

SKILLS MISMATCH MEASUREMENT IN SERBIA

Report written by Vladimir Vasić, PhD for the European Training Foundation.

The contents of this report are the sole responsibility of the author and do not necessarily reflect the views of the ETF or the EU institutions.

© European Training Foundation, 2019

Reproduction is authorised, provided the source is acknowledged.

ACKNOWLEDGEMENTS

This report was prepared for the European Training Foundation (ETF) by Vladimir Vasić, PhD, Economic Faculty of the University of Belgrade, with support from Ben Kriechel and Tim Vetter, Economix Research & Consulting. ETF experts Cristina Mereuta, Lida Kita and Mircea Badescu provided suggestions for revision and completion of the analysis and reviewed the final version of the report.

The document was shared with the Serbian authorities in the fields of education and training, employment and statistics, for comments. The ETF and the research team would like to thank the national institutions for their invaluable assistance and support in the process of country data collection and analysis.

CONTENTS

ACKNOWLEDGEMENTS	3
INTRODUCTION	5
1. CONTEXTUAL INFORMATION	8
1.1 Country context and institutional background	8
1.2 Developments in skills demand and supply: Analyses and key findings	14
2. DATA SITUATION	16
3. INDICATORS OF SKILLS MISMATCH: INTERPRETATION AND DISCUSSION	18
3.1 Unemployment rate and unemployed/employed ratios	19
3.2 Coefficient of variation by skills	27
3.3 Variance of relative unemployment rates (by education level)	30
3.4 Occupational mismatch	30
3.5 Over- and under-education using the empirical method	31
3.6 Relative wages	33
CONCLUSIONS	35
ANNEXES	39
Annex 1. Data used/provided	39
Annex 2. Additional figures and tables	40
LIST OF ACRONYMS	55
LITERATURE	56

INTRODUCTION

This report looks into the incidence of skills mismatches in the Republic of Serbia (hereafter referred to as Serbia). In 2017, the European Training Foundation (ETF) initiated a skills mismatch measurement project in the ETF partner countries with two objectives: (1) to identify regular data sources; and (2) to develop and test a series of indicators fit to capture various angles and implications of skills mismatches. Skills mismatch is recognised as one of the major challenges by policymakers and stakeholders in education and employment. In transition countries, like Serbia, mismatches are consequences of economic restructuring, technology advancement and demographic factors such as ageing and outmigration.

Using a combination of international and local expertise and in consultation with national stakeholders, the ETF aimed at definition and testing of a methodological approach to measuring skills mismatches adapted to the context of selected countries (namely transition or developing countries), while ensuring as much comparability as possible across countries and with European or similar international research.

In the first phase, four partner countries were selected – Serbia, Georgia, Egypt and Morocco, while in the second phase, the project included North Macedonia, Montenegro and Moldova. Country-specific analyses were developed to contextualise skills mismatch measurement for each country, and a cross-country report complements country findings and further delves into methodological aspects and potential to replicate such initiatives in other ETF partner countries.

The ETF intends to share with participating partner countries an easy to update template for skills mismatch measurement to support continuation or replication of such practice on a regular basis. A deeper knowledge of the nature and incidence of skills mismatch, including contextualisation (e.g. socio-economic aspects, labour regulations, job-matching services), would help countries to better target their efforts to match supply with demand via education, training, employment and other policy interventions. Such analytical exercises may also help institutions and partners to assess the effectiveness of their skills policies.

As regards the working methodology within the project, the ETF and research team selected a number of indicators from international practice and previous attempts to analyse skills mismatches. The choice of indicators was also guided by the feasibility to collect this on a regular basis and without significant investment in data generation, given each country's capacity and data availability.

A skills mismatch is mostly measured by proxy in the current project. Education and occupation are proxies for the skills taught and the skills required in a job. A skills mismatch in the current context entails a mismatch in the level of education or skills with those required in the job position/occupation, the so-called vertical mismatch, but it also includes a horizontal mismatch in which the types of skills do not match the job requirements even though the overall education level does match.

The phenomenon of skills mismatch is complex and therefore difficult to capture. An expanded set of indicators needs calculation and analysis from multiple angles. The adequacy of selected skills mismatch indicators in its practical application within ETF partner countries was the subject of the project underlying this report. To this end, an empirical study has been carried out to assess relevant data availability and reliability in the selected partner countries. The reliable data sets available in Serbia allowed for calculation of different skills mismatch indicators.

The key mismatch indicators (or clusters of indicators) calculated and discussed in this report are as follows: structure of unemployment, proportion of unemployed versus employed, coefficient of variation (by various dimensions), variance of relative unemployment rates, occupational mismatch, over-education and under-education using the empirical method, and relative wages across education levels.

There are multiple institutions and actors that might be interested in mismatch indicators. For example, governments might have an interest as skills mismatches lead to significant economic and social costs. From a macroeconomic perspective, a skills mismatch contributes to structural unemployment and low productivity, leading to no or slow gross domestic product (GDP) growth and reduced competitiveness.

Both the education system and public employment services can react to and address emerging skills mismatches looking at intensity, dimensions and affected groups. Active labour market policies can be geared towards overcoming or alleviating the causes and consequences of skills mismatches, mainly from a remedial perspective. Such policy interventions could be coupled with overall education and training reforms for improved relevance, for example through a closer connection between skills development processes and (future) labour market demand and social context. This would enhance a preventive approach to skills mismatches, saving resources, providing graduates with better chances for employment and sustaining productivity gains.

Tackling emerging skills mismatches could also be a topic of social dialogue. Employers' associations and trade unions are key sources for early signalling of supply–demand imbalances, and they are also able to negotiate actions for addressing skills shortages and help education and training systems deliver relevant skills to the labour market. Since skills are also developed in a work context (e.g. on-the-job training and continuing training for employees), inclusion of social partners in discussing and addressing skills mismatches would enhance the timeliness and adequacy of such lifelong learning opportunities.

Finally, skills inadequacy or insufficiency is often triggered by skills obsolescence due to high incidence and long spells of inactivity, unemployment, underemployment and precarious employment, including in informal contexts. In many countries, including Serbia, such precarious participation on the labour market and skills utilisation is often linked to poverty, low mobility, disability and many other factors that raise the risk of social exclusion.

Chapter 1 presents key background information on Serbia's economy, labour market, and social and demographic aspects. This is essential for contextualising the discussion on skills mismatch and avoiding insufficient or biased interpretations. The data situation, sources and aspects of comparability are explored in Chapter 2. Serbia is in a good position after sustained reforms and efforts to bring key labour market and economic statistics in line with international and European standards. Calculation results and findings in this report are based on the ETF's excellent cooperation with the Serbian authorities in the fields of employment, education and statistics. The Statistical Office of the Republic of Serbia (SORS) and the National Employment Service (NES) provided access to databases (e.g. labour force surveys (LFS), job vacancies, registered jobseekers), helping the research team to gather detailed (micro-level) data and understand coverage and comparability aspects. The ETF team and the external experts involved in this analysis are grateful for this support.

Chapter 3 discusses the relevance and results for each selected skills mismatch indicator (or cluster of indicators), while the last chapter summarises key conclusions and hints at main policy implications.

As the main objective of this ETF initiative was to develop a feasible (and replicable in other ETF countries) approach to skills mismatch measurement and analysis, the proposed conclusions do not dig extensively into policy implications. To get a better insight into how to respond to skills mismatches would require, for example, a wider analysis of education, training and employment systems, including into available resources and capacity, efforts to modernise initial education and expand continuing training, and a review of the role of sector skills councils. Nevertheless, the report's findings suggest the most important avenues for further action.

We hope the results of this attempt to measure the skills mismatches in Serbia, using available data (e.g. data produced on a regular basis), will inspire the continuous effort of Serbian policymakers and stakeholders to consolidate the research of skills needs and future requirements, on the one hand, and enhance complementary policies and programmes, on the other hand.

1. CONTEXTUAL INFORMATION

1.1 Country context and institutional background

Demographic and economic trends

Serbia has a long trend of population decline, with a continuing decrease since 1981. In the period 1981 to 1991, the overall decrease was 1.73%. The decrease in population between the two most recent censuses, i.e. between 2002 and 2011, averaged 0.47% per year. In more recent years, the population decreased from 7 131 787 in 2014 to 7 058 322 in 2016. The underlying reasons for the population decline in the past 30 years lie in several demographic factors, including mortality rates and emigration.

Slow improvements have been registered in fertility rates and life expectancy since the last census (2011). The fertility rate has slowly increased from 1.4 births per woman in 2011 to 1.5 in 2016. Expected lifespan of both men and women increased by one year between 2011 and 2016. In 2016, life expectancy at birth of men and women was estimated at 73 and 77 years, respectively. According to the ageing index, the Serbian population is getting older, leading to an increase in the age dependency ratio. This ratio was 46.3 in 2011, and it increased to 50.3 in 2016. The projected trend of population development is expected to be negative¹. This, together with the impact of an ageing population, will negatively affect the size of the workforce.

Over the last few years, particularly in 2015 and 2016, the Serbian economy registered important economic growth after several years of turbulent dynamics², including positive changes in employment and stable and decreasing inflation. Economic growth measured by real GDP growth was 0.8% and 2.8% in 2015 and 2016, respectively. In 2016, real GDP returned to 2013 levels, when the rate was 2.6%, the largest rate measured after the 3.1% drop in 2009 caused by the post-crisis recession. In 2015, GDP growth was reduced primarily due to negative developments in the agriculture sector (unprecedented drought), which significantly contributes to the overall GDP; in 2016, GDP gradually increased thanks to rising investments, a recovery in manufacturing and a boost in exports (Government of the Republic of Serbia, 2017).

Overall, it seems that 2014 was a turning point in the economic dynamics of Serbia, showing consistent signs of recovery and moving out of the post-2008 crisis. For this reason, the skills mismatch analysis focuses on 2014 to 2016 data only. It seems that the economic growth pattern after 2014, including key sectoral trends and adjustments (e.g. unemployment rates), will have a long-term impact on labour demand dynamics in Serbia. For example, the 2.8% GDP growth in 2016 was the largest since the crisis in 2008. The main driver of economic growth in 2016 was net exports. Export and processing industries accelerated relatively strongly over the year.

On top of the key economic developments, described above, it should be noted that the Serbian government is focused on reducing the fiscal deficit (for example, in 2015, it was brought to under 3% of GDP) and addressing the grey/informal economy. Public debt was reduced to 74.1% of GDP in 2016, and austerity measures were undertaken with the aim of boosting investment. The International

¹ See SORS (2014) for official projections.

² For example, in 2014 GDP decreased by 1.8%, mainly due to the catastrophic economic (and social) impact of the floods in the spring. The floods negatively affected the mining and electricity production sectors in the second half of 2014.

Monetary Fund rated positively the results of fiscal consolidation and pace of structural reforms (IMF, 2017). However, it may be noted that in certain areas – especially in public sector restructuring and law enforcement – reforms are rather slow and might inhibit further improvements in the environment for private investments.

Achievement of inclusive growth goals would require higher labour market participation rates, coupled with resolute actions to tackle poverty, particularly in-work poverty. The poverty rate, measured as USD 5.5 per day in 2011 purchasing power parity, was 23.5% in 2016. It is expected that this rate will gradually decrease to 21% by 2019 (World Bank, 2017a, p. 94). Social policy challenges remain and could be addressed through better targeting those with social needs and promoting their wider inclusion³.

Education

In a snapshot, the education system in Serbia is organised on (pre-)primary, secondary and tertiary levels, starting from pre-primary education and ending with university and post-university studies. Serbia uses International Standard Classification of Education (ISCED) 2011 for education and other related statistics. It seems the non-compulsory status of the (upper) secondary education directly influences the compatibility of youth competencies with labour market needs, causing a higher incidence of unemployment rates among young persons and lower chances to develop skills and competencies within a lifelong learning context (as most skills upgrading/retraining opportunities require a minimum education attainment at upper secondary level).

In a move to improve school performance at entry and throughout the full course of studies, the education system includes a minimum nine-month preparatory phase prior to entry into primary education. Pre-school children attend such education in kindergartens, and latest SORS data shows that 98% of children attend such pre-school preparatory classes⁴ (SORS, 2018b). Compulsory education lasts eight years (primary and lower secondary education, according to international terminology), with over half a million pupils enrolled in the 2017/18 school year. Serbia is not confronted with a particular challenge in school attendance and education attainment (e.g. relative low dropout and early school leaving rates), but issues like quality in education remain. For example, the latest available Programme for International Student Assessment (PISA) results reveal problematic performance for pupils at the end of lower secondary education⁵.

Serbia's education strategy prioritises actions to improve teacher/pupil ratios, revisit and update teaching material, carry out school refurbishment, and promote an inclusive approach towards children (and families) struggling with poverty and pupils with disabilities. More recently, the government initiated measures to develop Information Technology (IT) skills in younger pupils (in some cases, collaborating with the business community). Population decline will continue to influence the numbers of pupils enrolled in (pre-)primary and secondary education. Beyond restructuring school infrastructure or the number of classes, for example, such developments may also help with the implementation of enhanced approaches to education inclusiveness and quality (human, financial and material resources are required for such objectives).

³ For more details, see World Bank (2017b)

⁴ Overall pre-school education (children aged three and over) coverage was almost 60%.

⁵ According to the OECD PISA 2012 assessment, 33% of students aged 15 are low skilled in reading, 35% are low skilled in science and 39% are low skilled in mathematics (i.e. below Level 2 on the PISA scale).

Serbia's upper secondary education (ISCED 3) is organised in two main streams: (1) general education (general high schools) in which around 26% of students are enrolled; and (2) vocational schools, offering three- and four-year vocational education and training (VET) programmes and attracting three quarters of secondary education students.

General oriented programmes and four-year VET programmes lead to an award/certificate that allows continuation of studies at tertiary/university level. The three-year VET programmes do not allow upward movement to the next level of education and are, therefore, less attractive (enrolment figures have diminished over the last few years). Data for the VET stream of education shows that most students study economics, law and administration (13.3%), electrical engineering (10.9%), health and social welfare (9.6%), machinery and metal processing (8.7%) and trade, catering and tourism (8.1%) (SORS, 2018a).

Of the major study programmes, the most competitive enrolment process is in health/medical schools, followed by economics, law and administrative studies. Trade, catering and tourism seem to be less attractive, possibly reflecting a certain perception among students (and their parents). Most probably, wages and working conditions (e.g. seasonal employment, informality) within these sectors may lead to a negative perception and lower preference in educational options. Over the longer term, the lower enrolments in trade and hotelier/restaurant/catering fields of study will fuel skills shortages in economic sectors with growing potential in both Serbia and the wider region.

Provision and enrolment in post-secondary (non-tertiary) education is extremely limited in Serbia (SORS, 2017a), although transition studies are available. The experiences of other European countries reveal that post-secondary VET graduates enjoy a smoother pathway to employment, including better-matched skills to jobs. Statistical sources show participation of about 1 300 students in post-secondary studies, mostly in study streams related to metal processing, electrical engineering, trade, catering and tourism, and transport.

Employers' perceptions and research available reveal a weak relevance of VET studies for the labour market demand in Serbia, where practical skills are the main requirement. Overall enrolment policy will need adjustments in line with future skills requirements. A number of policy initiatives aim to make VET (and the overall skills development process) more relevant to the labour market and societal needs in Serbia, such as promotion of dual education (stimulating participation of companies in the training process), development of the national qualifications framework, and sustainable establishment of sectoral skills councils.

As regards dual education, the government has created a commission to develop and implement it. In addition, a new VET enrolment policy has been set up for the school year 2018/19. As part of the dual education model, a number of key issues have been identified for the creation/selection and implementation of profiles: responsiveness to the economy and the labour market; needs of the local self-government where the school is located; and school interest and capacities in implementing a certain profile. The involvement of companies in dual education is strong; over 600 companies have hosted students to 'learn through work'. Some 84 secondary vocational schools offered dual education in 2018/19. The legal basis for the implementation of the national qualifications framework was adopted at the end of 2018. Its main objective is to link education and labour market needs, thus ensuring higher relevance of the qualifications and skills acquired through education, improving the quality of and trust in the education system, and enhancing the employability of the workforce.

Serbia has successfully joined the Bologna Process related to the tertiary education system, which is now organised in three cycles that correspond to ISCED levels five to eight. The first cycle represents basic academic studies, which consist of three to four study years, and currently enrolls over 75% of students. The second cycle (master's-level degrees) attracts around 18%, while the third cycle (PhD studies) includes up to 5% of the total number of students in Serbia (SORS, 2017b). Science, technology, engineering and mathematics study fields are rather under-represented in total enrolment, with around 30% of students choosing natural sciences, mathematics and statistics; information and communication technologies (ICT); and engineering, manufacturing and construction⁶. As studies, employers' opinions and public debates in Serbia reveal, tertiary education suffers from a loose connection to labour demand, research and innovation or other key sectors that would attract university graduates. The main drawbacks seem to be traditional teaching methods, obsolete curricula, limited opportunities to gain practical skills and insufficient integration of university research and innovation (there are initiatives to build/consolidate such hubs).

The educational attainment of the total workforce in Serbia is dominated by those with a medium level of education⁷ (over 50%), while those who have completed a high level of education account for around 25%. Although there is a positive relationship between the level of education and the probability of labour market participation, insufficient relevance of skills acquired in upper secondary and tertiary education leads to a lengthy school-to-work transition. Most recent transition studies done in Serbia point towards difficult entry into the labour market. According to the International Labour Organisation's (ILO) 2015 school-to-work transition survey, it takes a graduate over 23 months to find the first job deemed either stable or satisfactory (Marjanović, 2016). Also, young people who finished primary education (or those who left before completing it), secondary general education or higher education experienced more problems with the transition from school-to-work than, for instance, those who completed secondary vocational education. This might imply that the labour market needs technical rather than general skills and knowledge. While Serbia still faces difficulties in absorbing young graduates due to insufficient demand, other aspects hindering youth employment include insufficient practical skills and work experience and low quality of employment.

Continuing training measures may counteract some of these initial education shortcomings. Although participation in lifelong learning has seen a slight increase, the share of persons aged 25 to 64 in education or training remains stubbornly around 5%.

Labour market

Since 2014, the labour market situation has been improving, with an overall decrease in unemployment and increased activity and employment rates. The latest annual LFS results in Serbia show positive trends in employment for 2017, but at a lower growth pace compared to 2016 (SORS, 2018c). The number of employed increased by 75 300 in 2017, compared to a 145 200 increase registered in 2016. The total unemployment rate dropped as well by 1.8 percentage points, reaching 13.5% in 2017, while the inactivity rate slightly decreased by 0.7 percentage points. Both employment growth and the decline in total population fuelled the positive trends in key labour market indicators.

⁶ Enrolment, completion and relevance to labour market of tertiary education in Serbia (and other Western Balkan countries) is extensively discussed in the study *From university to employment* (DG EAC, 2017).

⁷ Low, medium and high levels of education correspond to ISCED 0–2, ISCED 3–4 and ISCED 5–8 levels, respectively.

As discussed above, young people face a particularly unfavourable position when it comes to entry and participation on the labour market. Nevertheless, the overall improving economic context (coupled with population decline) has contributed to a rise in employment and consequently lower unemployment and inactivity rates. The youth unemployment rate dropped to 31.9% in 2017 (3.0 pp lower than 2016), while the share of young people not in employment, education and training has decreased to 17.2% (one of the lowest in the region). High unemployment (and inactivity) rates are not significantly linked to poor education attainment as the early school leavers share in the population aged 18 to 24 was 6.2% in 2017.

The labour market in Serbia, by typology of contractual arrangements, is dominated by open-ended and full-time labour contracts (over 77% of employees worked on an open-ended contract in 2017). However, the market remains rather dual – while almost 80% of employees aged 25 to 64 enjoy a permanent job, only 42% of young people (people aged under 25) have such contractual arrangements. Another aspect of duality is formal versus informal employment, which again shows improving trends in Serbia. Depending on the definition of formal/informal employment (strict or less strict definition), the informal employment rate ranges from 20.7% to 27.6% in 2017, but overall there is a constant decrease in numbers of informal workers. The drop in employment in agriculture (a sector still dominated by informal contractual relationships, e.g. contributing family members) may partly explain this trend.

From a sectoral and occupation perspective over the last few years, economic restructuring and growth of new sectors, such as ICT, have shaped the number and share of people employed in various sectors. The latest data shows, as stated above, a decrease in people employed in agriculture and, consequently, in occupations included in International Standard Classification of Occupations (ISCO) group 6 (skilled agricultural, forestry and fishery workers). This trend is not necessarily negative, as the agriculture sector still needs to gain efficiency, employing around 20% of the workforce but contributing just 8% to GDP. LFS 2017 data shows an increase in people employed as plant and machine operators, and assemblers (ISCO group 8) and professionals (ISCO group 2). The manufacturing sector recorded the highest increase in 2017, against a backdrop of employment increases in most economic sectors.

The spatial/territorial distribution of growth and employment opportunities is essential in addressing skills mismatches. A macro analysis of supply–demand mismatches is definitely insufficient for designing targeted education, employment and other matching support policy measures. From a territorial (and sectoral) perspective, the incidence and profile of mismatches differs significantly. Serbia, like many other countries, features regional discrepancies in employment and unemployment, with some regions acting as ‘growth poles’ (e.g. the region of Belgrade) while other zones struggle with obsolete industry and underdeveloped services or infrastructure, and hence are less attractive for investments. The urban-rural divide in labour market participation and profile of economic activities is also significant in Serbia. If we factor in rather low internal mobility⁸, there are significant risks of deepening skills shortages or oversupply in certain regions/cities. Serbian authorities, at both central and regional/province level, are trying to address such discrepancies with targeted stimulation of economic development and innovation, such as through regional industry hubs. For example, Serbia participates in the EU-led Smart Specialisation Platform⁹, has set up a network of regional

⁸ SORS published data on internal mobility reveals that only 35% were active out of those who changed their residence from one municipality or region to another during 2017. The Belgrade region and Vojvodina register positive internal migration, while regions like Šumadije and Zapadne Srbije and Južne and Istočne Srbije reveal a negative score.

⁹ For more information, see: <http://s3platform.jrc.ec.europa.eu/serbia>

development agencies, and strives to include a regional dimension in its implemented policies. In the field of employment, for example, regional stakeholders are invited each year to design regional employment programmes to support the implementation of local action plans for employment.

One reaction towards low demand or insufficiently attractive work conditions (particularly salaries) is emigration (external mobility), especially among people with qualifications and skills allowing them to easily get work abroad, with more attractive wages than those they would earn in Serbia. This holds especially true for those who have completed engineering and computer science degrees. The outflow of a highly educated workforce with technical skills is seen, by now, as a serious problem for the Serbian labour market.

As mentioned above, certain groups are less likely to be employed; young people and women account for prominent gaps, followed by older workers. Social and labour market vulnerability is in most cases triggered by an accumulation of disadvantages such as low education attainment, poverty, living in rural areas, belonging to ethnic minority groups (e.g. Roma), or having a disability or lower work capacity. Although low demand has to date been the most dominant aspect of economic dynamics in Serbia, the situation might change in the future, as economic growth is forecast to continue. Coupled with a continuing decline in population (and increased emigration), raising employment levels among groups that were traditionally not economically active could be prioritised to address emerging skills shortages and keep the positive momentum for economic development and competitiveness.

Wage-setting mechanisms and evolution of the minimum wage (plus working conditions) influence significantly the matching process, as workers may prefer higher salaries or better working conditions at the expense of a match between skills and job. Serbia is continuing its macro fiscal stabilisation plan, with a primary goal to keep public sector wages and pensions at a certain level relative to GDP (IMF, 2017). Starting in 2016, a rise in wages (in both public and private sectors) was registered, after a number of years of stagnation. The minimum wage in Serbia is set through tripartite negotiations between the government, employers and trade unions. Given the austerity context, there was no increase in the minimum wage between 2013 and 2016. Beginning 2017, the minimum wage rose, and now amounts to around two fifths of the average wage. The ratio of minimum wage to value added per worker remains in the regional average, as shown in the World Bank's Doing Business 2018 report (World Bank, 2017c).

With regard to labour legislation, the 2014 labour law reform included regulatory changes in duration of fixed-term contracts and probationary periods for new employees. Another aspect of more flexible labour relations is agency work (i.e. employing workers on temporary/short-term assignments) which seems to have gained prominence, particularly for low-skilled jobs or in foreign-owned companies.

The Ministry of Labour, Employment, Veteran and Social Affairs and the National Employment Service (NES) are tasked with the design, implementation and monitoring of employment promotion policies and programmes in Serbia. The National Employment Strategy 2014–2020 and annual action plans for employment are the leading strategic and operational priorities in employment and skills development for jobseekers.

