Underskilling in Hungary:

An assessment of the country's vocational education reforms

by

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ABSTRACT

This thesis examines the effects of better numeracy and literacy skills on the labour market, namely whether better set of skills lead to better employability, higher hourly earning and less time spent in unemployment. The relevance of these questions is given by the post-2010 reforms to the Hungarian education system, in particular, to the vocational training. The number of general education lessons – such as mathematics, literature and natural sciences –taught per week were severely cut as part of these reforms in vocational secondary education schools, and it is expected that pupils will see a deterioration in their above-named skills. Wishing to approximate the possible outcomes of these reforms, estimates of better employability, better bargaining position and shorter time spent unemployed with the help of Linear Probability Models and regressions building on dichotomous variables. Results show that numeracy and literacy skills do matter in all 3 of the aspects. Furthermore, they reveal that while labour-market entrants from vocational education might be employed almost instantly – providing incentives for governments to promote vocational education in times of skill shortages -, they are exposed to more time in unemployment in later life and a weaker bargaining position. The findings imply that the reforms in Hungary will be harmful both to employees as well as employers in the long run.

Keywords: skill mismatch, PIAAC, Hungary, VET

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LIST OF ABBREVIATIONS

CEDEFOP – European Center for the Development of Vocational Training

EEPO - European Employment Policy Observatory

ESJS - European Skills and Jobs Survey

Eurofund - European Foundation for the Improvement of Living and Working Conditions

ILO – Interntational Labour Organization

ISCED – International Standard Classification of Education

LPM – Linear Probability Model

OECD – Organisation for Economic Co-Operation and Development

PISA – Programme for International Student Assessment

PIAAC - Programme for the International Assessment of Adult Competencies

VET – Vocational Education and Training

INTRODUCTION

Today's policy makers are growingly concerned about what digitalization, automatization, artificial intelligence and robotization will mean to skill demands in economies. The Executive Chairman of the World Economic Forum, Klaus Schwab (2015) has called this era the Fourth Industrial Revolution, implying that changes will bring about such disruptions to traditional means of production as for example the possibility of mass production did. These changes are of "great promise and great peril" at the same time, he writes. (Schwab 2015) Although technological innovation has much potential, it is worrisome that organizations might be unable to adapt. Schwab (2015) calls for leaders to empower their citizens, to make them prepared for the challenges of the future.

The Hungarian secondary education has undergone meaningful reforms in recent years, yet seemingly in the opposite direction to what the above presented trends would point to as a sensible response. The country appears to be a textbook example of what Jacques van den Broek (2015), CEO of the recruitment company Randstad Holding NV, so illustratively put when claiming that "the current education systems […] teach yesterday's skills to tomorrow's graduates." With vocational education and training having been given over to the Ministry for National Economy and with the Chamber of Commerce and Industry gaining more and more influence over its shaping, vocational training programs seem to be controlled by the economy's prevailing needs as opposed to providing its students a secure and competitive position on the labour market. However, the programs seemingly fail to meet the needs of employers too as there is a high level of labour shortage in the economy.

This essay aims to examine whether the introduced reforms, first and foremost putting more emphasis on vocational education as opposed to general knowledge, will be beneficial for the economy – employers and employees likewise - in the long run.

The primary research question of this paper is thus:

Does having better literacy and numeracy skills – i.e. skills not related to any specific type of vocation – increase one's employability?

The structure of the essay is thus the following follows: Chapter 1 - alongside with a review of existing literature - gives a theoretical overview of skills, skill mismatches and finally skill shortages. Causes, types and economic implications of skill shortages will be presented in detail. Chapter 2 shall follow with a discussion first on the Hungarian labour market, then on its education system, in particular, its vocational education system. Chapter 3 is devoted to the empirical research part, describing the dataset used, explaining the variables and the model. Findings will be discussed in Chapter 4. Finally, the last chapter concludes and offers policy implications.

CHAPTER 1:
A THEORETICAL OVERVIEW

1.1 Literature review

A multitude of research papers discuss the issue of skill mismatch, however, most of them focus on overskilling. This is most probably due to the reason that labour or skill shortages are far more atypical to developed economies, and thus not in the foreground of economic research. Countries having to tackle skill shortages on the other hand produce less reliable and less detailed data to study. (CEDEFOP 2018)

Nonetheless, the issue has been discussed, albeit not frequently. As pointed out by Fazekas and Köllő (2017), the rivalry between the then-successful Soviet Union and the West produced a number of research papers investigating labour shortages among scientists. In 1957, Blank and Stigler (1957) offered three possible definition for labour shortages and concluded that the most realistic one is to specify the phenomena as the case of labour supply growing at a slower rate than labour demand at average wages of previous years. Two years later, Arrow and Capron (1959), also examining the shortage of engineer scientists in the US and introduce the notion of dynamic shortages. The terminology rests on the notion that as long as the economy is growing, the labour demand curve will steadily be shifting outwards.

While the above-mentioned examples have handled the question of a shortage of specific professions, skill shortages have really been charged into focus only in the recent past. So much so in fact that the International Labor Organization (ILO) has only formulated the definition of skills in 1990. (ILO 2004) With last decades' innovations such as robotics, 3D printing, the Internet of Things or artificial intelligence, the idea that a considerable portion of the population would have to face dramatic changes in how they work – were they to find jobs at all - surfaced, and with it much discussion about skills in advanced economies too. Their concerns root from John Maynard Keynes' essay titled 'Economic Possibilities for Our Grandchildren' that was first published in 1928. In it the economist warned of a "new disease", namely technological

unemployment. (Keynes 1972, p. 325) Keynes refers to "unemployment due to our discovery of means of economizing the use of labour outrunning the pace at which we can find new uses for labour". (Keynes 1972, p. 325)

Almost 90 years after Keynes, Klaus Schwab (2015), the Executive Chairman of the World Economic Forum named the sum of ongoing developments the Fourth Industrial Revolution, comparing it to such events in history as the introduction of water and steam power in production. This echoed the views of research pieces of previous years, for example the ones of Erik Brynjolfsson and Andrew McAffee (2014) or Frey and Osborne (2013), warning of a disruption of the labour market with automated technologies making human labour obsolete.

Within this line of research, cognitive skills have always been in the main area of focus. Numerous scholars claim that the cognitive capacity of the population plays a pivotal role in modern economic development and growth, among them Hanushek and Woessman (2012) who have found, investigating a sample of 64 countries, that between the years of 1960 and 2000, that those countries have shown stronger economic growth which have, over the examined time period, have also shown improvements in their youth's PISA scores. This piece of research is important because of its wide range but also its long timeframe. Instead of wanting to examine the effects of abrupt policy changes, the authors recognize that the skill composition of a country is formed over a long period of time and parallelly, achieving long-term economic growth is a question of good policy consistency, not just good policy.

This thesis sets out to further investigate in the role skills, namely numeracy and literacy skills play when it comes to skill shortages. It will do so by using survey data to see whether those with better skills sets are at an advantage on the labour market, and if so, it will also aim to quantify by how much. The issue will be investigated in relation to recent reforms to the Hungarian educational system, and while studies have been published on the subject, they most

often do not include quantitative estimates as to how the reforms will have an influence on labour market efficiency.

1.2 Skills

As defined by ILO (2004), skill is "the ability to carry out the tasks and duties of a given job", and can be broken down into two dimensions, skill level and skill specialization. The former is defined as "a function of the complexity and range of the tasks and duties involved", while the latter as "the field of knowledge required, the tools and machinery used, the materials worked on or with, as well as the kinds of goods and services produced." (ILO 2004) It should be evident from these definitions that labour supply should be thought of in terms of specific occupations and as a subset of workers with the skills the occupation would require.

Yet in the mainstream realms of economics, labour is not portrayed as heterogenous and workers are not treated as individuals with different set of skills, instead they are collectively a factor of production. Even when differentiating between workers on the labour market, they are usually only separated into two groups, skilled and unskilled. (Bosworth, Dawkins and Stromback 1996, Borjas 2016)

While simplifications in economic modeling are necessary, this approach encumbers the understanding of labour market disruptions. Referring back to the ILO definition of skills, these should not only be thought of as the homogenous mass of workers and employers unable to meet in equilibrium because of one exceeding the other, but also as the imbalance between workers with different skills and different occupations. Unemployment – an excess of supply - and labour shortage – an excess in demand - can thus be present in an economy at the same time, namely in certain variations of skill mismatch. (Fazekas and Köllő 2017)

1.2 Skill mismatch

The European Centre for the Development of Vocational Training (CEDEFOP) defines skill mismatch as a "situation where skill supply and skill demand diverge." (CEDEFOP 2018, p. 12) This time, the simplicity of the definition is fitting. It is namely clear from this formulation that both the case of employees or prospective workers being less skilled than needed as well as the case of them being overly skilled can be denoted as a case of skill mismatch. Hence, unemployment, recruitment difficulties, skills obsolescence or workers employed in jobs either above as well as below their potential are symptoms of skill mismatches.

Although all connected and often interchangeably used in everyday-reporting, there are different ways through which a shortage of skilled workers in the economy can take form. These are, according to CEDEFOP (2010, p. 13.), defined as follows:

Overeducation: A situation in which an individual has more education than the current job requires (measured in years).

Undereducatin: A situation in which an individual has less education than the current job requires (measured in years).

