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Labour Market Shortages in the European Union

Study for the EMPL Committee

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Labour Market Shortages in the European Union

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DIRECTORATE GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A: ECONOMIC AND SCIENTIFIC POLICY

LABOUR MARKET SHORTAGES IN THE EUROPEAN UNION

STUDY

Abstract

This study, provided by Policy Department A to the Committee on Employment and Social Affairs, gives an overview of labour shortages, looking at their types and causes, their occurrence within the EU-28 and possible measures to counter them. It finds that there are no overall quantitative shortages at EU-28 level in the wake of the economic crisis, but qualitative shortages, especially relating to skills shortages and mismatch, occur in several regions, sectors, occupations and Member States. Employers and Member States are the prime actors to counter labour shortages effectively, but the EU can play an important supporting role through its influence on intra-EU mobility, by increasing the transparency of the labour market and by using its structural funds as supportive frameworks.

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LIST OF ABBREVIATIONS

ALMP	Active Labour Market Policies
CEDEFOP	European Centre for the Development of Vocational Training
CEE	Central and Eastern Europe
CVTS	European continuing vocational training survey
EC	European Commission
ECS	European Company Survey
ECVET	European Credit system for Vocational Education
EEO	European Employment Observatory
EMCO	Employment Committee
EPM	European Performance Monitor
EQF	European Qualifications Network
ERM	European Restructuring Monitor
ESCO	European classification of Skills, Competences, Qualifications and Occupations
ESF	European Social Fund
ESP	European Skills Panorama
EVM	European Vacancy Monitor
EU	European Union
EUROFOUND	European Foundation for the Improvement of Living and Working Conditions
FET	Further Educational and Training
GDP	Gross Domestic Product
HV	Hirings vs Vacancies ratio

ICT	Information and Communication Technology
ILO	International Labour Organisation
IMF	International Monetary Fund
IOM	International Organisation for Migration
ISCO	International Standard Classification of Occupations
JOLTS	Job openings and Labour Turnover Survey
LFS	Labour Force Survey
LS	Labour market shortages
MAC	Migration Advisory Committee
MS	Member State
NEET	Not in Employment or Education and Training
NUTS	Nomenclature of territorial unit
OECD	Organisation for Economic Co-operation and Development
SME	Small and medium enterprise
STEM	Science, Technology, Engineering, and Maths
UH	Unemployment versus hiring ratio
VET	Vocational Education and Training
WHO	World Health Organisations
YEI	Youth Employment Initiative
yfEj	Your first EURES job

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EXECUTIVE SUMMARY

This study, prepared at the request of the Committee on Employment and Social Affairs of the European Parliament (EMPL), aims to provide a comprehensive overview of labour shortages in the European Union. It analyses the different types and causes of labour shortages, their occurrence within the EU-28 and lists possible solutions to counter these labour shortages by employers, Member States and the European Union. The study includes a number of cases studies on measures developed in different Member States to counter their specific labour shortages. Finally, recommendations are put forward to resolve current and future shortages by strengthening and improving current policies and practices.

There are quantitative and qualitative labour shortages, with different characteristics and causes

When individual employers cannot find the workers they need to fill open vacancies, labour shortages occur. Labour shortages refer to a situation in which labour demand exceeds labour supply. However, a distinction should be made between quantitative and qualitative labour shortages.

- In case of a ***quantitative*** **labour shortage**, there is an **absolute lack of workers** in the labour market. Labour demand is larger than labour supply, resulting in a large share of difficult-to-fill vacancies and a low unemployment rate. Quantitative shortages can be caused by increased demand for specific goods or services or economic growth more generally. The insufficient supply of labour can be caused by a decline in the working age population due to ageing or emigration or by a decrease in participation rates due to early retirement or the inactivity of certain groups.
- In case of a ***qualitative*** **labour shortage**, labour demand and labour supply are roughly in equilibrium (balanced), but a **large share of unfilled vacancies and a high unemployment rate** exist simultaneously. This signals a qualitative mismatch between supply and demand. A common cause is skill mismatch, either because there are not enough graduates with the necessary skills to fill open vacancies, or because skill requirements have changed or because job requirements by employers do not fit with the competences of jobseekers and graduates. Qualitative shortages can also be caused by a mismatch between the preferences of jobseekers and the characteristics of the open vacancies. This occurs when jobseekers do not want to fill a vacancy because of the working conditions offered or because the sector is seen as unattractive. Moreover, the lack of sufficient and correct labour market information for both employers and jobseekers can also contribute to qualitative shortages.

However, it should be noted that a **labour shortage is always relative** in the sense that it refers to labour demand in excess of labour supply of people *willing to work at a particular wage and under particular working conditions at a particular place and point in time* (Barnow, Trutko and Piatak, 2013). Offering better wages and working conditions can thus be effective at resolving shortages. Employers who do not increase wages in the face of shortages indicate that they expect to find a candidate at the current wage and labour conditions. Shortages are therefore relative to the terms offered, as wage levels might be the reason why students and jobseekers do not to opt for a field of study or job which could reduce the shortage.

In the EU there is currently no overall labour shortage

The tightness of the EU-28 labour market has decreased substantially compared to the pre-crisis period. At EU-28 level there is **no evidence of quantitative shortages.** Unemployment is high compared to the number of vacancies, indicating there are **enough jobseekers to meet the demand of the labour market.** However, we do observe tighter labour markets in some Member States than in others, highlighting that labour demand and supply are not balanced across Member States. Moreover, there are **geographical mismatches within countries**, i.e. a shortage of workers in one region and a surplus in another region. This is true for regions in **Belgium**, **Italy** and **Spain**, for example. As the crisis has largely decreased the tightness of labour markets throughout Europe, quantitative shortages may grow if the economic recovery picks up.

But specific shortages, especially skill related shortages occur across Member States

Within Member States and regions, sector and occupation **specific labour shortages occur**. Two in five companies claim to have difficulties recruiting people with the required skills to fill their open vacancies and many employees have difficulties to find a job which matches their qualification level. This signals the **presence of skill mismatches** and possibly **skills shortages**. Skills shortages can be observed for low, medium and high-skilled jobs. Throughout Europe there is some consistency across Member States when it comes to occupational groups with shortages: metal, machinery and related trade workers, science and engineering as well as ICT professionals. However, when analysed in detail, the specific occupations experiencing shortages differ between Member States.

The occurrence of qualitative shortages and especially skill mismatches indicates that additional training and retraining is necessary to counter these shortages, which take time to have an effect. This implies that filling open vacancies with the unemployed is often not an option in the short-term and reducing the current labour market shortages is therefore not a quick-fix for unemployment.

Member States can counter their specific shortages through various measures

Within Member States, several strategies can be followed to reduce shortages, either initiated by governments or in cooperation with social partners and individual employers. The optimal approach to counter shortages depends on the cause and the scale of the shortages experienced.

- **Activation policies**: These are aimed at reducing quantitative shortages by bringing more people into the labour market. If combined with training in basic and therefore transferable skills, these measures can also help in reducing skills shortages in the long run. Especially important is the transition of young people into the labour market to ensure the future supply of labour. As is shown by a good practice in **Italy**, this requires the collaboration between PES, educational institutions and social partners.
- **Attract workers from abroad**: Migration can decrease shortages, but does not provide a long term solution, as systematic emigration or brain drain in the "sending" country might hinder economic development in that country. Within the EU context, targeted intra EU mobility can be a solution for skills shortages and can be mutually supported by Member States, for example within EURES. A good practice example in **Germany** shows that mobility-schemes also need to take contextual and cultural factors into account to function properly.

- **Stimulate geographical mobility within a Member State**: National authorities in Member States with large regional disparities have the primary responsibility when it comes to removing barriers or even creating incentives or wage-subsidies for workers and students to relocate. They can also facilitate functional mobility by reforming institutions, including labour legislation such as hiring and firing regulations.
- **Training the (un)employed**: As skill mismatches are the most prevalent cause of shortages, Member States can focus on training. Good practices in **Ireland** and the **UK** show that when training initiatives are coordinated and set up in partnership with employers they can leverage large funds benefitting the upskilling of workers. Equally, guiding young people towards educational choices leading to employment in (future) shortage sectors or occupations can be a relevant solution, but is a more long-term strategy. Good practices in **Austria** and **Poland** show such measures can greatly increase the number of students choosing an education which leads to qualifications needed by the labour market.
- **Increase the attractiveness of sectors/professions**: Through awareness campaigns, but also through measures to improve working conditions, shortages in less desired sectors or professions can be eased.
- **Increase labour market transparency**: Better job matching by PES, better information to employers and jobseekers and the development of forecasting tools, allow Member States to reduce shortages caused by information mismatches.

But employers also have a role to play in reducing shortages

Employers are often the first ones to encounter a particular shortage, especially when identifying a bottleneck occupation. Consequently, they also have developed several strategies to deal with those bottlenecks.

Individual **employers often upgrade the skills of their (potential) staff** to counter shortages through (re)training, or offering internships, apprenticeships and supporting education systems, including working and learning. Other employers resort to **targeted migration**, obtaining the needed skilled workers from elsewhere. Some employers, when confronted with shortages, also resort to measures that **increase the productivity** of their workers through outsourcing or automation. In other words, the shortage is alleviated by lowering the demand for labour.

As employers control **job design and working conditions**, they have important tools at their disposal to alleviate shortages. Evidence shows that some employers change job content to better match profiles available on the labour market, while others raise the wage or improve other working conditions to make their jobs more attractive.

The EU plays an important supportive role

The EU can contribute substantially in a number of domains to allow both Member States and employers to counter shortages effectively. The EU is most active on issues of mobility, labour market transparency and its support to training provided by the structural funds.

- **Intra-EU mobility** is strongly supported by the EU's efforts to **reduce barriers to mobility**. This is done by stimulating convergence and transferability of national regulations and labour laws and by setting up **targeted mobility schemes** such as the EURES network and *Your first EURES job*.
- **Labour market transparency** is greatly supported by **monitoring tools** such as for example the European Vacancy monitor and the EU Skills Panorama. Transparency on the labour market is also increased by the introduction of

frameworks for qualifications and skills throughout the EU such as European Qualifications Network (EQF) and the ESCO-classification. The latter identifies and categorises European Skills, Competences, Qualifications and Occupations in a standard way.

- Through its structural funds such as the European Social Fund and European Globalisation Adjustment Fund the EU **supports the activation and skill strategies of Member States**. Initiatives such as the European Youth Guarantee provide additional incentives and funding for activation and skill policies aimed at young people.

Policy recommendations

In order to counter shortages in the future further measures can be taken.

Firstly, to identify current shortages, **investment in better monitoring of vacancies**, can be of great value. Currently, only limited information is available on open vacancies through local PES and developments such as the European Vacancy Monitor. PES data and employers surveys could be improved to collect information on actual job openings, hirings and separations, rather than just subjective skills shortages. This would allow for the detection of trends and management at micro-level. Secondly, the development of long-term strategies requires powerful **forecasting tools to predict** labour market evolutions and future skill requirements. The European Parliament **could support all efforts to strengthen the further development of monitoring and forecasting tools** by the Commission**.**

Secondly, it is also essential to **increase the adaptability of the workforce** as an automatic stabiliser to counter future shortages. Given that skill mismatches are often the cause for shortages, a key part of the solution to increase the adaptability of workforce lies in the skills of the workers: by investing in the key competences, functional mobility will be enhanced. Similarly the policies and measures taken in the context of shortages must also be flexible as the adaptability of shortage measures contributes to their effectiveness. The European Parliament could **call on the Commission to use structural funds**, especially the ESF, to **increase the adaptability of the workforce**, especially basic skills, as a preventive measure to shortages.

Another recommendation would be to **embed shortage policies in the active labour market policies** including a special focus on skills. The European Social Fund (ESF) can provide a useful framework, as well as a key source of funding, for targeting shortages and supporting policies designed to alleviate specific shortages. The EP could **call upon the Commission to ensure that Member States include an analysis of labour/skills shortages** when designing national Operational Programmes (OPs). This analysis should lead to more targeted actions and interventions in the national programme.

Fourthly, the EU remains a key-actor in removing barriers to mobility. Issues such as transferability of social security rights and welfare benefits need to be developed further. The Parliament can call upon the Commission to **expand on the experience of the EURES network and the action *Your first EURES job*.**

Finally, the **involvement of all relevant stakeholders** is key to success when designing and implementing shortage measures. This means **calling upon better and more structural partnerships for medium term alleviation of shortages**: between social partners, sectors and education actors for a better school to work transition or a better match, between employers and PES for increased transparency, involvement of sectoral skills councils, and of temporary work agencies. The EU has taken up a role by setting up European Sector Skills Councils: the sharing of information and experiences, learning from

each other, and ensuring that national organisations cater more effectively to the needs of the various sectors are their main aims. The European Parliament could **encourage the spread of these Councils to many more sectors**.

1. TYPES AND CAUSES OF LABOUR SHORTAGES

KEY FINDINGS

- In this report, we adopt the definition for labour market shortages (LS) as "a **sustained market disequilibrium** between supply and demand in which the **quantity of workers demanded exceeds the supply** available and willing to work at a particular wage and working conditions, at a particular place and point in time" (Barnow, Trutko and Piatak, 2013: 3).
- An important distinction is that between quantitative labour shortages and qualitative labour shortages. A **quantitative** (or aggregate) **labour shortage** refers to a situation in which the total supply of labour in an economy (i.e. for all sectors and occupations) falls short of the total demand for labour in that economy. **Quantitative shortages** can be measured at a regional, a national or the EU level. Currently, quantitative shortages are **not a serious problem** in the EU, due to the high unemployment rate in most regions. Quantitative shortages may, however, arise in the future if the labour force shrinks and labour demand increases again.
- **Quantitative LS** can occur due to a **decline in the working-age population** itself or to a **decline in the participation rate** of the working-age population (supply side) or they can occur due to **increases in labour demand**. If a labour shortage in one geographical area (region or country) coincides with a surplus in another area, there is a **geographical mismatch**. This shortage may be related to (a lack of) mobility.
- **Qualitative LS** occur if the labour **demand in a specific sector/occupation/skill level is higher than the labour supply** in the same sector/occupation/skill level. Thus, there is a **mismatch** between the particular characteristics of the labour supply and the particular characteristics of the labour demand, resulting in a shortage in a specific segment of the labour market.
- An important cause of qualitative LS is the existence of a **skill mismatch** between labour supply and demand, i.e. an **imbalance between the supply and demand of particular skills** within a given economy. Apart from a labour shortage, a skill mismatch may also result in undereducation and underqualification (and sometimes in overeducation and overqualification).
- A skill mismatch can be caused by **technological change**, changes in the **sectoral** or **occupational structure** of labour demand, recruitment rigidities and an increase in replacement demand. They can also be caused by a mismatch between the fields of study that students choose, or are able to choose, and the type of qualifications that employers demand (horizontal mismatch).
- Qualitative labour market shortages may also be due to **preference mismatch**, caused by a **negative image** or **unfavourable working conditions** in particular occupations.
- Finally, qualitative shortages can be the result of **imperfect information** about (the qualifications of) job seekers and vacancies.

This literature overview includes the most important policy papers of the EU (including CEDEFOP and Eurofound) and other international organisations, such as the OECD and the ILO, as well as a selection of academic papers. The first section discusses the various definitions of labour market shortages, while the second and third sections focus on

quantitative (aggregate) labour market shortages and qualitative (segmented) labour market shortages, respectively. Each of these sections gives a brief overview of the different types of labour market shortages and then discusses the factors that explain these shortages.

1.1. What types of labour shortages exist?

There are **various definitions and types of labour market shortages**. In general, they refer to a situation where the **quantity of workers needed, exceeds the available supply** at a particular wage and working conditions, and at a particular place and point in time. We distinguish two main types:

- **Quantitative shortages,** caused by an **aggregate excess demand** with insufficient workers to fill the overall demand**.**
- **Qualitative shortages,** which refer **to shortages in particular skills, occupations** or **sectors,** while available workers do not have the skills, preferences or information needed to fill these shortages.