The NES gives priority to assisting people facing difficulties in finding employment, particularly young people, laid-off workers, people with disabilities, and those with no qualifications, as well as long-term unemployed people. Support for jobseekers is provided in line with each person's profile, particular needs and potential opportunities in the labour market. For example, jobseekers with qualifications/skills that are demanded in the labour market or those who display higher employability potential can benefit

from guidance, counselling and job-matching services. Training, retraining and other skills development measures are geared towards unemployed people with obsolete qualifications. A complex activation package is offered, such as personalised counselling, subsidised employment schemes and public works opportunities, to the most vulnerable jobseekers, those experiencing long unemployment spells, or people from difficult socioeconomic backgrounds. The monitoring and evaluation of active labour market programmes are carried out on a regular basis and the findings are fed into the efforts to improve their quality and effectiveness. Insufficient resources (e.g. funding, public employment service staff) and jobseekers' coverage remain points of concern (European Commission, 2018).

The low skills level of the adult population (both unemployed and inactive) hinders employment opportunities and upward career prospects. Although the younger generation shows higher levels of education attainment, the population decline calls for an adult-focused distribution of training/retraining opportunities. Vulnerable groups, such as Roma or people belonging to other ethnic minorities, people living in rural, remote or declining cities/regions (e.g. de-industrialised areas), and people with disabilities, would benefit from remedial/second chance education and continuing training. Children and young people under the age of 18 and families with three or more dependent children are prominently exposed to the risk of poverty or social exclusion (Survey on Income and Living Conditions, 2016). Given the wide array of social exclusion risks, education and skills development should be coupled with decisive and wider policy measures to ensure a socially cohesive society and inclusive growth.

Structural reforms, particularly restructuring and privatisation of state-owned enterprises, would further influence the labour market, for example through lay-offs, job destruction, and demand in new economic branches, mainly driven by private sector expansion¹⁰. Entrepreneurship is a priority policy area for the government as it is seen as a strategy to secure new employment opportunities, for young people especially, and diversification of the company profiles in the country with a move from very large to medium and small-scale enterprises. Such changes will not only influence technical skills requirements, but will also call for a change of education paradigm to provide a wider set of skills, particularly entrepreneurial and digital. Such (initial and continuing) education transformation applies equally to the government's ambition to enhance elements such as the digitalisation of the economy and public administration.

1.2 Developments in skills demand and supply: Analyses and key findings

The labour market information system in Serbia includes multiple actors and sources of data. Data produced and disseminated by the SORS, the ministries of education and labour and the NES are of particular importance. A number of research institutes and think tanks are also producing economic, labour market and education analyses that feed into policymaking. It is expected that sector skills councils will work on the identification of skills trends and occupational changes, specific to each sector¹¹, and provide input to evidence-based development of qualification standards.

¹⁰ This is a reflection of how Serbia and other countries from Central, Eastern and South Eastern Europe are transiting from a centralised economy, with large companies and industry based, to a market economy, where services dominate and new industries emerge (e.g. IT).

¹¹ The recently adopted Law on the National Qualifications Framework and the EU Instrument for Pre-accession Assistance (IPA) will enhance sectoral capacity for occupational demand, which will need to be reflected in qualifications standards development and subsequent adjustment of education and training programmes.

Since 2011, the NES has been conducting an annual employer survey. The survey is considered reliable and representative: it includes active companies employing 10 or more people; a stratified sample is used, which is determined by number of employees, economic sector and geographical distribution. Self-employed people and micro companies are excluded as this would make the sample size too large and could lead potentially to low response rate. The field research is conducted each November by NES staff (branch level). Data collection, cleaning, storage and interpretation is coordinated at the NES headquarters. Results and findings of the survey guide planning and targeting of active labour market measures (set out in the Annual Action Plan for Employment) and, hence, contribute to addressing mismatches between supply and demand of qualifications, competences and skills.

The NES survey allows calculation/projection of occupational needs for the year ahead; for example, for 2017, increased demand was forecast for service and sales workers (ISCO 5), plant and machine operators, and assemblers (ISCO 8), professionals (ISCO 2) and technicians (ISCO 3). In terms of recruitment problems, employers highlighted insufficient knowledge and skills, lack of work experience and supply shortages, i.e. insufficient job applicants. It seems such shortcomings are common for all economic sectors, and therefore more resolute policy actions are recommended to enhance skills relevance and provide practical/work experience opportunities, particularly to young graduates.

As discussed in the sub-section on education, when analysing the school-to-work transition, it seems that skills gained by students during their education are inadequate for the workplace. This might be predominantly caused by outdated curricula, insufficient practical learning and support prior to and during the transition phase (such as career guidance and counselling in and post school, internship/apprenticeship opportunities, active employment measures targeted at young graduates' needs, and insufficient social services and protection for those at social risk).

Research on graduates' transition to the labour market has so far been limited to periodical school-to-work transition studies, such as the ones led by the ILO, in collaboration with the SORS, or the European Commission's Directorate-General for Education and Culture's study on university graduates' pathways towards employment. To date, Serbia does not have in place a system of regular monitoring of education outcomes (i.e. tracer studies), such as graduate employment or overall labour market status; use of skills in the workplace; and difficulties encountered during the job-searching phase or strategies to find employment. A pilot graduate tracking study is currently being implemented (2018) with the aim to make this practice mainstream in future.

A previous analysis of skills mismatch in Serbia and other countries in the region can be found in the study *Labour market and skills in the Western Balkans* (Arandarenko and Bartlett, 2012)¹², led by the Foundation for the Advancement of Economics and LSEE. Data and findings presented in the study include the ETF's data and analysis of skills mismatch (ETF, 2012). According to the study, a skills mismatch tends to be more persistent in transition countries (Serbia included) compared to developed countries. Such a finding could be attributed to: (1) rapid speed of technological change (particularly driven by the economic restructuring process); (2) a difficult or poor investment climate and uncertainty about the future could trigger a 'prudent' attitude of employers towards investing in their employees' skills development (hence limited or even non-existent on-the-job training, particularly in informal contexts); (3) long-term unemployment spells and higher risks of skills becoming obsolete; and (4) low access/provision of lifelong learning opportunities.

¹² The study used the variance of relative unemployment rates indicator for the period 2005 to 2010.

2. DATA SITUATION

As the main data source, this report uses the microdata from the national LFS, which is carried out in Serbia by the SORS. LFS data can be considered reliable and representative. National classifications that are used are all compatible and consistent with European and international classifications. The only disadvantage is that the NES does not use, at this moment, the ISCO-08 international classification for occupations; instead, it uses a national classification. There are plans to revise the classifications used for the employers' survey and other statistical products of the NES.

The research team made a choice to use 2014 to 2016 data derived from the LFS, as Serbia completed its statistical standards harmonisation in 2013 and since 2014 has been producing fully harmonised data. Another reason to limit the time span to 2014 onwards was to capture the most recent economic dynamics, with reversed trends after years of decline (post-economic crisis of 2008) and stagnation. There were some minor comparability issues between 2014/15 and 2016 (e.g. different classification of field of education) but the slight deviation was addressed in the research. The data collection process required a comparatively high amount of coordination as microdata was only made available to the ETF local expert.

Overall, the Serbian LFS provides sufficient detail to analyse the skills mismatch. Alongside the LFS, two additional data sets were available and used in the skills mismatch calculation and analysis.

The ILO school-to-work transition survey (SWTS), done in Serbia in collaboration with the SORS, was carried out in 2015 (results published in 2016) and captures in detail the pathway from education to the labour market (employment, unemployment, inactivity, further education) among young people aged between 15 and 29. SWTS 2015 contains many standard labour market-related variables (e.g. place of work, occupation, hours worked, work contract information, wages). Extended information is provided on work experience and employment history. Data on experiences in up to 10 jobs is collected from each participant. Some variables can be analysed to gather information on skills mismatch among the younger population, for example reasons for never attending school, problems in engaging with the labour market, wishing to change the employment situation, or the occupation a person wishes to work in.

The second important source of information in this report is the NES survey on companies, using data from 2014 to 2016. The NES survey is an essential source for spotting emerging mismatches on the labour market, and ensures a good level of reliability and representativeness (see discussion in Chapter 1). The survey provides detailed information, for example, on occupations in demand, broken down by education level and specific knowledge (skills).

Administrative databases on education, employment (jobseekers, active measures, etc.), economic activities and companies (e.g. company register) are fundamental in analysing skills supply and demand, and matching policies. A more comprehensive outlook of occupational demand and supply and regular analysis of emerging trends, shortages and gaps would be of benefit if additional important sources are developed and made regular (e.g. tracer studies and sectoral studies). As discussed in Chapter 1, various research has been carried out, but, for example, sector-specific skills outlooks are heavily dependent on external (IPA) support. The same applies to graduate tracking. Sustainability and integration of these additional data sources into the existing labour market information system could be an important avenue of future work in Serbia.

Stronger interconnection and joint exploitation of administrative databases could be further prioritised. For example, Serbia is currently working on single data entry/database interconnection to better target social protection benefits. Internet-based communication on vacancies and matching processes (interactions between jobseekers and employers) have developed strongly over the last few years, including in Serbia, though its intensity correlates with certain sectors/occupations (e.g. ICT) and qualification levels (it seems internet-based job searching is a strategy mainly used by tertiary graduates or highly specialised workers). Nevertheless, opportunities for database interconnection and tapping the potential of the internet/big data to provide real-time and insightful information should not be missed by Serbia's decision-makers and other interested parties, for example the research community.

3. INDICATORS OF SKILLS MISMATCH: INTERPRETATION AND DISCUSSION

While labour market imbalances in general refer to a difference between demand and supply, mismatch concentrates on certain aspects of demand–supply imbalances, specifically a mismatch of skills or qualifications between demand and supply. A skills mismatch can occur even when the total supply meets total demand in numbers, but not in skills or qualifications. The micro dimension of a skills mismatch is a matter of level: the skills are within the correct field of a specific task or occupation, but the skill level is lower than what would usually be required for the specific occupation or task. This is usually referred to as vertical mismatch, or over- and under-education or over- and under-skilling. A horizontal mismatch occurs when the level of the qualification is sufficient, but the type or field of qualification does not adequately match. The more detailed job requirements can be measured in terms of skills or qualifications, the more likely it is that one finds (some) horizontal mismatch. The corollary is also that the less detailed the data is, the less likely it is to identify a horizontal mismatch, even if it exists.

The body of knowledge and recommendations summed up in the ETF methodological note, as well as other important studies carried out on the skills mismatch by the Joint Research Centre (2014), Cedefop (2015), the European Commission (2015), and Eurostat (2016), represent the essential conceptual and methodological starting point for this country study. The indicators used are summarised in Table 3.1.

TABLE 3.1 MISMATCH INDICATORS: DEFINITIONS AND INTERPRETATION

Indicator	Definition	Purpose	Data source(s)	Interpretation
Unemployment rate	$U/(E+U)$	Official unemployment rate Often a strict definition of unemployed (person searching for work within the past four weeks)	LFS	Higher unemployment rates show a mismatch between demand and supply.
Unemployed/employed ratio	U/E	Like the unemployment rate Simpler to calculate Provides a direct interpretation of the ratio of employed to unemployed people	LFS	See above. Note also that the different groups might exhibit quite different ratios. Here, youth unemployment shows problems in the school-to-work transition; old-age unemployment shows a lack of the relevant skills or institutional barriers to employment.
Over-education	Percentage with education level above required or identified level of education in occupation (group)	Degree of mismatch by qualification level	LFS, skills surveys	Higher percentages of over-education (or an increase) reflect higher mismatch.

Under-education	Percentage with education level below required or identified level of education in occupation group	Degree of mismatch by qualification level	LFS, skills surveys	Higher percentages of under-education (or an increase) reflect higher mismatch.
Coefficient of variation		Comparison of differences in education level among employed and unemployed people		Increasing levels indicate higher skills mismatch.
(Relative) wage rates	Various definitions Mostly index of wages relative to base year (and relative to specific base level)	Examines the overall level at a specific time, also the development over time	LFS, wage surveys, administrative (tax or social security) data	Increasing (relative) wages usually indicate a higher (relative) demand for the specific group, i.e. an increase in the wages of people with a higher level of education relative to those with an intermediate level of education reflects higher relative demand for those with a higher level of education.

Notes: U – unemployed, E – employed. The population is, by definition, the sum of employed, unemployed and inactive (IA) people ($POP=U+E+IA$), while the labour force (LF) is defined as unemployed plus employed people ($LF=U+E$).

In the following sections, the set of skills mismatch indicators is discussed, using existing data and providing interpretation in line with the country's context.

3.1 Unemployment Rate and Unemployed/Employed Ratios

The unemployment rate calculates the rate of unemployed people relative to the population that is active in the labour market (the sum of employed and unemployed people). Higher rates show an increasing mismatch between supply and demand.

Related to this are the unemployed to employed ratios, which provide a placid way to express the magnitude of the unemployed. A ratio of 0.1 implies that for each unemployed person there are 10 employed people, while a ratio of 1 implies a one-to-one relationship.

Table 3.2 provides a general overview of employed, unemployed and inactive people by four types of education: low, intermediate non-VET, intermediate VET and high education¹³. Almost half of the population falls into the category of low education, a small group of 6% fall into the intermediate education level outside of VET, while the bulk of the educated are within intermediate VET (30%) and those with a high level of education (18%). Relative to their proportion in the population, people with a low level of education are more likely to be inactive, and while intermediate VET and those with higher levels of education are much less likely to be inactive, they are, however, slightly more likely to be

¹³ Annex 1 includes further information on aggregation by education level used in this report.

unemployed. This is also related to the age distribution across these education levels. As discussed in previous chapters, young generations tend to have higher levels of education attainment.

TABLE 3.2 POPULATION (15–64 AGE GROUP) BY EDUCATION LEVEL, 2014

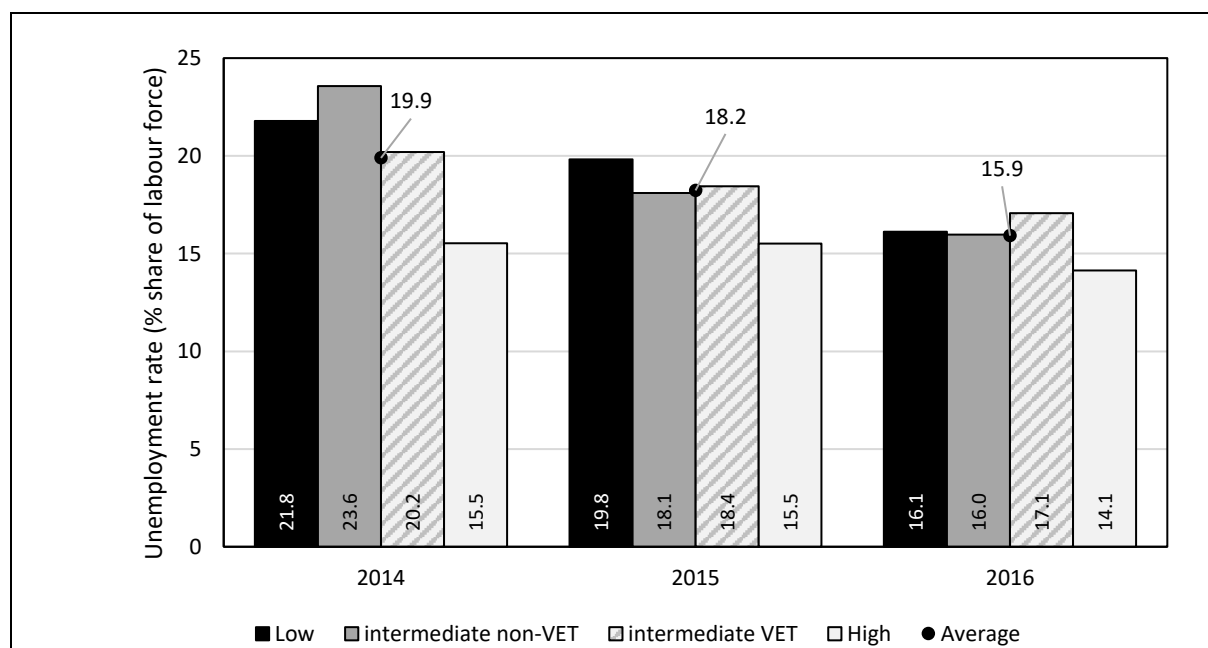
	% share of population with the same education level			
	Employed	Unemployed	Inactive	Total
Low	38.91	43.64	56.79	46.07
Intermediate non-VET	4.06	5.04	9.08	6.02
Intermediate VET	32.55	33.19	25.93	30.20
High	24.48	18.13	8.20	17.71
All education levels (%)	100	100	100	100
All education levels (thousands)	2 445.71	607.37	1 770.32	4 823.40

Note: The year 2014 has been selected as the reference year for the ETF skills mismatch project due to the unavailability of micro-level data in other countries included in the project (i.e. Morocco, Egypt). In Serbia, data was available for more recent years (i.e. annual LFS data up to 2016 at the time of data processing and calculation of indicators).

Source: LFS 2014–16

Here, we will first concentrate on the unemployment rate following the general definition of the ratio of unemployed over the sum of employed and unemployed, in relation to the population that is active on the labour market.

FIGURE 3.1 UNEMPLOYMENT RATES BY EDUCATIONAL ATTAINMENT LEVEL (15–64 AGE GROUP), 2014–16 (%)



Source: Calculations based on LFS data, Economix

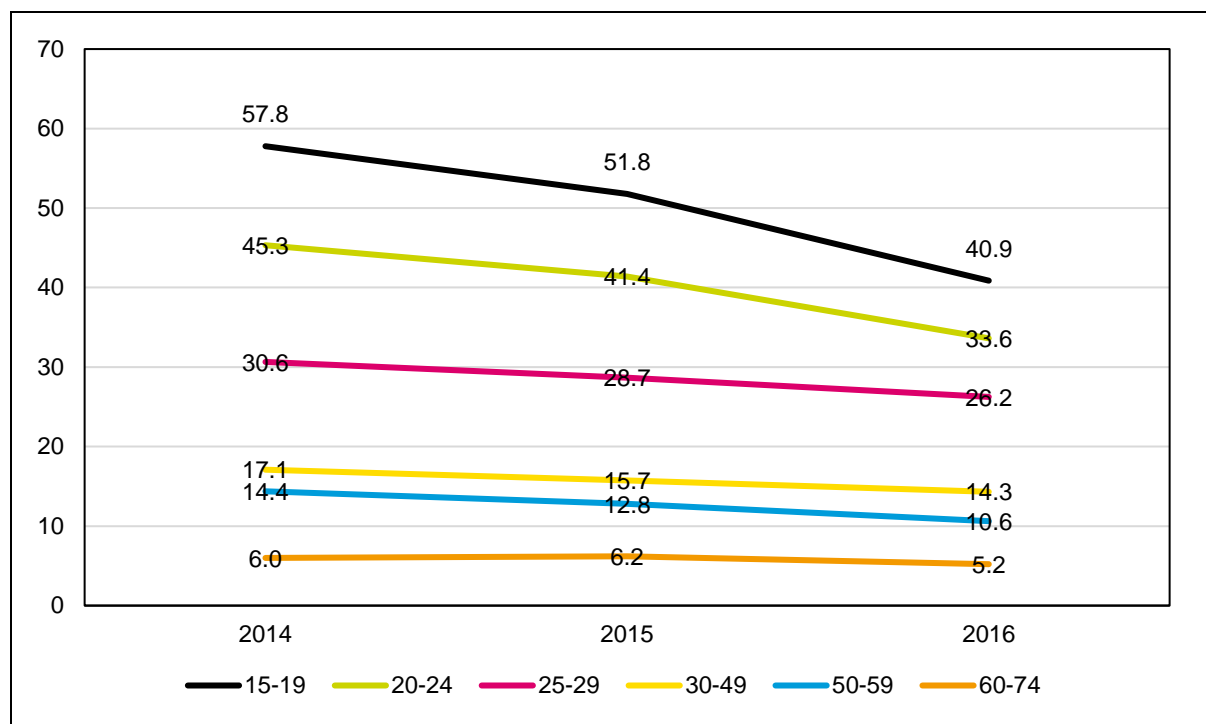
Figure 3.1 provides a breakdown of the unemployment rates by education level over time (the same four education levels are used: low, intermediate non-VET, intermediate VET, and high). In 2014, unemployment is still rather high in Serbia. On average 19.9% of the active population, aged 15 to 64, is unemployed. This improves to 15.9% in 2016. This improvement is achieved through a reduction in unemployment rates across all categories, though not to the same degree. In 2014, unemployment rates by education level vary, with 15.5% of those educated to a high level, 23.6% of those with intermediate non-VET, and 21.8% of those with a low level of education being unemployed. This wide divergence of unemployment rates reduced by 2016. Now, the highest unemployment rate, at 17.1%, lies within intermediate VET, with unemployment rates for those with a low level of education at 16.1% and high level at 14.1%. Relatively speaking, those with low and intermediate non-VET education have managed to reduce their unemployment rates significantly more than intermediate VET, but also more than those with higher levels of education¹⁴. Overall, the rates in 2016 are more evenly distributed than in the years before.

Figure 3.2 displays the contribution of different age groups to the reduction in the unemployment rate. It provides a breakdown of unemployment rates for age groups over time. The first thing to note is that there are quite high unemployment rates for the young: 15- to 19-year-olds face an unemployment rate of 57.8%, 20- to 24-year-olds of 45.3% and 25- to 29-year-olds of 30.6% if active on the labour market in 2014. These rates reduced strongly in the following two years, dropping to 40.9% in 2016 for the youngest group, to 33.6% for the 20- to 24-year-olds, and to 26.2% for the 25- to 29-year-olds. The unemployment rates for prime age and older workers seem to be more stable and are much lower over time. This indicates that the most volatility is to be observed among young persons, confirming the difficulties in entering the labour market during the school-to-work transition.

Figure 3.3 breaks down the unemployment rates by two dimensions: age and education level, this time only for 2014. For the young people, it seems that the education level does not make much difference in the unemployment rate. Here, it should be noted that the unemployment rate, especially for 15- to 19-year-olds, is based on a rather small group, as the majority of that age group is likely to be in education. Starting with those aged 25 and for prime-age individuals, those with intermediate VET and higher levels of education tend to have significantly lower unemployment rates, suggesting that after a difficult school-to-work transition, more stable employment prospects can be achieved.

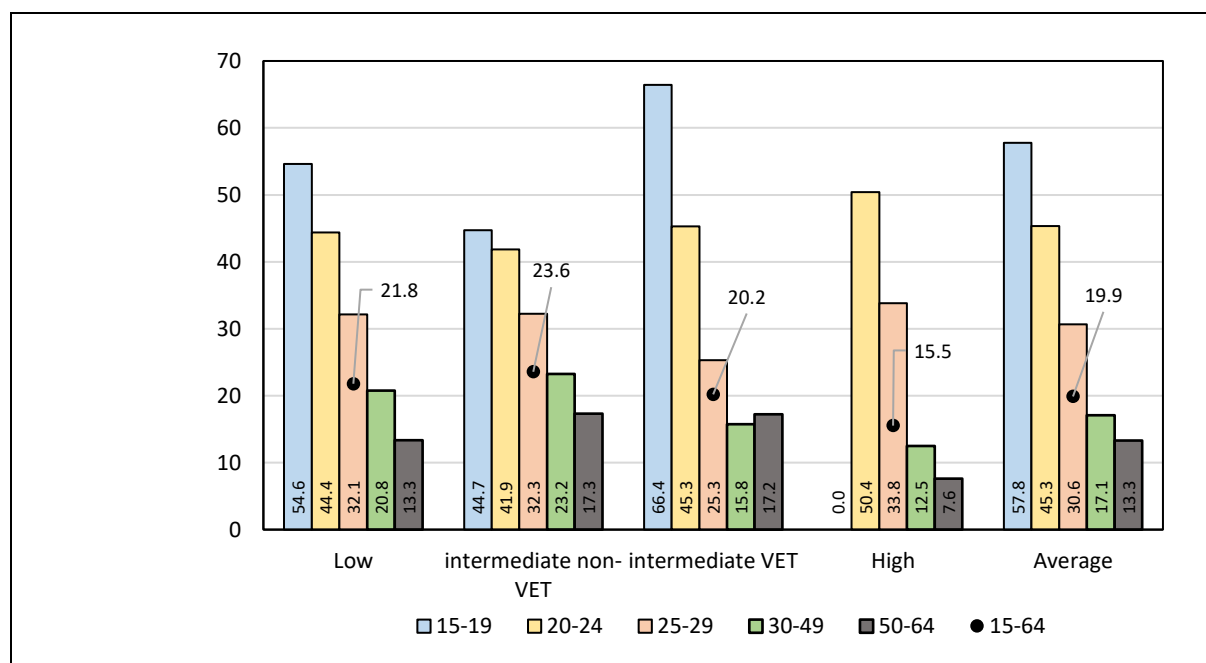
¹⁴ Such trends should be carefully interpreted as the unemployment incidence is heavily influenced by the size of concerned groups (e.g. very low share of unemployed with non-VET intermediate education) and overall change in labour market status (e.g. those with a low level of education are more prone to being inactive and hence a reduction in unemployment spells).