Overqualification: A situation in which an individual has a higher qualification than the current job requires.

Underqualification: A situation in which an individual has a lower qualification than the current job requires.

Overskilling: A situation in which an individual is not able to fully utilize his or her skills and abilities in the current job.

Underskilling: A situation in which an individual lacks the skills and abilities necessary to perform on the current job to acceptable standards.

Skill shortage: A situation in which the demand for a particular type of skill exceeds the supply of available people with that skill.

Skill gap: A situation in which the level of skills of the currently employed is less than that required to perform the job adequately or the type of skill does not match the requirements of the job.

Economic skills obsolescence: A situation in which skills previously utilized in a job are no longer required or have diminished in importance.

Vertical mismatch: A situation in which the level of education or skills is less or more than the required level of education or skills.

Horizontal mismatch: A situation in which the level of education or skills matches job requirements, but the type of education is inappropriate for the current job.

In what follows, the focus shall be upon skill shortages.

1.3 Skill shortage

1.3.1 Theoretical approaches

As discussed by Fazekas and authors (2017), labour shortages appear due to frictions on the market. Classical economics assuming perfect markets state that an event of labour shortage will immediately cause an increase in wages and thus, by stipulating a growth in labour supply and mitigating the excessive demand at the same time, find its way back to an equilibrium point. (Bosworth, Dawkins and Stromback 1996) Outside of the world of perfectly functioning markets however, shortages do occur.

1.3.1.1 The Marshal diagram:

Grasping the essence via a simple Marshallian demand and supply diagram (Bosworth, Dawkins and Stromback 1996), skill shortage can be depicted the same way as labour shortages can.

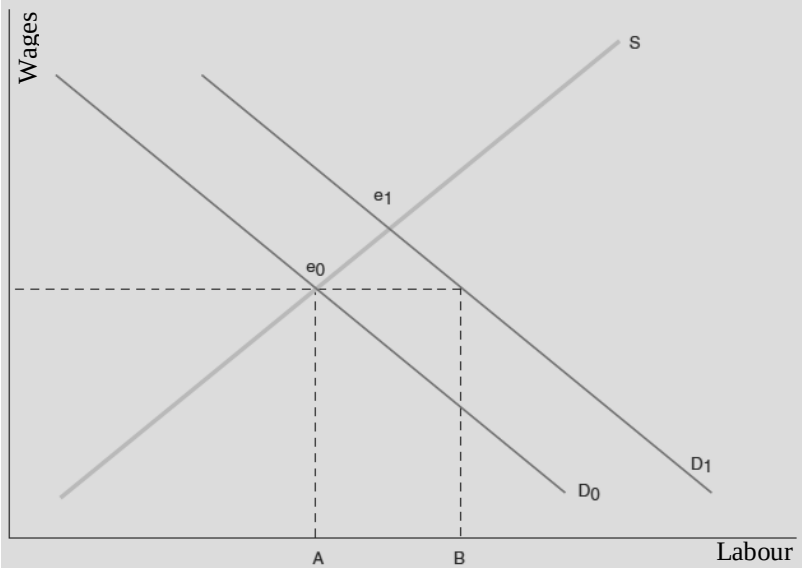

Figure 1: The Marshallian diagram of labour supply and demand
Source: Holt, Sawicki and Sloan (2010)

The original point of equilibrium is where the supply curve of skilled people eager to work and the demand curve, representing the number of skill-requiring jobs offered for them, meet at the prevailing wage. There is neither an oversupply of skilled workers at this stage, nor a shortage of them.

Given that labour is a factor of production, an increased demand in goods for example can shift the demand curve for skilled labour to the right (from D_0 to D_1). If wage stickiness hinders salaries to increase instantly to e_1– attracting more people onto the labour market and thus reestablishing the state of equilibrium -, there will be a shortage of suitably skilled labour at the prevailing wage, the size of B-A. (Bosworth, Dawkins and Stromback 1996)

But why is there a stickiness of wages? A shift in the demand curve suggests that employers would be able to pay higher wages while from the upward-sloping supply curve it is obvious that workers would prefer being paid more, yet the Marshallian diagram fails to shed light onto why this does not happen. Developing a model that is a step more complicated than the Marshallian cross allows to look behind the simple explanation of sticky wages by offering theories as to why wages might not act in accordance with the changes in skilled labour demand.

1.3.1.2 The Arrow-Capron Model:

Arrow and Capron (1959) introduce a new term, dynamic shortages. They state that wages are not permanently sticky, it merely takes time for employers to react to changed conditions of the labour market. According to their theory, after the demand curve shifted to the right, employers will first have to discover that they are unable to hire more skilled workforce – engineers, in the authors' example -, at the prevailing wage, then acknowledge the need for higher salaries and finally, to carry the raise through by gaining the approval of the management. Only then will the firm start to hire at the new wage. (Arrow and Capron 1959)

A further step in adjustment is needed however, to equal the wages of the newly hired with those already working at a lower wage – the market cannot be in equilibrium as long as there are different salaries being given to workers in the same occupation. As there is a shortage on the market, engineers will receive higher offers from rival firms, eventually resulting either in their departure from the firm, or, in some cases, in receiving a higher offer from their current employers. Fixing this discrepancy further adds to the time lag, since previously employed engineers will not be informed immediately of what their new colleagues are getting, nor will all instantly leave their workplace for better offers. In summary, "average prices will tend to rise so long as there is an excess of demand over supply, but it will not rise instantaneously to the level that will bring supply and demand into equality." (Arrow and Capron 1959, p. 299)

In addition, the authors also presume that with a steady growth in the demand for the commodity produced by the skilled workforce, a steady upward shift in the demand curve will also be discernible, resulting in shortages at the prevailing wage. Such shortages they name dynamic shortages, indicating that, with the demand curve is almost constantly shifting outwards, the shortages appear persistent and wages to always be lagging behind. Although persistent, the size of dynamic shortages can change according to a) the rate of increase in demand, b) the reaction speed of the market and c) the elasticity of supply and demand. (Arrow and Capron 1959)

1.3.1.3 The Beveridge curve:

A final explanation and theoretical approach for skill shortages is given by the Beveridge- or UV-curve. The curve - building on the works of but not formulated by the economist it is named after, William Beveridge (1944), but by Christopher Dow and Leslie Arthur Dicks-Mireaux (1959) -, depicts an inverse relationship between the job vacancy rate (V) and unemployment (U). It connects a tight labour market with lower unemployment to a higher occurrence of skill shortages and vice versa.

Given that the labour market is constantly in motion with jobs created and ceased, an equilibrium state is a point in time when the number of new hires equals the number of those terminated – meaning $U = V$. (Fazekas and Köllő 2017) It is important to reiterate therefore that an equilibrium point does not mean that the unemployment rate or vacancy rate is particularly low or zero.

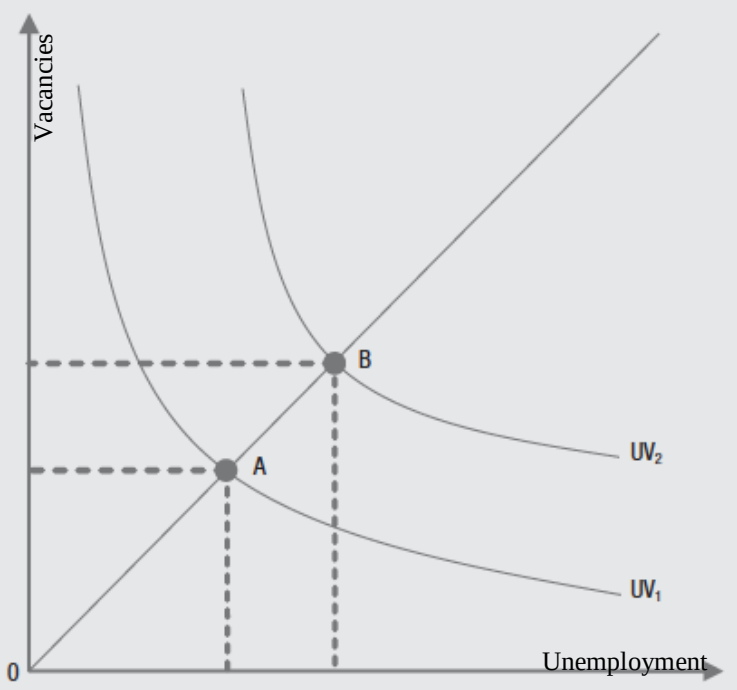

Figure 2: The Beveridge Curve
Source: CEDEFOP (2010)

In this understanding, both points A and B depict a labour market equilibrium on Figure 2, but with different levels of skill mismatch. In both cases, the number of unemployed equals the number of open vacancies, but in Equilibrium B, a higher level of unemployment is matched with more unfilled positions. This implies that in point B the grade of skill mismatch is higher and thus points to a higher structural unemployment. (CEDEFOP 2010) Summarizing, a shift in the Beveridge curve indicates an increase - or decrease - of skill mismatch, while a movement along the curves only corresponds to cyclical fluctuations of the unemployment and unfilled vacancies rate. (CEDEFOP 2015)

A limitation of the curve however is that it gives no information about the quality of either the employed labour nor the jobs, that is to say, even the Beveridge curve can miss such cases of skill mismatch when those employed are under- or overskilled or under- or overeducated compared to what the job to fulfil would require.