There is no universal agreement about the definition of labour market shortages in the literature (OECD, 2003; Barnow, Trutko and Piatak, 2013; Ruhs and Anderson, 2010; IOM, 2012). Various definitions are suggested in policy documents as well as in the academic literature. Very generally, labour shortages refer to a situation in which labour demand exceeds labour supply (Barnow, Trutko and Piatak, 2013: 1). The European Commission (2004: 5) gives a more narrow definition by stating that 'labour shortages occur where the demand for workers in a particular occupation exceeds the supply of workers who are qualified, available, and willing to do that job'.

We will follow Barnow, Trutko and Piatak (2013: 3) who define labour shortages as 'a sustained market disequilibrium between supply and demand in which the **quantity of workers demanded exceeds the supply available** and **willing to work** at a **particular wage and working conditions** at a particular place and point in time'. In a narrower sense, the European Commission (2012c, 2014a) refers to **bottleneck occupations**, as occupations for which employers have problems finding and hiring staff to fill vacancies.

While less frequently discussed, the social demand model refers to a shortage if the number of workers in an occupation is smaller than what is considered desirable from a societal point of view (Barnow, Trutko and Piatak, 2013). This perspective suggests that there might be a shortage of workers in a particular profession if the society would be better off with more people of this profession (e.g., engineers and scientists). According to this definition a labour market shortage does not mean that the labour market is in disequilibrium, but that market outcomes are not optimal from the perspective of society.

Starting from a labour market (segment) in equilibrium a labour shortage (or excess demand) can arise from either an **increase in demand** or a **decrease in supply**. In standard economic theory, a labour shortage is assumed to induce an **increase in the wage** offered by employers, resulting in an increase of supply and a reduction of demand, until equilibrium is restored and the market clears again.

A **persistent labour shortage** must therefore be due to either a **rigid wage level or to very slowly adapting (i.e. inelastic) supply and demand**. Alternatively, a persistent labour shortage can be caused by a succession of supply or demand shocks (cf. Layard et al. 1991, Barnow, Trutko and Piatak, 2013). Labour shortages are a concern because they may result in **economic inefficiencies** due to a loss of potential output and a suboptimal use of the available workforce (Barnow, Trutko and Piatak, 2013).

A distinction can be made between quantitative labour shortages and qualitative labour shortages (cf. Adams et al., 2000; Zimmer, 2012):

- In case of a ***quantitative*** **labour shortage**, labour demand is larger than labour supply, resulting in a large share of difficult-to-fill vacancies (V) and a lowl unemployment rate (U), i.e. a low U/V ratio or Beveridge ratio.
- In case of a ***qualitative*** **labour shortage**, labour demand and labour supply are in equilibrium, but there is simultaneously a large share of unfilled vacancies and a high unemployment rate, caused by **qualitative discrepancies** between supply and demand. I.e., the qualitative characteristics of the supply do not match with the qualitative characteristics of demand. These qualitative characteristics first and foremost refer to skills, but may also be related to work experience, age, gender and work preferences.

Table 1 gives an overview of the various types of labour shortages and their causes that are discussed in this chapter. Both quantitative and qualitative shortages may be caused by a decline in the available workers (supply side) as well as to an increase in the demand for workers, either in general, or restricted to particular sectors, occupations or skills. In the next sections we give an overview of the different types of labour shortages and discuss the factors that explain these shortages. Section 1.2 focuses on quantitative labour market shortages and section 1.3 on qualitative labour market shortages.

Table 1: Types and causes of labour shortages

Type		Specific causes	
		Supply side	**Demand side**
Quantitative Aggregate excess demand		Decline in the population of working-age: • demographic trends • emigration	Increase in labour demand or for specific goods & services: • economic growth • ageing • change in tastes of consumers • change in price of other production factors
		Decrease in the participation rate: • inactivity of marginal groups • early retirement • low participation of women, disabled	Increase in local labour demand • geographical mismatch
Qualitative Specific excess demand	Skill mismatch	Educational choices and options of students	Change in required skills: • technological change • sectoral change • occupational change
			Difficulty of filling vacancies: • recruitment rigidities • increasing replacement demand
	Preference mismatch	Preferences of labour supply	Quality or image of jobs
	Information mismatch	Suboptimal search channels	Suboptimal search channels

1.2. What causes quantitative shortages?

A quantitative labour shortage can be due to either a **decrease in the number of available workers** or due to an **increase in the demand for labour**. This can be caused by the following factors:

- A decrease in the number of available workers can be **caused by ageing, by emigration or by a decline in the participation rate** of particular groups.
- An increase in the demand for labour can be **caused by economic growth, shifts in consumer demand and changes in relative prices** of factors of production.

A **geographical mismatch** occurs if there is simultaneously a labour shortage in one region and excess supply in another region and is related to a **lack of geographical mobility**.

A quantitative labour market shortage refers to a situation in which the **total number of workers** available (total supply of labour) in an economy falls short of the total demand for labour in that economy. Quantitative shortages can be measured at a regional, at a national or at the EU level. A quantitative labour market shortage is usually characterised by **(near) full employment**, since labour demand exceeds labour supply, and a general difficulty in finding workers to fill vacancies in a particular region, Member State or at EU level (European Commission, 2004). In view of the high unemployment rate in most regions of the EU, largely as a consequence of the Great Recession that started in 2009, **quantitative labour market shortages are currently not a serious problem** in most parts of the EU (see chapter 2). However, they might become a problem in the future if the labour force starts to shrink as a consequence of demographic developments while labour demand simultaneously increases as the economy recovers.

While a quantitative labour shortage is rather broadly defined, identifying particular types of quantitative labour shortages is useful for establishing which mechanisms explain these shortages and what policy responses may be considered. Broadly speaking, we can distinguish two types of quantitative shortages:

- shortages that occur due to a decline in the number of available workers (aggregate labour supply) (sections 1.2.1 and 1.2.2),
- shortages that occur due to an increase in the demand for workers (1.2.3).

In addition, we will discuss **geographical mismatch**, which is the coincidental occurrence of a quantitative labour shortage in one region or country and a labour surplus in another region or country (1.2.4). These different types of quantitative shortages can be explained by different factors.

A decline of the labour supply in a region, a Member State or the EU as a whole may be caused either by demographic developments, in particular a decline in the population of working-age (section 1.2.1), or by a decline of the participation rate of (particular segments of) the working-age population (section 1.2.2).

1.2.1. A decline in the population of working-age

A decline in the population of working-age can be caused by a natural outflow out of the working-age population that is larger than the inflow due to ageing and a low fertility rate and by net emigration.

a. Demographic trends

Due to a low and/or declining fertility rate in the past decades, the **inflow of young people** into the labour force may be smaller than the **outflow of older workers** who

retire, resulting in a natural decline of the population of working-age. If activity rates remain constant, this will result in a decrease of the labour force, which may cause a tight labour market in which labour demand exceeds labour supply (OECD, 2013). In the medium term, the increasing number of baby-boomers who retire will in some occupations lead to a replacement demand that will be hard to fill from domestic labour supplies (OECD, 2003a).

b. Emigration

In addition to the natural decline of the population of working age, it may also decrease due to net-emigration. If more **people of working age emigrate** from a region or country than migrate to it, the total population of working age may decline. However, while emigration reduces the number of available workers in the country or region of origin, it also reduces potential labour market shortages in the country or region of destination (Kaminska and Kahancova, 2010). While in the process of migration the receiving countries are able to offset labour shortages, accumulate skills, and may sometimes augment the average skill level of their labour force, the sending countries experience a '**brain drain**' and decline in labour supply (Exenberger, 2007: 15). The motives for people leaving their home countries vary (Hartmann and Langthaler, 2009):

- Personal motives: poor career prospects, constraints on freedom,
- Economic motives: low wages, unemployment,
- Social motives: bad living and working conditions, social insecurity,
- Political motives: persecution, political instability and insecurity.

The extent to which emigration will result in labour shortages in the countries of origin depends, however, on the profile of people emigrating. According to Heinz and Ward-Warmedinger (2006) emigration is more likely among young and educated workers. The emigration of healthcare professionals from the CEE countries constitutes a serious problem in the healthcare sector resulting in labour shortages in public hospitals and healthcare provider organisations in various Eastern European countries (Eurofound, 2013; Kaminska and Kahancova, 2010). Recruitment is particularly high into Nordic countries that offer significantly better wages (European Commission, 2014a).

1.2.2. A decrease in the participation rate

a. Inactivity of marginal groups

A decrease in the overall labour participation or activity rate may be the result of particular segments of the labour force becoming **inactive**. For this reason, it is important to focus on **marginal groups**, as they are more vulnerable. The OECD Skills Strategy (2011) recognizes that there are multiple reasons which may prevent people from working. Particular attention is given to young people aged 15 to 29 who are neither in employment, nor in education or in training (**NEET**), as they are considered a group at risk. Their unused human capital constitutes a waste of talent and of resources spent on skill formation.

b. Early retirement and skill obsolescence of older workers

If older workers lose their job and become unemployed, this may result in a permanent departure from the labour market, due to a **loss of skills**. Prolonged periods of inactivity can lead to skill underutilisation or even skill obsolescence, as certain skills are bound to atrophy over time if they are not effectively put to use. Particularly foundation skills (core skills which are critical for effective performance in the workplace) have been shown to depreciate with age. This depreciation can be offset by careful job design (OECD, 2012).

c. Other groups at risk of inactivity

Other socio-demographic groups at risk of inactivity are **women**, people with **disabilities** or chronical illnesses and (especially low-skilled) **immigrants**. Cross-national variation in the participation of these groups in the labour force suggests that the measures to encourage labour force participation may differ across countries. In Scandinavian countries labour force participation rates may be increased by attracting people with disabilities to work, in Southern Europe policies for reconciliation of work and family could be pursued to draw women into the labour market (OECD, 2010a).

1.2.3. An increase in overall labour demand

Generally, an increase in the demand for goods and services can result from an increase in the purchasing power of consumers, a change in the composition of the population of consumers, or changes in the tastes of consumers (Barnow, Trutko and Piatak, 2013).

a. Increase in the demand for goods and services

The first factor, an increase in the income or wealth of consumers, is related to **economic growth** in general (European Commission, 2004). However, the extent to which economic growth results in increased labour demand depends on the labour intensity of the growing sectors, technological progress and the unexploited production potential (European Commission, 2004). Thus, depending on the circumstances, economic growth might not always result in larger demand for labour. For example, if labour demand is met with extending the labour input of insiders by enhanced productivity or increased working hours, there will be no or only a weak increase in labour demand. Nevertheless, a steady economic growth can be seen as the most important factor influencing labour demand (European Commission, 2004).

b. Increase in demand due to ageing societies

With ageing societies in Europe, the demand for products and services specific to the elderly will increase (e.g., **health products** and services), while demand for products and services directed at younger people (e.g., education) will decline (European Commission, 2004).

c. Changes in tastes and preferences of consumers

While tastes for some products and services are steady over time, increasing popularity of particular products and services can lead to **shifts in labour demand** between sectors, examples being the rising demand for 'wellness' products and increasing need for computers and other ICT products and services (European Commission, 2004).

d. Relative prices

An increase in labour demand can also occur when the **prices of other factors of production** rises (such as raw material or machinery) and labour can be used to substitute in the production process (Barnow, Trutko and Piatak, 2013).

1.2.4. A geographical mismatch between regions

Geographical mismatch occurs when there is a shortage of (skilled) workers in one region or country, while there is a **surplus in another region or country**. Consequently, there are sufficient people but they are not in the same locations as the available jobs (Desjardins and Rubenson, 2011; OECD, 2012). Geographical mismatch arises when the locations where job openings are available are poorly matched with potential employees. It points to a **lack of geographical labour mobility**, i.e. an insufficient move of workers from one region to another within the same country (internal mobility) or a lack of mobility

across national borders (e.g. intra-EU mobility or immigration from third countries outside the EU). Labour mobility is constrained by people's unwillingness to move and relocate, by language barriers and the difficulties in recognising foreign qualifications (the latter two apply for cross-border mobility). An alternative to labour mobility is **mobility of firms**. Since moving is both time-consuming and costly for workers as well as for companies, periods with simultaneously high unemployment rates and high vacancy rates may persist due to geographical mismatches. In other words, labour shortages resulting from lack of inter-regional mobility occur when workers are reluctant to relocate between regions or when firms are reluctant to relocate between regions.

1.3. What causes qualitative shortages?

Qualitative shortages can be due to a **skill mismatch**, a **preference mismatch** and **information mismatch**.

- **Skill mismatch** is caused by an **imbalance between demand and supply of particular skills**, both in terms of the level of the skills and the type of skills. It may be caused by changes in demand, for example due to technological change, and changes in supply, for example due to a 'wrong' choice of an education.
- **Preference mismatch** occurs if the **characteristics of available vacancies**, for example with respect to working conditions, **do not match with the preferences** of potential workers.
- **Informational mismatch** is the result of a **lack of information** among job seekers and employers about the available vacancies and candidates.

Even without a quantitative labour shortage at the regional, national or EU level, there may still be qualitative shortages in particular occupations or sectors whilst absent in other occupations or sectors (OECD, 2003). Qualitative labour shortages occur if the **labour demand in a specific sector/occupation/skills level** is higher than the labour supply in the same sector/occupation/skills level. Thus, there is a **mismatch** between the particular characteristics of the labour supply and the particular characteristics of the labour demand, resulting in a shortage in a specific segment of the labour market. This type of shortage can coexist with an excess labour supply in other sectors/occupations/skills levels and at the aggregate level and, thus, with high unemployment rates. An important cause for qualitative labour market shortages is skill mismatch. However, skill mismatch is a broader category than skills shortages, as we will explain in the next section. In addition, qualitative shortages may be due to preference mismatch and information mismatch. We will discuss each of these types of mismatches.

1.3.1. Mismatch between the skills needed and available in the labour force

Skill mismatch can be defined as an **imbalance between the supply and demand of particular skills** within a given economy. A skill mismatch can occur in a specific sector, a specific occupation, or at particular skill levels. The ILO (2014) distinguishes between vertical skill mismatch, meaning that the level of education or qualification is less or more than required, and horizontal mismatch, meaning that the type or field of education or skills is inappropriate for the job (see Box 1). Another distinction is that between educational mismatch and skill mismatch (Allen and Van der Velden, 2001; Allen and De Weert, 2007) to specify whether the imbalance concerns the level or field of education or, more broadly, the skills possessed by job holders compared to what is required for their jobs.

Box 1: Skill mismatch and skills shortages

Table 2 gives an overview of the various ways in which a skill mismatch can manifest itself, based on ILO (2014). Apart from a skill shortage, which arises if vacancies cannot be filled due to a lack of qualified candidates, there are several other kinds of mismatch between the skills of the employee and the skills that are required to perform a job optimally.

Skill mismatch may result in economic losses, since it may affect productivity negatively: lower output may result from firms hiring less-skilled workers as a replacement for skilled labour that is hard to recruit, or from the increasing bargaining power of skilled workers who are in the position to slow down their pace of work (Haskel and Martin, 1993).

Table 2: Definition of various types of skill mismatches

Name	Definition
Skill shortage	Demand for a particular type of skill exceeds the supply of people with that skill
Skill gap	Type or level of skills is different from that required to adequately perform the job
Vertical mismatch	The level of education or qualification is less or more than required
Horizontal mismatch	The type/field of education or skills is inappropriate for the job
Overeducation (undereducation)	Workers have more (or fewer) years of education than the job requires
Overqualification (underqualification)	Workers hold a higher (or lower) qualification than the job requires
Skills obsolescence	Skills previously used in a job are no longer required and/or skills have deteriorated over time

Source: (ILO, 2014: 7).