FIGURE 3.2 UNEMPLOYMENT RATES BY AGE GROUP, 2014–16 (%)



Source: Calculations based on LFS data, Economix

FIGURE 3.3 UNEMPLOYMENT RATES BY EDUCATIONAL ATTAINMENT LEVEL AND AGE GROUP, 2014 (%)

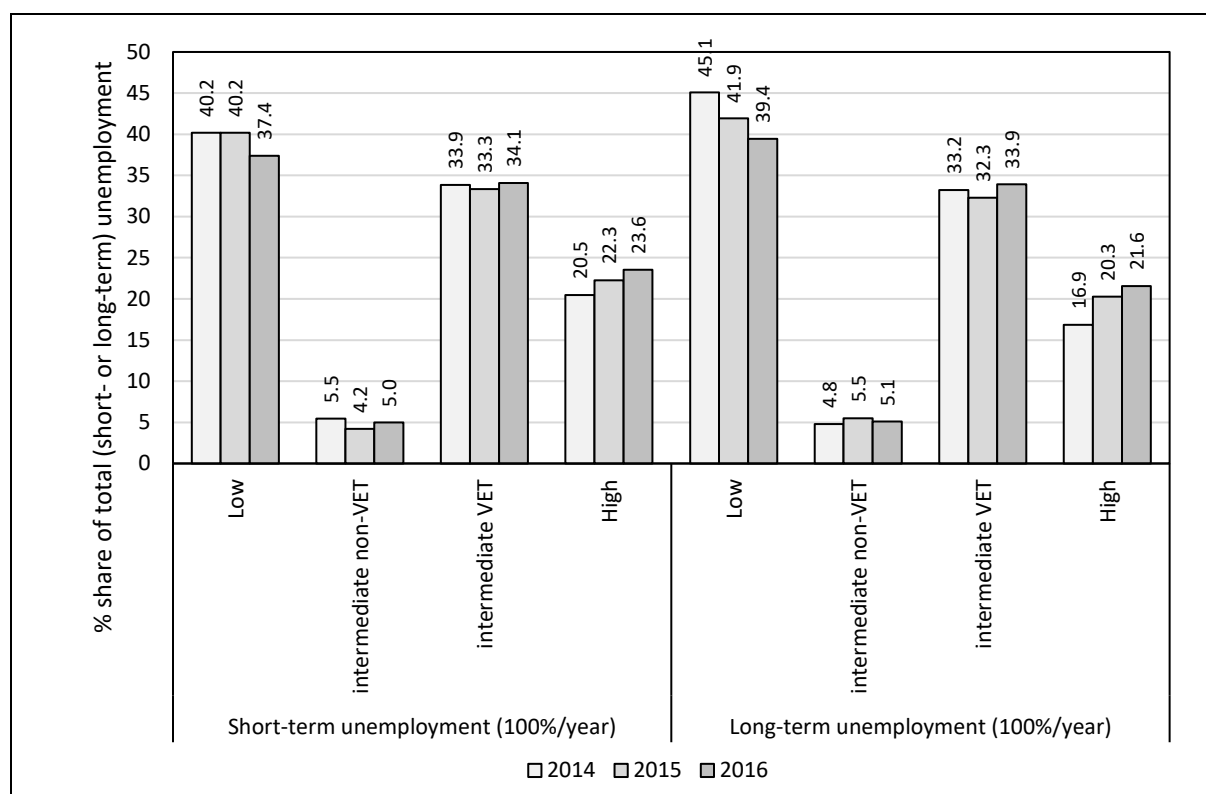


Source: Calculations based on LFS data, Economix

Finally, Figure 3.4 distinguishes between short- and long-term unemployment. It shows how much short- and long-term unemployment rates differ by education level for each observed year. Those with low levels of education dominate the long-term unemployed. Yet it seems that the better labour market

situation has especially strong effects on this weaker group than in the other education levels, which supports the results shown in Figure 3.1 discussed above, where those with a low level of education benefited from a stronger reduction in (overall) unemployment rates.

FIGURE 3.4 UNEMPLOYMENT SPLIT BY DURATION AND EDUCATION LEVEL (15–59 AGE GROUP), 2014–16 (%)



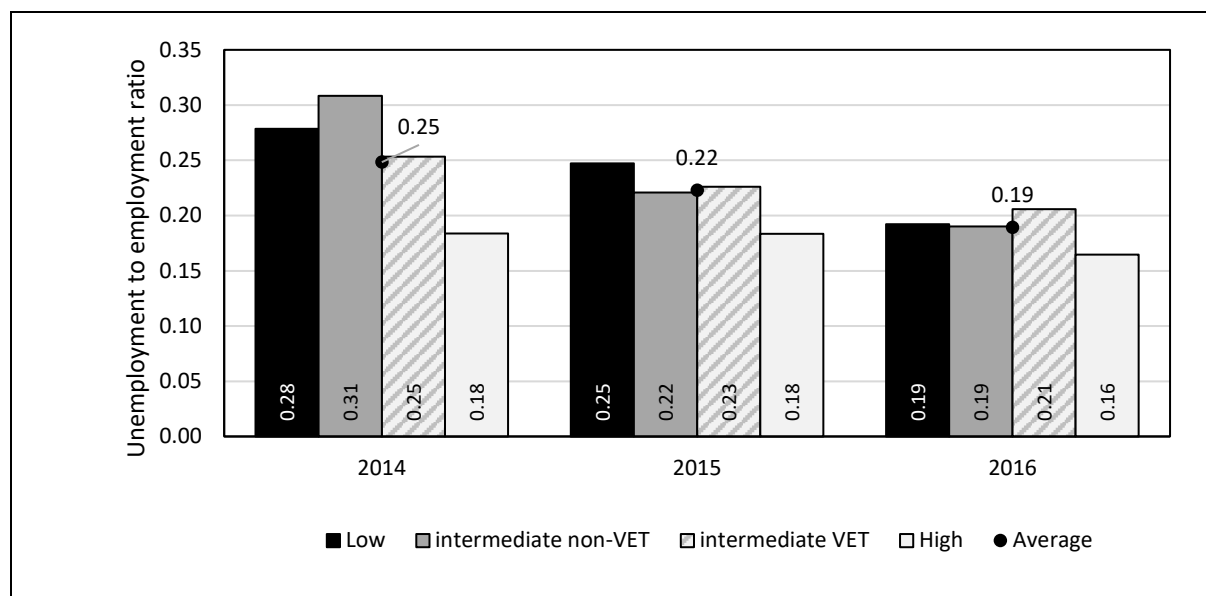
Source: Calculations based on LFS data, Economix

Proportion of unemployed versus employed

The proportion of unemployed versus employed by different categories enables us to analyse the relative size of unemployment (or employment) independent of the overall size of a specific category. Naturally, this indicator is very much related to the unemployment rate and many aspects confirm the earlier observations. Figure 3.5 confirms the downward trend in unemployment, including through the unemployment to employment ratio. The data shows that the greatest ratios of unemployment versus employment are for those with low levels of education in all years but the last one. In 2016, the greatest unemployment to employment ratio was for the intermediate VET group. This could be the result of a larger number of public works and other activation schemes implemented by the NES. The active labour market measures are intended usually for unemployed people with low or no education.

Lower unemployment to employment ratios can be found among those with high levels of education. This could point towards better labour market conditions for highly educated workers, but it might also be the result of a larger inclination and opportunity to emigrate when they face adverse conditions.

FIGURE 3.5 UNEMPLOYMENT TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (15–64 AGE GROUP), 2014–16



Source: Calculations based on LFS data, Economix

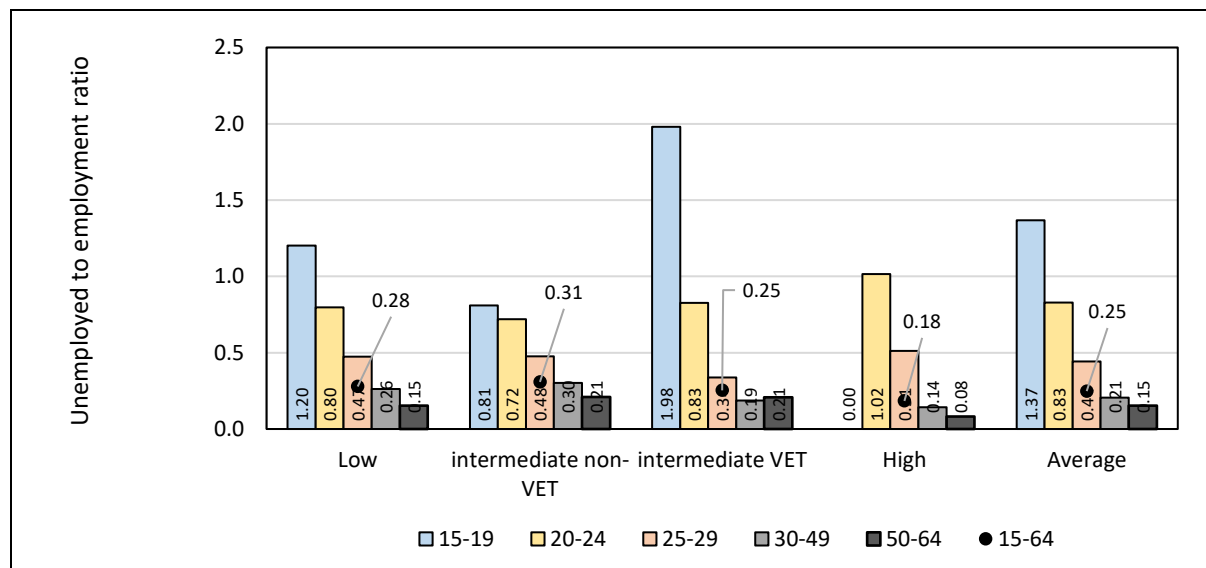
Figure 3.6 shows this unemployment to employment ratio for 2014 within specific age groups. Figures 3.7 to 3.11 show the development over time for each age group. In Figure 3.6, we can see that the highest ratio can be found for the youngest age group with a medium level of education. However, this is likely to be the result of low overall figures (employment and unemployment) and the reliability is therefore questionable. Figure 3.7 reveals that the number drops over time. The ratios for the higher age groups are potentially more reliable.

The second youngest age group (20–24), shown in Figure 3.8, is still affected by part of its population being in education or just having finished studying. This leads to an ordering of the proportion from low levels of education to high. This, in most cases unexpected, increase in chances of unemployment by education level is probably the result of variations in age at which the qualifications are usually completed. The higher the level of education, the more likely it is that within this age group the qualification has just been finished; furthermore, at the beginning of one's career, young people experience more unemployment spells before entering more stable employment. By contrast, we find that the unemployment to employment ratio of those with low levels of education reflects the situation after some years on the labour market, and could therefore be better compared to the situation of those with higher levels of education when they enter the labour market.

It is interesting to see, though, that the ordering of the ratios remains from low to high levels of education even for 25- to 29-year-olds¹⁵, as reflected in Figure 3.9. Only analysis of the prime age groups of 30- to 49-year-olds, in Figure 3.10, shows the regular pattern of higher ratios of unemployed to employed for those with low levels of education, which decrease with increasing education (a similar trend is visible in Figure 3.11 as well which refers to older workers).

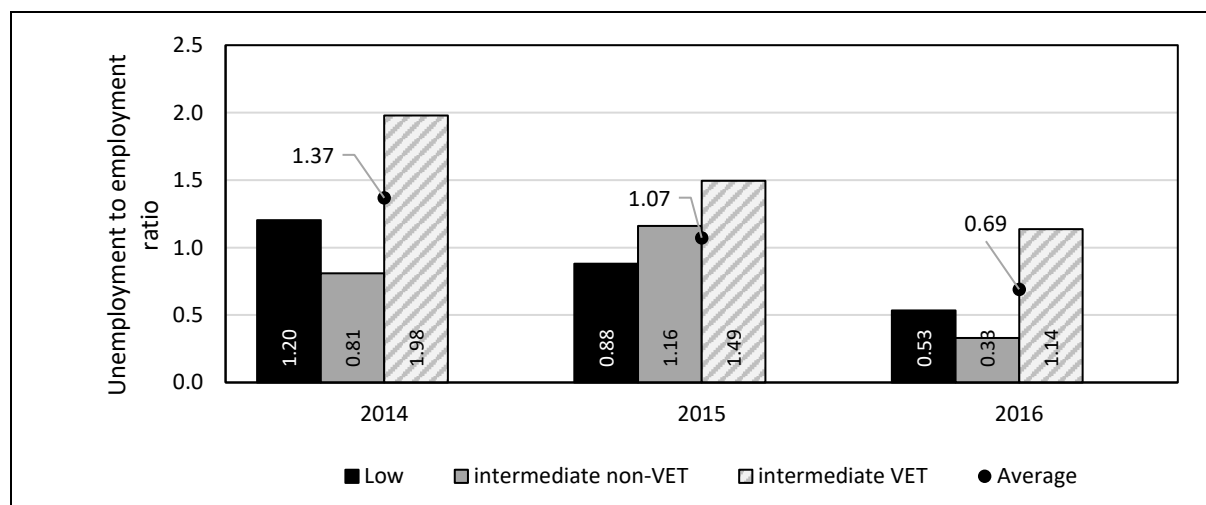
¹⁵ This could also be related to a relatively lower employment rate of young graduates (aged 20–34).

FIGURE 3.6 UNEMPLOYMENT TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL AND AGE GROUP, 2014



Source: Calculations based on LFS data, Economix

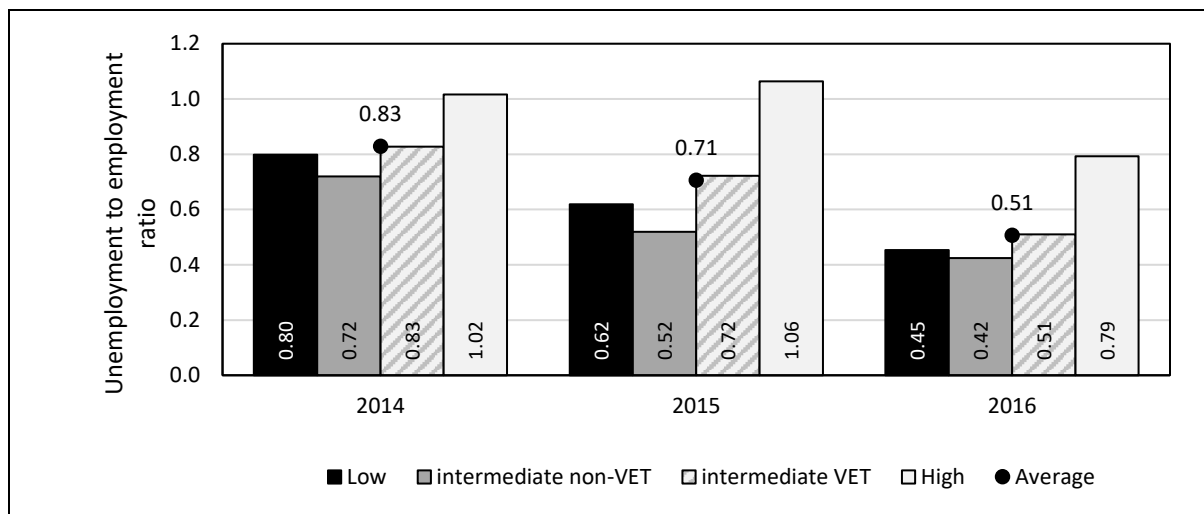
FIGURE 3.7 UNEMPLOYMENT TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (15–19 AGE GROUP), 2014–16



Note: No calculation for 'high' level of education (i.e. university) due to very young age group.

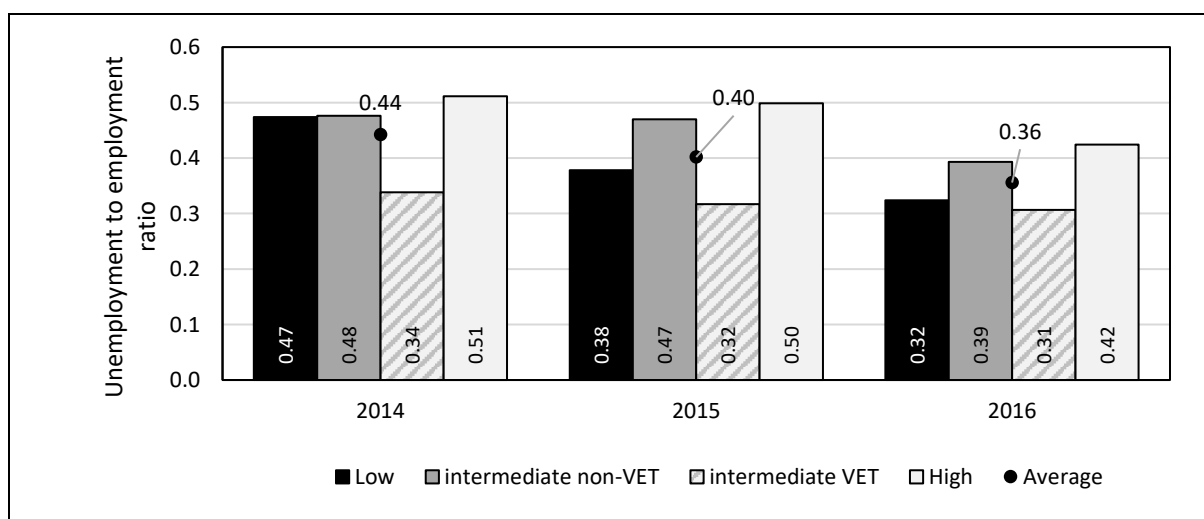
Source: Calculations based on LFS data, Economix.

FIGURE 3.8 UNEMPLOYMENT TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (20–24 AGE GROUP), 2014–16



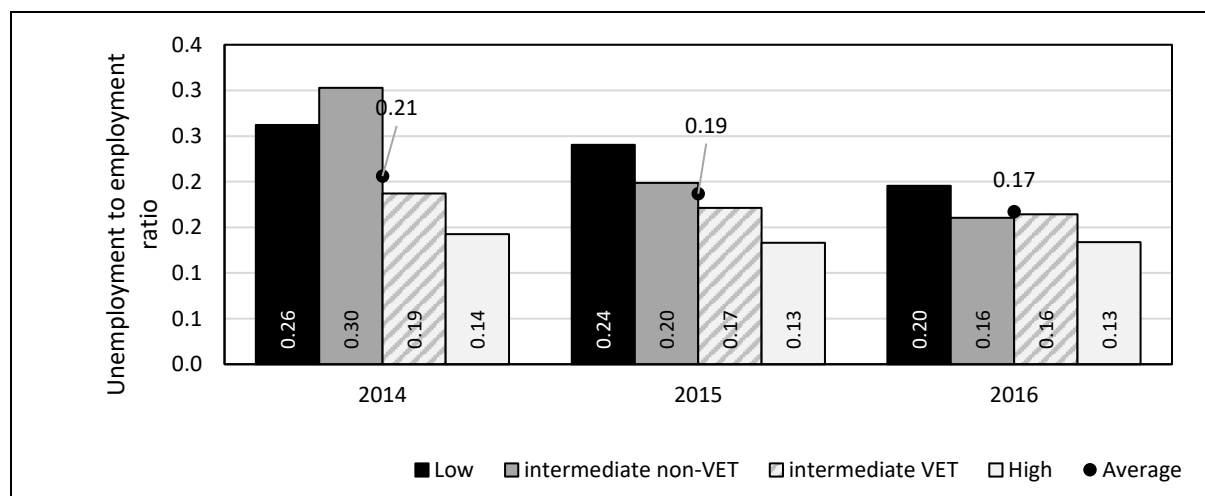
Source: Calculations based on LFS data, Economix

FIGURE 3.9 UNEMPLOYMENT TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (25–29 AGE GROUP), 2014–16



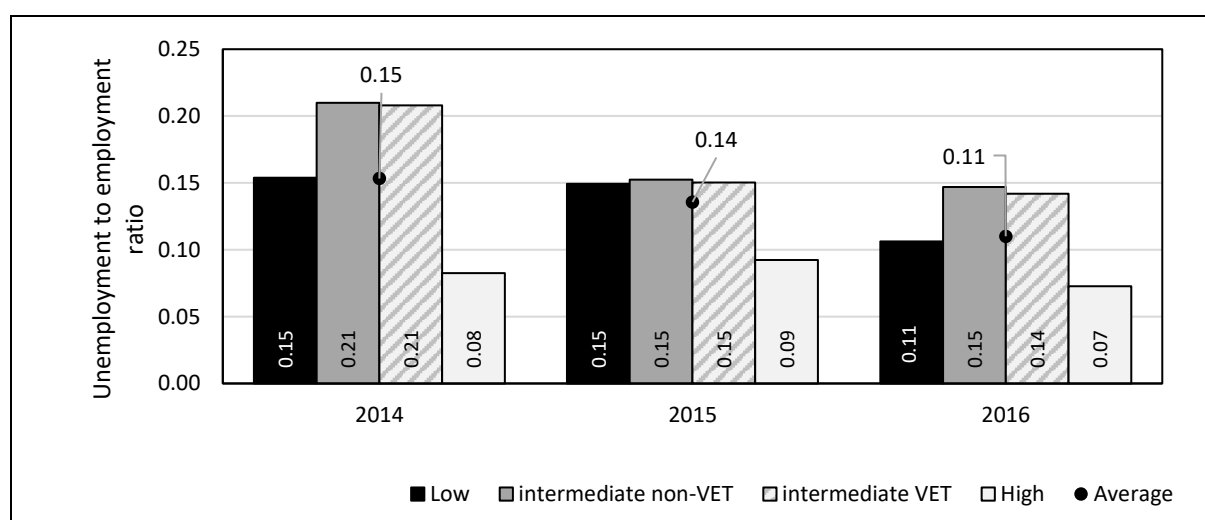
Source: Calculations based on LFS data, Economix

FIGURE 3.10 UNEMPLOYMENT TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (30–49 AGE GROUP), 2014–16



Source: Calculations based on LFS data, Economix

FIGURE 3.11 UNEMPLOYMENT TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (50–64 AGE GROUP), 2014–16



Source: Calculations based on LFS data, Economix

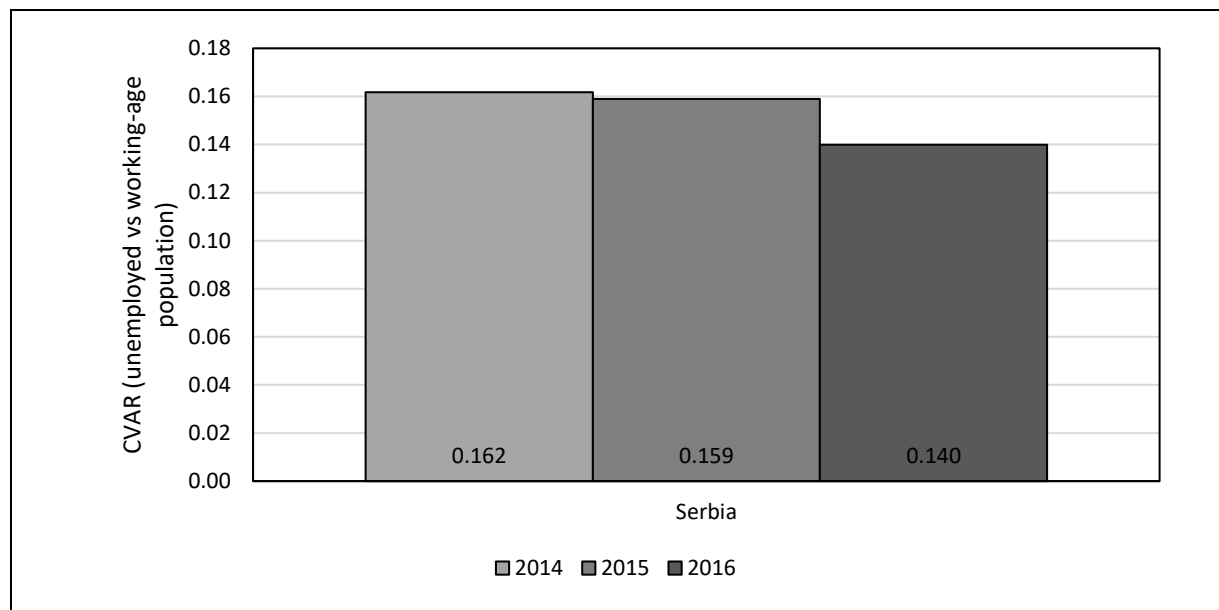
3.2 Coefficient of Variation by Skills

This indicator compares the distribution of skills within different groups while correcting for the overall size of the underlying statistic. The difference in skills composition of employed to unemployed is expressed in just one number, which measures the overall extent of mismatch. The higher the number, the greater the difference between the skills possessed by people employed in the labour market and the skills possessed by people wishing to enter the labour market. The extent to which the distributions are different can therefore be interpreted as a measure of the ineffectiveness caused by the matching process of supply and demand of skills in the labour market (ETF, 2012).