1.3.2 Types of skill shortage

According to the source of firms' difficulties to recruit and employ sufficiently-skilled workers, one can either speak of an apparent or a genuine skill shortage. (CEDEFOP 2018)

A portion of the reasons why a firm might face skill shortages can namely be traced back to its own behavior solely. Those employers who propose an uncompetitive market wage, poor working conditions or unfair contracts, promise no or little prospects for future development or simply require workers to accept provisions below the average, will face difficulties in recruitment and hiring, regardless the level of skill shortage in the economy. (CEDEFOP 2018) This is called a case of apparent skill shortage.

By contrast, genuine skill shortages also exist, in the case of which the firm cannot be blamed for not being able to hire enough workers. Genuine skill shortages are "instances where employers cannot fill a job vacancy because job applicants do not possess the required skills even though a competitive job offer is made." (CEDEFOP 2018, p. 41) Or, put differently, "instances when the demand for a particular skill exceeds the supply of available people with that skill at market clearing wage rates." (CEDEFOP 2015, p. 24.) The words "market clearing wage rates" are key here. As opposed to the above-mentioned cases of skill shortages, when there is a genuine skill shortage, the employer would be willing to pay an attractive wage and provide such conditions that in no way are below the average offer on the market, but either there are not enough new entrants on the supply side or they are poorly prepared in terms of

what skills their potential workplaces would require. Such scenarios typically arise in high-innovation and internationally competitive sectors and occupations since these industries exhibit a faster rate of technology change. Demographics also plays a pivotal role however, as it determines the size of labour supply available in the future as well as indicating the demand of goods and services these workers would produce. Accordingly, ICT, manufacturing – innovative, competitive sectors - as well as social and health care – having to serve a fast ageing population that an ever-decreasing number of new entrants will have to assist - are all forecasted to experience a growingly significant skill shortage in the future. (CEDEFOP 2015)

As stated above, genuine skill shortages might arise due to demographics as well as due to new entrants' characteristics. Along the same lines, Adams and authors (2000) distinguish two types of shortages on the labour market, quantitative and qualitative. In the case of quantitative shortages, the aggregate demand for labour exceeds the aggregate supply. This typically occurs alongside with full, or nearly full employment, when it is very difficult to recruit further workers to unfilled jobs. (MKIK GVI 2017) Note that this specification does not only apply exclusively to skilled workforce.

On the other hand, qualitative shortages refer to situations in which there would be an enough number of workers to fill open vacancies, yet there is a mismatch between supply and demand resulting in a high unemployment level coupled with a high rate of open vacancies. The mismatch can root from, for example, the jobseekers being inadequately qualified or from deferring preferences of the two parties. (MKIK GVI 2017) At times of such skill gaps, there is a high rate of vacancies in specific, skills-heavy sectors of the economy, alongside with a high level of unemployment of low-skilled individuals. (Barnow et al. 2013)

The remaining parts of the paper shall primarily focus on qualitative skill shortages.

1.3.3 Causes of qualitative skill shortages

The emergence of skill mismatches is the responsibility of many agents – employers, jobseekers and the state. Identifying the underlying causes of (qualitative) skill shortages is essential in tackling the issue and ensuring that the labour market remains efficient in the long run.

For the purposes of this research paper, the government's main areas of influencing should be highlighted:

1.3.3.1 Institutions

The importance of a country's institutions lies within its capabilities to prevent or aid the labour market to clear. A centralized wage bargaining system, for example, cannot meet the challenges a sectoral or regionally-based skill mismatch would impose on it. (CEDEFOP 2010) But even a restriction on output price can cause a rigidity of wages. Barnow, Trutko and Piatak (2013) offer the example of the U.S. healthcare system: by defining the level of reimbursements providers can obtain for treating the elderly, the government also limits how much the providers can pay their workers, raising the risk of an eventual mismatch in preferences, and thus a skill mismatch.

1.3.3.2 An inefficient public education system

The education system has naturally an immense role to play when it comes to skill creation, and not only in terms of training an enough number of adequately-qualified of workers but also ensuring that they obtain the skills necessary for the labour market. (MKIK GVI 2017) If the public education system fails to equip its students with the required skills, a qualitative skill shortage will emerge, even though quantitatively there could be an excess of supply of new entrants.

1.3.3.3 Lack of labour market information

Insufficient labour market information thwarts, or at least slows down market adjustment, prolonging the duration of skill mismatches as well as contributing to their emergence. (Shah

and Burke 2003) Market labour intelligence should be the basis of a well-coordinated skill anticipation system that would not only allow governments to shape their educational policies according to the economy's needs – including future needs -, but also enables entrants of the education system to make well-prepared decisions about which career path they should choose. (CEDEFOP 2017) Without such dynamics, skill mismatch is likely to surface.

1.3.3 Economic implications of qualitative skill shortages

Having shown how one way to grasp the emergence of skill shortages is via the dynamics of jobs creation and jobs destruction, it is important to note that a certain level of mismatch is not only to be expected in a free and functioning market economy, but that its presence does not damage the economy. In certain cases, underskilling can even be an indicator of dynamically changing jobs and thus a developing economy that requires its workers to learn, adapt and increase their productivity continuously. (CEDEFOP 2018) When skill shortage builds up to an excessive degree however, it leads to grave economic and social costs.

At the firm level, skill shortages hamper productivity, innovation, growth and the ability to expand. Analyzing the results of company surveys carried about by the European Foundation for the Improvement of Living and Working Conditions (Eurofund), the CEDEFOP research paper (2015) explains that employers having difficulties to attract talent are expected to show decreased productivity levels – this should be no surprise as firms facing genuine skill shortages are unable to perform at their full potential.

The surveys also show that employers facing a genuine skill shortage anticipate their businesses to contract in the near future – and might even turn to defensive business strategies prematurely such as cost-optimization or -reduction or the contraction of production -, and, parallelly, firms planning to hire and increase their turnover fear not being able to find skilled workforce.

Furthermore, skilled workers are easier to introduce to new technologies and techniques, and thus a firm lacking a rightly-matched workforce will face difficulties when wishing to innovate. (CEDEFOP 2015)

The availability of skilled workforce is thus a key question of firm performance, innovation and investment and as such, it naturally has an effect on the macroeconomic level too. First and foremost, in sectors with difficulties of recruitment, wage levels are bid up, harming competitiveness. In fields hit with an excess demand for skilled workers, jobseekers will be able to profit from – maybe even abuse – the skills they possess to attain especially beneficial working terms and conditions, even to the level that might be inefficient for their employers. In parallel, productivity also dwindles: regardless if the sector is unable to recruit workers – skill shortage – or can only employ candidates who are less skilled – skill gap -, economic output is harmed, the amount of output that would have been produced, had there been sufficiently-skilled workers available, will be lost. (CEDEFOP 2010)

As for even longer-term implications, recalling that the economy can settle for different skill-equilibria, it may find balance in a low-skill equilibrium (CEDEFOP 2010). This entails that firms get accustomed to the prevailing skill shortage by carrying out low-skills complementary investments, and thus, as a consequence, low wages and low demand for high-skilled labour will be dominant in the economy. In time this will undoubtedly lead to individuals – perceiving low returns to more education – not wanting to invest in their own human capital, and by this, reinforcing the low-skill equilibrium.

Videlicet, being underqualified or undereducated does not necessarily come with disadvantages on the individual level. In fact, workers employed at jobs that only exceed their abilities a little actually benefit from this skill mismatch. Having to perform at a more complex job namely comes with a multiplying effect of non-formal and informal learning. (CEDEFOP 2018) In addition, underskilled but employed workers enjoy a wage benefit since even though they earn

less than their peers with adequate skills, their wages are higher than what they would be, were they be hired for jobs their skills would perfectly match with (the reverse applies to the overeducated – they earn more for doing a work below their skills than their adequately matched peers, they however take home less than what they would, were they perfectly matched). (CEDEFOP 2010)

It should therefore not be a surprise that, according to a CEDEFOP (2010, p. 24.) study, "the undereducated have no incentive to become matched, as they earn a premium relative to their colleagues with similar education levels." The situation is most presumably the same for underskilled workers.

This explanation however assumes that the undereducated/underskilled individual is in fact employed in a job exceeding her abilities, which may not be the case for all unskilled jobseekers. For one, in his paper on wage inequality and overeducation, Skott (2006) points out that while overeducated workers have the possibility to enter a job below their qualification level, lower-skilled workers are unable to do as such – they cannot freely obtain high-skilled positions above their level of education or skills. Firms will only hire the undereducated or underskilled when the decline in productivity is offset by lower wage costs. (CEDEFOP 2010) This inequality in options further imposes the risk of unemployment on the poorly-skilled. In addition, employers may also resort to investing in such methods of technology that are able to offset the shortages in skills, thus diminishing the bargaining power of workers and jobseekers. (CEDEFOP 2015)

1.3.4 Summary

To recapitulate, the labour market should rather be thought of as the channel through which workers with different sets of skills are to be matched with specific occupations requiring specific skills. Qualitative skill shortages are instances in which there might be a large enough supply on the labour market in aggregate terms, but the skills of jobseekeres do not adequately

correspond to the qualities the vacant positions would entail. Jobs thus remain unfilled impairing firm performance, innovation and investment.