A **skill *shortage*** may be one of the **consequences of a skill *mismatch***. Desjardins and Rubenson (2011: 13) explain that skills shortages refer to 'a situation where employers in specific sectors cannot find suitably qualified workers', and therefore '**the job is often left vacant and there is no match or mismatch between a worker and a job**'. However, in case of a skill mismatch, employers may also decide to hire under-qualified or under-skilled workers. In such cases, the occurrence of **undereducation** or **underqualification** may be an indication of skill mismatch. Note that, under particular circumstances, the opposite may also occur, i.e. that workers have more education or better qualifications than is needed for their job. In this case, skill mismatch translates into overeducation or overqualification of workers.

Some authors discuss **skills shortages in relation to the wage** that the employer is willing to offer to skilled workers. According to Quintini (2011), skills shortages arise 'when employers are unable to recruit staff with the required skills in the accessible labour market

and at the ongoing rate of pay'. Healy, Mavromaras and Sloane (2011) refer to 'a disequilibrium situation in which the demand for labour by an employer or group of employers is in excess of the supply of available workers at the ruling market wage'. According to them, 'a situation in which a (low-wage) employer is not willing to pay the wage required to eliminate the shortage of workers should not be regarded as a true labour shortage' (cf. discussion on preference mismatch below).

Skills shortages can be both **cyclical and structural.** At times of economic growth, as more recruitment occurs, more difficulties in finding the 'right' workers are encountered (Green and Ashton, 1992). Cyclical periods of rapid economic growth can lead to skills shortages whereas the opposite is likely to occur during economic downturns (Desjardins and Rubenson, 2011). Healy, Mavromaras and Sloane (2011) observe that hiring standards change in response to fluctuations in the business cycle and, when demand is buoyant and the labour market is tight, employers may be forced to adjust their hiring standards downward, increasing the incidence of undereducation and underskilling to cope with difficulties in recruiting skilled labour. Therefore, countries with high rates of employment growth may at the same time register large skills shortages, as firms operate in a tight labour market.

Skills shortages may be **limited to specific skill levels**. Calculations based on EU labour force survey micro data suggest that there are more jobs requiring intermediate qualifications than individuals qualified at the correspondent level, whereas the opposite is true for low-level jobs and low-educated employees (CEDEFOP, 2014). Bottlenecks seems to arise due to different reasons, depending on skill level (European Commission, 2014a): skills shortages are the driving factor behind bottlenecks in high-level occupations, whereas unattractive working conditions play a larger role at lower levels (cf. discussion below on preference mismatch).

Both demand-side and supply-side factors are associated with the emergence of skills shortages. The former include adjustment lags of firms and wage rigidities, whereas the latter are related to adjustment lags of education systems, lack of geographical mobility and imperfect information for students on which skills to acquire (Quintini, 2011).

In the following, we discuss the various factors, distinguishing between skills shortages that are due to changes in skill requirements for jobs (a-d), and skills shortages that are due to changes in the skill composition of the labour supply (e).

Note that most factors that explain skills shortages are also explanatory factors of skill mismatch in general. Whether a skill mismatch translates into a skill shortage (i.e. unfilled vacancies) or into undereducation or underqualification depends largely on the recruiting strategies of employers.

a. Skills shortages due to technological change

Ongoing technological change increases the demand for skilled labour. Despite a general trend towards a higher level of educational attainment of the labour supply, skills shortages will occur if the supply of skilled labour does not keep pace with demand. Skills shortages may be due to a scarcity in the skills required for certain production technologies (e.g. digital literacy and computer skills), especially in high-tech companies. Quintini (2011) observes that structural changes, such as the adoption of new technology, can create needs for new skills that are not immediately available in the labour market, giving rise to skills shortages until the education system is able to meet the new skill requirements.

Organisational restructuring may be a further reason **behind the emergence of skills shortages for particular groups**. Job-seekers who previously worked in declining

sectors, such as agriculture and manufacturing, may not be easily employable in jobs in growing sectors such as health and education, which require interpersonal skills, communication skills or problem-solving skills (CEDEFOP, 2014).

b. Skills shortages due to changes at the sectoral and the occupational level

Sectoral shortages

Skills shortages may be caused by a lack of adequately trained candidates in labour market segments that experience strong growth. Skills shortages in specific sectors may be the consequence of **sectoral shifts in demand**. Skills shortages resulting from business growth in expanding markets with strong product demand can also be regarded as a marker of firm success (Healy, Mavromaras and Sloane, 2011). In such cases, shortages tend to be a temporary phenomenon associated with expanding sales and a consolidation of the business position in the market.

CEDEFOP's forecasts for 2025 predict a **trend towards more skill-intensive and demanding jobs**, requiring higher skills and high-level qualifications. Job creation is expected to be particularly strong for technicians and associate professionals, and for the distribution, transport and business services sectors, and in health care and tourism (CEDEFOP 2012c; 2013c). The top growth occupations identified by the European Vacancy and Recruitment report (EU Skills Panorama, 2014a) are related to health, ICT, engineering, teaching, administration and sales.

Various studies point to the following characteristics of sectoral shortages:

- According to the European Company Survey of Eurofound (2013) skills shortages concern **both skilled and low-skilled positions**. Shortages of high-skilled employees are more often reported in the construction, manufacturing and health sectors, and in large-sized firms. The hotels and restaurants sector is most affected by a shortage of low-skilled personnel.
- Strong job growth is expected in **advanced manufacturing**, particularly in the fields of nanotechnologies, materials science, electronics, ICT and biotechnology, heightening firms' needs to recruit graduates with expertise in digital techniques, computing, analytical thinking, and manufacturing methodologies (European Commission, 2012; UKCES, 2012). Employers experience skills shortages related to increasing specialisation within advanced manufacturing or to the fact that education curricula have not kept pace with the technological development of the sector (EU Skills Panorama, 2014a).
- Employers in innovative sectors, such as advanced manufacturing, are looking for technical specialists who also possess team-working and communication skills. More generally, employers report that these skills, together with sector-specific skills, computer skills, analytical and problem-solving skills and the ability to adapt to new situations are the characteristics that define graduate employability in knowledge-intensive jobs (Eurobarometer, 2010). Skills shortages may arise because individuals **possess the requisite sector-specific knowledge but lack interpersonal skills** that cannot be compensated for (European Commission, 2013).
- Employers in innovative sectors are competing in a tight labour market segment, as science and technology graduates are attractive for employers in a variety of sectors. A further reason for skills shortages may be **strong competition from other high-paying employers**, or the inability to offer competitive wages and working conditions (cf. section below about preference mismatch).

Occupational shortages

Occupations for which there is evidence of recruitment difficulties are also called **bottleneck occupations**. They meet one or more of the following criteria (European Commission, 2014a: 14):

- vacancies take a long time to be filled;
- employers report difficulties in filling vacancies;
- few unemployed are available to fill vacancies;
- the number of vacancies increases while the number of job-finders remains stable.

Bottlenecks tend to occur **not only in growing occupations**, but also in occupations with declining employment, high replacement demand or an ageing workforce. Although bottlenecks are more likely to be found in high-level occupations (health, IT, education, finance and insurance), bottlenecks are also present in skilled manual occupations, probably due to the less attractive working conditions of certain sectors (manufacturing and construction) as well as the higher replacement demand.

At the occupational level, shortages may also result from the introduction of new regulations (such as safety regulations). Another example that has recently attracted the attention of policy makers is the process of 'greening' of existing occupations (European Commission 2012e: 19). An important issue in this case is the availability of specific training: although investment in developing green skills may be part of the production and innovation strategies of firms, investment from SMEs in green training programmes tends to be limited.

c. Skills shortages caused by recruitment rigidity

Rigidity of recruitment criteria is another factor that contributes to skills shortages. In order to respond timely and effectively to skills shortages, a better understanding of the relationship between skill mismatches and human resource policies is necessary (CEDEFOP, 2012b). Skills shortages may result from **poor investments in recruitment**, especially for SMEs, which lead human resource managers to overestimate candidates at the recruitment stage and hire underskilled workers. Other recruitment related factors that can lead to skills shortages are discrepancies between the recruitment channels used by firms to attract skilled labour and the search strategies pursued by skilled job-seekers (Oyer and Schafer, 2011; cf. discussion below about information mismatch). Finally, informal recruitment channels have been found to reduce vacancy duration compared to more formal recruitment methods (Russo et al., 2001).

d. Skills shortages caused by increasing replacement demand

Skills shortages may also be due to an **increase in replacement demand**, i.e. 'jobs resulting from the departures of workers that have to be filled by new workers' (Willems and De Grip, 1993). If replacement demand is increasing and not all vacancies left vacant by departing employees can be filled by candidates with adequate skills, shortages arise. Factors that influence the replacement demand are the share of employees entering retirement, temporary or permanent withdrawals of women due to childbirth and childrearing, and occupational and job mobility. Replacement demand tends to be low in relatively new occupations that have recently arisen (Willems and De Grip, 1993).

Increasing replacement demand may also be due to a **lack of skill upgrading during the career and skill obsolescence**. Older workers may struggle to adapt to changing job requirements and to cope with the demand of technological change (EU Skills Panorama, 2014a). Skill obsolescence may be due to physical atrophy related to the ageing process, but may also be caused by the inability to perform cognitively demanding tasks, such as

working with IT or in jobs with tight deadlines (CEDEFOP 2010). Replacement demand may be particularly high if older workers in these types of jobs opt for early retirement.

Replacement demand is one of the main determinants of mismatches in the lower segment of the labour market, together with unattractive working conditions (cf. discussion on preference mismatch below). Future imbalances are expected for sales, services and elementary occupations due to high replacement demand (employees in these occupations will soon retire or leave the workforce) and poor working conditions that make these occupations unattractive and leave firms exposed to high recruitment difficulties (CEDEFOP, 2012c).

e. Skills shortages caused by the 'wrong' educational choices of students

An important source of skill mismatches is a **discrepancy between the fields of study that students choose or are able to choose and the type of qualifications that employers demand**. This phenomenon is known as horizontal mismatch and is particularly severe in health care, finance, ICT and engineering. In choosing a course direction, many pupils and students do not take into account the expected future demand for different fields of study. As far as they do base their field of study on labour market prospects, they tend to focus on current labour market shortages or surpluses instead of on the projected future shortages. This may result in so-called cobweb or pork cycles, in which periods with shortages and periods with surpluses of workers with particular qualifications succeed each other (Heijke, 1996: 8-10). In addition, the access to particular fields of study, such as medical specialisations, may be limited and may thus lead to a shortage of specific qualifications, despite the fact that sufficient students are willing to choose that field of study. Skill mismatches can also occur when insufficient educational institutions exit, or if they offer programmes of insufficient quality to meet the standards of the labour market, limiting the options of students.

Changes in the **skill composition of the labour supply** may also result in a **vertical mismatch**. In some countries, such as France, the increasing share of the labour force with tertiary qualification does not match a production structure that still requires a relatively large share of low-qualified workers, giving rise to labour shortages in low-skilled jobs or to a skill mismatch resulting in overeducated workers. On the other hand, countries with a small share of tertiary degree holders, such as **Italy**, may register skill imbalances in higher labour market segments (World Economic Forum, 2014).

1.3.2. Mismatch between preference of jobseekers and the jobs offered

Preference mismatch refers to the **unwillingness of working-age people to take up certain jobs** despite the fact that these jobs match their qualifications and skills profile and are located in the relevant geographical region (European Commission, 2004). This means that the full potential of the workforce is not utilised because people's preferences differ from the available occupations. Various factors may divert people from certain available jobs.

Preference mismatch can be related to the objective and to the subjective characteristics of particular jobs, in short the attractiveness of a job.

a. Preference mismatch due to working conditions

The most important **objective factors** are **inadequate remuneration and working conditions**. Green and Owen (1992) argue that definitions of skills shortages often assume that reasonable wages, training and working conditions have been offered to potential candidates. However, this is not always the case. Sectoral or occupational labour shortages may occur because certain jobs do not offer attractive working conditions (e.g. long hours, low wages, demanding tasks). Haskel and Martin (2001) report a lower incidence of

shortages in establishments that offer a higher wage relative to the average wage for the same occupational group in a given geographical area. 'Inability to offer a competitive starting salary is cited by 25% of employers in the 2010 Eurobarometer survey as a reason for unfilled vacancies. Another 11% of firms say limited resources inhibit their ability to market their graduate vacancies' (CEDEFOP, 2014: 3). Preference for jobs might also be reduced by a lack of flexibility in working hours which hinders combining work with caring responsibilities. In industries characterised by low wages and poor working conditions, employers may be forced to hire underqualified personnel for lack of interest from more suitable candidates (CEDEFOP, 2012b).

b. Preference mismatch due to low social status of a job/sector

The more **subjective factors** include the **status of the job**, whether a social stigma is attached to a particular kind of job and whether jobs are associated with a gender stereotype (European Commission, 2004; European Commission, 2014a). According to a recent study by the European Commission (2014a) around 35% of the reported bottleneck occupations were related to a gender-biased image (e.g. skilled manual occupations, personal care workers, science and engineering professionals). This can lead to a substantial narrowing of the potential workforce that has a preference for these occupations. As shown by the same study, the building sector in particular has a poor image and lacks attractiveness for female workers. Another sector that experiences a strong gender imbalance and that is affected by skills shortages is ICT (European Commission, 2014b). Some professions are also associated with immigrant or ethnic minority workers, often implying a social stigma (European Commission, 2004). Also the popularity of health care occupations is declining (European Commission, 2004). The problem of preference mismatch is more serious in countries where social benefit systems provide disincentives to take up low-paid or seasonal work (European Commission, 2004).

1.3.3. Information mismatch between jobseekers and employers

Shortages can also be related to **information asymmetries**. In this case, there is no shortage of skilled labour in the local labour market but the demand still remains unmet due to **imperfect information flows**, resulting in a lack of transparency on the labour market. Information mismatch may result from recruitment activities by companies that fail to reach their target or from job search strategies by job seekers that fail to locate available jobs. Depending on whether the focus is on the supply or on the demand side, either unemployed workers or other job seekers do not receive information on relevant vacancies, or firms do not obtain information on suitable candidates (cf. discussion above on skills shortages due to recruitment rigidities). Information mismatch may also concern workers who are currently employed in jobs that do not match their level of qualifications or skills and who may be qualified for and willing to move to a better fitting position.

2. CURRENT LABOUR SHORTAGES IN THE EU

KEY FINDINGS

- There is **no evidence of quantitative labour shortages at EU level**. In fact, the tightness of the labour market has decreased substantially compared to the situation prior to the crisis. There is evidence of relatively higher labour market tightness in some countries, namely **Austria**, **Belgium**, **Germany** and the **United Kingdom**.
- Comparing vacancies and unemployment, there is some indication that the **matching process** of job-seekers with vacancies may have **become less efficient at EU-level**, i.e. those looking for work are not a good match for vacant positions. However, there is no consensus on whether this reflects cyclical, structural or transitory factors.
- On the one hand, two in five companies claim to have **difficulties recruiting people with the required skills** and on the other hand many employees have **difficulties to find a job** which matches their qualification level.
- Following the decrease in general labour market tightness, the **incidence of labour shortages** in the broad sectors industry, services and construction is **well below its pre-crisis levels**. Only a limited set of countries experience larger shortages now than before the crisis, namely **Malta** and the **UK** in the industrial sector, **Germany** and **Hungary** in the service sector and **Germany** and **Luxembourg** in the construction sector.
- **Within Member States and regions, bottlenecks in occupations remain**, even in a looser labour market. There is some consistency across Member States when it comes to occupational groups observing shortages, but great variation when looking at specific occupations. Top-3 shortage groups across Europe are metal, machinery and related trade workers, science and engineering professionals, as well as ICT professionals.