The coefficient of variation (CVAR) is the first of a set of indicators that tries to grasp one or several elements of the skills mismatch to quickly gauge the degree to which a mismatch exists. The CVAR compares the variation of qualifications (in shares) in the group of unemployed versus those in the working-age population. The CVAR may vary between 0 and 1.

If unemployment were independent of the qualification level, the CVAR should be zero; the more the two groups differ, the higher the CVAR is. Figure 3.12 thus implies that, over time, qualification becomes less discriminatory in explaining unemployment, or said differently, the distribution of qualifications in the working-age population seems to coincide more with those of the unemployed in 2016 than it did in 2015 or 2014, implying a reduction in mismatch.

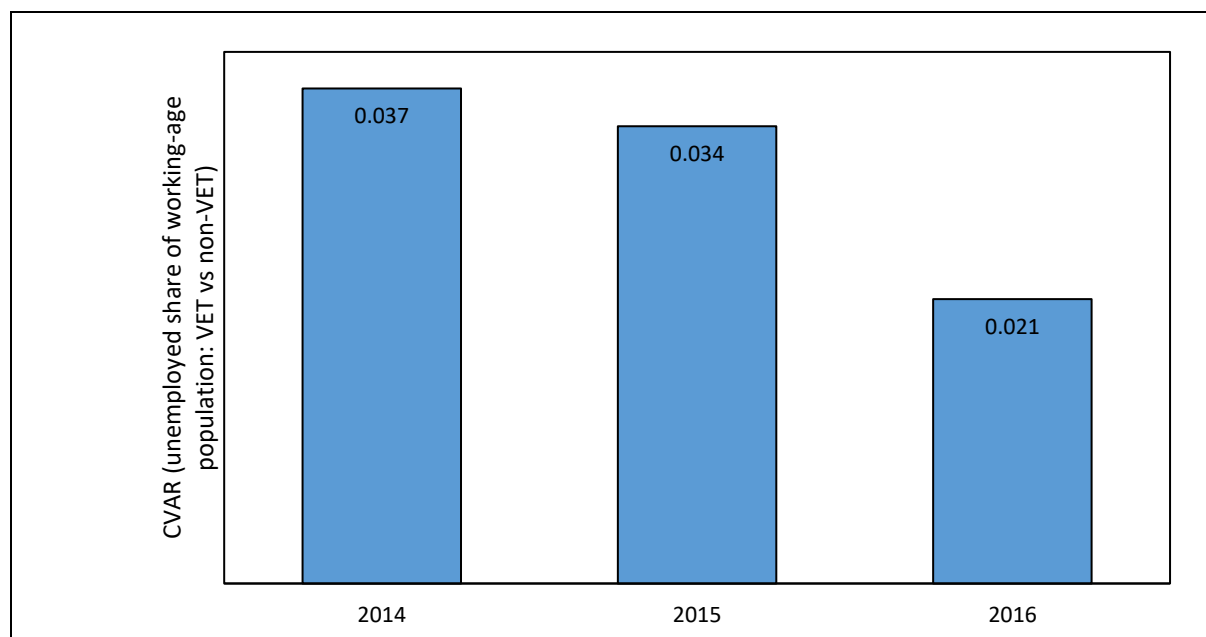
FIGURE 3.12 COEFFICIENT OF VARIATION (15–64 AGE GROUP), 2014–16



Source: Calculations based on LFS data, Economix

Figure 3.13 applies this concept to a different application of qualifications. Here, we only distinguish between qualifications through VET and those qualified by other means. The outcome over the three years shows a reduction over time, which is stronger from 2015 to 2016 than from 2014 to 2015.

FIGURE 3.13 COEFFICIENT OF VARIATION (15–64 AGE GROUP) – VET VERSUS NON-VET, 2014–16

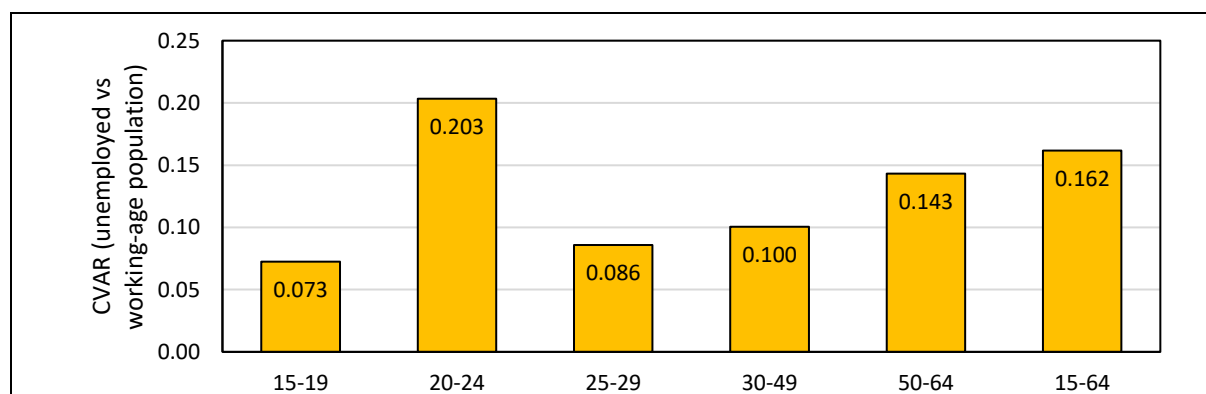


Source: Calculations based on LFS data, Economix

Effects of economic restructuring and tight fiscal conditions, including freezing public employment to keep financial stability, may have contributed to a larger CVAR in 2014. Generally, the trend in this short time series is declining. With this indicator we can estimate only the amount (or magnitude) of a mismatch. If we are interested in mismatch direction, we need to use this indicator in tandem with other statistics, for example the proportion of unemployed versus employed.

After analysing the development of the CVAR, a separate calculation by age group is provided in Figure 314. Low CVAR indicator values for the youngest category (15–19) are reasonable as at that age, young people have a low level of education, and they can be working in jobs that require a low level of skills; consequently, the mismatch will be low, too. There is a higher value of CVAR for age category 20 to 24, as in this age bracket, young people (mostly graduates) are entering the labour market. The high indicator value indicates a mismatch triggered by the problematic/difficult school-to-work transition.

FIGURE 3.14 COEFFICIENT OF VARIATION BY AGE GROUP, 2014



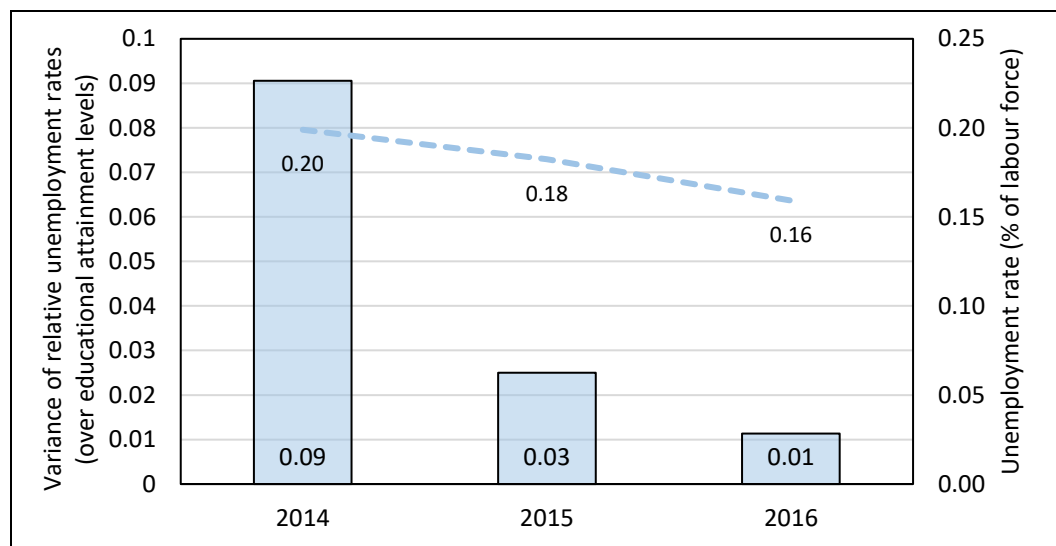
Source: Calculations based on LFS data, Economix

3.3 Variance of relative unemployment rates (by education level)

This indicator shows how unemployment deviates within education levels from the average of the entire country. The higher the value of the variance, the higher the level of mismatch. While education levels are generally used as in our indicator, the methodology would also be applicable to subgroups such as age, age and gender, and (previous) occupation.

The variance of relative unemployment rates, as presented in Figure 3.15, allows us to compare the variation that exists in unemployment rates of specific education levels with the national average. A higher level indicates that there is a lot of deviation in these education levels, or, in other words, unemployment hits the various types of education very differently. It provides an alternative but related indicator of skills mismatch to the CVAR. Higher values imply a higher level of mismatch. As can be seen in Figure 3.15, the overall mismatch, as measured by this indicator, decreases from 2014 to 2016, along with a decrease in the overall unemployment rate.

FIGURE 3.15 VARIANCE OF RELATIVE UNEMPLOYMENT RATES (15–64 AGE GROUP), 2014–16



Note: Education level 'none' excluded from calculations

Source: Calculations based on LFS data, Economix

The unemployed population became more homogenous in its composition and across categories. Also, a smaller coefficient of indicator variance of relative unemployment rates could imply a reduction in the level of structural unemployment rates, which is more important than general unemployment rates as it suggests an improving match between the education system and labour market.

3.4 Occupational mismatch

This indicator is based on comparisons of the ratio of people with a given education level (ISCED) working at an inappropriate qualification/skill level (measured by the International Standard Classification of Occupations – ISCO) to all workers within that ISCED level.

The data available for Serbia only enabled us to calculate an overall share of persons with medium and higher levels of education (Table 3.3) working in occupations requiring a qualification/skill level below their educational attainment. The data shows us the 'presence' of medium-skilled or semi-skilled people working in elementary occupations and of highly skilled people working in semi-skilled occupations; this is an indication of a vertical mismatch. Elementary occupations do not require specific (medium) qualifications, nor do semi-skilled occupations require qualifications beyond the medium level. Hence, both groups are over-qualified.

TABLE 3.3 OCCUPATIONAL MISMATCH – MEDIUM AND HIGHER LEVELS, 2014–16

	2014	2015	2016
Medium level – People (15–59) with upper secondary education working in elementary occupations, as a % of all people with upper secondary education	6.3	7.1	7.1
Higher level – People (15–59) with tertiary education working in semi-skilled occupations, as a % of all people with tertiary education	21.2	24.1	24.2

Note: Occupational classification based on ISCO-08

Source: Calculations based on LFS data, Economix

It can be noted that the degree of over-qualification as identified by this measure has increased from 2014 to 2016. The level of over-qualification seems to be particularly high for those with a high level of education, with almost a quarter being employed in semi-skilled occupations.

This can be the result of a lack of demand for higher-skilled graduates, who have to accept positions below their level of formal education. Whether this is the result of structural lack of demand or the lack of skills on behalf of the graduates cannot be directly assessed from this data.

It should, however, be noted that the high unemployment and limited opportunities on the labour market (particularly in less developed regions) force those with an intermediate and especially higher level of education into accepting these positions. Over-qualification/over-education might also lead to an upgrading of positions/jobs in firms employing those with higher levels of education and essentially upgrading the occupations to a level that would fit the higher qualifications of a large part of the employed workforce.

As the education system is known to be rather theoretical in nature, the level of practical skills, especially among those with higher levels of education, is problematic. During the (first) transition to the labour market, young people often gain practical experience by accepting jobs requiring lower levels of skills. Together with low labour mobility, this leads to a larger level of observed over-qualification.

3.5 Over- and Under-Education

This empirical method can be used when there are no specific questions or data on over-education or over-skilling; it is nevertheless quite a simplistic measurement and it must be interpreted as a proxy. The empirical method is a purely statistical measure where the distribution of education is calculated for each occupation. Over-education is defined as existing when the level of education is more than one standard deviation above the mean. Likewise, under-education is defined as one standard deviation below the mean.

The empirical method to determine over- and under-education allows an approximation of how prevalent the use of over- and under-qualified personnel is. In essence, the statistical technique tries to pinpoint the level of qualification considered normal or, in statistical terms, the average of all qualification levels. As in many cases, this will not be very exact; a range of education levels around this average is determined that provides the borders between over- and under-education. Note that this measure examines the labour market from the occupation side; it provides an insight into how far demand is using over- or under-qualified personnel to fulfil its needs.

Table 3.4 provides the degree of over-education by the main one-digit ISCO-08 occupation levels. It is common that over-education is more predominant among occupational groups that have lower qualification requirements. Professionals, for example, do not show any over-education as the highest qualification levels are likely to be included in this range of occupations. To a large degree, this is also the case among managers, technicians and associate professionals.

TABLE 3.4 OCCUPATIONAL MISMATCH – OVER-EDUCATION BY OCCUPATION (15–59 AGE GROUP), 2014–16

ISCO-08	2014	2015	2016
01 Managers	0.8	0.6	0.0
02 Professionals	0.0	0.0	0.0
03 Technicians and associate professionals	0.1	0.0	0.1
04 Clerical support workers	1.1	2.1	1.5
05 Services and sales workers	6.7	7.1	7.1
06 Skilled agricultural, forestry and fishery workers	2.8	3.4	3.8
07 Craft and related trades workers	1.5	2.4	2.3
08 Plant and machine operators and assemblers	1.5	1.2	2.3
09 Elementary occupations	2.7	3.9	3.4

Note: Occupational classification based on ISCO-08

Source: Calculations based on LFS data, Economix

The largest share of over-education can be found among service and sales workers, followed by the elementary occupations, skilled agricultural workers and clerical support workers. In all these cases, over-education seems to have increased from 2014 to 2016. This confirms the findings above whereby due to low demand or insufficient practical experience, skills, etc., higher education graduates are likely to take jobs below their formal qualifications and thus be mismatched.

More problematic for the labour market and overall goal of competitiveness and increasing the value added of economic activities is the phenomenon of under-education. Under-education by occupation is represented in Table 3.5.

TABLE 3.5 OCCUPATIONAL MISMATCH – UNDER-EDUCATION BY OCCUPATION (15–59 AGE GROUP), 2014–16

ISCO-08	2014	2015	2016
01 Managers	0.9	1.4	1.1
02 Professionals	1.8	0.9	0.8
03 Technicians and associate professionals	0.0	0.0	0.0
04 Clerical support workers	0.0	2.3	2.3
05 Services and sales workers	0.7	0.3	0.3
06 Skilled agricultural, forestry and fishery workers	0.5	0.3	0.2
07 Craft and related trades workers	0.1	0.1	0.1
08 Plant and machine operators and assemblers	0.1	0.0	0.0
09 Elementary occupations	1.6	1.1	1.1

Note: Occupational classification based on ISCO-08

Source: Calculations based on LFS data, Economix

Under-education is less common than over-education in Serbia. Under-education implies that persons who are formally under-qualified to perform a task, i.e. in the worst case do not have the level and complete set of skills, are taken on in jobs because no better match was found. This is a sign of workforce shortages. The occupational group of ‘Professionals’ exhibit the highest degree of under-education in 2014 at 1.8%, but this drops to 0.8% in 2016. However, managers and clerical support workers do show an increase relative to 2014 levels.

Under-education in the elementary occupations is somewhat odd as, by definition, these occupations do not require specific qualifications. However, we see here the limits of the empirical method: we have quite a large number of observations with intermediate and high levels of education within these occupations that are used to calculate an average and the statistical boundaries of under-education which now exclude the lowest qualification levels. In interpretation, this should not be seen as a problem of under-education in this specific case, but rather as an indication of (hidden) over-education in elementary occupations.

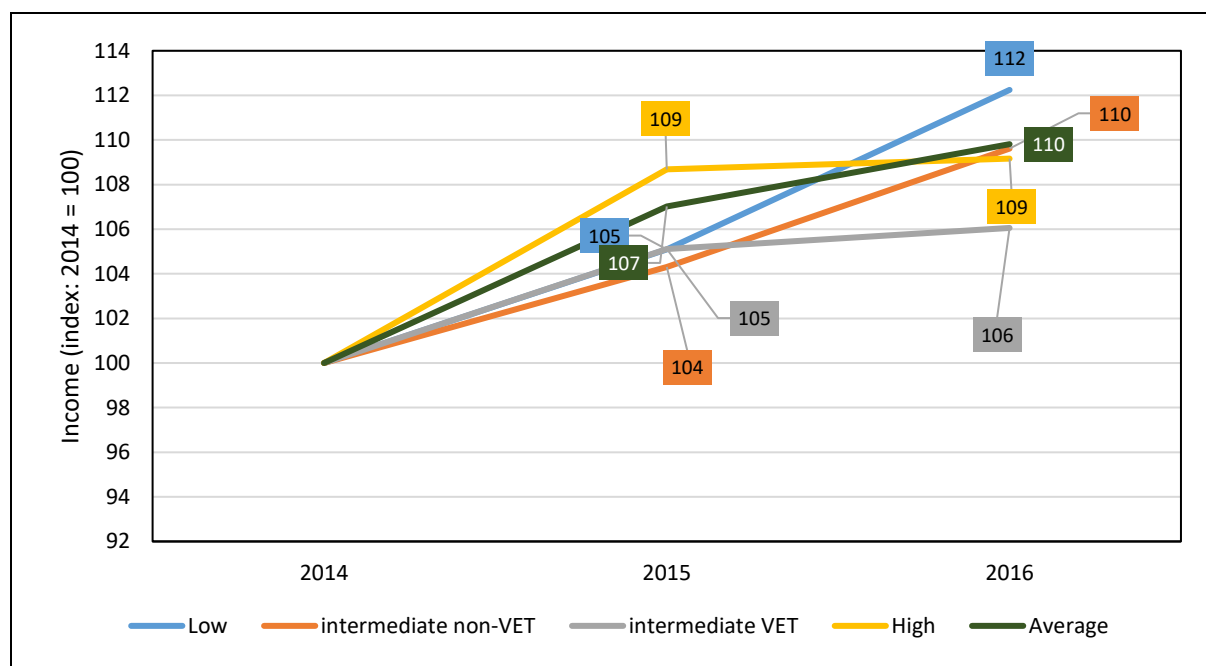
3.6 Relative wages

This methodology compares wages across education levels over time, either relative to a benchmark wage or indexed vis-à-vis a base year. It can usefully be plotted in a diagram, as it is then very easy to see how certain education levels are better remunerated than others over time. An education level that is seen to attract a higher income than that achieved by people with other levels of education can thus be a sign that this level of education is in higher demand in the labour market.

Wages by education level, as presented in Figure 3.16, provide an indication of the development of average wages in Serbia. Interpretation of these index figures should be done with caution, as wages reflect many aspects, institutional or following the play of supply and demand. The indicator reflects

demand for different skill levels by relative changes in wages, but relative changes in wages can depend on institutional factors affecting some occupations and also vary depending on the personal skill of an employee in negotiating their earnings. In addition, the short time period might show a catch-up by groups that have been lagging behind other qualification groups.

FIGURE 3.16 RELATIVE WAGES BY EDUCATIONAL ATTAINMENT LEVEL (15–59 AGE GROUP), 2014–16



Source: Calculations based on LFS data, Economix

Taking these constraints into account, analysing the data and growing relative wages through observed years, it can be concluded that the average wage level increased by 10%. The wage level of workers with VET intermediate education has been lagging behind, gaining only 6% since 2014, while those with a higher education level almost match the average increase by gaining 9%. Those with a low level of education achieved a wage growth of 12%, which is above the average.

Annex 2 includes additional tables and figures resulting from the calculation process, in particular details about the education dimension of various labour market elements, for example employment, unemployment and inactivity. VET and non-VET data disaggregation at the medium level of education is also available and has the merit of helping to spot diverse if not divergent labour market trajectories for those with VET and general education.

CONCLUSIONS

The ETF skills mismatch measurement project developed and piloted several indicators of labour market and skills mismatches with the aim of revealing mismatch indicators that are easy to access and update. The methodological approaches chosen for this project aimed to reflect country specificities and ensure comparability across countries. Insights on skills mismatch incidence and nature are essential for enabling better targeting efforts to match supply to demand via education, training, employment and other policy interventions.

This report presents an analysis of the mismatch from several perspectives and data sources available. It also examines the country context in areas directly or indirectly related to the skills supply and demand. For the ETF, the findings from the individual country studies are useful to develop a universal, comparable methodology. For the involved countries, this analytical exercise has the potential to help institutions and partners to assess the effectiveness of their skills policies in addressing mismatches. This paper reports on several findings related to skills development, demand for skills and matching in Serbia.

From the backdrop of continuous improvement in the economic situation, including key employment indicators, Serbia still struggles with relatively high inactivity rates, particularly among women and vulnerable groups, and rather difficult labour market entry for young people.

The overall level of education has increased over the last few decades, but this trend has not necessarily translated into more and relevant skills and competences demanded by the labour market. Increased participation in pre-primary education and closer follow-up of pupils at risk of school disengagement has led to an increase in education inclusiveness. Studies on employers' perceptions, however, reveal a loose connection between the education offer and skills demand, affecting particularly upper secondary (mostly VET-oriented) and tertiary-level education. Prioritisation of work-based learning through dual programmes in initial education or adoption of a legal framework on qualifications and sectoral skills committees are intended to close such gaps. Participation in lifelong learning remains modest and thus hinders the adaptability of individuals and capacity of enterprises to respond to new demand and keep/improve their competitiveness.

Active labour market programmes are geared towards closing the gaps in employment among particularly hard-to-employ categories of jobseekers. Strenuous efforts over the last years have helped to consolidate capacity to provide employment services and test innovative approaches to tackle joblessness among young people, people with disabilities and other vulnerable groups. Reaching increased percentages of unemployed people through activation measures is somewhat inhibited by the high ratio between public employment service advisers and job-seeking clients and limited financial resources earmarked for active labour market programme implementation. Looking at the profile of (long-term) unemployed people and barriers they face in looking for employment, the education level and the skills and competences they possess (or lack) seem to be very relevant when it comes to labour market (re)integration.

Over the last decade, relevant public authorities, civil society and the research community have made great strides towards linking employment, skills and social welfare policies, at least from a strategic

approach (see for example the 2016 adopted Employment and Social Reform Programme¹⁶ or the cross-referencing of various strategies or action plans in the fields of education, employment and social protection). Indeed, policies that are 'social inclusion-friendly' may be a good answer to labour supply challenges that Serbia is facing now and in the future in the wake of negative demographic trends (e.g. ageing, migration). There is important untapped workforce potential among the inactive population.

An important topic for discussion about skills mismatches is the governance system of skills anticipation, i.e. institutions and processes for current and future skills identification, including attempts to translate such findings into forward-looking skills and employment policies and programmes. The institutional set-up (including collaboration for information generation and exchange) is still in the development/refinement phase in Serbia. There are good statistical foundations for analysing skills and occupations needs and trends, such as regular and internationally comparable LFSs and monitoring of economic and demographic trends, stemming from SORS. NES plays an important role in skills needs identification and anticipation, alongside SORS, through its annual research on labour market demand and short-term projections, vacancy monitoring and administrative data on jobseekers and their integration into active labour market programmes. The ministry in charge of education is currently consolidating its monitoring and evaluation systems, with a view to enhancing evidence-based policymaking in education and skills areas and a focus on education system outcomes. For example, a graduate tracer system is in the making. Differentiated monitoring of VET programmes (featuring dual programmes) is also being planned. This would allow decision-makers to identify successful and less relevant programmes.