While all factors are important and lessening the problem of skill shortages should be a joint endeavor of the private and public sector, this thesis argues that the pivotal bedrock for the phenomena is an ill-designed educational system. The main assumption is that a system not building on up-to-date market information but on too much input from the only a limited number of stakeholders, results in an education and training scheme that is unable to provide the economy with adequately skilled workers. To investigate this notion, the Hungarian VET system will be presented in the following chapter, pointing out its possible weaknesses and the effects on the labour market thereof.

CHAPTER 2:
THE CASE OF HUNGARY

2.1 The Hungarian labour market

Just like in other economies around the world, the financial crisis of 2007-2008 took its toll on the Hungarian labour market with unemployment continuously above 10% in 2011 and 2012. It then started decreasing and eventually, the labour market tightened to an unemployment level of 3.6%. (Eurostat 2018a).

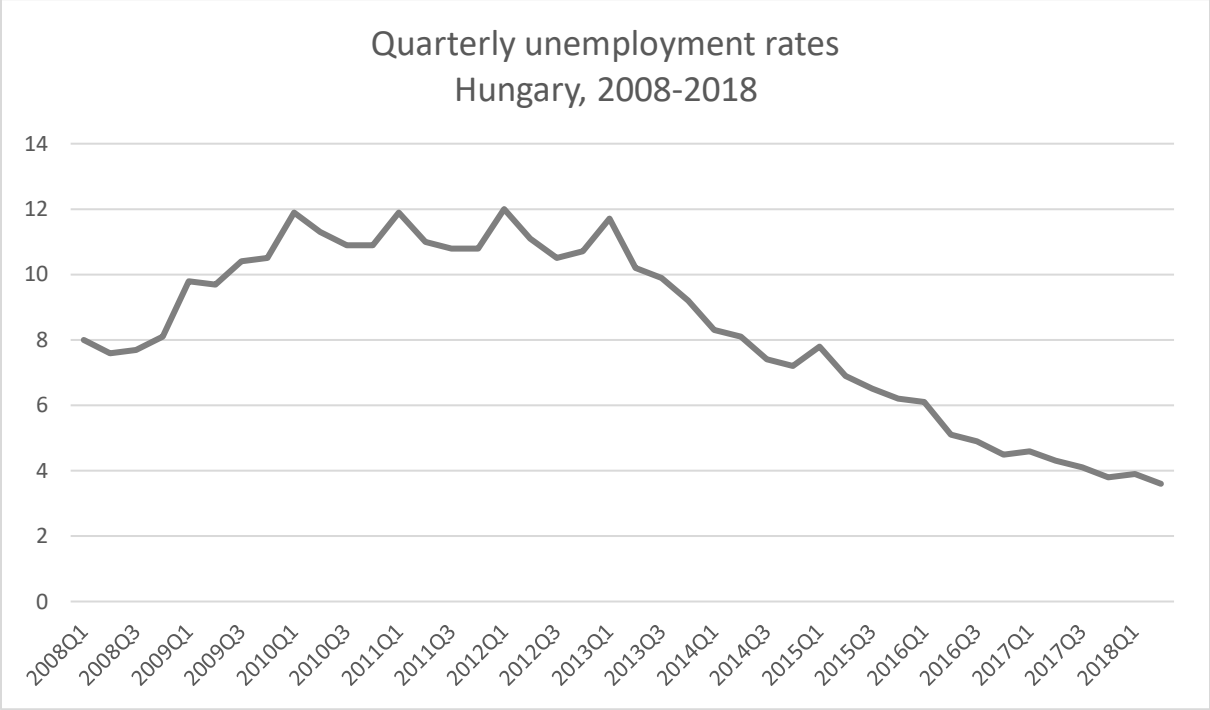

Figure 3: Quarterly unemployment rates in Hungary, 2008-2018
Source: Eurostat 2018a, author's own computation

In accordance to the unemployment rate, the job vacancy rate evolved as its mirroring image – unsurprisingly, since the job vacancy rate serves to express unmet labour demand. It is measured by dividing the number of job vacancies – paid posts that are "newly created, unoccupied, or about to become vacant" and for which employers are taking steps to fill, either immediately or within a specific period of time (Eurostat 2018b) -, with the sum of occupied posts and job vacancies. (Eurostat 2018b)

The job vacancy rate in Hungary fell in 2009 and remained low until the end of 2014. From then on, however it began to rise.

Figure 4: Quarterly job vacancy rates in Hungary, 2008-2018
Source: Eurostat 2018c, author's own computation

In fact, the Hungarian labour market tightened to such degree that labour shortage has been a constant topic for discussion in the past 2-3 years. (Fazekas and Köllő 2017) In specific sectors – mainly in manufacturing, healthcare, construction and administrative support –, there are an average of 4-6 vacant posts for every filled position. (Eurostat 2018c)

Looking behind the numbers however, this high level of job vacancy rate is not only a quantitative one. As pointed out by numerous authors (MKIK GVI 2017, Fazekas and Köllő 2017), the Hungarian labour market is hit by a seemingly paradoxical dual problem: while finding skilled workforce is increasingly problematic, about 10% of the economically active population is still unable to find work or is employed at the government's public work schemes. (MKIK GVI 2017) Videlicet, part of the fall in unemployment numbers is practically a

statistical deception. The government introduced grave modification to the social support system in 2011 (with the of Act CVI of 2011 on the Amendment of the Act on Public Employment), limiting the length of unemployment-benefit eligibility to 90 days and obliging all unable to find work after that period to take part in the state-orchestrated public works program. In February 2018, 120 900 people (2.6% of the active population) were employed in this scheme, but at its peak, in the summer of 2016, this number was as high as 180-190 000 (about 4% of the active population). (KSH 2018a, KSH 2018b)

In addition, it is also worth stressing that the public works scheme – opposite to what its aim is officially said to be, namely "to successfully introduce or reintroduce to the primary labour market" (kormany.hu 2012, own translation) – significantly decreases the chances of participants being able to find a job in the competitive sector. In fact, a study carried out by the Budapest Institute (2015) has shown that on average, 80% of those participating in a public works scheme return to being unemployed after their placement.

Hence the question: why is a considerable portion of the country's economically active unsuccessful in finding a job when there is such a high job vacancy rate? Why is the job vacancy rate this high when there is a considerably reserve of individuals willing to work?

Labour shortages do not appear on the aggregate level in Hungary but in specific sectors and in specific occupations – in those requiring skilled workforce. Partly, as MKIK GVI (2017) finds this is due to the fact that jobseekers do not possess the required skills – alongside with an ageing population, emigration and low geographical mobility.

Wishing to investigate more on the skill mismatch in the country, and to one of its possible causes in particular, the focus is now turned onto the educational system.

2.2 The VET system

2.2.1 Recent reforms to the VET

Currently, a Hungarian child in primary school can choose from 3 different pathways for further education (Farkas et al. 2016, European Commission 2017):

i) Grammar school (*gimnázium*): Children can enter grammar school either already in upper level general education (ISCED 2) or in secondary education (ISCED 3). In the former case, they either apply to grammar schools after 4 or 6 years of primary education (and study for 8 or 6 years in the institutions consequently) at the ages 10 or 12, or, in the latter case, go after having completed the 8 years of general education, at the age of 14. In either case, their secondary education ends with obtaining the certificate of the Maturity examination (*érettségi*), on average around the age of 18-19. No vocational training is available in grammar schools, the Maturity examination consists of Mathematics, History, Hungarian Grammar and Literature and several other elective courses such as English or Biology.

ii) Vocational grammar schools (*szakgimnázium*): Alternatively, a child can switch to a vocational grammar school after the 8th year of primary education. The training here consists of 4 + 1 years. The 4 years are completed with the Maturity examination and end with the student receiving a vocational certificate in addition to the secondary school leaving certificate. Pupils have the possibility to complete an additional year of post-secondary, non-tertiary education, thus acquiring a technical qualification too – and possible access to higher education.

iii) Vocational secondary school (*szakközépiskola*): Children can enter vocational schools after the 8th grade of primary school. This training scheme lasts 3 years, traditionally ends with pupils being around the age of 17 and does not offer a Maturity certificate examination. Consequently, it does not automatically ensure access to higher education either. For such, a student must enroll in an additional two-year course.

Parts of this structure are, however, quite novel to the country's educational system. The first half of the 2010s saw the emergence of a rather radical alteration of fundamental values shaping Hungary's public policy. In a speech in October 2012, Prime Minister Viktor Orbán made the following statement: "Our program is to, instead of the Western-type welfare states that are not competitive, build a work-based society". (fidesz.hu 2012, own translation)

Unsurprisingly, the new direction was and has been tangible in educational policies too. Alongside with almost all other levels of education, secondary vocational education and training were reformed, with the following new rules:

i.) With the Act CXC of 2011 on the Amendment of the Act on National Public Education, the school-leaving age was reduced – on all levels of education – from 18 to 16 in 2015.

ii.) The VET system was assigned under the jurisdiction of the Ministry for National Economy from 2015 onwards (with passing the Government Regulation 212/2010 of 2010).

iii.) The last two alternatives in secondary education listed above, vocational grammar schools and vocational secondary schools have been modified in their names as well as their curricula in 2016, again with the Act CXC of 2011 on the Amendment of the Act on National Public Education. Prior to the reforms vocational grammar school were called vocational secondary schools (*szakközépiskola*) while the current vocational secondary schools were simply vocational schools (*szakiskola*). Although this might seem like a trivial change, this was in fact a pursuit to make vocational institutions more attractive by giving them names that would suggest higher levels of quality.