2.1. How do we measure labour shortages?

There is **no universally accepted way to measure labour shortages**. Two approaches exist, **either using indicators of imbalance** between demand and supply or **using employer perceptions** of shortages through surveys.

In chapter 1, we have seen that there is not one single definition of labour shortages, but many different ways to define such shortages. In the same way, **there is no universally accepted way to measure them**. Most frequently used in the European policy literature are two approaches[1]:

- **Indicators of imbalance**, which relate indicators of labour demand, e.g. number of open vacancies, to indicators of labour supply, e.g. number of people unemployed. While labour supply can be estimated using European Labour Force Survey (EULFS) data for which long time series are available, **data on labour demand is more limited**. Recent developments such as the European Vacancy Monitor and the

[1] Other indicators are 1) Indicators based on price: a rise in the average hourly pay in a specific sector, for example, can indicate a shortage in this sector, because employees can demand higher salaries when there is little competition for a job. 2) Indicators based on volume: a decline in unemployment in a specific occupation, for example, can indicate an arising shortage, because less people are available to fill open vacancies.

European Vacancy and Recruitment Report[2] are working to improve this situation by collecting data on hirings amongst others. However, there is variation of coverage between Member States[3]. Harmonised data for more detailed level of analysis, e.g. by skills, sector or occupation, is particularly scarce.

- **Employer perceptions of labour shortages**, which are determined through employer surveys. These have been found to be strongly correlated with job vacancies series (Bonthuis, Jarvis and Vanhala, 2012). At European level, the European Commission's Surveys of Business Confidence can be used, but data is only available for a limited number of aggregated sectors only (manufacturing, services and construction).

The following sections present and interpret the most relevant and up-to-date data available. First we discuss data on quantitative labour shortages at European, Member State and regional level. Then, data on qualitative shortages, i.e. skills, sector and occupational shortages is discussed. It should be kept in mind that availability of data on labour shortages is far from perfect and interpretation of the data available comes with the outlined caveats.

2.2. Do we currently observe quantitative labour shortages in Europe?

There is **no evidence of quantitative labour shortages** at EU level. In fact, the tightness of the labour market has decreased substantially compared to the situation prior to the crisis.

There is **evidence of relatively higher labour market tightness in some countries**, namely **Austria, Belgium, Germany** and the **United Kingdom**. Comparing vacancies and unemployment, there is some indication that the matching process of job-seekers with vacancies may have become less efficient at EU-level, i.e. those looking for work are not a good match for vacant positions. However, there is no consensus on whether this reflects cyclical, structural or transitory factors.

Some Member States also experience a large **geographical mismatch**, a regional imbalance between labour supply and demand, most notably, **Italy**, **Spain** and **Belgium**.

A quantitative shortage refers to a situation where labour demand is larger than labour supply. This gap between demand and supply is typically not expressed in absolute terms (e.g. *"there is excess labour demand of 10.000 workers"*), but in relative terms using the concept of **labour market tightness**, which describes the **balance between labour demand and supply**. Labour market tightness is typically defined as the ratio of vacancies to job seekers. In a tight labour market, the ratio of job vacancies to job seekers is high: there are a high number of job vacancies and those who are looking for a job have a high probability of finding one. In a slack labour market, the opposite is true and a high number of job seekers are competing for a small number of vacant positions.

2.2.1. No evidence of quantitative labour shortages at EU-level

The graphical representation and economic tool to illustrate the labour market tightness is the **Beveridge curve** (Beveridge, 1944), which maps the vacancy onto the unemployment rate**.** While movements along the Beveridge curve illustrate effects relating to business

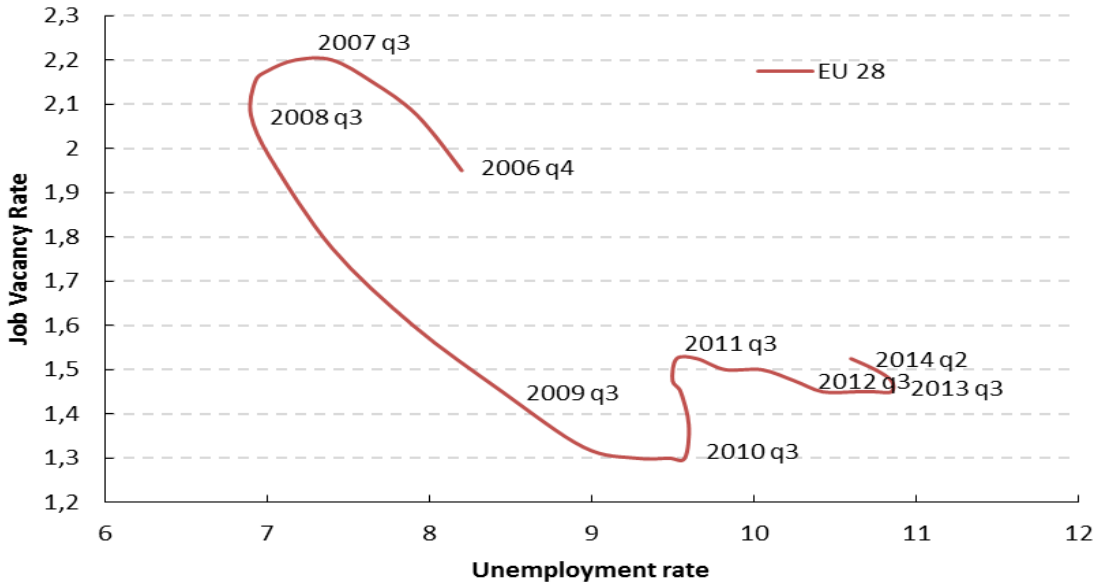
[2] EC website, Monitoring the Job Market, http://ec.europa.eu/social/main.jsp?catId=955 (accessed 11.11.2014)

[3] See also Eurostat website: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Job_vacancy_and_unemployment_rates_-_Beveridge_curve

cycle fluctuations, shifts in the curve can sometimes illustrate structural change or changes in the efficiency of the labour matching process (Dow, Dicks-Mireaux, 1958).

The figure below shows the EU-28 Beveridge Curve for the time period q4 2006 to q2 2014[4]. The job vacancy rate[5] represents the share of vacant posts out of all occupied and unoccupied posts. The unemployment rate measures unemployment in line with the ILO definition[6].

Figure 1: EU-28 Beveridge curve 2006q4 to 2014q2



Source: Eurostat, (jvs_q_nace2) and (lfsq_urgan), own illustration, based on Eurostat methodology http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Job_vacancy_and_unemployment_rates_-_Beveridge_curve (accessed 11.11.2014).

The Beveridge curve conveys two pieces of information:

- **There is currently no evidence of quantitative labour shortages at EU-level**, as a relatively high unemployment rate (10.1) coincides with a relatively low job vacancy rate (1.6). That means that there are many more workers looking for work than vacancies available. This kind of labour market can be described as loose overall. The labour market is now much looser compared with the pre-crisis scenario.
- The Beveridge curve has shifted to the right, indicating that **the matching process of job-seekers with vacancies may have become relatively less efficient**[7]. A given level of vacancies (e.g. 1.6) is now associated with higher unemployment rates (e.g. 10.1 compared to less than 8 in 2008). This means that the unemployed

[4] It plots the EU-28 job vacancy rate against the unemployment rate. Both are displayed as four-quarter moving average.

[5] It should be noted that Eurostat job vacancy statistics are not completely harmonised.

[6] Unemployed persons comprise persons aged 15 to 74 years who were: (1) not employed in the reference week, i.e. they did not work for at least one hour in the reference week for pay or profit or family gain but were not absent at work during the reference week, but had a job; (2) currently available for work, i.e. were available for paid employment or self-employment before the end of the two weeks following the reference week; (3) actively seeking work, i.e. had taken specific steps in the four week period ending with the reference week to seek paid employment or self-employment or who found a job to start later, i.e. within a period of at most three months from the end of the reference week." (Eurostat, EULFS definition)

[7] Although outward shifts can also occur through an increase in the labour force participation rate, activity rates in the EU28 have shown only small fluctuations between 69.9% and 72.2% in the time period under review

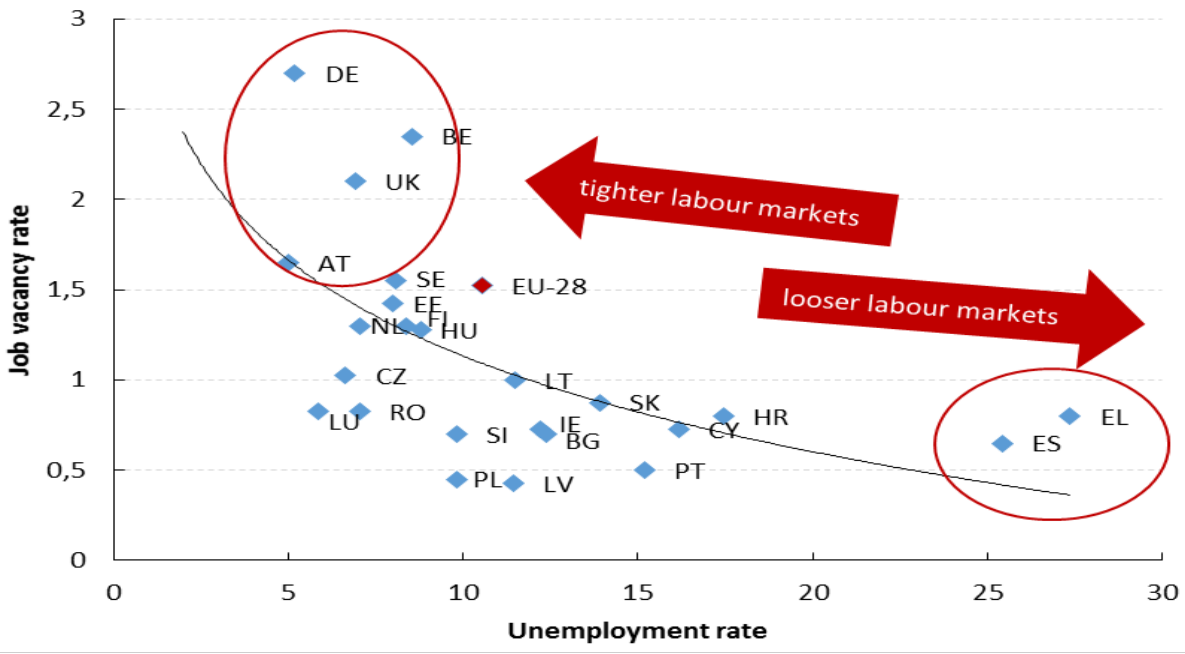
seem to have more difficulties of finding appropriate jobs even though the level of jobs available may be the same. This has also been recognised through the analysis of the European Commission in the context of their Employment and Social Developments in Europe Report 2013 (European Commission, 2014e).

From a policy-making perspective, this implies that there are currently **many more job-seekers than jobs available**. Moreover, even if aggregate stabilisation policies with the aim to create more jobs are put in place, these will not be enough to lower the unemployment rate to pre-crisis levels, as the labour market is now "structurally less efficient" in matching job-seekers to vacancies than before the crisis (Diamond, Sahin, 2014). However, recent academic research using US data has contested the interpretation of shifts in the Beveridge curve as structural, and noted that these shifts are frequently observed after serious recessions and are therefore cyclical in nature (Bernanke, 2012), with important implications for the policy response. Similar analysis providing conclusive evidence on whether the observed shift across the EU-28 is of cyclical, structural or transitory nature is still lacking (Arpaia, Turrini, 2014).

2.2.2. Large differences in labour market tightness between Member States

In line with the large variation in the performance of European economies at present, there are vast differences between Member States when it comes to the tightness of their labour markets. Figure 2 plots the **average vacancy rate to the average unemployment rate** for the last year **per Member State**[8] and illustrates that while some Member States have relatively tight labour markets currently, namely AT, BE, DE and UK, others combine high unemployment rates with a low vacancy rate, namely EL and ES. The labour market outlook for employees and job-seekers is relatively more positive in the former, while competition for jobs is obviously much higher in the latter.

Figure 2: Beveridge points, cross-country comparison 2013q2-2014q2 average



Source: Eurostat, (jvs_q_nace2) and (lfsq_urgan), own illustration, based on Eurostat methodology http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Job_vacancy_and_unemployment_rates_-_Beveridge_curve (accessed 11.11.2014).

[8] Data for Denmark, France, Italy and Malta missing, as data are not comparable

The great variance across the Member States when it comes to labour market tightness starkly highlights that despite the free movement of workers in the European Union, **labour demand and supply are not balanced across Member States**, with important implications for policies to facilitate intra-EU mobility.

2.2.3. Large geographical mismatch in some Member States.

There can also be regional labour shortages, i.e. **regional imbalances of labour supply and demand within Member States**. This is often described as **geographical mismatch** between those looking for work and the location of vacant positions. While it is not possible to review unemployment to vacancy ratios at regional level with the level of harmonised data on vacancies currently available, what can be analysed is the dispersion of employment rates across regions (at NUTS 2 level)[9]. This can approximate geographical mismatch. Strong variation and a large coefficient indicate that there are vast differences in employment rates between different regions. While this can also be due to compositional factors of the population, it gives a fist indication of labour market imbalances within Member States.

Table 3: MS with largest and smallest labour market imbalances between regions

Member State	Dispersion / coefficient of variation[10]	Lowest regional employment[11]	Highest regional employment
Member States with largest labour market imbalances between regions			
Italy	19	39.0% (Calabria)	71.5% (Bolzano/Bozen)
Spain	11.3	43.8% (Autonomous City of Melilla)	62.5% (Madrid)
Belgium	9.3	52.5% (Brussels)	68.5% (East Flanders)
Member States with smallest labour market imbalances between regions			
Denmark	1.9	70.7% (South Denmark)	74.4% (Capital City)
Netherlands	2.4	70.6% (Groningen)	77.4% (Utrecht)
Sweden	2.8	72.0% (East Middle Sweden)	77.5% (Stockholm)

Source: Eurostat, tsdec440 and lfst_r_lfu3rt, accessed 11.11.2014.

Using Eurostat data for 2013, the table above highlights the three Member States with the largest and smallest labour market imbalances between regions.

Even when currently no quantitative labour shortages are observed in the EU-28, i.e. there are high numbers of unemployed people looking for employment; this does not necessarily

[9] No data for EE, IE, HR, LT, LU, LV, MT, SI (no NUTS2 level). No data available on the dispersion of unemployment rates in Eurostat.

[10] Eurostat, tsdec440, dispersion is defined through the standardised coefficient of variation

[11] Eurostat, lfst_r_lfu3rt

mean that employers find it easy to fill vacancies.[12] There can be qualitative shortages and, linked to this, recruitment difficulties due to the fact that those looking for work may not be suitable for the open positions. This can stem from a variety of reasons, including a mismatch between the sectors, occupations or skill-requirements of the open job vacancies and available job seekers.

2.3. Do we observe skills shortages and mismatches?

Skills shortages or **skill mismatches** describe the imbalance between the skill requirements of (vacant) jobs and the skills held by the labour force. Following observations can be made for the European labour market:

- Various employer surveys show that up to two in five companies claim to have **difficulties recruiting people with the required skills**.
- Many employees have difficulties to find a job which matches their qualification level. There is a relative **shortage of medium level qualifications** and a relative **oversupply of employees with low levels of qualifications**.

One of the more frequently quoted reasons for recruitment difficulties in the context of the current oversupply of labour is that employees do not have the right skills for the vacant positions. It should be noted that skills can be defined in a variety of ways, and may refer for example to soft, hard/technical or generic skills.

Skills shortages or **skill mismatches** (a more accurate concept given the absence of labour shortages on aggregate) describe these imbalances between the skill requirements of (vacant) jobs and the skills held by the labour force, in particularly those looking for a job (Keese, 2008). They go hand in hand with occupational and sectoral mismatches and they cannot always easily be disentangled.