Although the country has gained experience in various processes and angles of looking at skills demand, a shortcoming can be seen, for the moment, in the role of sectoral partners, via sector skills committees for example, in the identification of skills needs, emerging gaps and addressing mismatches. Several legislative and capacity building initiatives¹⁷ aim to address such shortcomings and probably the biggest challenge ahead is ensuring continuity of such activities and the creation and expansion of collaboration with the research sector/academia.

This report explored the feasibility of calculating the skills mismatch using data from existing and reliable sources. This led to the identification of a number of clusters (of indicators) that provide insights to key aspects of skills mismatches, as follows:

1. unemployment rates and unemployment to employment ratio;
2. over-education and under-education;
3. CVAR from various angles, for example labour market status and age (e.g. comparison of differences in education level among employed and unemployed);
4. wage aspects in measuring mismatches.

While working on primary data gathering and processing, it emerged that Serbia has a good statistical and evidence basis for calculation and analysis of skills mismatches. The LFS allows general calculations to be made, broken down by several dimensions. The calculation of mismatch indicators

¹⁶ <http://socijalnoukljucivanje.gov.rs/wp-content/uploads/2016/06/SIPRU-ESRP-2016-English.pdf>

¹⁷ For example, the recent adoption of the Law on the National Qualifications Framework, including aspects related to the setting up and functioning of sectoral skills committees, and the ongoing EU IPA support in the field of education and skills that entails capacity building of key actors in the qualification development process.

following a cross-country methodology was possible and insightful. There is good available data (including at the micro-level) for labour market and skills analyses in the country, particularly the LFS, regularly implemented by the SORS. Full harmonisation of the LFS with international and European standards allows international comparability and increased relevance of results within Serbia's specific context. Other surveys (e.g. company surveys) and administrative data (e.g. education and labour market) are also available and may complement the LFS-driven outlook of occupational and skills demand.

As mentioned above, most of the skills mismatch indicators were calculated using microdata from the LFS. The report analysed data from 2014, 2015 and 2016 (no 2017 annual data was available at the time of calculation). The solution chosen for aggregation by educational attainment levels is presented in Annex 1. This choice of clustering was done taking into account various classifications in the selected ETF partner countries to ensure as much cross-country comparability as possible. A further discussion in the case of Serbia would be on what is the most meaningful and feasible clustering by level of education when it comes to VET studies, as there are three main study programmes in place, as follows:

- lower secondary VET (lasting three years) – below ISCED 3;
- upper secondary VET (lasting four years) – ISCED 4;
- post-secondary (non-tertiary) VET – ISCED 4.

The results of mismatch calculation would not differ much if a different clustering method were applied since actual participation (number of students and graduates) in the three-year VET and post-secondary VET is very low in the country.

Focusing on actual findings, certain levels of mismatches were identified, first and foremost related to young people. The mismatch indicators suggest a problem on the labour market in the school-to-work transition, which is confirmed by the results of this analysis, as well as by other studies using alternative data sources (see references made in Chapter 2).

Such a difficult transition to (first) employment for graduates and hence higher mismatches for younger people seems to be triggered by the difference between skills taught and skills expected in the workplace. Insufficient practical training of graduates is one of the most frequent reasons quoted by employers for difficult recruitment and job retention of young people. On the one side, over-education, for example, mirrors the 'strategy' of intermediate and tertiary graduates in accepting lower-level positions in order to get the practical skills and work experience they are lacking. While this is to some extent acceptable given the inherent difficulties when starting out in one's professional career, a prolongation of such a phenomenon is extremely risky for the employee to exercise/develop their skills and negatively affects the economy's competitiveness overall. On the other side, over-education is a sign of structural economic problems, i.e. low demand and/or uneven territorial distribution of labour demand (e.g. demand for highly skilled workers is concentrated around growth poles). Finally, there might be a mismatch between the education and actual labour demand, namely an oversupply of tertiary graduates in an economic context. Such a conclusion needs further research and careful interpretation as the unemployment spell, discussed below, shows mixed outcomes for medium-/intermediate-level graduates as well.

These elements of a difficult school-to-work transition are confirmed by unemployment-related indicators. Unemployment is high among young people, though the rates improve as people move towards prime age. VET-educated persons, in Serbia at the intermediate level, show mixed outcomes.

While the unemployment rates at prime age seem to suggest some benefits of a more practical education, it is not possible to clearly distinguish this from non-VET education of the same level – which arguably is also a very small group in Serbia – nor do employees with this level of education perform better in terms of employment than those with higher levels of education.

This might also be a problem related to structural change and the rebuilding of the Serbian economy which led to the closing down of many firms that employed people with lower VET-level qualifications, while new employment is more in service sectors requiring different sorts of occupations and skills. The incidence of mismatch is also relatively high in the services sector compared to other occupations, as indicated by the data, revealing a dynamic evolution not yet matched by skills supply.

Improving education in terms of more practical and up-to-date curricula in higher education, and potentially also in VET training, in line with the changes in the Serbian economy might also address over- and under-education phenomena. There seems to be a large group of people who cannot match their level of qualification and skills to those required in their jobs. Several aspects of the national labour market contribute to that; among others, these include the above-mentioned curricula, but also a lock-in into lower-level jobs through which skills become lost, the limited regional scope of job searching (i.e. low mobility of the labour force), and – of course – insufficient overall demand and ongoing economic restructuring.

As mentioned before, a wealth of additional data and research are available on skills mismatches and other interesting aspects of skills supply and demand. However, given the degree to which the school-to-work transition seems to be problematic, the introduction of regular tracer studies would help policymakers and the research community to have a fuller picture of graduates' integration on the labour market, supply–demand imbalances and underlying causes of such mismatches.

Further discussion about the nature and incidence of skills mismatches in Serbia is necessary. Data on the gender dimension and territorial aspects (e.g. urban versus rural and regional divergence in employment, education attainment and economic development) need to be further explored as such dimensions would ensure a fuller picture and help policymakers to choose the right solutions. Emigration may distort the picture as well and needs to be factored into such discussions to enable assessment of whether it will become one of the key reasons for emerging shortages in certain sectors, particularly those that require high levels of knowledge and skills. Beyond macro analysis of mismatches, a sector-focused approach would help social partners to get up-to-date information on in-demand sectors and skills demand, and would enable them to work together to adjust initial and continuing training. Recent policy advancements in setting up the national qualifications framework and sector skills committees promise to help such developments, with EU IPA support as well.

It is recommendable to further expand and make regular analyses of skills mismatch dimensions and impacts. Use of currently available information and data could be complemented by additional evidence, such as tracer studies. As there are multiple sources and angles for calculating skills mismatch incidences, there is a need for a more integrated approach to labour market and skills information in the country. This would necessitate cross-sector data management and exchange through interinstitutional cooperation, tapping into valuable information; social partners or the research community could provide and address sustainability issues of various skills intelligence practices as some practices depend on donors' funding and are at risk of discontinuation.

Understanding the degree, but also the causes and consequences, of skills mismatches might help to shape the right policy response to tackle skills supply and demand imbalances.

ANNEXES

Annex 1. Data used/provided

Most of the skills mismatch indicators were calculated using microdata from the 2014, 2015 and 2016 national LFS carried out by the Statistical Office of the Republic of Serbia.

The table below displays the aggregation by educational attainment level used in this report.

TABLE A1.1 AGGREGATION OF EDUCATIONAL ATTAINMENT LEVELS

Aggregated level	Serbia national classification
Low	Without education
	Primary education, grades 1–3
	Primary education, grades 4–7
	Primary education, 8 years
	Lower secondary education, 1–2 years
	Lower secondary education, 3 years
Intermediate non-VET	Grammar school
	Specialisation after secondary education, school for highly qualified workers (including VET ISCED 4)
Intermediate VET	Upper secondary education, 4 years (ISCED 3)
High	Higher education, first level of faculty (old programme)
	Faculty, academy, undergraduate academic studies, high applied education school, specialised academic studies
	Master's level academic studies, integrated studies (medicine, pharmacy, stomatology and veterinary science – Bologna Process)
	Doctoral academic studies

There are a number of differences between the aggregation of educational levels used in this report and the aggregation used in Serbian LFS.

- Lower secondary education lasting one to two years and lower secondary education lasting three years are included in the low level of education while they are considered as intermediate levels in national LFS.
- Specialisation after secondary education, school for highly qualified workers belongs to VET programmes, not to non-VET programmes as it is classified in this report.

Initial aggregation performed by the research team took into account the recommendations of the local expert and the need to reach a harmonised aggregation across the seven countries involved in the study. Future work on mismatch measurement should of course reflect closely the national classification of educational levels.

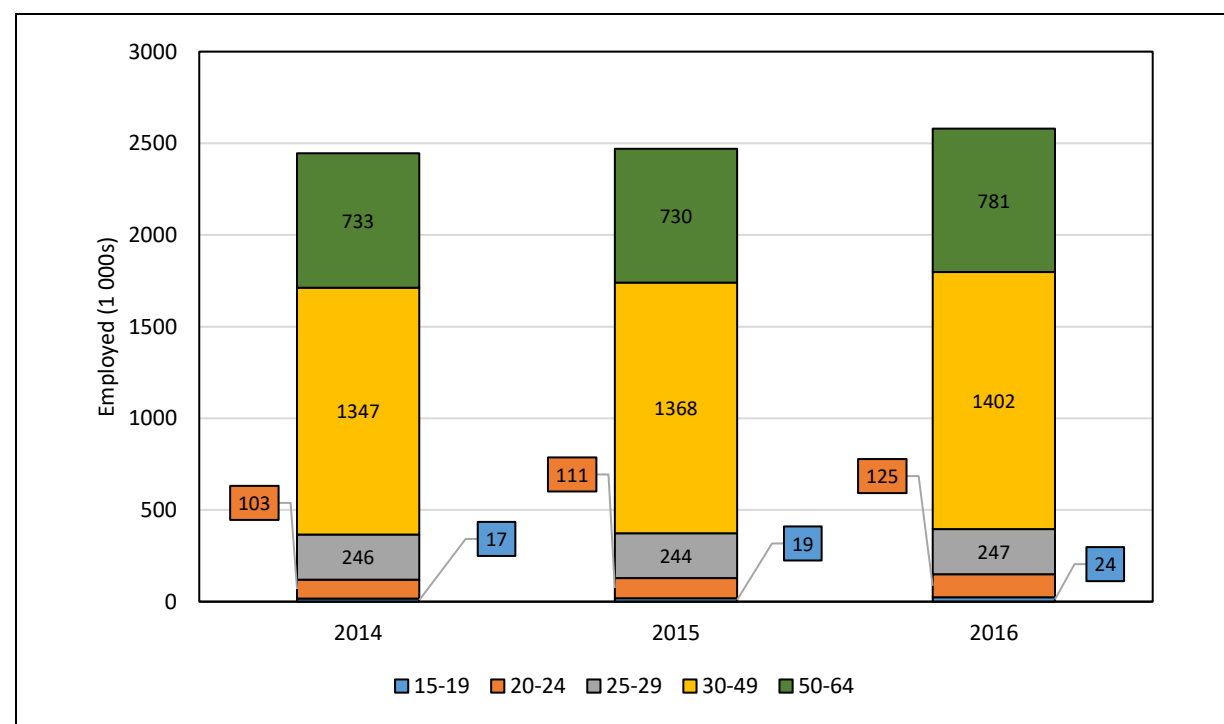
Annex 2. Additional figures and tables

TABLE A2.1 POPULATION (15–64 AGE GROUP) BY (ALTERNATIVE) EDUCATION LEVEL, 2014

	% share of population with the same education level			
	Employed	Unemployed	Inactive	Total
No education	2.87	2.61	6.62	4.21
Low	36.04	41.03	50.17	41.86
Medium	36.61	38.23	35.01	36.23
High	24.48	18.13	8.20	17.71
All education levels (%)	100	100	100	100
All education levels (thousands)	2 445.71	607.37	1 770.32	4 823.40

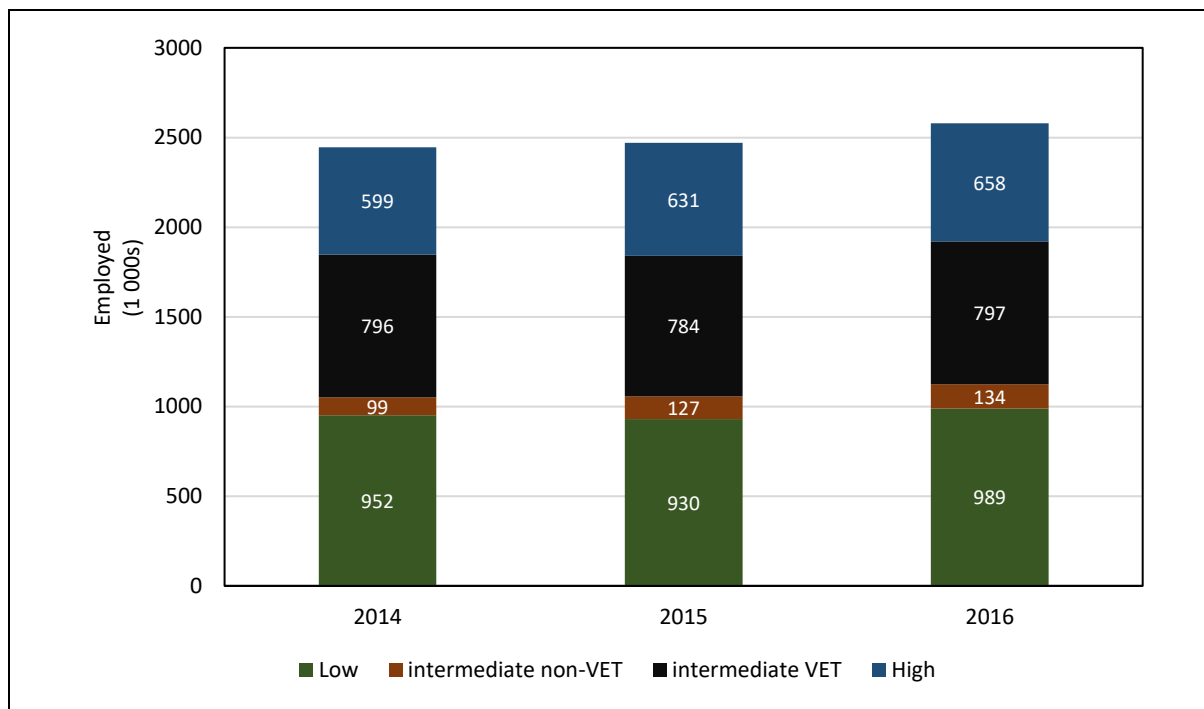
Source: Calculations based on LFS data, Economix

FIGURE A2.1 STRUCTURE OF EMPLOYMENT BY AGE GROUP, 2014–16



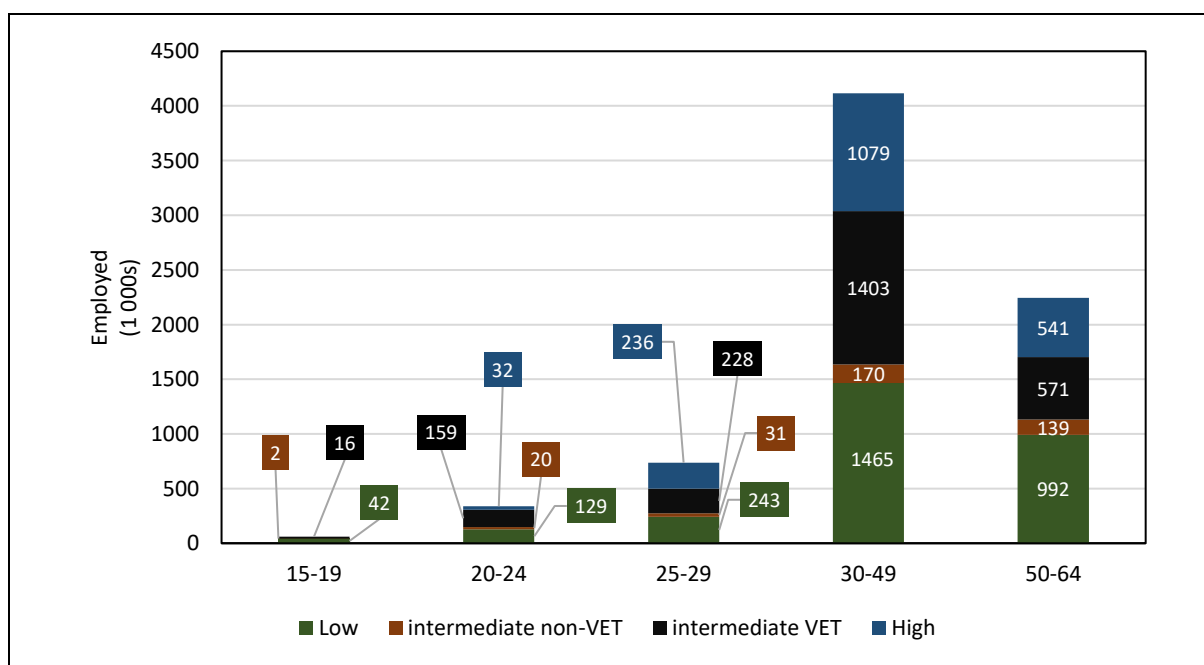
Source: Calculations based on LFS data, Economix

FIGURE A2.2 STRUCTURE OF EMPLOYMENT BY EDUCATIONAL ATTAINMENT LEVEL (15–64 AGE GROUP), 2014–16



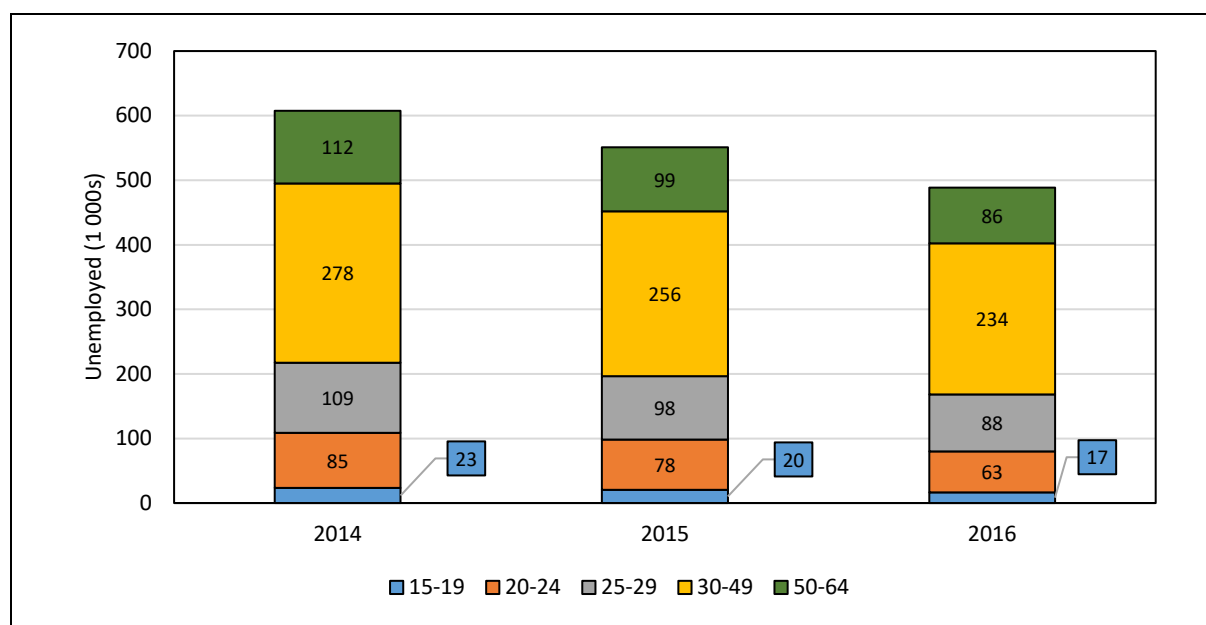
Source: Calculations based on LFS data, Economix

FIGURE A2.3 STRUCTURE OF EMPLOYMENT BY AGE AND EDUCATIONAL ATTAINMENT LEVEL, 2014



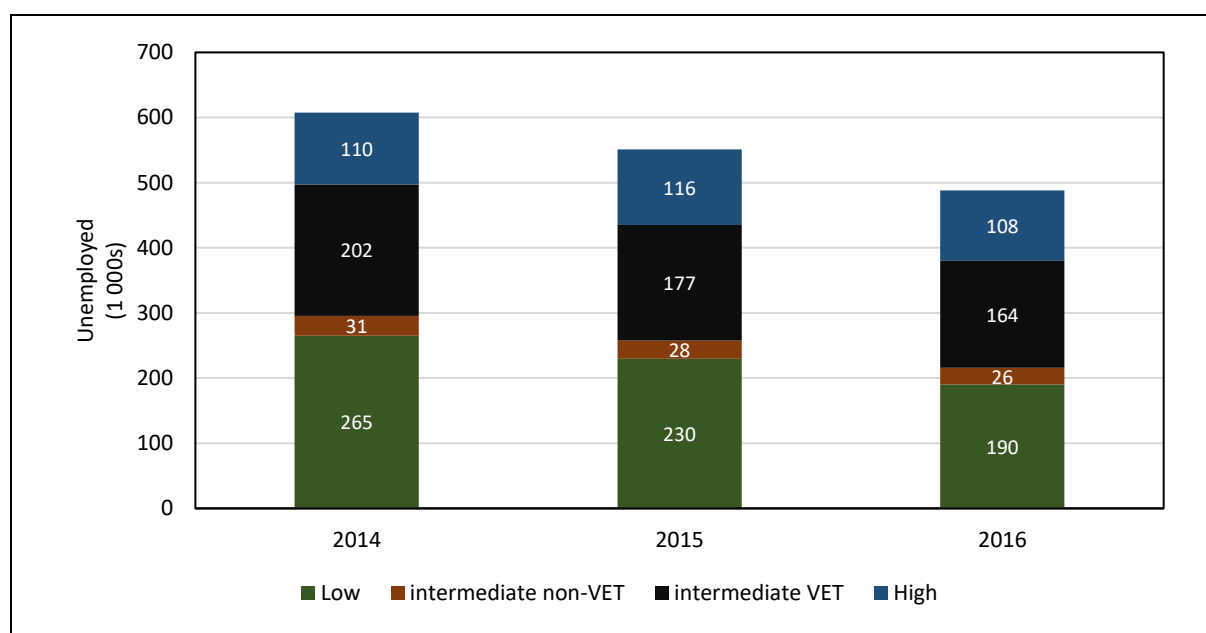
Source: Calculations based on LFS data, Economix

FIGURE A2.4 STRUCTURE OF UNEMPLOYMENT BY AGE GROUP, 2014–16



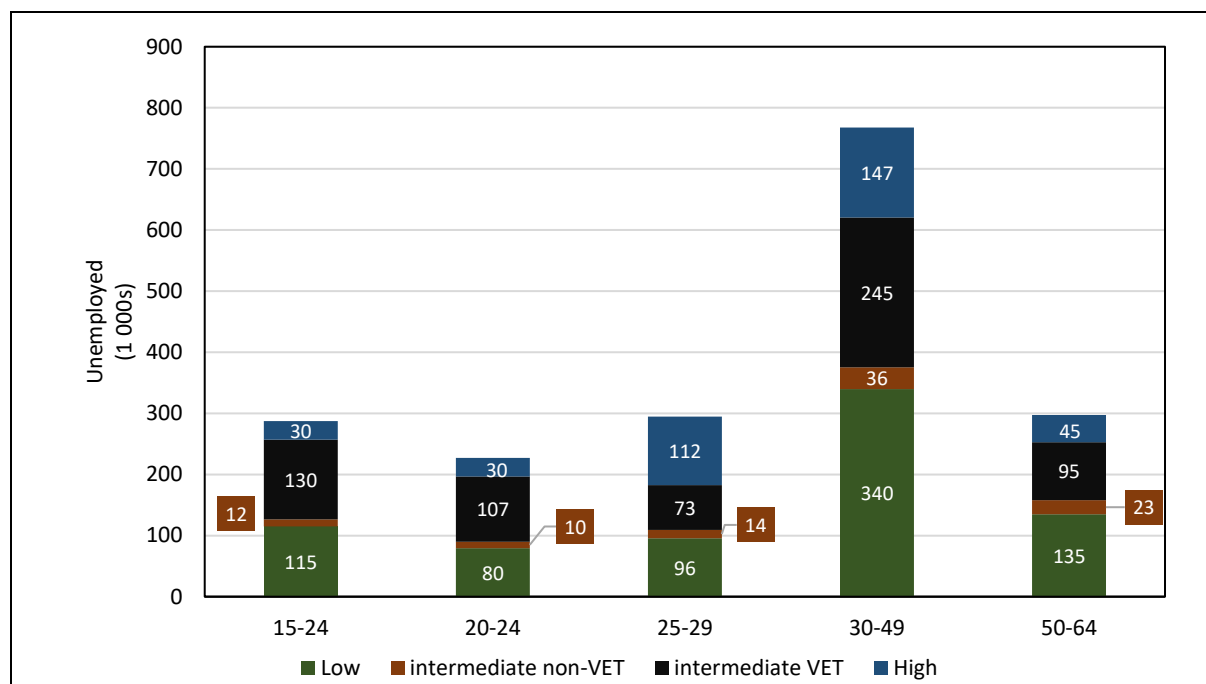
Source: Calculations based on LFS data, Economix