When, in fact, alongside with the appellation changes, drastic reforms went down regarding training content. From the 2016/17 onwards, vocational secondary schools as well as vocational grammar schools are to keep to a reformed National Core Curriculum (introduced with the Act CXC of 2011 on the Amendment of the Act on National Public Education). The curricula are heavily focused on courses related to the given occupation, and as such, has drastically decreased the number of lessons dedicated to general education subjects such as mathematics, science, literature or foreign languages. A comparison of the previously prevailing timetable of 9th-grade students in vocational secondary schools prior and after the reform of the curricula depicts just how big a decrease this was:

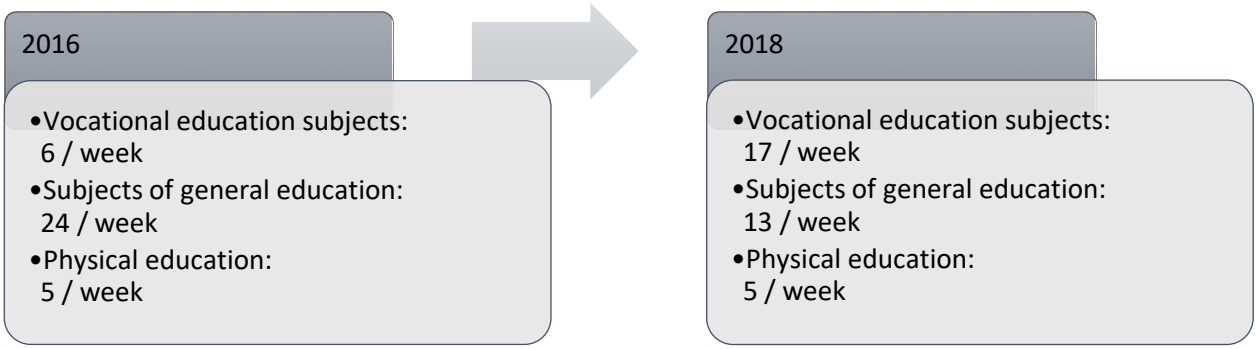

Figure 5: Distribution of subjects by 9th-grader vocational secondary school pupils
Source: oktatas.atlatszo.hu (2016)

As opposed to previous practices that did not lay such an emphasis on specialization and let pupils in 9th Grade – ages 14-15, on average - learn general education subjects in the majority of the time, from 2018 however, pupils were no longer provided that broad set of skills and knowledge. (oktatas.atlatszo.hu 2016)

To paint an even darker picture, the number of general education lessons decreases and, in many cases, completely disappears as they progress in their vocational education.

Non-occupation related subjects	**9th Grade**	**10th Grade**	**11th Grade**
Hungarian – Communication	2	1	–
Foreign language	2	2	2
Mathematics	2	1	–
Social studies	2	1	–
Science (physics, biology or chemistry)	3	–	–
Physical education	5	5	5
Lesson with the tutor	1	1	1
Subject free to be set by the school	*1*	-	*1.5*
Total	**18**	**11**	**9.5**

Table 1: Distribution of non-occupation related subjects in vocational secondary schools
Source: OFI (2016)

Notice how there is are no lessons dedicated to IT education. The decree proposes that the schools dedicate the lessons not set by the national core curriculum – 1 in Grade 9, none in

Grade 10 and 1.5 in Grade 11per week – to teaching IT. Seeing as how it is not compulsory for the schools to provide IT education and how they would only be able to have 1 lesson a week only for pupils in Grades 9 and 11, it is doubtful that many school will decide to invest in the equipment.

iv.) Last but not least, László Palkovics, the then-Secretary of State Responsible for Education, adumbrated in 2017 that entrance examinations to secondary schools would become compulsory from 2019 onwards, with centrally set admissions-numbers, determining how many children can gain entry to grammar school, vocational grammar schools and vocational secondary schools. (hvg.hu 2017) It is not hard to foresee that if the government's objective is to herd students to vocational schools, they will set the admissions quotas accordingly.

2.2.2 The aftermath

2.2.2.1 Reactions

The reforms sparked a great measure of opposition and concern. Even at their start, scholars voiced their bewilderment as why an increase in the number of VET students was needed. Fazekas and authors (2017) note that talks of reforming the vocational education system have started well before the emergence of labour shortages, its economic rationale is, therefore, even more questionable. Contrary to popular belief, Köllő (Fazekas and Köllő 2017) writes, the number of children attending vocational education did not drop with the regime change after 1989, merely changed in in its structure: Pupils streamed from vocational schools (named vocational secondary schools today) not offering a Maturity certificate to vocational secondary schools (named vocational grammar schools today) that did.

This view echoes that of the European Employment Policy Observatory (2015, p. 10) that writes: "…the post-2010 period is the time of grand educational reforms in Hungary. Political

will and systematic reform dominate everyday coordination with stakeholders and the former is often difficult to link to labour market intelligence."

By far the largest outcry however was caused by the extreme cuts to general education subjects taught in vocational secondary schools. The Public Education Presidential Committee of the Hungarian Academy of Sciences issued a statement voicing their concerns about the „threatening constriction of general knowledge" (MTA KEB 2018, own translation) and urged the expansion of natural sciences courses in vocational training. In addition, the Committee made the firm stance of saying "that the primary task of public education should be to provide the skills needed for lifelong learning and not to emit freshly trained workers for economic actors." (MTA KEB 2018)

Concerns rose that the newly enforced curriculum will only equip students with too narrow, too specialized knowledge instead of a broader, more transversal one, cutting children off from the chance to study further already at age 14. (Although vocational secondary schools, with their 3+2 years structure, provide their students the possibility to undertake an additional 2-year long preparation for the maturity exam. Theoretically therefore they could choose to abandon their occupation and eventually enter higher education. With such a low level of general education however, it is doubtful how many will a) choose this path and b) score high enough points to gain entrance to universities.)

Furthermore, the reforms were introduced at a time when vocational secondary schools were already on the path of deteriorating. In the most recent rounds of the National Competency Assessment – an annual survey measuring numeracy and literacy skills of all Hungarian students in upper primary schools or secondary schools in the 6th, 8th and 10th Grade (introduced with Act LXXIX of 1993) – results showed that students in vocational secondary schools not only lag behind the national average in all fields of competencies but also that their pupils in

10th Grade fail to meet – not to mention rise above – the results achieved by 6th Grade-students of upper primary schools. (Szabó et al. 2018)

Their findings are echoed by CEDEFOP's Skills Panorama (2016) which states that "it is a general problem that professionals educated in vocational schools do not possess the appropriate basic competences (e.g. mathematical, social, writing and reading skills), which makes their entry into the labour market difficult. As a result, a significant over-supply can be observed (in spite of unmet demand) in crucial areas such as the metal and engineering industry."

2.2.2.2 Effects in numbers

The portion of secondary-education attendees among the 16-21 aged youth has been steadily increasing between 2000 and 2010, but then the trend abruptly reversed, and participation rates began to drop. Although all age cohorts showed a significant decrease in participation rates, individuals aged 17, 18 or 19 were the most affected: the proportion of students among them has dropped by more than 10 percentage points between the years 2011 and 2016. (Varga 2018)

The worries that VET is becoming more and more ineffective continue to be reflected in the entrance statistics as well. Examining participation rates, the proportion of those studying in vocational secondary schools (vocational schools prior to the reforms) among all children aged 16-21 decreased the most. (Varga 2018) On the one hand this is unsurprising as the prior 4-year programs were gradually superseded by the reformed 3-year programs and, as of the school year 2013/14, only the latter training scheme is allowed at vocational secondary schools. On the other hand, however, application trends show that the reforms carried out in the vocational training scheme has led to a drop in its popularity. Between the years 2002 and 2010, application ratios between the three types of secondary education institutions – grammar schools, vocational grammar schools and vocational secondary schools - did not alter much. Yet from

then onwards in the upcoming schoolyears, vocational grammar schools have seen a 6%-points drop in application rates (from 41% to 35%), accompanied by an almost equal, 4%-points rise in application rates to grammar schools (from 34% to 38%). (Varga 2018)

In sync with the application trends, the proportion of students being given admission to grammar schools is steadily growing while the number of students starting their secondary education in vocational grammar schools receding. (Varga 2018) In other words, parents – or pupils – try to avoid vocational secondary schools since the reforms.

CHAPTER 3:
RESEARCH

As discussed above, the reforms carried out in the Hungarian VET system were implemented with the objective of ensuring a flow of new entrants onto the labour market fast to lessen the labour shortages. In their zeal to overcome the prevailing difficulties on the labour market, the decision-makers pushed vocational training into the foreground, neglecting that schools, regardless of their type, should also provide a solid foundation of general knowledge and skills to their students.

Wanting to investigate whether these measures will cause harm to efficient matching on the labour market, this paper sets out to quantify the difference diversely-matched jobseekers face when searching for jobs. It poses the following questions: Is a certificate of Maturity an advantage when looking for a job? And similarly, do better skills in numeracy and literacy ensure better chances of employability and better bargaining power?

