined as unregulated, unprotected, and untaxed employment. The analysis of data from N. Macedonia reveals fluctuating informal employment rates, with individuals with less than basic education consistently having the highest rates. Recommendations include policies to improve access to quality education, skill development programs, labor market regulations, social protection measures, and the formalization of small enterprises.

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