The academic and policy literature measures skill mismatches in two different ways[13]:

- Skills can be approximated with qualification levels, in which case one can examine the mismatch of qualification levels. This type of mismatch is sometimes also referred to as **qualification mismatch** (World Economic Forum, 2014), with its expressions under and over-qualification.[14]
- Skill-match and/or shortage can be measured by **employer surveys**. These surveys assess if recruitment difficulties are due to mismatches in the skills needs of jobs and the availability of such skills in the labour force. An example for the former is the European Company Survey implemented by Eurofound (Eurofound, 2013) or the Manpower Group talent shortage survey (ManpowerGroup, 2013). The major caveat of this approach is that employer surveys are based on subjective judgements and most often do not define (but leave it up to the judgment of the respondent) what is precisely meant by 'skills' (ILO, 2014).

The following focuses on skills shortages or mismatch approximated by the indirect measurement of skills shortages as specified in employer surveys and qualification mismatches, keeping in mind the above outlined caveats.

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[12] EC (2014), EU Employment and Social Situation, Quarterly Review, Luxembourg: Publications Office of the European Union : p. 78

[13] OECD website, http://skills.oecd.org/hotissues/skillsmismatch.html (accessed 18.11.2014)

[14] It should be noted that new data sources have opened up the possibility to measure skills more directly (PIAAC, see below) and related studies have stated that qualifications are not a good approximations of skills (Flisi, Goglio, Meroni, Rodrigues and Vera-Toscano, 2014).

2.3.1. Skills shortages in Europe according to employers

A large share of employers report **having difficulties recruiting employees with the right skills** even in the context of high unemployment rates and abundant labour supply in many countries:

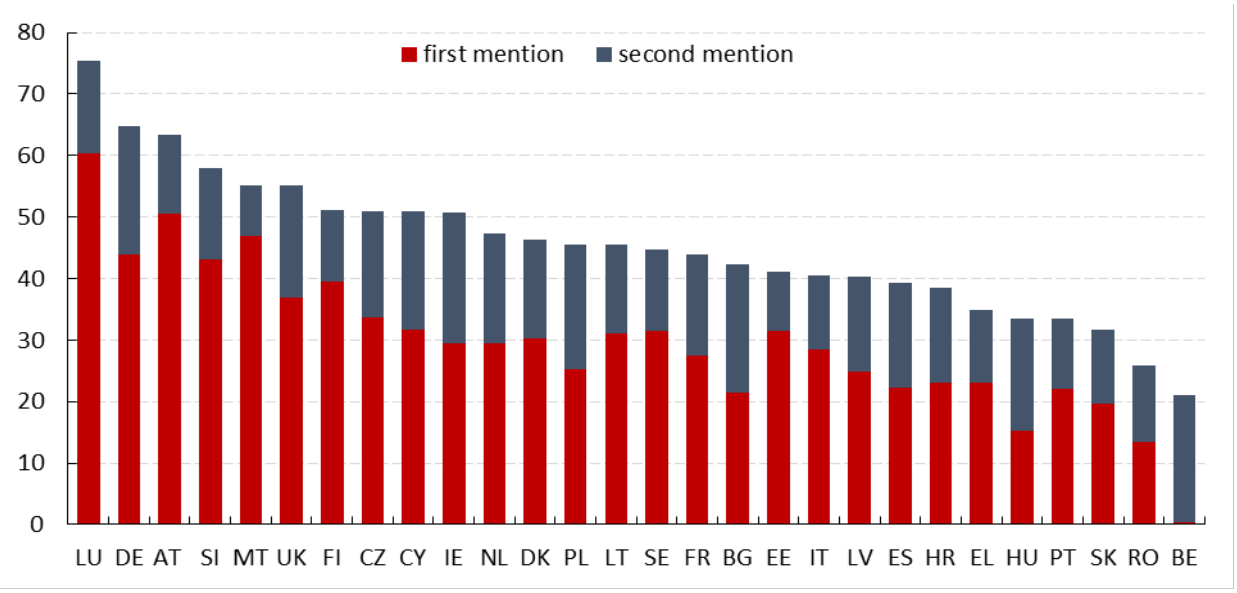
- European Company Survey data from 2013 indicate that four in ten European companies (39%) state to "have difficulties finding employees with the required skills" (Eurofound, 2013), with the greatest recruitment difficulties reported in the manufacturing sector (43%).
- Equally, the Manpower Group talent shortage survey 2014 finds that in the 19 EU Member States surveyed 28.5% of employers reported having difficulties filling jobs[15].
- Albeit not assessing the extent of difficulties in filling jobs, but rather the gravity of the challenge of skills shortages, Eurobarometer data from 2010 find that 33% of surveyed companies stated that the most important challenge in filling vacancies was "the shortage of applicants with the right skills and capabilities" and a further 14% claimed this to be the second most important challenge (European Commission, 2010).
- When looking at differences between Member States, the European Company Survey highlights that recruitment issues are particularly pronounced in **Austria** and the Baltic countries, where more than 60% report recruitment difficulties due to skill mismatch, and less severe (below 25%) in **Croatia**, **Cyprus**, **Greece** or **Spain**[16].

Eurobarometer data (from 2010 (see Figure 3) complement this picture by illustrating the share of companies, which mentioned skill and capability shortages as the first or second challenge in filling vacancies.

[15] It should be noted that no detailed information is available on the methodology of the survey and sample sizes achieved per country.

[16] Eurofound (2013), data not available

Figure 3: Incidence of companies indicating that skill/capability shortages are the greatest challenge to filling vacancies (%), 2010



Source: Own illustration based on Eurobarometer 2010 data, Flash EB Series, No. 304.

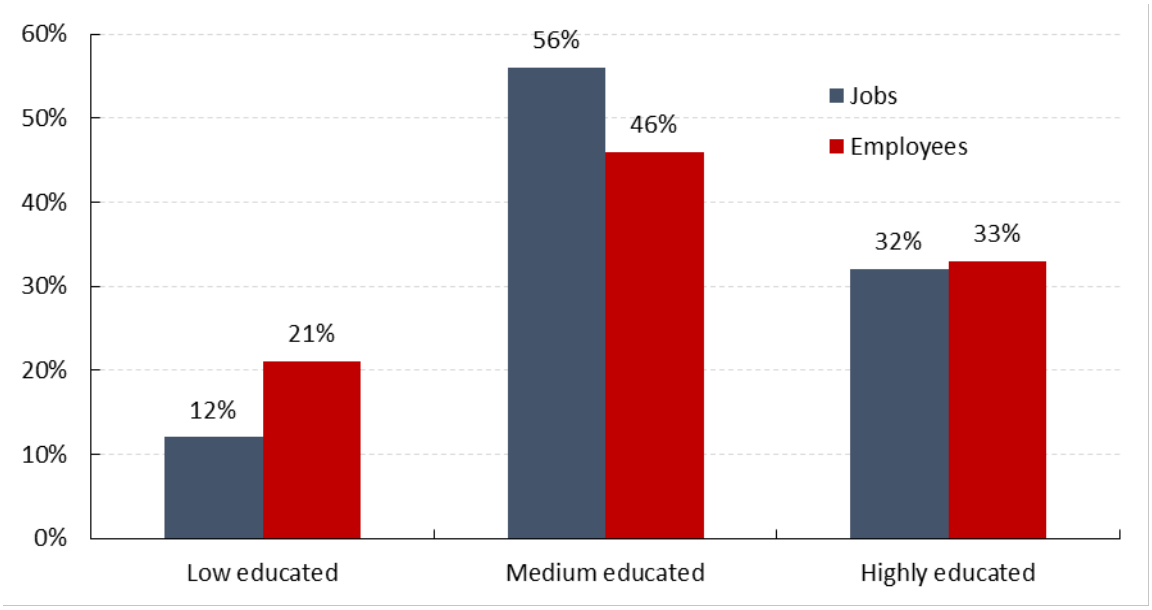
Skills shortages are highlighted as a recruitment challenge in **Luxembourg**, **Germany, Austria** and **Slovenia**, while they are less frequently identified as a barrier to recruitment in a number of Eastern and Southern European countries and not at all mentioned as the greatest barrier in **Belgium**.

From a policy-making perspective, it is interesting that **many employers perceive the available labour force as not well equipped to fill open vacancies**. While it is important to further look into what is meant by 'skills' in practice and what employers' expectations of the required skills are, this finding has important implications: it calls upon social partners, educational institutions and political stakeholders to work together on making qualifications more relevant for the labour market (e.g. through increasing the share of work-based or practical learning), but also to update skills of the labour force over the life-course.

2.3.2. Qualification mismatch in Europe

Employees have difficulties finding jobs that match their qualification levels. Looking at the mismatch between the **qualifications** held by employees **at European level** and the qualification levels required for existing and filled jobs, it shows that there is a relative shortage of medium level qualifications compared to the share of jobs at that level and a relative oversupply of employees with low levels of qualifications. Skill supply and demand for high qualifications seem roughly balanced on aggregate.

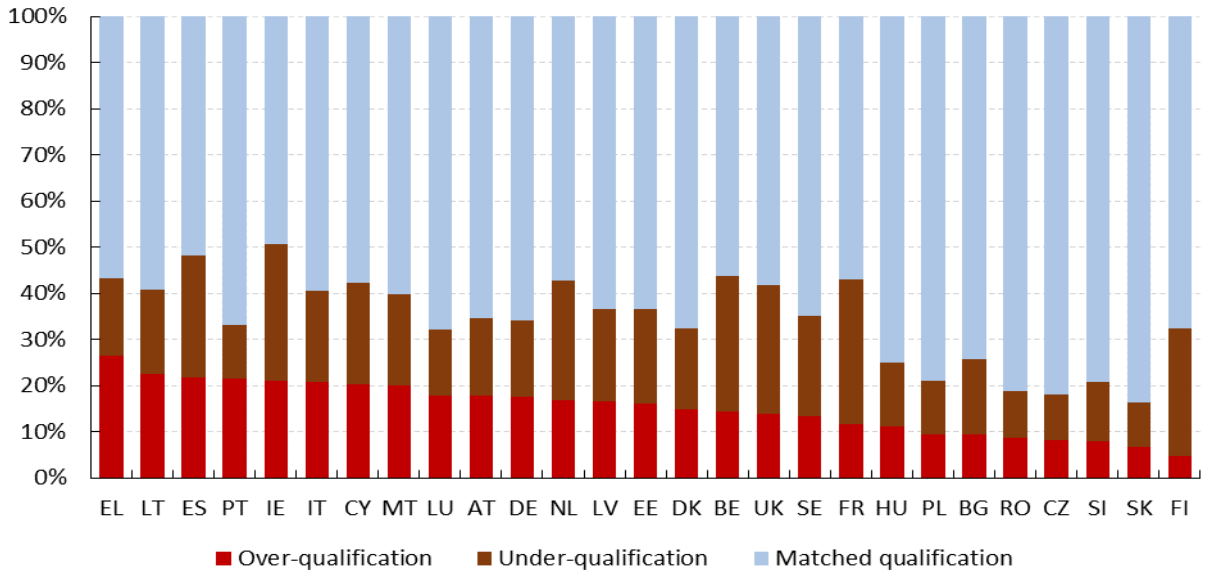
Figure 4: Qualification mismatch in the EU labour market, 2011



Source: Own illustration using Cedefop data based on EU labour force survey data, from Cedefop (2014): Skill mismatch: more than meets the eye, briefing note, March 2014, includes adult employees 25-64, categorisation by rough qualification levels (Low: ISCED 0-2, Medium: ISCED 3-4, High: ISCED 5-6).

This implies that a large share of people are working in jobs that they may be overqualified or underqualified for. In fact, an analysis of European Labour force survey data highlights that in some countries up to half of the population work in jobs that they are either overqualified or underqualified for (see Figure 5 below)[17]. There is great variation of the extent of qualification mismatch across Member States.

Figure 5: Average incidence of qualification mismatch in the EU-27, 2001-2011



Source: Own illustration based on Cedefop analysis, itself based on EULFS data, published in EC (2013), Employment and Social Developments in Europe 2012, Luxembourg: Publication office of the European Union: p. 360.

[17] Over/under-qualification here is measured as having an occupation that requires lower/higher qualification levels than is held by the employee.

As can be seen, the highest incidence of over-qualification for the time period is recorded in **Greece** (26%), **Lithuania** (23%), **Spain** (22%), **Portugal** (21%), **Ireland** (21%) and **Italy** (21%), whereas the highest incidence of under-qualification can be observed in **France** (32%), **Ireland** (30%), **Belgium** (29%), **United Kingdom** and **Finland** (28%). This implies that in **France**, around one in three workers is underqualified for the current jobs.

The **greatest incidence of mismatched workers** overall (both over and under-qualified) was observed in **Ireland** (51%), **Spain** (48%), **Belgium** (44%), **Greece** (43%) and **France** (43%), meaning that every second person in **Ireland** and **Spain**, for example, is working in a job that they are either over- or underqualified for. From a policy perspective poorly matched employees are important, as mismatch can have effects on individual labour market outcomes, but also growth, productivity and competitiveness of the European economies as a whole.[18]

2.4. Where do we observe sector shortages?

Perceived labour shortages as factor limiting production at EU level fell sharply across the three broad sectors industry, services and construction after the crisis. Only a limited set of countries experience larger shortages now than before the crisis, namely **Malta** and the **UK** in the industrial sector, **Germany** and **Hungary** in the service sector and **Germany** and **Luxembourg** in the construction sector.

Even when a workforce with the appropriate skills is available, shortages can occur at sectoral level. These often go hand in hand with occupational shortages within specific sectors (see also section 2.3.3). We can understand the extent of sector shortages by consulting **employer surveys**, e.g. the Eurostat Business Surveys[19], which ask managerial staff at European companies about their assessment of the situation of their business[20]. This includes an assessment of the main factors currently limiting their production, which can be labour force shortages. Data is available for the broad sectors industry, manufacturing and construction.

The following therefore focuses on the presentation of labour shortages in the three broad sectors **industry, services and construction**, as experienced by employers.

2.4.1. Strongly decreased sector shortages since the crisis

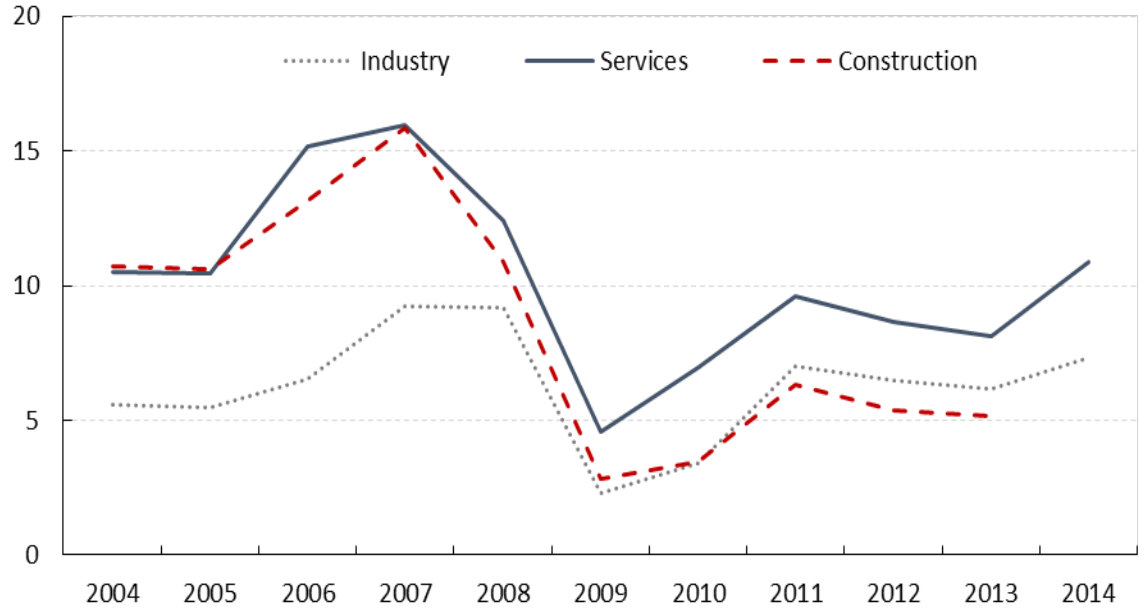
Perceived labour shortages as factor limiting production at EU level **fell sharply** across the three broad sectors industry, services and construction in 2009. While the service industry indicates the highest incidence of labour shortages both before and after the crisis, the industrial and construction sector have swapped places, with the construction industry indicating a continued low level of labour shortages compared with the pre-crisis scenario.