3.1 Data, Variables and Methodology

3.1.1 Data

To carry out the research, the survey results of OECD's Programme for the International Assessment of Adult Competencies (PIAAC) – also known as the Survey of Adult Skills - was used. The survey is an examination of adults' proficiency in literacy, numeracy and problem-solving skills in technology-rich environments, coupled with a background questionnaire. (OECD 2018a) The latter collects further details related to the respondents' skills – for example, on the availability of on-the-job trainings or the frequency with which participants use a computer -, but also serves with information regarding living conditions, family, earnings or even subjective health status. (OECD 2018b)

The Survey of Adult Skills is conducted on individuals aged between 16 and 65, minimum on 5 000 of them in each of the 38 participating countries – including OECD Partner countries such as Russia and Ecuador. It is designed in a way that makes it valid cross-culturally as well as cross-nationally, and thus provides comparable results. (OECD 2018a).

It is important to note however that the interviewing was carried out through a period of 10 years, in 3 rounds. Thus, datasets from different rounds refer to different points in time. Furthermore, results for countries being in the last round (2016-2019) have not been published yet. (OECD 2018a)

Full datasets – with 5000 observations and 1328 variables - are available for public use on the OECD website, published by country. As Hungary is taking part in the 3rd round however, with results being published in 2019, examining the Hungarian labour force is not yet possible. For that reason, the decision to use all data from Poland, the Czech Republic was made. All other Visegrád4 countries were surveyed in Round 1 that stretched from 2008 to 2013 (OECD 2018a), but all in 2011, thus eschewing the complications that would otherwise arise from undertaking examinations in different points of time after the global financial crisis.

3.1.2 Variables

The most important variables used in the regression analyses and their description are as follows:

HST_QUAL: a factor variable denoting the respondent's highest attained qualification

MAT_EX: a dummy variable indicating whether the respondent has had taken a Maturity examination or not. Derived from highest qualification attained. (0 indicates no, 1 yes)

YRS_CERT: a numeric variable denoting the number of years passed since the attainment of the highest qualification – calculated from the age of the respondent minus age when obtaining their highest qualification

EARNHR_LOG: a numeric variable denoting the log of gross hourly earnings of the participants.

SC_NUM and **SC_LIT**: numeric variables, denoting the participants' scores on the numeracy and literacy tests. Calculated from taking the mean test scores of each test.

SEC_PRIV, SEC_PUBL, SEC_NONP and **SEC_UNK**: Dummy variables indicating the economic sector in which the respondent works: the private sector, the public sector, for a non-profit organisation or unknown. Copied from either the sector of the current work, or, when unavailable, the sector of the last workplace. (0 indicates no, 1 yes)

PAIDW_MONS_LOOK: a numeric variable denoting how many months in total the respondent has/had been looking for paid work (if looking for work).

EXP_NO: a dummy variable indicating whether the respondent has never had any work experience in their lives. Derived from years of paid work. (0 indicates some experience, 1 none)

EMPL: a dummy variable indicating whether the individual is employed or not. Derived from the responses given to 'subjective work status', announcing all individuals employed in a part-time or full-time job as employed. (0 indicates unemployed, 1 employed)

3.1.3 Methodology

3.1.3.1 Data cleaning and manipulation:

As this piece of research sets out to discover the effects of skills and education on employability, individuals who are not active on the labour market were dropped from the dataset – students, the retired, the disabled, those in the military of fulfilling domestic tasks were filtered, leaving full-time and part-time employed unemployed participants, as well as those currently doing an apprenticeship.

Secondly, as the main aim of this paper is to compare whether preparing for – implies receiving the adequate amount of general knowledge education - and passing the maturity examination adds to employability, a subset was created along which this question could be best measured. To achieve this, all individuals who have not completed levels of education higher than primary education (their highest qualification attained being ISCED 1, ISCED 2 or below ISCED 1), and those having obtained qualifications higher than secondary education (ISCED 4, 5 and 6) are filtered out from the dataset.

This leaves individuals whose highest attained qualification is at the ISCED level of 3, who have:

a) attended secondary education in non-vocational grammar schools, and passed the Maturity examination,

b) attended vocational grammar schools and passed the Maturity examination, receiving a vocational certificate,

or c) attended vocational schools that do not give a certificate of Maturity examination.

The two previous steps leave a subset of about 8200 individuals, with summary statistics 0to be found below:

	Min.	Mean	Max.	St. Dev.	Obs.
Age (AGE_R)	16	36.83	65	12.67	8167
Years since obtaining highest qual. (YRS_CERT)	0	17.63	50	12.85	8151
Score on literacy (SC_LIT)	109.9	268.6	390.5	36.04	8167
Score on numeracy (SC_NUM)	98.42	267.31	391.0	39.84	8167
gross hourly earnings (EARNHR)	0	65.53	85 000	1213.1	5281

Table 2: Summary statistics of the PIAAC dataset

Furthermore, the distribution of factor variables is as follows: 58% of the individuals are males in the dataset, 82% are employed and 57% of them have attended a school that provided a Maturity examination as the final exam.

Furthermore, the distribution of literacy and numeracy scores is in sync with assumptions: those with a secondary education but no Maturity certificate examination as their highest qualification score lower on both tests on average.

Finally, since the variable on hourly gross earnings is much skewed to the left with a long right tail, a new variable is created by taking logs of the hourly earnings.

3.1.3.2 The Linear Probability Model

Regression models can work with any type of independent variables, may that be continuous, integers or even dichotomous – also known as a dummy variable that only takes on two values, either 1 or 0 (for example, by assigning the number 1 to all males in the dataset and 0 to all females). When the left-hand side variable of the regression is a dummy variable, the coefficient of the linear regression is limited to the range of 0 to 1 as well, displaying the relative frequency of the given value. The result can thus be interpreted as a probability. (Aldrich and Nelson 1984) For this reason, regression models that have a dummy variable as the dependent variable are called Linear Probability Models. (Caudill 1988)

By contrast, including dummy variables on the right-hand side serves as breaking down the dataset into subcategories within the same regression. In these models for example, controlling for the respondent's home country is achieved by creating three dummy variables: one each for denoting whether it is Poland (1 = yes, 0 = no), Slovakia (1 = yes, 0 = no) or the Czech Republic (1 = yes, 0 = no). All participants will have exactly one of these dummy variables with the value 1 and 2 with the value 0. In the regressions, only two of these categories will be included as control variables, keeping in mind that they are always to be interpreted in relation to the left-out category, in other words, the reference category. For example, including the Polish- and Czech dummies in a regression, the intercept value (where all right-hand side variables take on the value 0) should then be interpreted as the average value of all Slovakian participants.

Similarly, when the right-hand side variable is a category with only 2 possibilities (gender, for instance), the intercept value should be considered as the average the dependent value takes on when the explanatory variable is 0, and the slope as the difference compared to the intercept value when the explanatory value is a unit higher, thus 1.

This piece of research heavily builds on dichotomous variables as well as Linear Probability Models. A large part of the main variables – both dependent and independent -, are variables with multiple categories: e.g. whether the respondent has stood the Maturity examination, whether the respondent is employed, or in which sector the respondent works (business, public, non-profit or other).

3.1.3.3 Regressions of employability

Firstly, wanting to investigate how specific attributes to an individual increase or decrease the probability of employment, regressions are run with EMPL, the dummy variable on being employed as the dependent variable.

The final 3 regressions are as follows:

$$EMPL = b_0 + b_1 * MAT\_EX + b_2 * MALE + b_3 * YRS\_CERT + b_4 * EXP\_no + b_5 * CNTRYID,$$

$$EMPL = b_0 + b_1 * SC\_LIT + b_2 * MAT\_EX + b_3 * MALE + b_4 * YRS\_CERT + b_5 * SEC\_UNK + b_6 * SEC\_PUBL + b_7 * SEC\_NONP + b_8 * CNTRYID$$

$$EMPL = b_0 + b_1 * SC\_NUM + b_2 * MAT\_EX + b_3 * MALE + b_4 * YRS\_CERT + b_5 * SEC\_UNK + b_6 * SEC\_PUBL + b_7 * SEC\_NONP + b_8 * CNTRYID$$

The first regression only takes the dummy variable on having a Maturity examination as an explanatory variable. The further two however take literacy and numeracy test scores as explanatory variables, taking maturity examination as a control variable. The aim with this approach is to filter out credentialism: to grasp whether a better set of skills can add to

employability beyond having the official certificate of having completed a certain amount of years in secondary education.

In all three regressions and all that follow, control variables are gender, economic sector, country and years passed since attaining the highest level of qualification – making a control variable for age redundant. Sector and country variables are added as dummies while the years since having finished education is included with a piecewise linear function with a breakpoint at 12 years.

3.1.3.4 Regressions of earnings

The same set of regressions are run on the log variable of hourly gross earning being the dependent variable as were run on employment – on a smaller subset of data as not all have recorded values of hourly earnings in the full dataset.

EARNHR_LOG =
$b_0 + b_1 * MAT\_EX + b_2 * MALE + b_3 * YRS\_CERT + b_4 * EXP\_no + b_5 * CNTRYID,$

EARNHR_LOG =
$b_0 + b_1 * SC\_LIT + b_2 * MAT\_EX + b_3 * MALE + b_4 * YRS\_CERT + b_5 * SEC\_UNK + b_6 * SEC\_PUBL + b_7 * SEC\_NONP + b_8 * CNTRYID$

EARNHR_LOG =
$b_0 + b_1 * SC\_NUM + b_2 * MAT\_EX + b_3 * MALE + b_4 * YRS\_CERT + b_5 * SEC\_UNK + b_6 * SEC\_PUBL + b_7 * SEC\_NONP + b_8 * CNTRYID$

While the formulas are the same – with disregard to the dependent variable -, this modification serves to nuance differences between the treatment people with different attributes face at work. In other words, it sets out to show the difference between employed and employed with the help of compensation.