FIGURE A2.5 STRUCTURE OF UNEMPLOYMENT BY EDUCATIONAL ATTAINMENT LEVEL (15–64 AGE GROUP), 2014–16



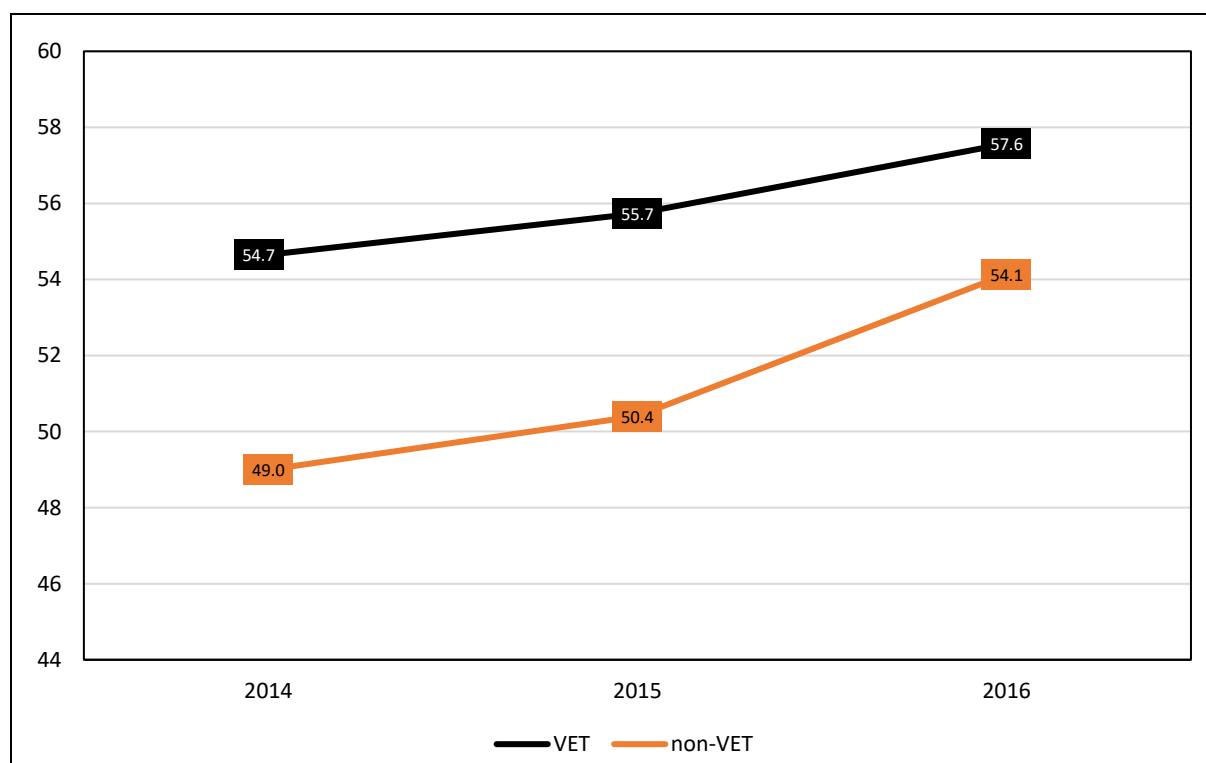
Source: Calculations based on LFS data, Economix

FIGURE A2.6 STRUCTURE OF UNEMPLOYMENT BY AGE AND EDUCATIONAL ATTAINMENT LEVEL, 2014



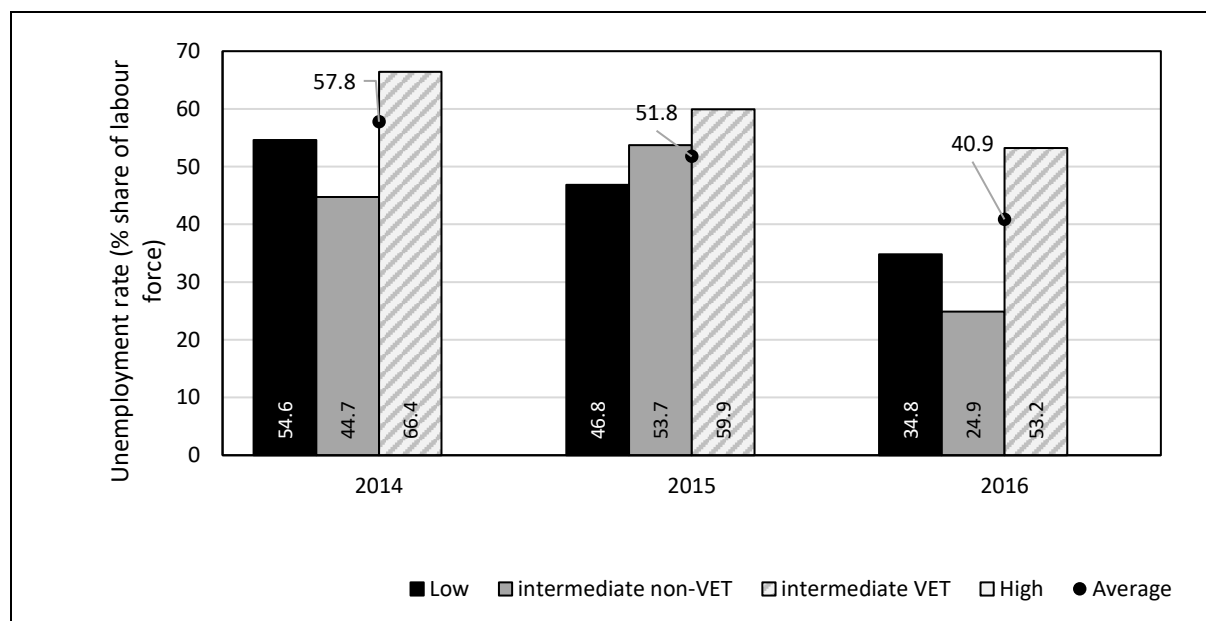
Source: Calculations based on LFS data, Economix

FIGURE A2.7 PERCENTAGE OF EMPLOYED (15–64 AGE GROUP) – VET VERSUS NON-VET, 2014–16



Source: Calculations based on LFS data, Economix

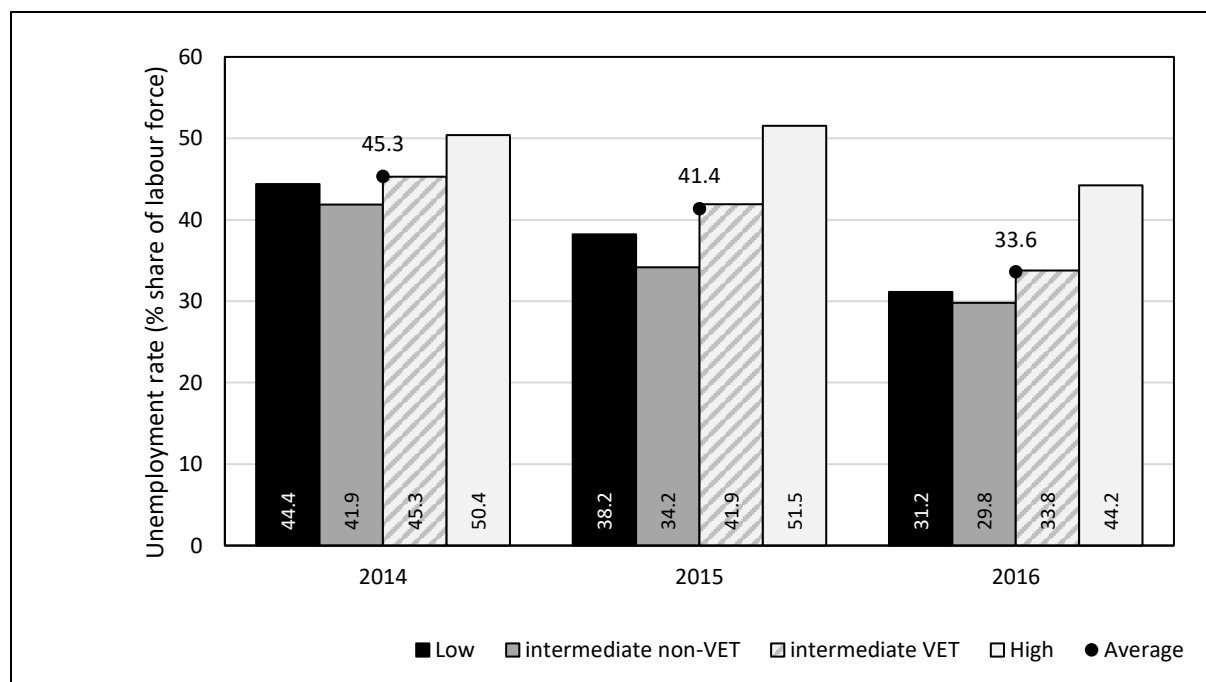
FIGURE A2.8 UNEMPLOYMENT RATES BY EDUCATIONAL ATTAINMENT LEVEL (15–19 AGE GROUP), 2014–16 (%)



Note: Educational level 'High' (i.e. university) excluded due to very young age group

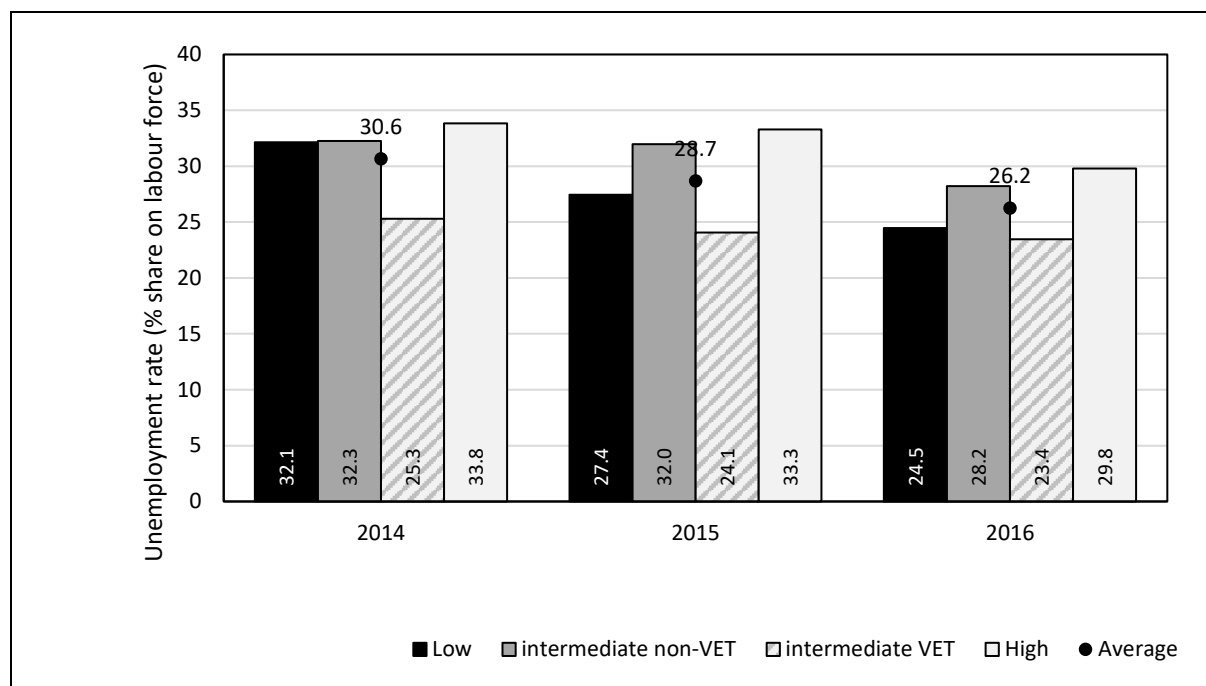
Source: Calculations based on LFS data, Economix

FIGURE A2.9 UNEMPLOYMENT RATES BY EDUCATIONAL ATTAINMENT LEVEL (20–24 AGE GROUP), 2014–16 (%)



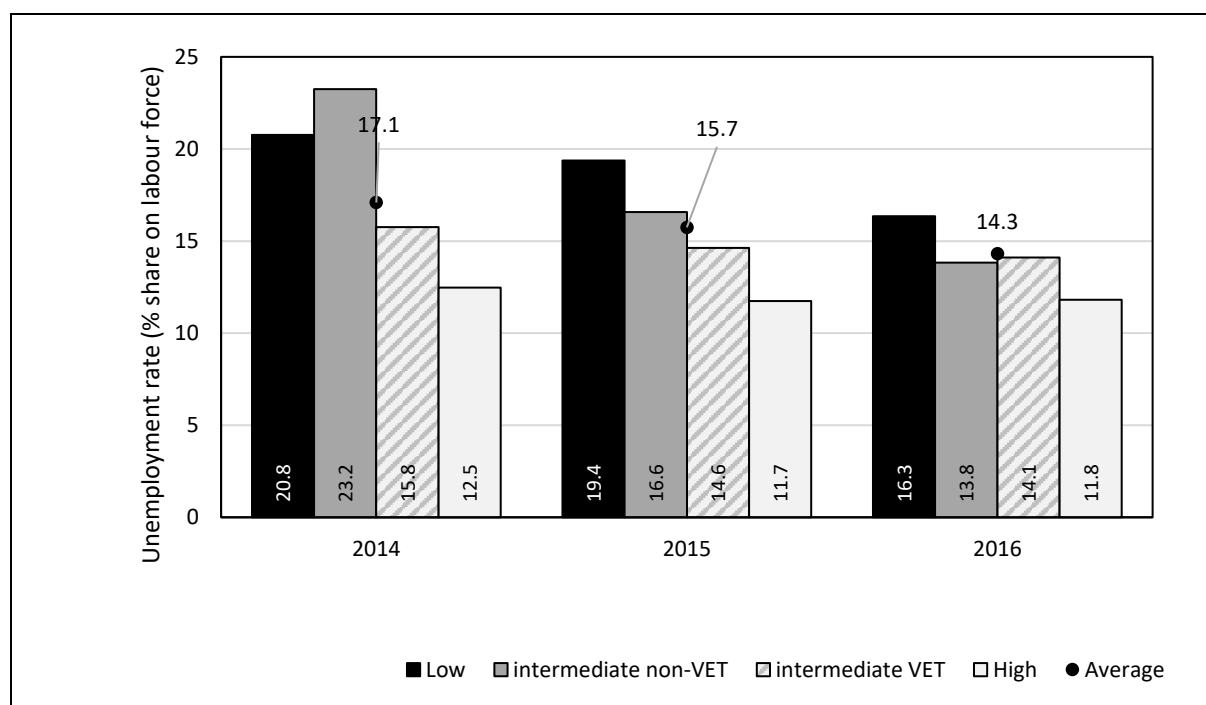
Source: Calculations based on LFS data, Economix

FIGURE A2.10 UNEMPLOYMENT RATES BY EDUCATIONAL ATTAINMENT LEVEL (25–29 AGE GROUP), 2014–16 (%)



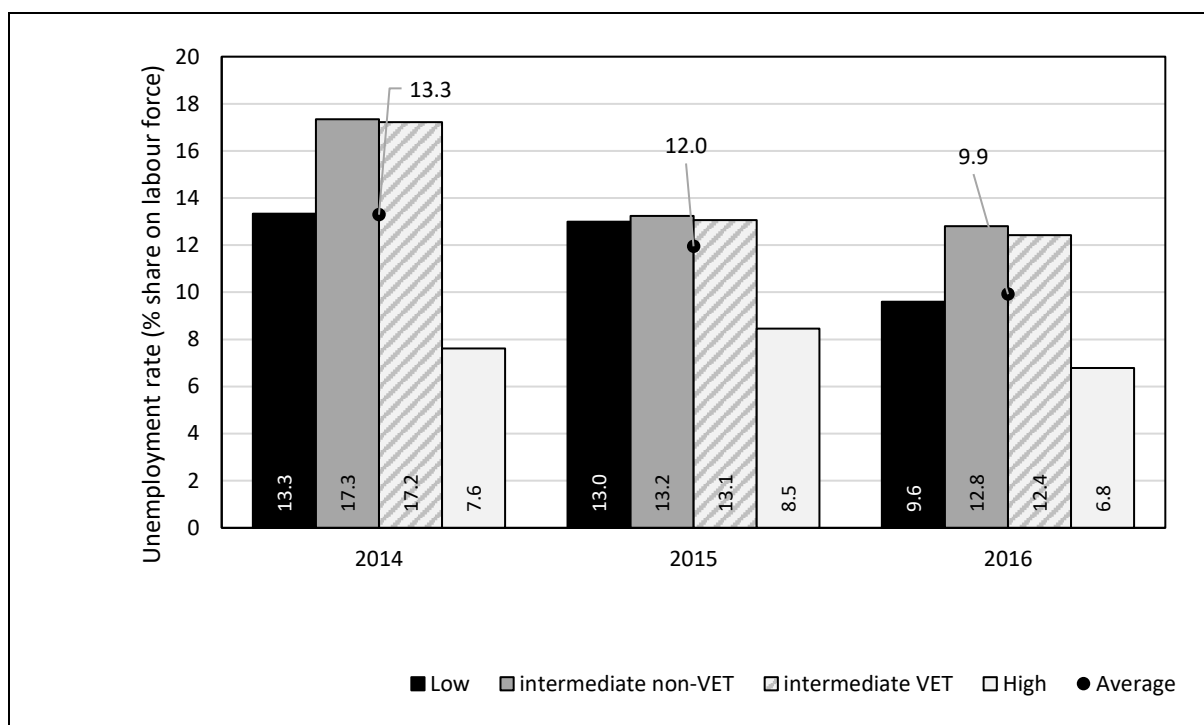
Source: Calculations based on LFS data, Economix

FIGURE A2.11 UNEMPLOYMENT RATES BY EDUCATIONAL ATTAINMENT LEVEL (30–49 AGE GROUP), 2014–16 (%)



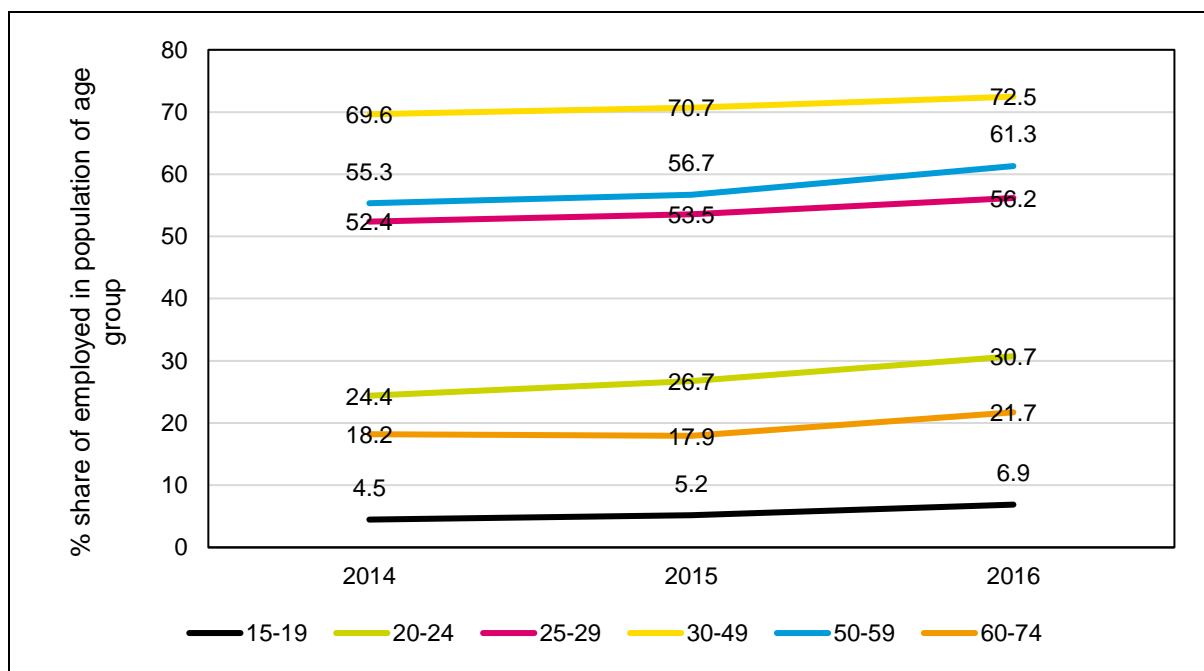
Source: Calculations based on LFS data, Economix

FIGURE A2.12 UNEMPLOYMENT RATES BY EDUCATIONAL ATTAINMENT LEVEL (50–64 AGE GROUP), 2014–16 (%)



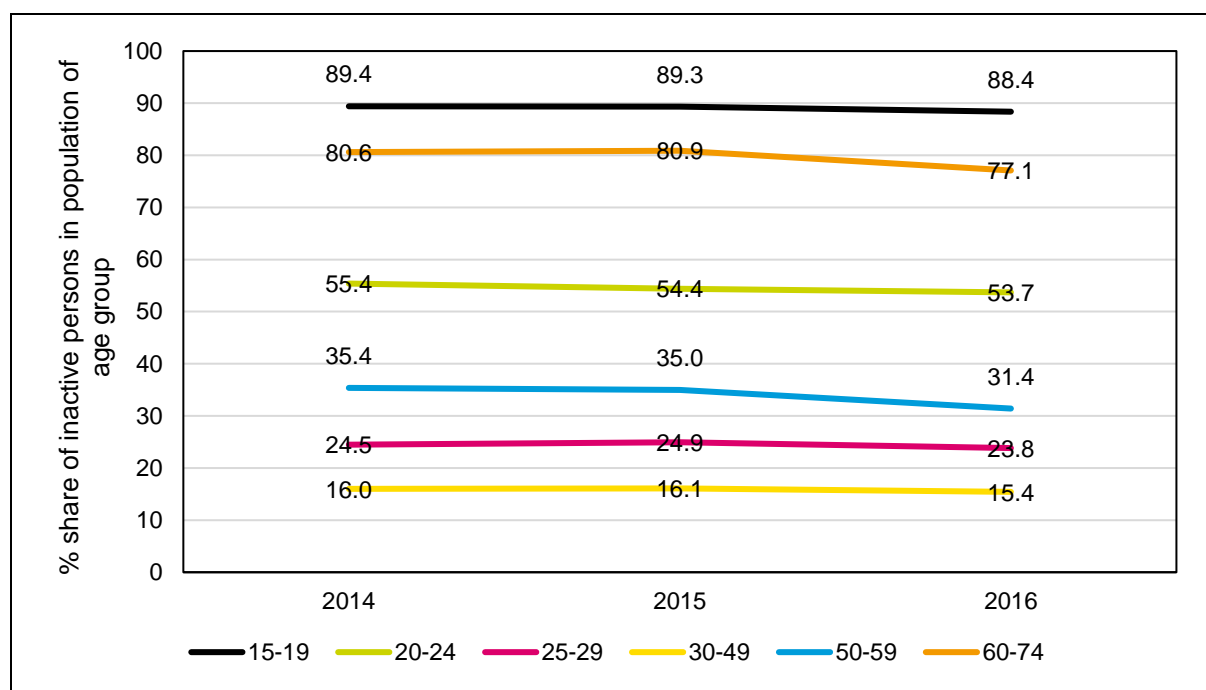
Source: Calculations based on LFS data, Economix