[18] ILO (2014) Skills mismatch in Europe, Geneva : ILO

[19] Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/euroindicators/business_consumer_surveys (accessed 20.11.2014)

[20] For detailed methodology, please see: EC (2014), The Joint Harmonised EU Programme of Business and Consumer Surveys, User Guide, 21. March 2014, DG ECFIN

Figure 6: Incidence of companies indicating that labour force shortages are a factor currently limiting their production (%), EU-28



Source: Own illustration based on Eurostat business survey data, factors limiting production.

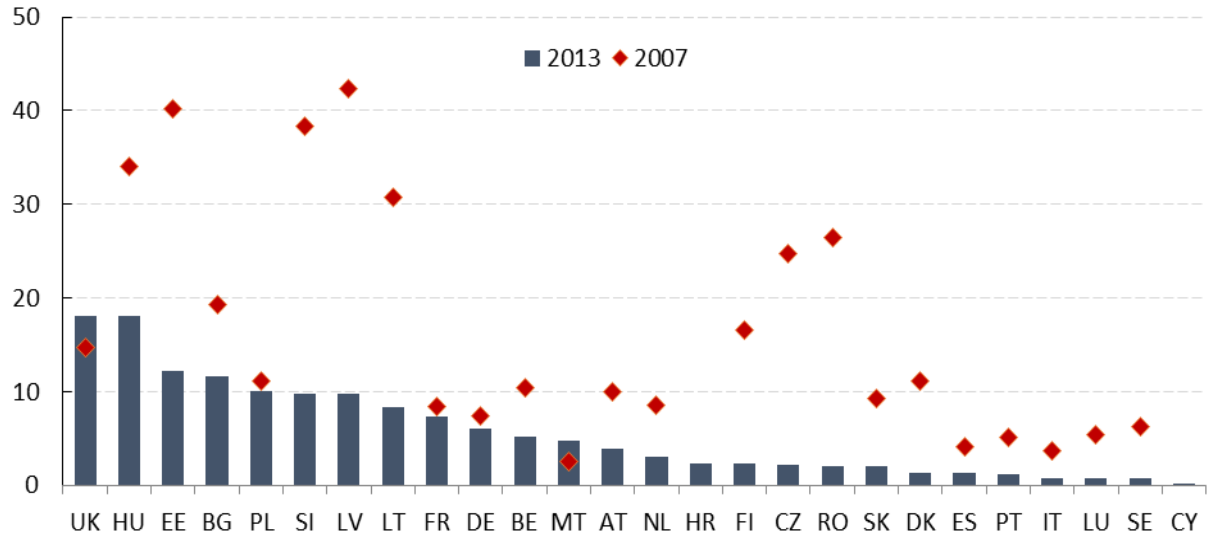
Other research complements this picture: a recent study of the European Commission (2014a) on bottleneck vacancies finds that labour shortages are most frequently observed in the manufacturing, construction and health and social work sectors.

2.4.2. Shortages exist in some Member States

Data at Member State level highlights the **great diversity of perceived labour shortages** amongst European Member States. The three following graphs present the Eurostat business surveys data on shortages for respectively the broad sectors industry services and construction for 2013 and 2007.

Figure 7 displays the incidence of labour shortages limiting production in the industrial sector. It shows that the incidence of labour shortages has decreased for all countries except **Malta** and the **United Kingdom** compared to the pre-crisis scenario.

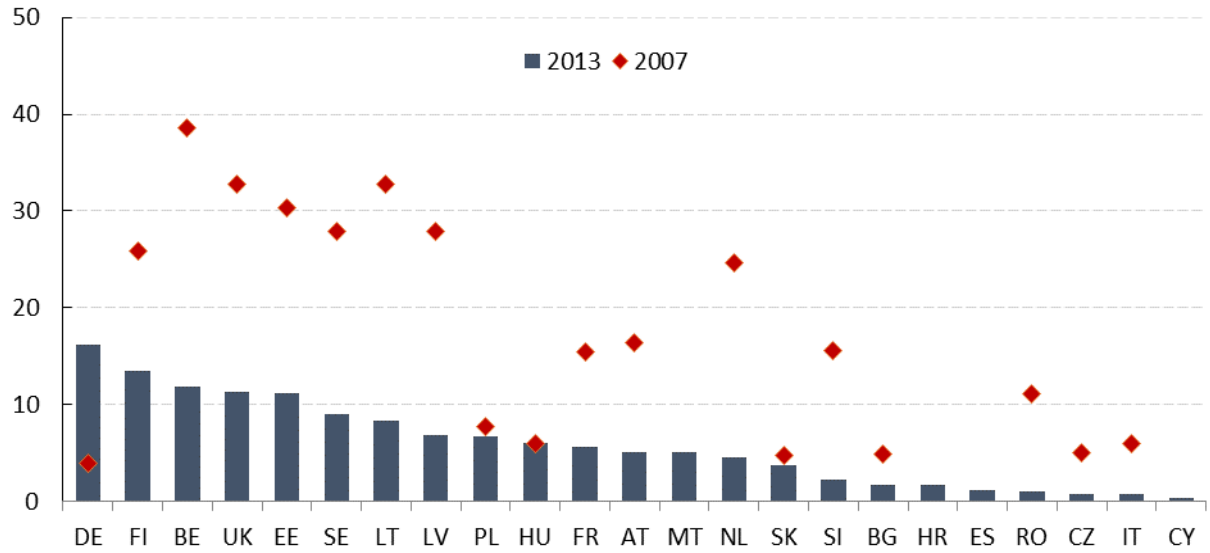
Figure 7: Incidence of labour shortages limiting production (%), industry



Source: own illustration based on Eurostat business survey data, factors limiting production in industry, no data available for Ireland, Greece, no data for 2007 for Croatia and Cyprus.

Figure 8 shows the incidence of labour shortages limiting business in the service sector. The incidence of labour shortages has decreased for all countries except for **Germany** and **Hungary** compared to 2007. The highest incidence of labour shortages in services is recorded in **Germany**, **Finland** and **Belgium**.

Figure 8: Incidence of labour shortages limiting business (%), services

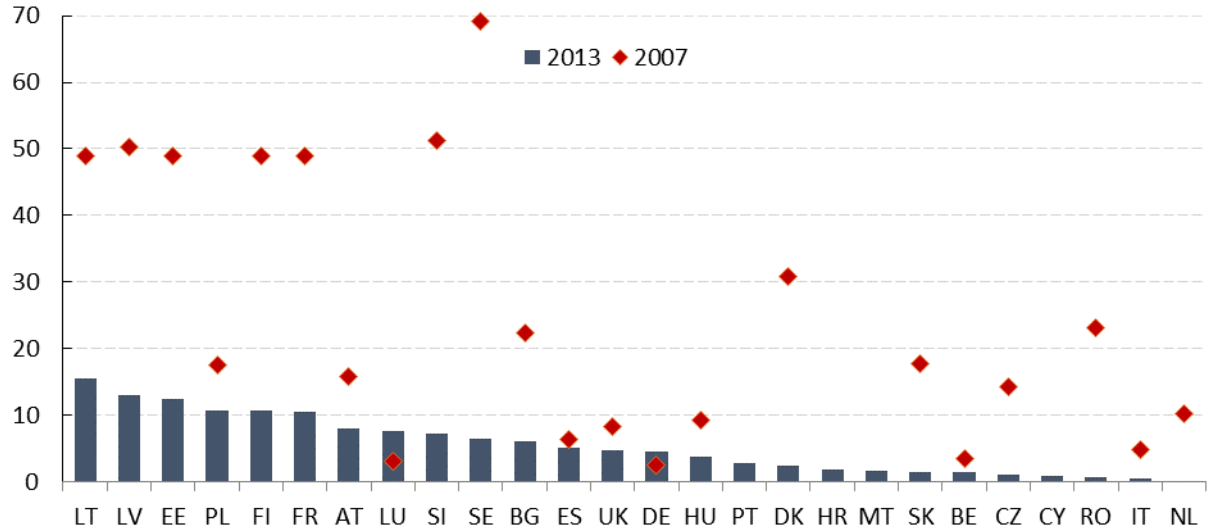


Source: own illustration based on Eurostat business survey data, factors limiting business in services, no data available for Denmark, Ireland, Luxembourg and Portugal, Greece, no data for 2007 for Croatia, Cyprus, Malta and Spain.

Figure 9 illustrates the incidence of labour shortages limiting building activity in the construction sector. The incidence of labour shortages has decreased for all countries except for **Luxembourg** and **Germany** compared to 2007. The highest incidence of labour shortages in construction is now reported in the Baltic countries. This picture also strongly illustrates the boom in construction demand immediately prior to the crisis and labour

shortages in 2007 were significantly higher than for other sectors in some countries, namely, the Baltic states, **Finland**, **France**, **Slovenia** and **Sweden**.

Figure 9: Incidence of labour shortages limiting building activity (%), construction



Source: own illustration based on Eurostat business survey data, factors limiting building activity in construction, no data available for Ireland, Greece, no data for 2007 for Croatia, Cyprus, Malta, Portugal

In sum, sectoral shortages in the broad sectors industry, services and construction have decreased sharply across European Member States. Only a limited set of countries experience larger shortages now than before the crisis, namely **Malta** and the **UK** in the industrial sector, **Germany** and **Hungary** in the service sector and **Germany** and **Luxembourg** in the construction sector.

2.5. Where do we observe occupational shortages?

Within Member States and regions, **bottlenecks in occupations remain**, even in a looser labour market. There is some consistency across Member States when it comes to occupational groups observing shortages, but great variation when looking at specific occupations. The top-3 shortage groups across Europe are metal, machinery and related trade workers, science and engineering professionals, as well as ICT professionals.

The **reasons for bottleneck occupations vary** across Member States and occupations. Many employers indicate **skill mismatches** as the main cause, but preference and information mismatches are also relevant.

While overall shortages in a sector may be limited, there can still be shortages in specific occupations within a sector. These are also known as **bottleneck occupations**, as they become visible when employers have problems recruiting staff for specific occupations and/or it takes a long time for these occupations to be filled. Detailed harmonised vacancy statistics at occupational level are not available across the EU-28. Consequently, the following draws on existing analysis in the area of occupational shortages, namely a recent study by the European Commission on **bottleneck vacancies** at EU and Member State level (European Commission, 2014a).[21]

[21] The study directly identifies those occupations in which there is evidence of recruitment difficulties through desk-research and stakeholder consultations at national level, bypassing the need for UV-ratios for different occupations. It should be noted that this methodology is associated with a risk of over identification of

2.5.1. Bottleneck occupations and occupational groups

The EC report analyses occupational groups[22] and more specific occupations facing bottlenecks in Europe[23]. It finds that there is **great variation of specific bottleneck occupations** in the EU, e.g. only one occupation (cooks) is reported as a bottleneck vacancy in the majority of countries. The report therefore concludes that there are "no Europe-wide shortages of labour" at the level of specific occupations (European Commission, 2014a). The list of the top 20 bottleneck occupations can be found in annex 1.

There is **greater consistency across Member States, when it comes to occupational groups**. Table 4 below presents the top-10 occupational groups with bottlenecks in Europe. It highlights the number of countries reporting shortages in this occupational group and the number of bottleneck vacancies reported. It should be noted that while the report provides a mapping of bottleneck vacancies across Europe, Member States displayed greatly varying data quality. In some countries, the list of bottleneck vacancies and occupational groups facing bottlenecks is solely based on expert interviews, raising questions about the validity of the findings. Moreover, often candidates are still found for bottleneck vacancies. For example Flemish PES in Belgium reports that in 2013 77% of all bottleneck vacancies were filled compared to 84.5% off regular vacancies (VDAB, 2014).

Table 4: Top 10 occupational groups facing bottlenecks at EU level[24] (ISCO 2-digit)

Occupational group	No. of countries reporting shortages	No. of bottleneck vacancies reported in this group
Metal, machinery and related trade workers	23	53
Science and engineering professionals	22	48
ICT professionals	20	47
Health professionals	21	45
Building and related trade workers, excluding electricians	18	41
Personal service workers	22	32
Science and engineering associate professionals	14	29
Sales workers	13	14
Drivers and mobile plant operators	16	21
Food processing, wood working, garment and other	12	20

Source: EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final: p. 10

shortages as the number of shortage occupations presented was pre-determined per Member State, and data quality and availability varies between countries.

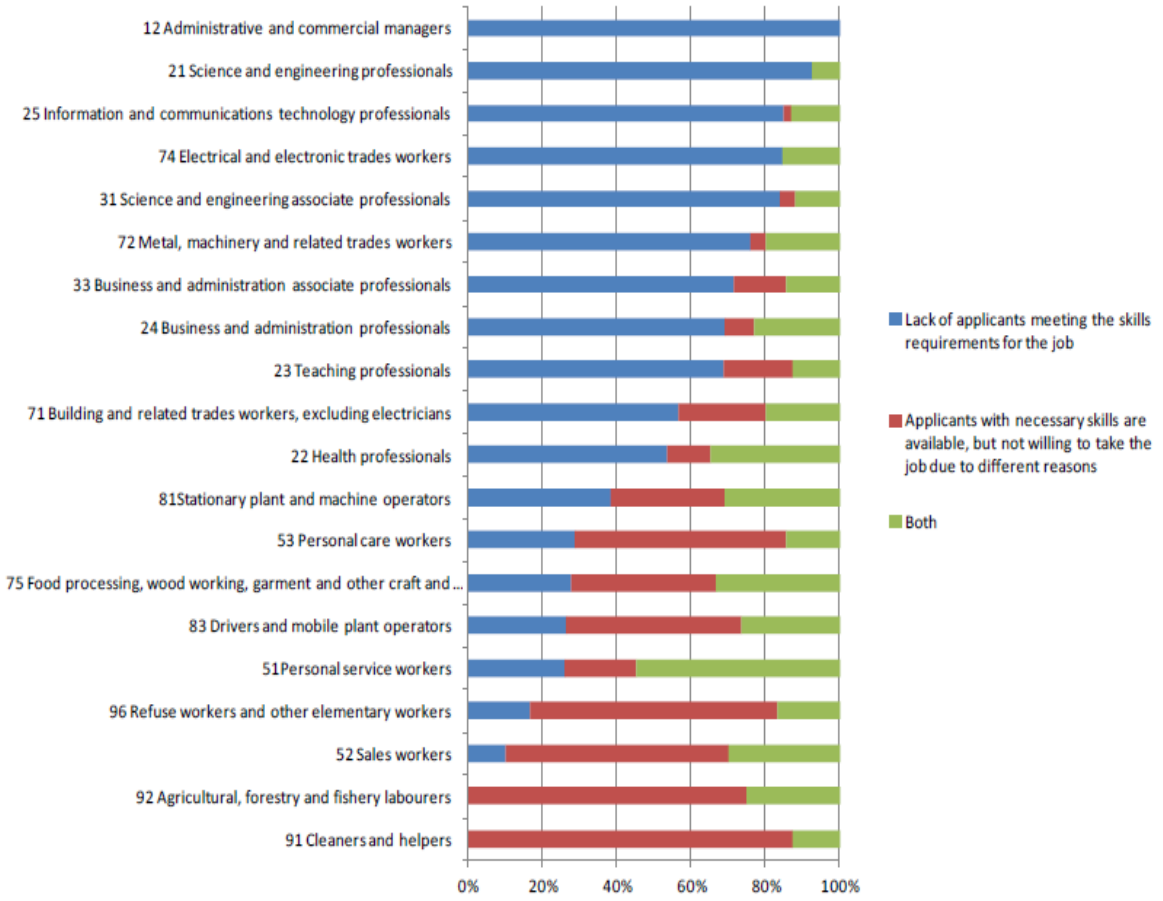
[22] ISCO-2 level
[23] ISCO-4 level
[24] This also includes EEA countries

These findings are in line with other analysis, for example from the European Vacancy and Recruitment report 2014 (European Commission, 2014b), which has identified professions in **Healthcare, ICT, Engineering, Teaching and Finance** as having significant future growth potential, and the Cedefop skill supply and demand medium-term forecast from 2010 (CEDEFOP, 2010). The forecast predicts that occupations with positive growth in the next years will be technicians and associate professionals; professionals; legislators, senior officials and managers; service workers and shop and market sales workers as well as those working in elementary occupations. The list of key-shortages per MS for the main occupational groups on ISCO 4 can be found in the annexes 2-11.