3.1.3.5 Regressions of months spent searching for work

Finally, a new subset is created containing only those unemployed at the time of surveying. The dependent variable is 'PAIDW_MONS_LOOK', the number of months the respondent has or had been looking for work: with the assumption that the more time has passed since having started actively looking for work, the worse chances the individual has on the labour market.

The regressions are then as follows:

PAIDW_MONS_LOOK =
$b_0 + b_1 * MAT\_EX + b_2 * MALE + b_3 * YRS\_CERT + b_4 * EXP\_no + b_5 * CNTRYID$

PAIDW_MONS_LOOK =
$b_0 + b_1 * SC\_NUM + b_2 * MAT\_EX + b_3 * MALE + b_4 * YRS\_CERT + b_5 * SEC\_UNK + b_6 * SEC\_PUBL + b_7 * SEC\_NONP + b_8 * CNTRYID$

PAIDW_MONS_LOOK =
$b_0 + b_1 * SC\_LIT + b_2 * MAT\_EX + b_3 * MALE + b_4 * YRS\_CERT + b_5 * SEC\_UNK + b_6 * SEC\_PUBL + b_7 * SEC\_NONP + b_8 * CNTRYID$

PAIDW_MONS_LOOK =
$b_0 + b_1 * MAT\_EX + b_2 * MALE + b_3 * YRS\_CERT + b_4 * EXP\_no + b_5 * CNTRYID$

As shown, the main direction behind these regressions is the same in the two previous instances: control variables are gender, years since having left the education, economic sector and country. Nevertheless, there is a new control variable too, namely 'EXP_NO' with the aim of differentiating between those recently entering the labour market with no experience and those who have already had jobs but have lost them.

CHAPTER 4:
FINDINGS AND DISCUSSION

4.1 Findings

4.1.1 Regressions of employability

	Dependent variable:		
	EMPL		
	(1)	(2)	(3)
SC_LIT		0.0003**	
		(0.0001)	
SC_NUM			0.001***
			(0.0001)
MAT_EX	0.07***	0.06***	0.05***
	(0.01)	(0.01)	(0.01)
MALE	0.05***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)
bs(YRS_CERT, degree = 1, knots = 12)1	0.12***	0.12***	0.12***
	(0.01)	(0.01)	(0.01)
bs(YRS_CERT, degree = 1, knots = 12)2	0.13***	0.13***	0.13***
	(0.02)	(0.02)	(0.02)
SEC_UNK	-0.78***	-0.77***	-0.77***
	(0.02)	(0.02)	(0.02)
SEC_PUBL	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)
SEC_NONP	-0.03	-0.03	-0.03
	(0.04)	(0.04)	(0.04)
CNT_SK	-0.04***	-0.04***	-0.04***
	(0.01)	(0.01)	(0.01)
CNT_PL	-0.05***	-0.05***	-0.04***
	(0.01)	(0.01)	(0.01)
Constant	0.74***	0.67***	0.60***
	(0.01)	(0.03)	(0.03)
Observations	8,151	8,151	8,151
R^2	0.29	0.29	0.29
Adjusted R^2	0.29	0.29	0.29
Residual Std. Error	0.32 (df = 8141)	0.32 (df = 8140)	0.32 (df = 8140)
F Statistic	372.36*** (df = 9; 8141)	336.01*** (df = 10; 8140)	339.65*** (df = 10; 8140)
Note:			*p<0.1; **p<0.05; ***p<0.01

Figure 6: Regression estimates on employability

Starting with only the Maturity certificate, 74% of individuals not having gone to schools that offer such examinations – and who work in the business sector in the Czech Republic, are fresh graduates and are females - are employed. Having the Maturity certificate – but not differing in any of the further controls – raises their chances of employment by 7 percentage points.

Breaking down the factors influencing employability however shows that when controlling for skills, only 67% of those with no Maturity certificate and a 0-score literacy test (with all other controls similarly at 0) are employed, while this is an even lower, only 60% for those with a 0-score numeracy test. Scoring one point more on the literacy test raises the chances of having a job by 0.03 percentage points, on average, and by an average of 1 percentage points when the difference is between skills of numeracy. The Maturity certificate has less of an influence when including test scores, the previous 7 percentage points rise in probability is only 6 and 5 percentage points this time.

All estimates are statistically significant at the 1% level, it can therefore be concluded with a 99% probability that a) having passed the maturity examination increases the chances of employment, but also that b) having better numeracy and literacy skills also add an increase to this probability, regardless of the examination – albeit to a smaller degree.

4.1.2 Regressions of hourly earnings

	Dependent variable:		
	EARNHR_LOG		
	(1)	(2)	(3)
SC_LIT		0.001***	
		(0.0002)	
SC_NUM			0.001***
			(0.0002)
MAT_EX	0.20***	0.17***	0.16***
	(0.02)	(0.02)	(0.02)
MALE	0.29***	0.29***	0.28***
	(0.02)	(0.02)	(0.02)
bs(YRS_CERT, degree = 1, knots = 12)1	0.27***	0.27***	0.26***
	(0.03)	(0.03)	(0.03)
bs(YRS_CERT, degree = 1, knots = 12)2	0.23***	0.24***	0.23***
	(0.04)	(0.04)	(0.03)
SEC_UNK	0.01	0.03	0.03
	(0.21)	(0.21)	(0.21)
SEC_PUBL	-0.001	0.005	0.01
	(0.02)	(0.02)	(0.02)
SEC_NONP	-0.06	-0.06	-0.06
	(0.09)	(0.09)	(0.09)
CNT_SK	-3.36***	-3.37***	-3.37***
	(0.02)	(0.02)	(0.02)
CNT_PL	-2.14***	-2.13***	-2.11***
	(0.02)	(0.02)	(0.02)
Constant	4.13***	3.75***	3.75***
	(0.03)	(0.07)	(0.07)
Observations	5,263	5,263	5,263
R^2	0.84	0.84	0.84
Adjusted R^2	0.84	0.84	0.84
Residual Std. Error	0.59 (df = 5253)	0.59 (df = 5252)	0.59 (df = 5252)
F Statistic	3,049.74*** (df = 9; 5253)	2,765.74*** (df = 10; 5252)	2,769.67*** (df = 10; 5252)
Note:			*p<0.1; **p<0.05; ***p<0.01

Figure 7: Regression estimates on hourly earnings

The results are quite similar to the previous set of regressions.

Having a Maturity certificate raises expected hourly earnings by 20%. Scoring 1 point higher either on the numeracy test or the literacy test means a 1% higher hourly wage on average, while the effect of having a passed Maturity exam is lessened somewhat and only accounts for 17-16% of the difference in wages.

Again, all estimates are statistically significant at the 1% level, indicating that, with a 99% certainty, both having a Maturity certificate as well as being better skilled at numeracy or literacy have an effect on hourly earnings.

4.1.3 Regressions of months spent searching for work

	Dependent variable:		
	PAIDW_MONS_LOOK		
	(1)	(2)	(3)
SC_NUM		-0.04***	
		(0.02)	
SC_LIT			-0.02
			(0.02)
MAT_EX	-0.13	1.17	0.49
	(1.28)	(1.37)	(1.35)
MALE	1.35	1.61	1.37
	(1.21)	(1.21)	(1.21)
YRS_CERT	0.39***	0.39***	0.39***
	(0.06)	(0.06)	(0.06)
EXP_no	-17.20***	-17.13***	-17.29***
	(2.47)	(2.46)	(2.47)
SEC_UNK	24.32***	23.92***	24.29***
	(2.02)	(2.02)	(2.02)
SEC_PUBL	1.99	1.91	1.89
	(2.23)	(2.23)	(2.23)
SEC_NONP	3.47	4.21	3.85
	(9.90)	(9.87)	(9.89)
CNT_SK	5.26***	5.48***	5.30***
	(1.65)	(1.64)	(1.65)
CNT_PL	3.29**	2.79*	3.03*
	(1.62)	(1.63)	(1.63)
Constant	0.69	10.75**	7.16
	(1.91)	(4.24)	(4.83)
Observations	838	838	838
R^2	0.26	0.26	0.26
Adjusted R^2	0.25	0.25	0.25
Residual Std. Error	17.02 (df = 828)	16.95 (df = 827)	17.00 (df = 827)
F Statistic	31.54*** (df = 9; 828)	29.30*** (df = 10; 827)	28.64*** (df = 10; 827)
Note:			*p<0.1; **p<0.05; ***p<0.01

Figure 8: Regression estimates on months spent looking for work

On average, individuals spend 0.69 months looking for work. Comparing two individuals who are different in them possessing a Maturity certificate, the one who passed the exam is expected to look -0.13 months less for a job.