FIGURE A2.13 EMPLOYMENT BY AGE GROUP, 2014–16



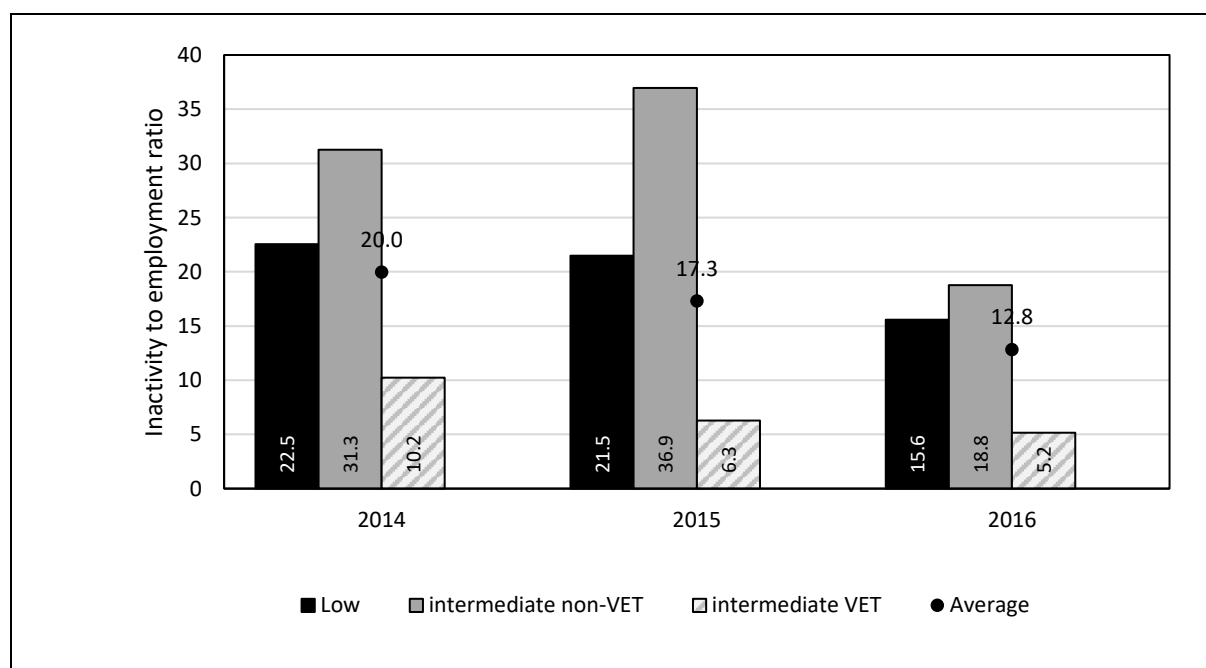
Source: Calculations based on LFS data, Economix

FIGURE A2.14 INACTIVITY TO POPULATION RATIO BY AGE GROUP, 2014–16



Source: Calculations based on LFS data, Economix

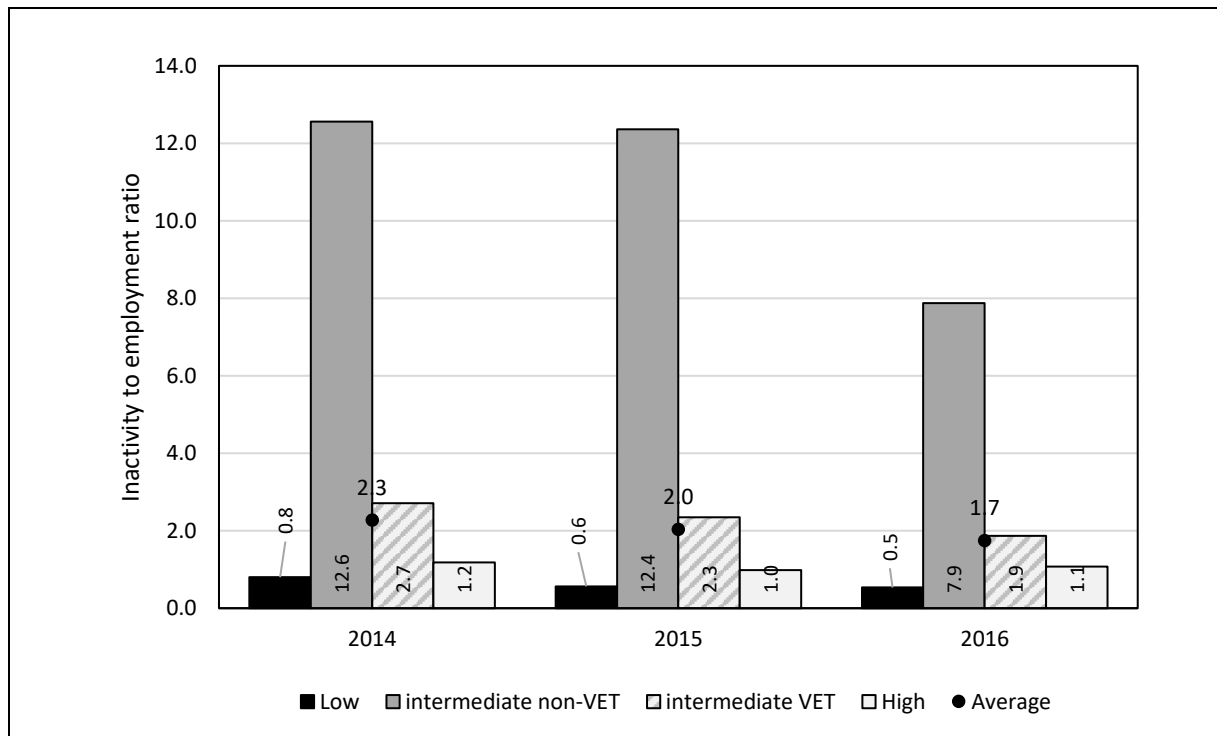
FIGURE A2.15 INACTIVITY TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (15–19 AGE GROUP), 2014–16



Note: Educational level 'High' (i.e. university) excluded due to very young age group

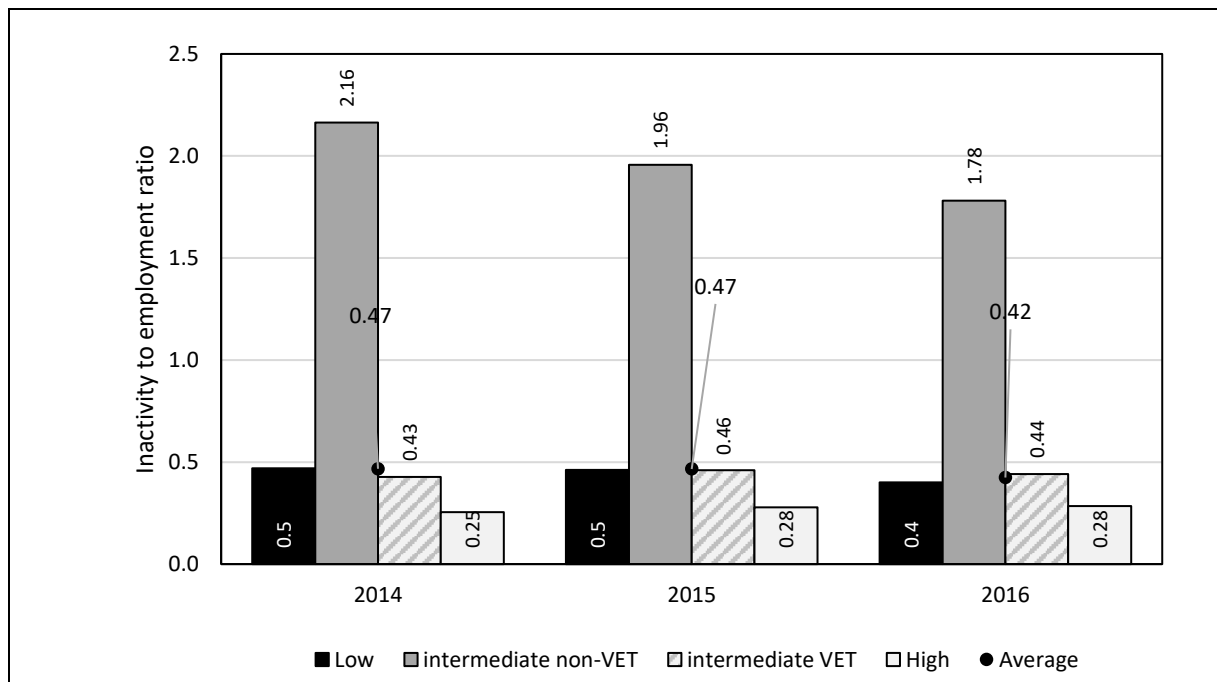
Source: Calculations based on LFS data, Economix

FIGURE A2.16 INACTIVITY TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (20–24 AGE GROUP), 2014–16



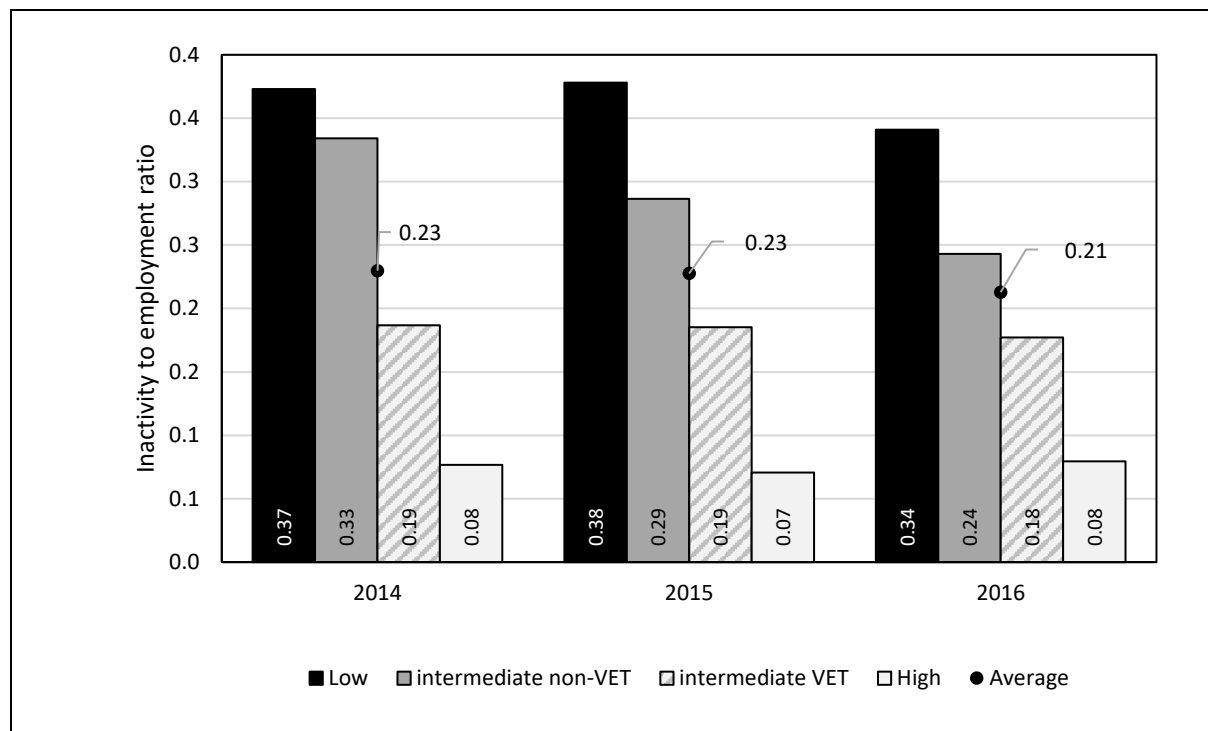
Source: Calculations based on LFS data, Economix

FIGURE A2.17 INACTIVITY TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (25–29 AGE GROUP), 2014–16



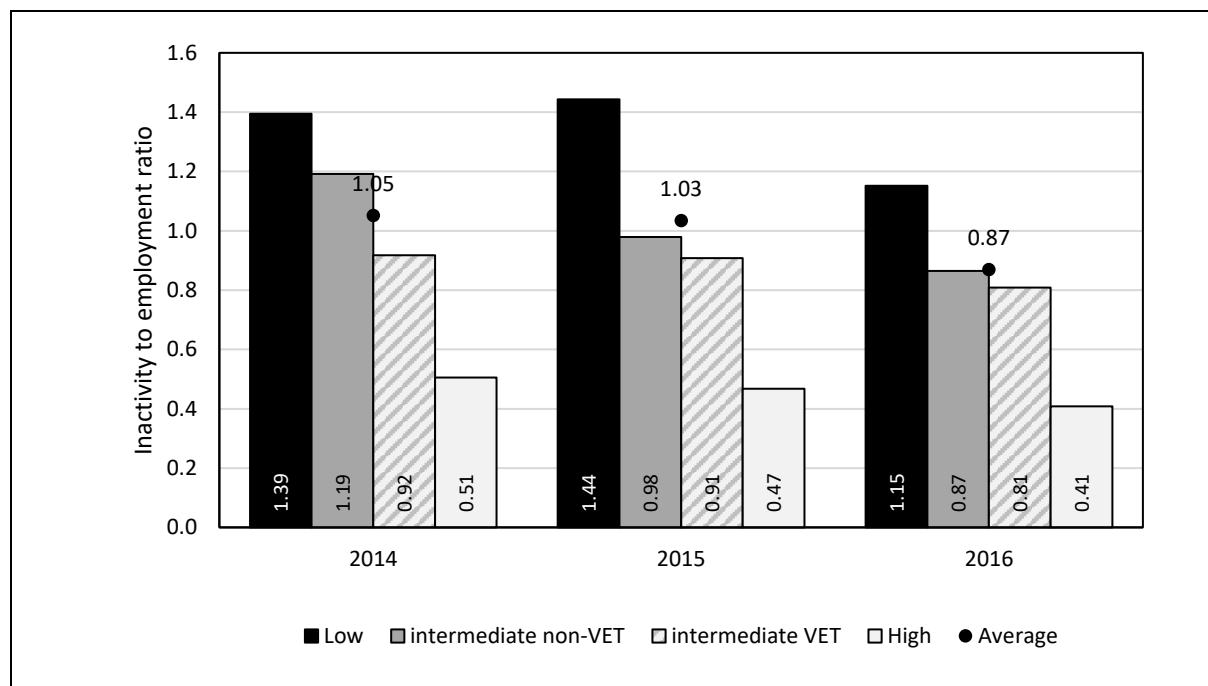
Source: Calculations based on LFS data, Economix

FIGURE A2.18 INACTIVITY TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (30–49 AGE GROUP), 2014–16



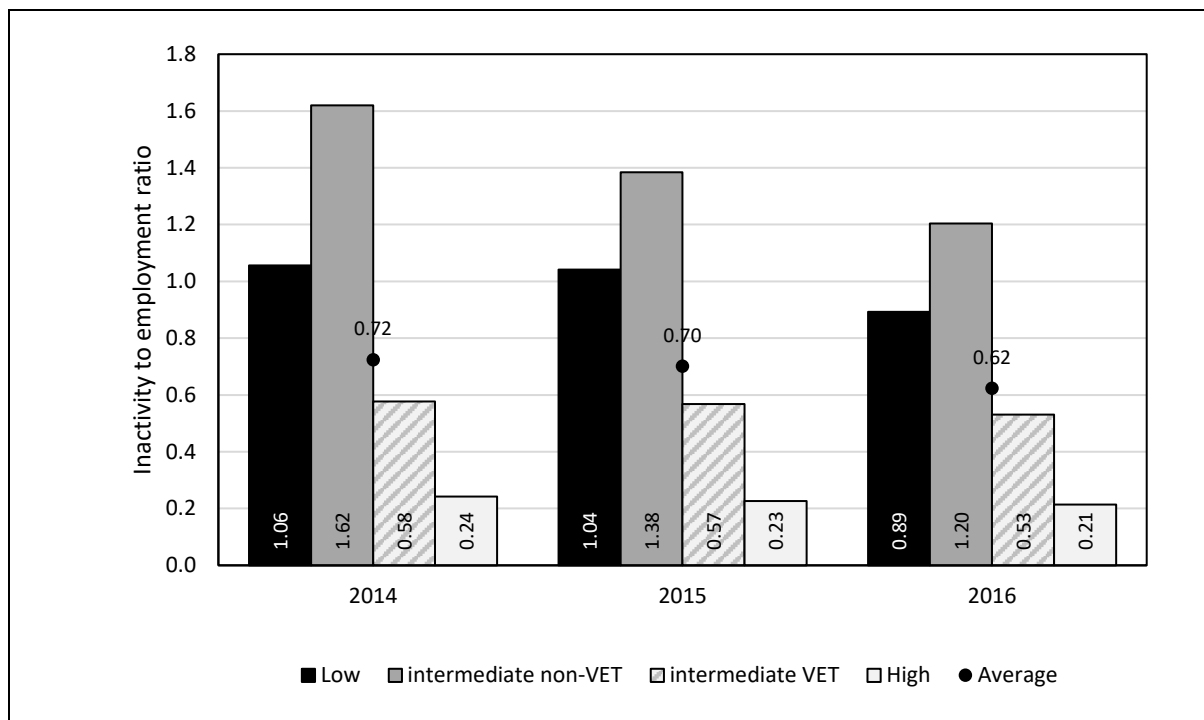
Source: Calculations based on LFS data, Economix

FIGURE A2.19 INACTIVITY TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (50–64 AGE GROUP), 2014–16



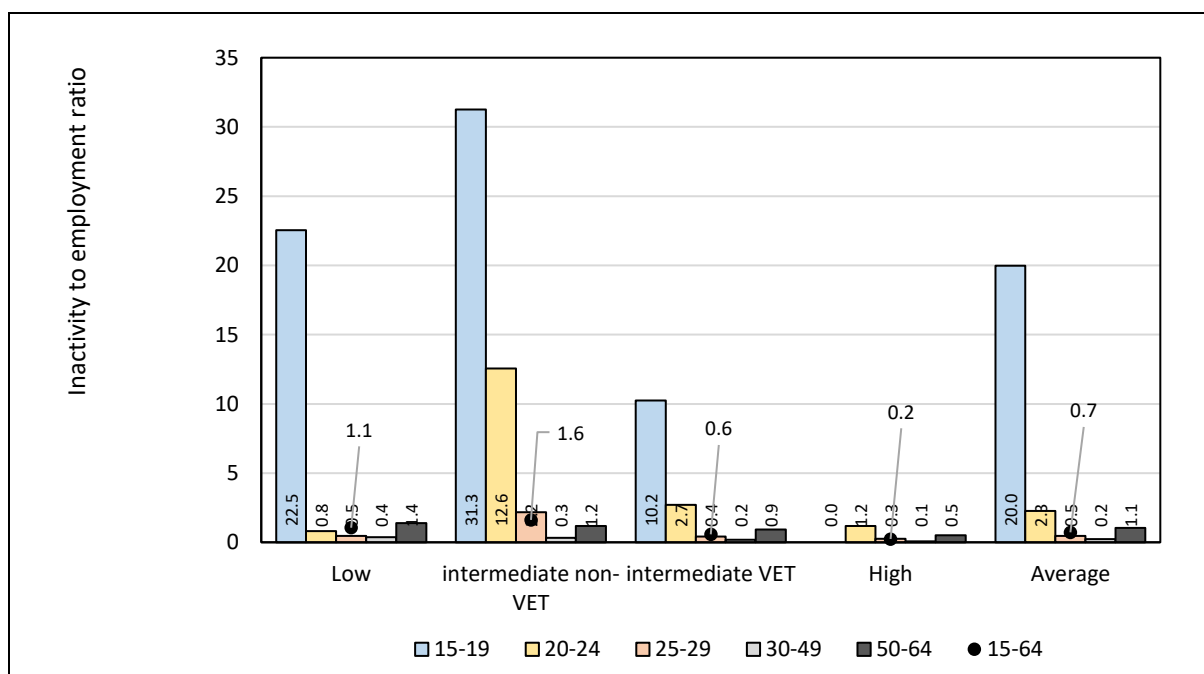
Source: Calculations based on LFS data, Economix

FIGURE A2.20 INACTIVITY TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (15–64 AGE GROUP), 2014–16



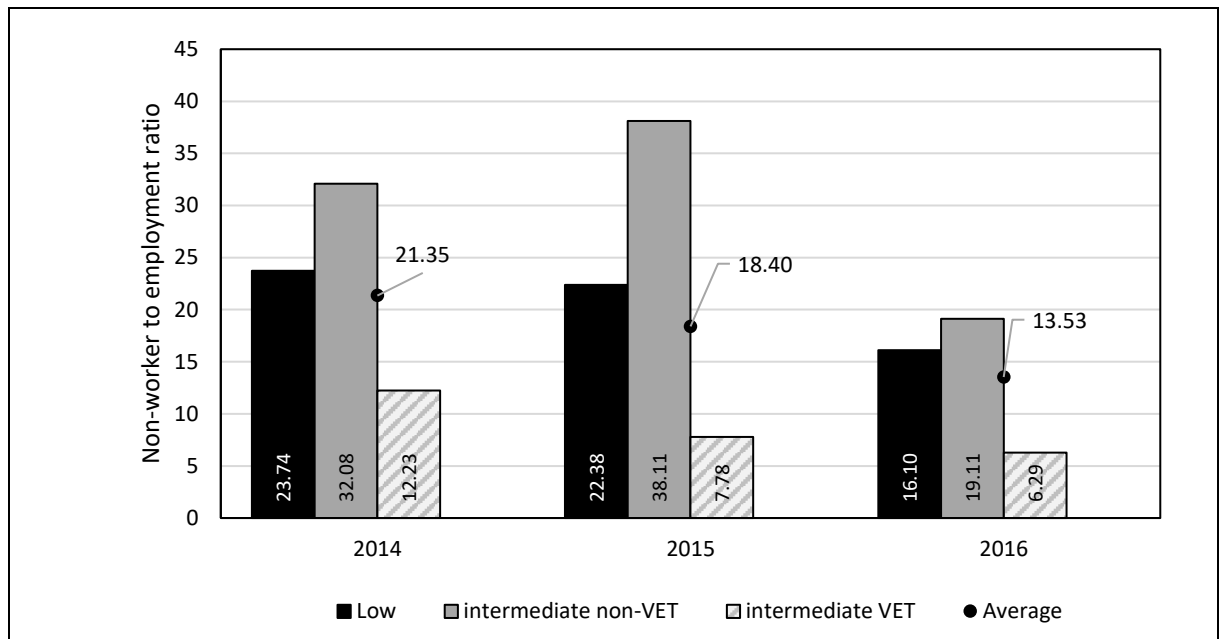
Source: Calculations based on LFS data, Economix

FIGURE A2.21 INACTIVITY TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL AND AGE GROUP, 2014



Source: Calculations based on LFS data, Economix

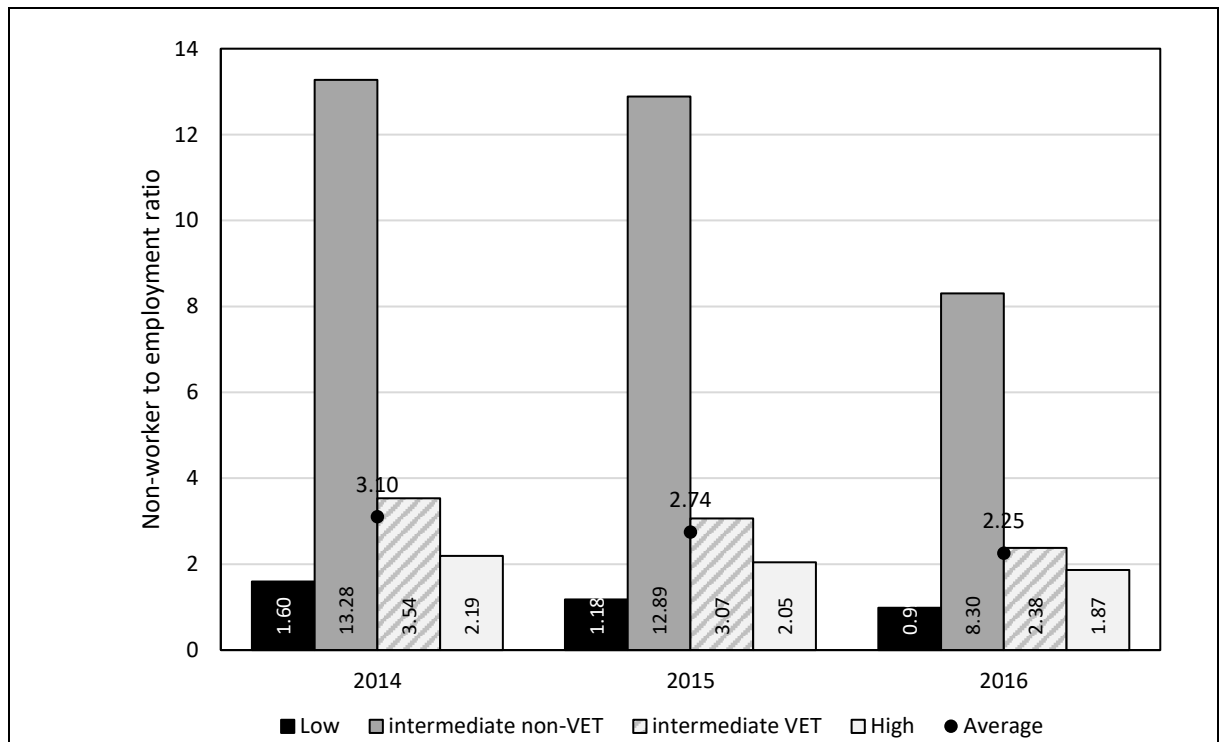
FIGURE A2.22 NON-WORKER TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (15–19 AGE GROUP), 2014–16