2.5.2. Reasons for bottleneck for occupational groups

When analysed, the reasons for bottleneck occupations vary, with most of them **indicating skills shortages and mismatch** either due to a tight labour markets with insufficient (skilled) workers or due to the non-availability of the right skills in the available workforce. For other occupations it appears the necessary skills are available but workers choose not to fill available vacancies, either by a lack of information or because of a preference mismatch. The latter can be caused by working conditions linked to the occupation (European Commission, 2014a).

Figure 10: Reasons for bottlenecks by occupational group (ISCO 2-digit)



Source: EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final: 37.

2.6. What shortages occur in each Member State?

There are clear **differences between the national labour markets** in the EU, with some experiencing tighter or more imbalanced labour markets. Specific bottleneck occupations occur in all Member States, but for different occupations and due to different reasons.

The following table summarises the analysis and presents an overview of the prevalence of shortages for each Member State (MS). Countries are categorised as featuring a high, medium or low level of shortages, by category of shortages. The categorisation is established by taking into account the prevalence of the shortages according to the most recent data available and using intervals of equal length, with the exception of the overall labour market tightness indicator, where Member States with extreme values would clearly skew the distribution into the three categories.

It should be noted that the table resulting from this method here presents **the relative differences regarding shortages between Member States in the current economic situation**. It does not reflect if and how the level of shortages is high, medium or low compared to their long-term average in the absence of such benchmarks. This means that even Member States that exhibit relatively high shortages compared to other Member States now, may face comparatively lower shortages compared with their long-term average.

It should be noted that data is not always comparable; all categorisations are based on the relative position of a country on a specific indicator and carries an element of judgement.[25]

[25] The categorisations are defined as follows:

- Labour market tightness: Takes into account UV ratios for each MS in the last four quarters (2013/2014). High: MS with a UV-ratio <4; Medium: MS with a UV-ratio 4<x<9, Low: MS with a UV-ratio >9. This is in line with the intuition of figure 1 earlier.
- Regional imbalances: Takes into account the dispersion coefficient of employment for each MS in 2013. High: MS with a dispersion rate >10; Medium: MS with dispersion rate 5<x<10; Low: MS with dispersion rate <5.
- Skills shortages: Based on overall incidence of qualification mismatch (over and under-qualification based on Cedefop analysis). High: incidence >40%; Medium: incidence 20%<x<40%; Low: incidence <20% .
- Sectoral shortages: Are based on Eurostat business survey data and reported incidence of skills shortages in the broad sectors industry, services and construction in 2013. High: incidence in a specific sector >10%: Medium: incidence in a specific sector 5%<x<10% , Low: incidence in a specific sector <5%.
- Occupational shortages (at ISCO 2 and 4) and reasons for them are those identified in the country fiches of the EC (2014) report on bottleneck vacancies (European Commission, 2014a). Reference is made to occupational groups rather than specific occupations, as these help to highlight trends across countries.

Table 5: Relative shortages of Member States observed in the current economic situation[26]

Member State	Quantitative shortages		Qualitative shortages				
	Labour market tightness[27]	Regional imbalances	Skills shortages	Sectoral shortages	Sectors with bottleneck vacancies	Occupational shortage groups	Reasons for shortages
Austria	**High**	**Low**	**Medium**	**Medium (Services, Construction)**	ICT, hospitality, healthcare and nursing, industrial production and construction, and building sectors	Engineering professionals and associate staff, construction workers and electricians, machinery and metal workers	• Decrease in VET training (in companies) • Applicant mobility to rural regions • Lack of work experience for school leavers
Belgium	**High**	**Medium**	**High**	**High / Medium (Services / Industry)**	Construction, manufacturing, healthcare, ICT, restaurants	Engineers and technicians, IT professionals, sales staff, nurses, (technical) teachers in secondary education	• Lack of supply of graduates • Need for up-skilling due to technological change lack of attitude • Motivation and specific language skills
Bulgaria	**Low**	**Medium**	**Medium**	**High / Medium (Industry / Construction)**	Manufacturing, accommodation and food services, ICT, human health and work	Managers, engineers, specialist medical practitioners, IT personnel, low skilled staff in tourism, trade and textile	• Lack of technical competencies • Poor terms and conditions • Emigration of qualified workforce
Croatia	**Low**	**n / a**	**n / a**	**Low**	Healthcare, accommodation, foodservices, education	Doctors, nurses and pharmacists, teachers and professors in specific subjects, occupations in accommodation and food services	• Lack of technical skills and experienced candidates • Educational system • Poor terms and

[26] Please note that data is not always comparable; all categorisations are based on the relative position of a country on a specific indicator compared to the position of other countries, as no general benchmarks exist; all categorisations carry an element of judgement.

[27] Please note that the colour coding for this category is inverse to the coding used for other types of shortages. A low level of tightness is coded red as it indicates high unemployment and a low level of vacancies, implying relatively depressed labour markets.

							conditions in healthcare
Cyprus	**Low**	**n/a**	**High**	**Low**	Agriculture, forestry and fishing, accommodation and food services, human health and social work, manufacturing	Mainly low skilled occupations, e.g. in agriculture and livestock sectors, accommodation and food services	• Poor working conditions • Seasonal demand, rapid technological change
Czech Republic	**Medium**	**Low**	**Low**	**Low**	Construction, manufacturing, health, ICT	Administrative and support service activities, construction and manufacturing occupations, high-skilled occupations in healthcare and ICT	• Competition for qualified candidates • Insufficient interest in type of work • Low salary and poor working conditions
Denmark	**Medium**	**Low**	**Medium**	**Low**	Hospitality, travel agencies, ICT, healthcare, construction	Mainly skilled occupations, e.g. professionals in sales, hospitality and skilled trades. Also software developers, mechanical engineers, nurses and medical doctors	• Lack of technical competencies • Rapid technological change • Mobility • Poor working conditions
Estonia	**Medium**	**n/a**	**Medium**	**High (Industry, Services, Construction)**	Machinery and metalworking, health, ICT	Mainly high-skilled occupations, e.g. specific types of engineers and teachers, medical doctors, software and applications developers and analysts. Also different mechanics and technicians.	• Lack of technical competencies • Poor image of certain occupations • Regional disparities and age issues
Finland	**Medium**	**Low**	**Medium**	**High (Services, Construction)**	Healthcare, social services, education	Mainly high-skilled occupations, healthcare (nurses and doctors), practical nurses, special education teacher and social workers	• Need for healthcare services in the whole country • Gender imbalances
France	**Medium**	**Medium**	**High**	**High / Medium (Construction /**	Construction, industry, health	Mainly skilled occupations, e.g. in construction and	• Lack of skilled candidates • Candidates unwilling to

				Industry, Services)		industry (metallurgy workers), but also high-skilled occupations in health and computer engineering	move • Rapidly evolving technology
Germany	**High**	**Low**	**Medium**	**High / Medium (Services / Industry)**	Electrical industry, mechanical and plant engineering sector, healthcare	Mainly highly-skilled occupations in the electrical industry, engineering and ICT. Also health, care and other service occupations	• Lack of required formal qualifications • Unfavourable conditions such as low salary • Replacement demand
Greece	**Low**	**Medium**	**High**	**n / a**	ICT, wholesale and retail trade	Mainly high skilled occupations, ICT professionals, sales staff, managerial staff, craft and trade workers	• Lack of candidates with sufficient work experience and technical competencies • Increased focus on sales abroad • Decrease in vocational education and other factors
Hungary	**Medium**	**Medium**	**Medium**	**High / Medium (Industry / Services)**	Construction, transport, retail	Both skilled and elementary occupations, e.g. sales people, cooks, truck-drivers, but also medical professionals, nurses, engineers, ICT professionals	• Lack of technical competencies and candidates • Competition from abroad and emigration • Demand in healthcare sector
Ireland	**Low**	**n / a**	**High**	**n / a**	ICT, life-sciences, financial services, food and beverages, healthcare	Mainly specialists within occupations, in particular in the ICT sector and engineers	• Lack of technical skills and graduates • Rapidly developing technologies • Salary, regulation and other factors
Italy	**Low**	**High**	**High**	**Low**	Manufacturing (metallurgic, automotive), health, ICT, green jobs	Mainly high-skilled and skilled-manual occupations, such as ICT professionals, engineers and pharmacists, mechanics and repairers	• Lack of technical competencies • Technical progress in manufacturing • Unsociable hours and

							other reasons
Latvia	**Low**	**n/a**	**Medium**	**High/Medium (Construction/Industry, Services)**	Textile industry, health, ICT, construction	Mainly in skilled manual occupations, in production, construction, machine operation and food preparation	• Lack of technical competencies • High manufacturing demand • ICT development
Lithuania	**Low**	**n/a**	**High**	**High/Medium (Construction/Industry, Services)**	Industry, transport and logistics, ICT, healthcare	Across skill levels, including high-skilled ICT, health and financial professionals, and lower skilled occupations, such as sales assistants, plant operators truck and lorry drivers.	• Lack of technical competencies • Unattractive working conditions • Emigration
Luxembourg	**Medium**	**n/a**	**Medium**	**Medium (Construction)**	**n/a**	**n/a**	• n/a
Malta	**Medium**	**n/a**	**Medium**	**Medium (Services)**	Healthcare, ICT, finance	Across skill levels, high-skilled in particular in healthcare, finance and ICT professions, also unskilled occupations in hospitality and tourism	• Strong sectoral growth • Unattractive working conditions
Netherlands	**Medium**	**Low**	**High**	**Low**	Manufacturing, construction, business services, energy supply health care, ICT	Occupational shortages of technicians in manufacturing, construction and technical consultancy, healthcare personnel, also high-skilled ICT, administrative and economic staff, certain type of teachers	• Growing demand and insufficient supply • Negative image and unattractive working conditions • Change in the kind of profiles sought
Poland	**Low**	**Low**	**Medium**	**High/Medium (Industry, Construction, Services)**	Construction, transport, services	Mainly skilled manual occupations, as well as service sector occupations (sales assistants, waiters, cooks), also business and	• Emigration of labour • Decreasing uptake of vocational training • Lack of technical competencies and

						administration professionals in hospitality services, high-skilled occupations such as civil engineers and medical doctors	emigration
Portugal	**Low**	**Low**	**Medium**	**Low**	ICT, forestry and fishing, construction, manufacturing	Lower skilled professions such as manual workers, machine operators, craft and trade workers, also occupations in deep-sea fishing and forestry. Skilled occupations in telecommunications, electronics and system analysis	• Salary considered too low Lack of technical competencies • Shift work/unsociable hours
Romania	**Medium**	**Medium**	**Low**	**Low**	Manufacturing, construction, health, ICT	Predominately craft and related trades workers, plant and machine operators/ assemblers, service and sales workers, also high and low-skilled occupations in the healthcare sector	• Emigration • Salary and working conditions
Slovakia	**Low**	**Medium**	**Low**	**Low**	Manufacturing	High-skilled occupations, e.g. mechanical engineers, product graders and testers (in particular in the car industry), sales representatives, accountants, primary school teachers.	• Low number of qualified candidates • Low interest in vocational training and technical studies • Benefits trap • Emigration of skilled labour
Slovenia	**Low**	**n/a**	**Medium**	**Medium (Industry, Construction)**	Manufacturing, construction, wholesale and retail trade	Occupational shortages in manufacturing, construction and retail. Also seasonal shortages for hospitality and farm workers	• Lack of hard skills • Working conditions in some sectors are regarded as unattractive
Spain	**Low**	**High**	**High**	**Medium (Construction)**	**n/a**	Mainly high-skilled occupations e.g., translator, occupational therapist,	• n/a

						business intelligence consultant. Particularly ICT occupations are affected: mobile architect, ABAP programmer, JAVA architect, COBOL programmer and Oracle Database administrator. On the skilled non-manual occupations there is a shortage for energy performance salespersons.	
Sweden	**Medium**	**Low**	**Medium**	**Medium (Services, Construction)**	Mining, healthcare, ICT	Mainly high-skilled occupations, e.g. health professionals, specific types of engineers, and occupations in ICT. Also lower skilled occupations, e.g. in mining and quarry, pre-primary school teachers and cooks	• Lack of technical competencies • Specific requirements for occupations
United Kingdom	**High**	**Medium**	**Medium**	**High (Industry,Services)**	Construction, agriculture, manufacturing, care sector, low carbon energy	Mainly specific skilled trade occupations, e.g. cooks, telecommunications engineers and vehicle bodybuilders. Also high-skilled production managers.	• Lack of technical competencies, • Poor image of some sectors • Strong growth in low carbon sector

3. MEASURES AND POLICIES TO COUNTER LABOUR SHORTAGES

KEY FINDINGS

- There are **various ways in which shortages can be resolved or mitigated**, depending on the type of shortages encountered and the national labour market context. However, no **single measure can entirely resolve a shortage** without a broader policy framework.
- We can distinguish a typology of **seven different types of measures**, each containing a range of more specific measures. These types can be classified according to their aim: bringing more people into the labour market through activation strategies, using international mobility to attract workers, getting more out of less labour by increasing productivity, bringing the skills of the workforce and unemployed up to the level requested by the labour market through training and education, making sectors and occupations more attractive by improving working conditions and increasing the transparency on the labour market. These measures can be **enacted by employers, Member States or EU institutions**.
- **Employers** are often the **first ones to encounter a particular shortage**, especially when identifying bottleneck occupations. They will be **less involved in activation strategies** to counter shortages, apart from the provision of apprenticeships. Contrary to public authorities, they will sometimes resort to **increasing the productivity** of their remaining workers as a resolution to shortages. Measures taken by employers focus more heavily on **resolving shortages in the short run**.
- **Member States** can and will pursue **all strategies** to reduce shortages, **except for increasing productivity** as it reduces employment opportunities. Measures taken by Member States can be either fully driven by government or taken in cooperation with social partners. Contrary to employers, Member States will also implement measures to **counter shortages in the medium or long run**, especially by devising activation strategies and by influencing educational choices towards qualifications needed in the future.
- The **EU** plays an important role in reducing shortages by providing Member States with **supportive frameworks** in which to develop several measures. The EU currently actively supports measures that reduce shortages, especially in the field of **activation of skilled workers, targeted mobility and skills training**, by means of the European Social Fund and initiatives such as the *Youth Guarantee* and *Your first EURES job*. The EU also plays a **significant role in increasing the transparency on the labour market** through a variety of programmes and initiatives.