Dissecting the group further and looking at the intercept value in a regression controlling for skills too, the average time of looking for work increases. Those with a 0 score on the numeracy test and no Maturity certificate (and 0 on all other control variables too) are expected to look

for an average of 10.75 months, those with a 0 in literacy for 7.16 months. Having scored 1 point higher on the numeracy test reduces this period by 0.04 months on average, while having a 1-unit better score in literacy by 0.02 months.

These coefficients however – apart from the slope coefficient of the numeracy test scores – are not statistically significant, thus it cannot be rejected that, in this population, having a maturity certificate or a better skillset does not influence the longitude of job search.

An interesting finding to pay attention to however is the coefficient associated with the 'EXP_NO' variable. Based on the estimates, two individuals with the same qualities in either numeracy or literacy and/or with regard to the Maturity examination (and all further control variables), will find that the person with no work experience will have to search for a considerably shorter amount of time – 17 months less, on average – to find work.

4.2 Discussion

The main research question of the thesis aimed to determine whether a Maturity certificate and/or a better skillset leads to better employability and a stronger bargaining position.

To summarize the findings, both the Maturity examination but also better numeracy and/or literacy skills ensure better employability and bargaining power to jobseekers and employees. This concludes that even in schools that offer no Maturity certificate, general education subjects should not be cut severely. A better skillset will ensure better chances of finding a job and a somewhat higher salary, even beyond the effects of qualification.

The very last finding – that jobseekers with no experience have an considerably easier task finding work implies that while pumping lower-skilled workforce onto the labour market through short and specialized training schemes might mitigate the effects of skill shortages the very short run – as jobseekers will be hired seemingly immediately after having left school -,

once they lose their first jobs, they have great difficulties in finding a replacement. As voiced already by opponents of the Hungarian VET reforms, a too-narrow, too-specialized knowledge limits individuals' abilities to change paths, to retrain themselves if they are no longer needed in the occupations they have been originally been training for. Nor will they be able to keep up with technological advancements in their work without broader base of general education to build onto. The long-term effects of high specialization are thus detrimental, not only for the individuals but for firms as well. A passage from Cedefop's analysis of the European Skills and Jobs Survey (ESJS) underpins this notion, as it states that "relying on a snapshot of the labour market may lead to erroneous policy conclusions for tackling skill mismatch." (CEDEFOP 2018, p. 14)

4.3 Limitations

A major limitation was, naturally, the lack of data on Hungary. Data on the country is to be published in the upcoming years, it will then be possible to assess the conditions vocational secondary school attendees face on the labour market.

Furthermore, all survey results were recorded in 2011 in all 3 countries. A panel data would have been more informative, especially since the importance of skills have grown since 2011. OECD will eventually repeat its surveys in countries, such undertaking therefore will be possible in the future.

As the original dataset does not differentiate between those who have attained their Maturity certification in a grammar school – that are typically stronger institutions - and those who attended a vocational grammar school, it was not possible to filter out the former group. Fortunately, grammar-school attendees mostly continue onto higher education, the portion of those with a grammar school leaving certificate as their highest qualification is most probably negligible in the dataset. Nevertheless, comparing the two types of vocational schools exclusively would require the grammar school graduates to be left out.

CONCLUSION AND POLICY RELEVANCE

This study set out to give an evaluation of the reforms in the Hungarian VET system carried out after 2010. It found that a core element of the reforms, namely extreme reductions in general education subjects that would ensure better numeracy and literacy skills, will diminish individuals' chances on the labour market. Even though young individuals who have attended vocational schools might be absorbed fast after leaving the intuitions by employers, they will face significantly greater difficulties were they to leave their first job. A lack of basic numeracy and/or literacy skills makes changing paths or keeping up with innovations at the workplace a challenge, eventually pushing the individual's skills into obsolescence.

The paper thus argues that the government has approached the issue of skill shortages shortsightedly and sought a remedy that, in the long run, will jeopardize the employability of vocational secondary school attendees.

Based on the results, the following steps would be advisable:

i. Vocational education policies should be formed based on long-term market intelligence and not on prevailing wishes of a smaller group of stakeholders

Vocational education should not be under a jurisdiction separate from other educational levels, but the education system should be treated as a whole, acknowledging that it is there to ensure better life chances and abilities to its pupils on every level, not a given number of new hires to a specific business sector.

ii. General education subjects should not be reduced

The cavernous gap in numeracy and literacy skills between vocational secondary school pupils and 6th graders of upper primary schools should be reduced, general educaton subjects should be given more emphasis, even in vocational education.

IT education should be introduced and compulsory in all vocational school institutions. Computers and technology are an indispensable part of almost any work in this day and age, if schools were equipping their students with every other skill except this, they would still be doing them a disservice, failing to prepare labour entrants to what is required of them.

iii. Postponing specialization until later years in vocational secondary schools would be advisable

Pupils should first be given a broader set of skills not only facilitating their further education and training at a later age but also giving them the chance to change schools while still learning. Pupils of 14 should not be forced onto such a narrow career path at this young age.

iv. Herding children to vocational secondary schools is not advisable

In the future, grammar-school admissions quotas should not be set at a particularly low level relative to vocational schools. Vocational education – even if well-designed – should not be forced beyond what economic rationale and needs would dictate.

All in all, the country's competitiveness will not be ensured by merely "building a work-based society", workers should be able to rise to the challenges of years to come.

Given the ongoing skill-biased technological change, this question will gain more and more importance over time. Hungary should act as soon as possible, saving 14-year old children from a life of vulnerability and no tools to break out.

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APPENDIX

1. The Structure of the Hungarian Education System, 2017/18

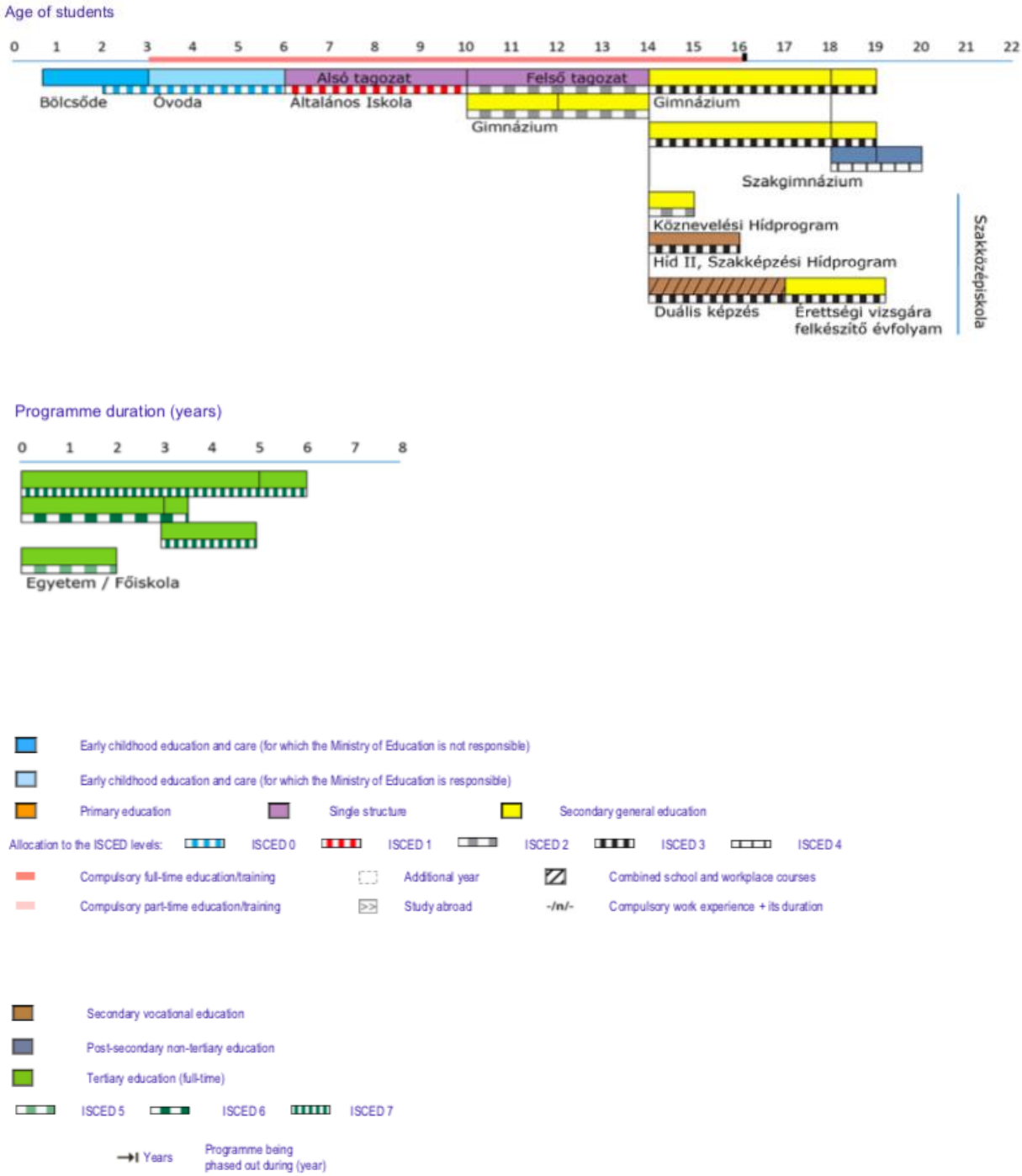

Figure 9: Structure of the Hungarian Education System, 2017/18
Source: European Commission (2017)