Note: Educational level 'High' (i.e. university) excluded due to very young age group

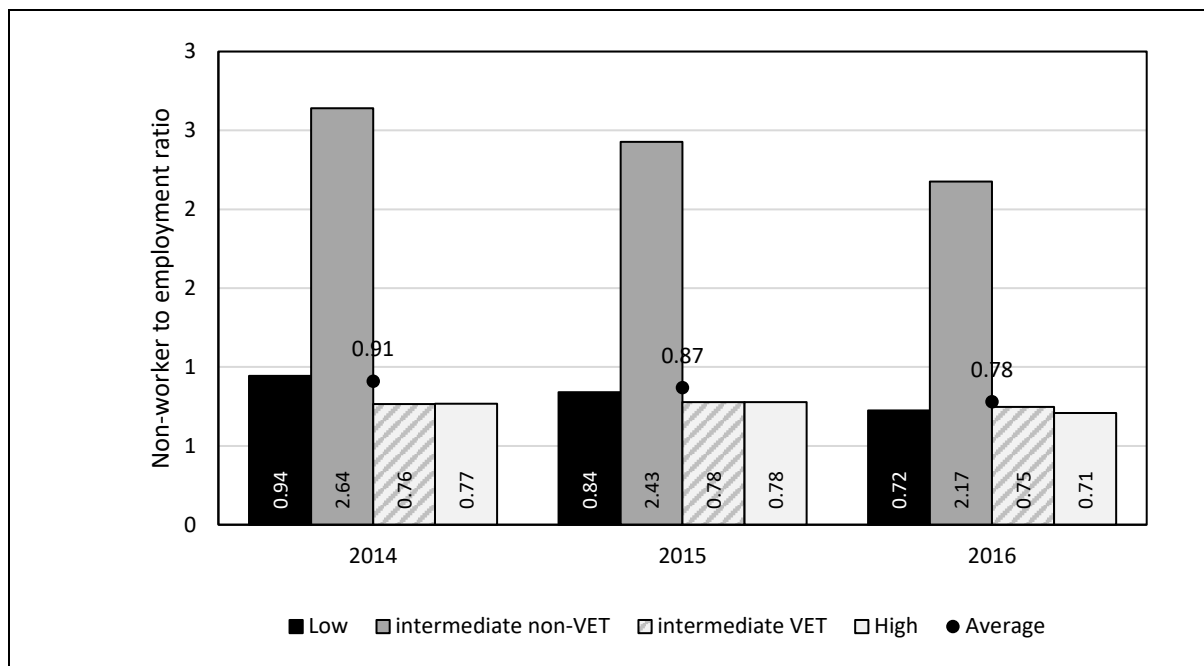
Source: Calculations based on LFS data, Economix

FIGURE A2.23 NON-WORKER TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (20–24 AGE GROUP), 2014–16



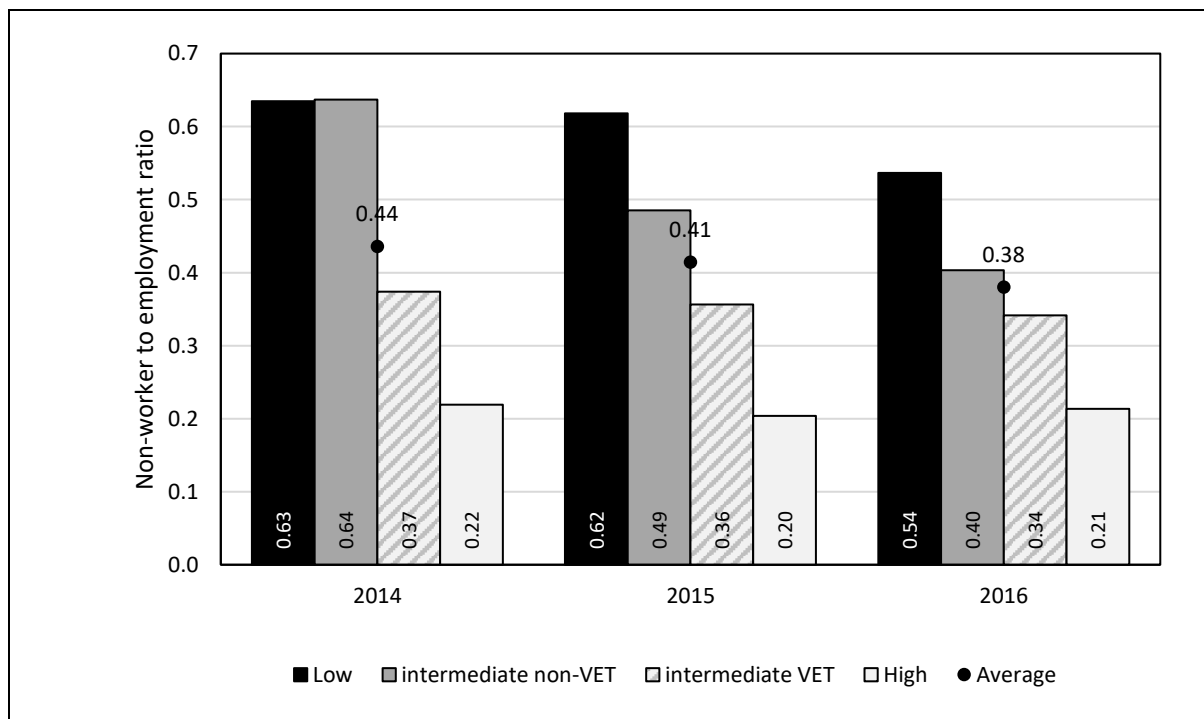
Source: Calculations based on LFS data, Economix

FIGURE A2.24 NON-WORKER TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (25–29 AGE GROUP, 2014–16)



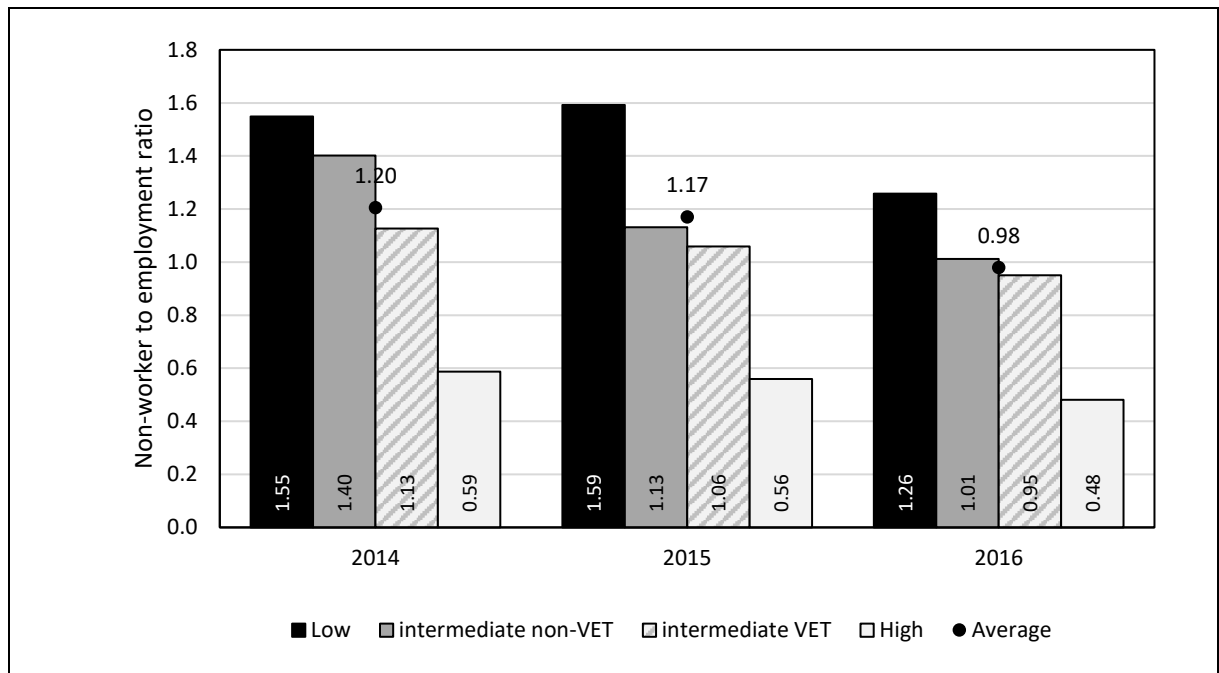
Source: Calculations based on LFS data, Economix

FIGURE A2.25 NON-WORKER TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (30–49 AGE GROUP), 2014–16



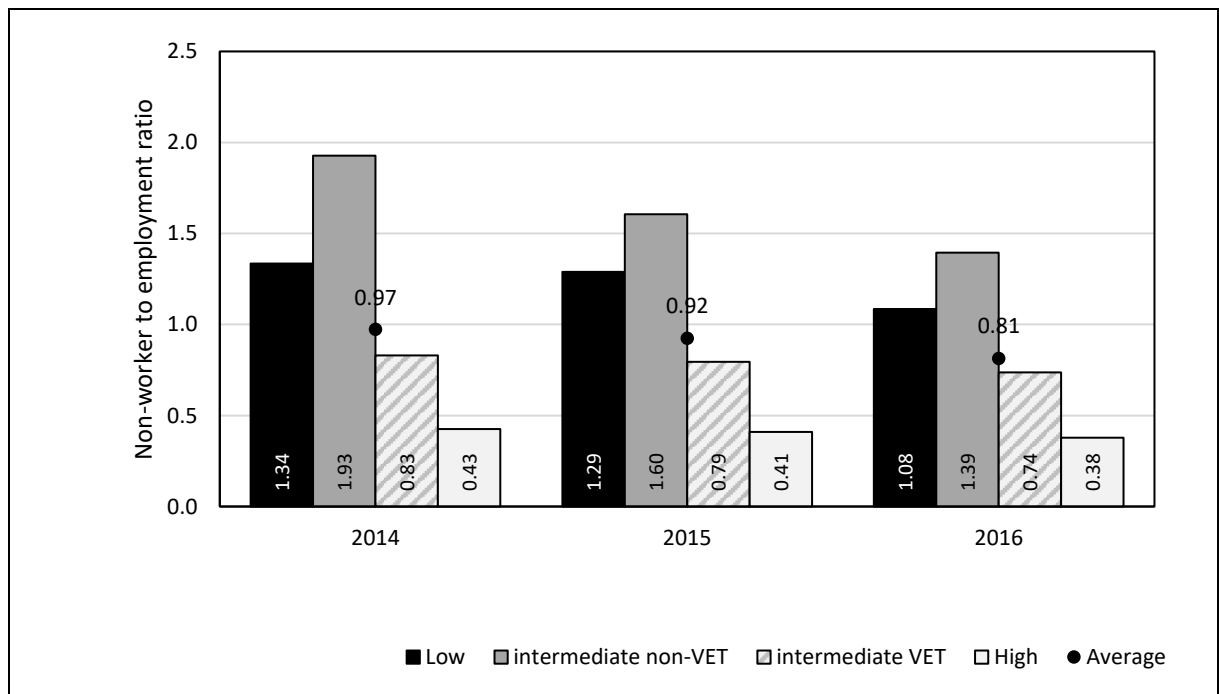
Source: Calculations based on LFS data, Economix

FIGURE A2.26 NON-WORKER TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (50–64 AGE GROUP), 2014–16



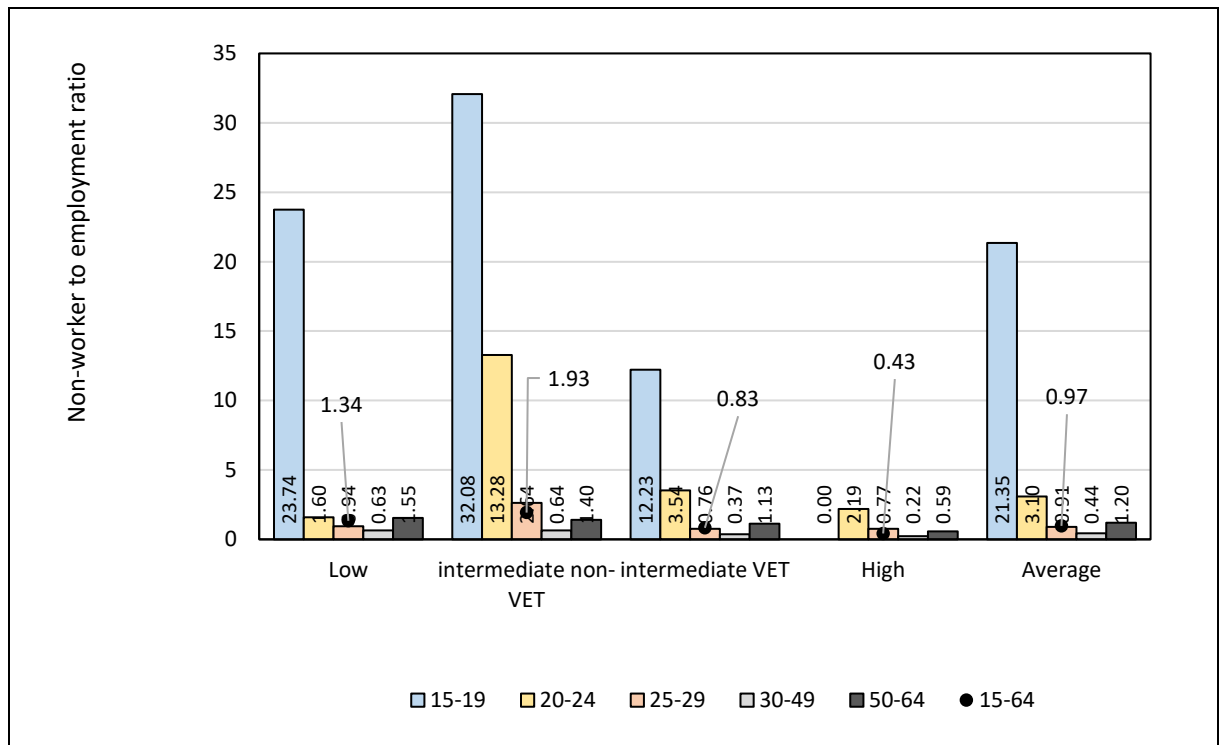
Source: Calculations based on LFS data, Economix

FIGURE A2.27 NON-WORKER TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL (15–64 AGE GROUP), 2014–16



Source: Calculations based on LFS data, Economix

FIGURE A2.28 NON-WORKER TO EMPLOYMENT RATIO BY EDUCATIONAL ATTAINMENT LEVEL AND AGE GROUP, 2014



Source: Calculations based on LFS data, Economix

LIST OF ACRONYMS

CVAR	Coefficient of variation
ETF	European Training Foundation
EU	European Union
GDP	Gross domestic product
ICT	Information and communications technology
ILO	International Labour Organisation
IPA	Instrument for Pre-accession Assistance
ISCED	International Standard Classification of Education
ISCO	International Standard Classification of Occupations
LFS	Labour force survey
NES	National Employment Service
OECD	Organisation for Economic Cooperation and Development
PISA	Programme for International Student Assessment
SORS	Statistical Office of the Republic of Serbia
USD	United States dollar
VET	Vocational education and training

LITERATURE

Arandarenko, M. and Bartlett, W. (eds), *Labour market and skills in the Western Balkans*, Foundation for the Advancement of Economics, Belgrade, 2012. Last accessed 28 February 2019 at:

www.lse.ac.uk/LSEE-Research-on-South-Eastern-Europe/Assets/Documents/Publications/Other/SkillstheLabourMarket.pdf

Cedefop (European Centre for the Development of Vocational Training), *The skill matching challenge: Analysing skill mismatch and policy implications*, Publications Office of the European Union, Luxembourg, 2010.

Cedefop (European Centre for the Development of Vocational Training), *Skill mismatch: More than meets the eye*, Briefing note, Publications Office of the European Union, Luxembourg, 2014.

DG EAC (Directorate-General for Education and Culture), *From university to employment: Higher education provision and labour market needs in the Western Balkans*, European Commission, 2017.

ETF (European Training Foundation), *Measuring mismatch in ETF partner countries: A methodological note*, ETF, Turin, 2012.

ETF (European Training Foundation), *Young people not in employment, education or training*, ETF, Turin, 2015. Last accessed 28 February 2019 at: www.etf.europa.eu/web.nsf/pages/NEET ETF partner countries

ETF (European Training Foundation), *Skills needs identification and skills matching in South Eastern Europe*, ETF, Turin, 2016. Last accessed 28 February 2019 at: www.etf.europa.eu/sites/default/files/m/52A4B230DF6113F1C125805A005567B3_Skills%20needs%20identification%20and%20matching%20SEE.pdf.

ETF (European Training Foundation), *Local skills matter: Serbia*, ETF, Turin, 2016. Last accessed 28 February 2019 at: www.etf.europa.eu/sites/default/files/m/4E8FE4405026DCD8C12581B60052A323_Local_Skills_Serbia_EN.pdf

ETF (European Training Foundation), *Institutional cooperation and coordination in skills development in Serbia*, ETF, Turin, 2017. Last accessed 28 February 2019 at: www.etf.europa.eu/en/publications-and-resources/publications/institutional-cooperation-and-coordination-skills

ETF (European Training Foundation), *Digital skills and online learning in Serbia*, ETF, Turin, 2017a. Last accessed 28 February 2019 at: www.etf.europa.eu/sites/default/files/m/0A2814EFC7BF6440C125822E00573883_Digital%20factsheet_Serbia.pdf

ETF (European Training Foundation), *Work-based learning in EU candidate countries*, ETF, Turin, 2017b. Last accessed 28 February 2019 at: www.etf.europa.eu/sites/default/files/m/333F8DD829CBDBDFC12581FE00299A16_Work-based%20learning_candidate%20countries.pdf

ETF (European Training Foundation), *Torino Process 2016–17: Serbia – Executive summary*, ETF, Turin, 2017c. Last accessed 28 February 2019 at: www.etf.europa.eu/sites/default/files/m/A55C44A221EC34F2C1258125005DE420_TRP%202016-17%20Serbia.pdf

ETF (European Training Foundation), *ICT sector skills needs analysis in Vojvodina in a VET multilevel governance perspective*, ETF, Turin, 2017d. Last accessed 28 February 2019 at:

www.etf.europa.eu/sites/default/files/m/00A336F8DFFE9763C1258224005B90E6_ICT%20sector%20skills%20needs%20analysis%20Serbia.pdf

ETF (European Training Foundation), *Tracking vocational graduates in the EU candidate countries*, ETF, Turin, 2018. Last accessed 28 February 2019 at:

www.etf.europa.eu/sites/default/files/m/9C43BF40FE2B51DEC125829B005A1BFF_Tracking%20vocational%20graduates_candidate%20countries.pdf

European Commission, Analytical web note 07/2015: Measuring skills mismatch, 2015. Last accessed 28 February 2019 at: <http://ec.europa.eu/social/main.jsp?catId=738&langId=en&pubId=7860>

European Commission, *Economic reform programme of the Republic of Serbia: Commission Assessment 2018*, Staff Working Document, 2018. Last accessed 28 February 2019 at:

https://ec.europa.eu/neighbourhood-enlargement/sites/near/files/swd_serbia.pdf

Eurostat, *Statistical approaches to the measurement of skills: 2016 edition*, Publications Office of the European Union, Luxembourg, 2016. Last accessed 28 February 2019 at:

<http://ec.europa.eu/eurostat/documents/3888793/7753369/KS-TC-16-023-EN-N.pdf/438b69b5-2fcb-4923-b9e2-fa7b59906438>

Foundation for the Advancement of Economics, *Quarterly monitor*, 39, Faculty of Economics, FREN, Belgrade, 2015.

Foundation for the Advancement of Economics, *Quarterly monitor*, 43, Faculty of Economics, FREN, Belgrade, 2016.

Foundation for the Advancement of Economics, *Quarterly monitor*, 47, Faculty of Economics, FREN, Belgrade, 2017.

Government of the Republic of Serbia, *Employment and social reform programme in the process of accession to the European Union*, 2016. Last accessed 28 February 2019 at:

<http://socijalnoukljucivanje.gov.rs/wp-content/uploads/2016/06/SIPRU-ESRP-2016-English.pdf>

Government of the Republic of Serbia, *Economic reform programmes for the period 2017–2019*, 2017.

Last accessed 28 February 2019 at: www.mfin.gov.rs/UserFiles/File/strategije/ERP%202017%20-%202019%20final_Eng.pdf.

IMF (International Monetary Fund), Republic of Serbia: 2017 article IV consultation, seventh review under the stand-by arrangement and modification of performance criteria, IMF country report, No 17/263, September, 2017.

Joint Research Centre, *Occupational mismatch in Europe: Understanding overeducation and overskilling for policy making*, JRC, 2014. Last accessed 28 February 2019 at:

<http://publications.jrc.ec.europa.eu/repository/bitstream/JRC89712/occupational%20mismatch%20in%20europe.pdf>

Marjanović, D., 'Labour market transitions of young women and men in the Republic of Serbia', *Work4Youth Publication Series*, No 36, International Labour Office, Geneva, 2016. Last accessed 28 February 2019 at:

www.ilo.org/wcmsp5/groups/public/---ed_emp/documents/publication/wcms_488799.pdf

SORS (Statistical Office of the Republic of Serbia), *Population projections of the Republic of Serbia 2011–2041*, SORS, Belgrade, 2014. Last accessed 28 February 2019 at:

www.mdpp.gov.rs/doc/projekcije/Projekcije%20stanovnistva%20Republike%20Srbije%202011-2041.%20godine.pdf

SORS (Statistical Office of the Republic of Serbia), *Statistical yearbook of the Republic of Serbia*, SORS, Belgrade, 2016.

SORS (Statistical Office of the Republic of Serbia), *Statistical yearbook Serbia*, SORS, Belgrade, 2017a. Last accessed 28 February 2019 at: <http://publikacije.stat.gov.rs/G2017/PdfE/G20172022.pdf>

SORS (Statistical Office of the Republic of Serbia), *Tertiary education*, SORS, Belgrade, 2017b. Last accessed 28 February 2019 at: <http://publikacije.stat.gov.rs/G2017/PdfE/G20176010.pdf>

SORS (Statistical Office of the Republic of Serbia), *Demographic yearbook 2016*, SORS, Belgrade, 2017c.

SORS (Statistical Office of the Republic of Serbia), *Upper secondary education: Beginning of 2017/18 school year*, SORS, Belgrade, 2018a. Last accessed 28 February 2019 at: <http://publikacije.stat.gov.rs/G2018/PdfE/G20181097.pdf>

SORS (Statistical Office of the Republic of Serbia), *Pre-primary education in the Republic of Serbia: 2017/2018 school year*, SORS, Belgrade, 2018b. Last accessed 28 February 2019 at: <http://publikacije.stat.gov.rs/G2018/PdfE/G20181099.pdf>

SORS (Statistical Office of the Republic of Serbia), *Labour force survey in the Republic of Serbia*, SORS, Belgrade, 2018c. Last accessed 28 February 2019 at: <http://publikacije.stat.gov.rs/G2018/PdfE/G20185634.pdf>

World Bank, *Migration and mobility: ECA economic update*, World Bank, October, 2017a.

World Bank, *Faster growth, more jobs: Western Balkans regular economic report*, No 11, World Bank, 2017b. Last accessed 28 February 2019 at: <http://pubdocs.worldbank.org/en/310431491458109659/WBRER-11-v6.pdf>

World Bank, *Doing business 2018: Serbia*, World Bank, 2017c. Last accessed 28 February 2019 at: www.doingbusiness.org/~media/WBG/DoingBusiness/Documents/Profiles/Country/SRB.pdf

World Economic Forum, *Matching skills and labour market needs: Building social partnerships for better skills and better jobs*, Davos-Klosters, Switzerland, 2014.

www.etf.europa.eu