In chapter 1 we discussed the various labour shortages that can occur in the labour market and their possible causes, while in chapter 2 we showed that the overall tightness of the labour market in the EU has decreased in the wake of the crisis. Nevertheless, specific qualitative shortages still occur within national labour markets, sectors and occupations. This chapter addresses the policy responses to these shortages by looking into the measures and practices implemented by employers, Member States and the European Union.

3.1. What measures can be used to counter shortages and by whom?

Labour shortages can be resolved using various strategies. We can distinguish a typology of **seven different types of measures**, each containing a range of more specific measures. These types can be classified according to their aim: bringing more people into the labour market through activation strategies, using international mobility to attract workers, getting more out of less labour by increasing productivity, bringing the skills of the workforce and unemployed up to the level requested by the labour market through training and education, making sectors and occupations more attractive by improving working conditions and increasing the transparency on the labour market.

Employers, Member States and the EU are all **actors involved in countering labour market shortages**. However due to their constraints, they are less involved in the use of certain measures:

- **Employers** are less involved in activation measures or measures to increase labour market transparency, because the responsibility and tools belong to public authorities.
- **Member States** will not develop measures to increase productivity as a resolution for labour shortages, because of the loss of employment opportunities.
- Likewise **the EU** will also rather support employment policies than measures to increase productivity. The EU is also less involved in the development or support of measures which increase the geographical and functional mobility within Member States.

3.1.1. Overview of measures to counter labour shortages

Labour shortages can be addressed in various ways by policy makers at EU-level, national level or by employers themselves. The most adequate response **depends on the causes of the shortage, the extent and the instruments available**. In addition various types of measures can be used to respond to a similar cause of the shortage.

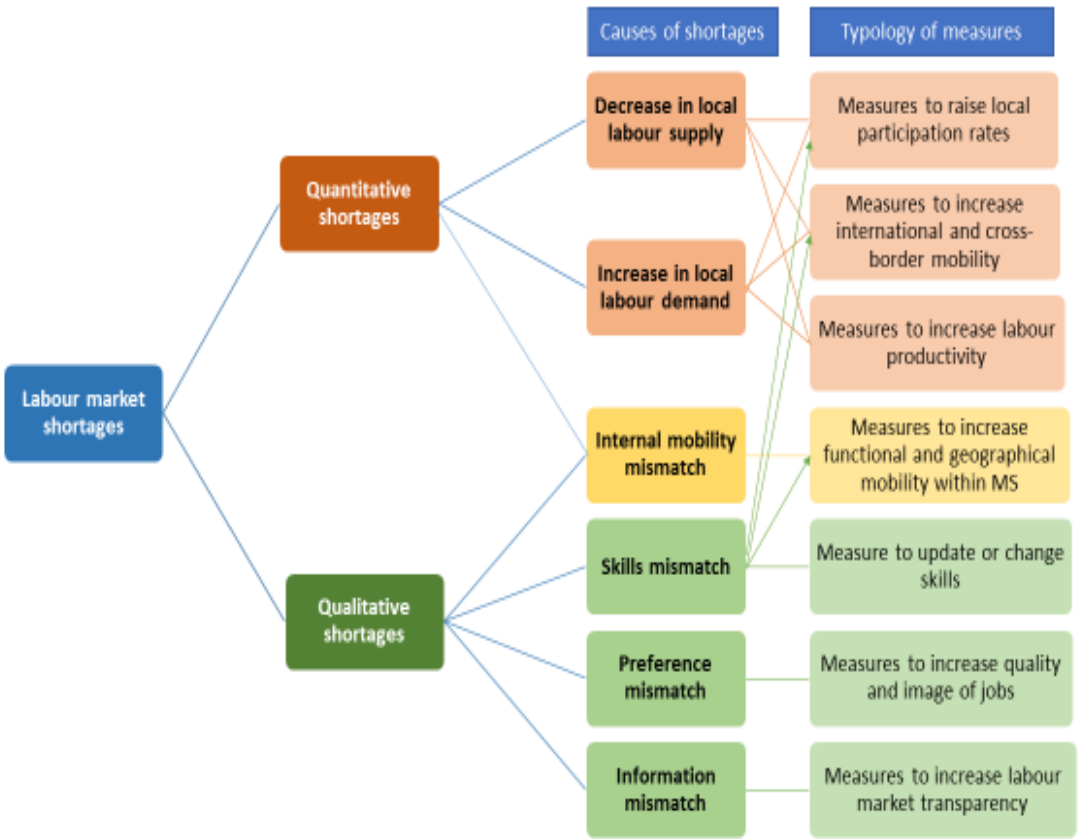
We therefore catalogued the different measures according to a typology which connects the cause of shortages to the possible responses. Specifically we discern seven types of measures. Each of these types harbours a range of specific measures and practices. Some types link to one specific cause of shortage while other types include measures that can address several causes of shortages simultaneously. Depending on the design, a measure can relieve either quantitative or qualitative shortages or both. The seven types of measures are:

- Measures **raising the participation rate**: This set of measures includes various activation policies and measures aimed at increasing the labour supply. This type also includes measures to facilitate the transition between education and work, ensuring a smooth inflow into the labour market. In short, these measures aim to *bring more people into the labour market*.
- Measures **increasing international and cross-border mobility**: These measures include mobility schemes to attract workers from other EU-countries, possibly targeted to specific skills or sectors. This type also contains those measures aiming for the return of migrant workers or measures preventing brain drain. This type of measures uses *international mobility as a solution while avoiding brain drain*.
- Measures to **increase productivity**: Other possible responses to shortages might be measures to increase labour productivity, such as outsourcing and automation. The aim of these measures it to *get more out of less labour*.

- Measures to **increase geographical and functional mobility within Member States**: Another set of measures tries to counter shortages by increasing, either functional mobility by facilitating hiring and firing and facilitating job changes, or geographical mobility by encouraging the movement of workers within a country or region. They aim to *facilitate transfers between jobs and regions.*
- Measures to **update or change skills**: These measures focus on changing the skill level of the labour population by either focussing on the (re)training of the active or inactive population, or by securing the inflow into education which leads to specific occupations. The general aim is to *bring the skills of the labour force in line with the needs on the labour market*.
- Measures to **increase the image and quality of jobs**: These measures try to improve the working conditions (wage or non-wage) and the job design. This type also includes those measures to promote working in particular jobs or sectors. These measures therefore aim to *make sectors and occupations more attractive*.
- Measures to **increase labour market transparency**: The last set of measures aim to provide more information to employers, policy makers and jobseekers through better PES services, forecasts of skill needs and qualification frameworks. Therefore these measures aim to *make the labour market more transparent for all actors*.

The typology of measure is also shown in the figure below:

Figure 11: Typology of measures responding to shortages



Source: Own assessment based on literature.

3.1.2. Involvement of employers, Member States and the EU in countering shortages

The seven types of measures listed in Figure 11 provide the different ways employers, Member States and the EU can counter shortages. However, not every actor has the necessary jurisdiction to implement certain measures or has the necessary means or instruments at their disposal. This results in a different usage of measures to counter shortages.

When shortages occur, **employers** experience them first. But contrary to public authorities, they only have a **limited number of tools** available to resolve the shortages and must resort to mitigation strategies. Table 6 provides an overview of strategies used by employers to counter the shortages for occupations where they experience bottlenecks (European Commission 2014a).[28] Following the typology of measures responding to shortages, it appears employers use **several of the different types of measures**, **except for initiatives to raise the participation rate or increase transparency of the labour market**. This is logical as the latter are measures for which public authorities are responsible.

Depending on the occupational groups where shortages are detected, employers respond differently. Training is often used as a way to counter shortages, but more so in ICT and metal occupations than in other occupational groups. Recruiting abroad is also a much used strategy, especially for health workers, ICT occupations and science and engineering (associate) professionals. Many employers also try to increase the attractiveness of the occupations through campaigns and improved working conditions. Interestingly, this is less the case for occupations related to construction. An alternative strategy is to increase productivity with the existing employees, resulting in a lower need for labour. Especially in sales occupations this strategy is used.

[28] The table shows the percentage of employers that indicated using a certain strategy to counter shortages within each occupational group. As employers sometimes use several strategies the total for each row exceeds 100%.

Table 6: Mitigation strategies of employers towards shortages for main occupational groups

Typology	Mitigation strategies	72 Metal	21 Science and engineering	25 Information and communications	22 Health	71 Building	51 Personal service workers	31 Science and engineering associate professionals	52 Sales workers
Increase inter EU-mobility	Additional recruitment activities in other EU countries	23	29%	34%	38%	27%	16%	28%	-
	Additional recruitment activities outside EU	8%	6%	36%	27%	24%	19%	10%	-
Increase productivity	Increase the hours of work	2%	8%	11%	11%	7%	9%	-	21%
	Reorganisation of work	-	-	-	13%	-	3%	-	14%
Increase functional mobility	Recruitment activities aimed at related occupations	11%	31%	26%	9%	10%	16%	14%	14%
Update or change the skill level	Providing additional training and development to existing staff	32%	8%	47%	9%	17%	16%	17%	29%
Increase quality and image of jobs	Improvement of terms and conditions offered for the job	11%	16%	19%	24%	5%	22%	14%	29%
	Campaigns and marketing	15%	22%	26%	22%	5%	16%	21%	21%
Other		15%	16%	53%	24%	10%	9%	21%	14%

Source: IDEA Consult based on EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final

Member States have a **larger arsenal of instruments** at their disposal. Contrary to employers they can use activation strategies to bring more people into the labour market and have the means to provide labour market transparency through PES and other institutions. They can also implement measures to increase international and EU-mobility, increase geographical and functional mobility, set up training or related measures to increase the skill level and improve working conditions to make jobs more attractive. However, they will **rarely focus specifically on increasing productivity in order to reduce shortages**, since this will decrease employment opportunities.

Notwithstanding the fact that the **EU** cannot always directly intervene to implement measures to counter shortages, it does have a **number of tools at its disposal** which can contribute in countering shortages. The EU mobility schemes and efforts to erase barriers within Europe are efficient measures to increase EU-mobility and its qualification frameworks and monitoring initiatives are clear measures increasing labour market transparency. Through its structural funds, the EU provides policy frameworks and funding for national measures to activate and upskill the labour force. The EU quality frameworks also support measures to improve working conditions and thus the image of jobs and sectors. As the EU aims to increase the employment rate in Europe, it would **not directly support strategies which aim to resolve shortages by increasing productivity** by automation or increasing working hours, thus reducing employment opportunities. However, indirectly EU policies stimulating innovation might have such effects. The EU will also be less involved **in measures to improve the geographical and functional mobility**. Here also, the EU will support Member States indirectly to adopt policies to facilitate mobility between jobs and regions within the country.

The table below provides a summary of the involvement of the different actors in the use of different measures.

Table 7: Involvement of employers, Member States and the EU in the implementation of measures to counter shortages

Typology	Empl.	MS	EU	Remarks
Raise participation rates	*	***	**	Employers can provide apprenticeships, but the activation of the population is a competence of national (or regional) authorities. For this they can receive EU support through the structural funds.
Increasing international and EU-mobility	**	***	***	Employers can recruit actively abroad (and do so). Removing barriers to mobility and setting up large scale mobility schemes can only be done by Member States or the EU.
Increase productivity	***	*	*	Countering shortages through productivity raises rests mostly in the hands of employers as national and EU authorities rather prefer solutions creating employment.
Increase geographical and functional mobility	**	***	*	Member States are the key-actors in removing functional and geographical barriers. Employers can focus on functional barriers in their company, while the EU provides overall guidance.
Update or change the skill level	***	***	**	Both employers and Member States can reduce shortages through training and education. They can be supported by EU funding and policies (such as the ESF).
Increase the image and quality of jobs	***	***	**	Employers and Member States are best placed to improve working conditions and conduct image campaigns. The EU provides more general quality frameworks and labour regulation.
Increase labour market transparency	*	***	***	Labour transparency can be provided by monitoring data, forecast and guidance. The latter can best be provided by national PES, while the first can be provided by Member States and the EU.

Source: IDEA Consult, own assessment.

The approaches used by employers, Member States and the EU to counter shortages, will be studied in detail in the next subchapters, illustrated with measures taken throughout the EU-28. First we discuss measures taken by employers and Member States (3.2), followed by measures taken at EU-level (3.3). As the EU does not have a significant contribution in measures involving the increase in productivity or geographical or functional mobility within Member States, these will not be discussed in the last section.

3.2. How do Member States and employers counter shortages?

A **variety of measures** can be put in place by both Member States and employers to counter shortages, but it is **unlikely shortages will be resolved entirely by a single measure**.

- To counter mainly quantitative shortages, Member States can enact measures to **enlarge the labour supply**, **prevent people from leaving** the labour force and cooperate with education providers and employers **to ensure the inflow in the labour market** through the school-work transition.
- Using international mobility can be an option to counter quantitative shortages by **attracting workers from abroad**. Both employers and Member states can also relieve **skills shortages by targeting mobility schemes** to skilled workers. Member states can **prevent brain drain** by implementing **retention policies** and **encouraging return** migration.
- Employers can resort to **increased productivity** to counter shortages, an option Member States will not pursue, because of the loss of employment opportunities.
- Internal mobility mismatches have various solutions. **Facilitating mobility by wage-subsidies** and **avoiding lock-in welfare systems** allow Member States to counter geographical mismatches. Employers can strengthen **functional mobility** by making **job designs** more flexible. Member States can do this by **loosening employment regulation**.
- Skills shortages can be countered in the short run by (**re)training both the employed and unemployed** population, which can be organised by employers or public authorities. In the medium or long run, Member States can ensure that more students **take up studies leading to qualifications needed** on the labour market.
- Employers and Member States can counter shortages caused by preference mismatches by **improving working conditions**, especially wages, and by **improving the image of occupations and sectors** experiencing shortages.
- Member States can resolve shortages due to information mismatches by measures making the labour market more transparent such as the **implementation of qualification frameworks**, **forecasting tools** and **high quality guidance services**.

Based on the typology of measures we discuss the seven different approaches to counter labour shortages, illustrated by measures implemented within EU Member States. As noted by the OECD (2003) however, no single instrument can promise a solution to shortages by itself. Thus the measures reviewed below must always be part of a broader policy framework within the national labour market context.

3.2.1. Bringing more people into the labour force

When faced with an insufficient supply of workers on the labour market, a simple general response could be to bring more people into the labour force. This approach can be used

for both quantitative and qualitative shortages, as the new inflow of workers can be aimed at the general labour demand or guided towards particular sectors and occupations.

First and foremost, these measures try to enlarge the labour supply both by ensuring that more people enter into the labour market. Secondly they try to prevent people from leaving prematurely. Finally measures can be set up to ensure the inflow into the labour market, especially through facilitating the school-work transition.

From this point of view the measures within this category are **closely linked to general active labour market policies** which aim to activate the unemployed or inactive population. Depending on the groups targeted, this approach can **deliver results on a short or rather long-term basis**.

a. Enlarging the labour supply

To **encourage participation in the workforce**, policies can either make employment financially more attractive or reduce non-financial barriers to employment (OECD, 2012).

- **Making employment more attractive**: This includes measures such as improving access to services; restricting access to income replacement schemes; providing tax incentives that encourage the labour market participation of second earners or that induce part-time workers to increase their working hours (e.g. individual tax systems); and providing a back-to-work allowance to recipients of social benefits.
- **Reducing barriers to employment**: This includes measures such as increasing part-time work opportunities; providing affordable childcare facilities; offering flexible working arrangements around the time of childbirth; reforming parental leave programmes; designing effective re-entry programmes for people who have had a protracted period of illness; offering job search training and personalised employment-related services as part of active labour market policies; and introducing financial incentives to train and retain workers with disabilities and to reduce employers' reluctance to hire inactive individuals.

However, activating the labour potential is mainly relevant for countries with low labour force participation rates (OECD, 2003). For countries with low unemployment rates and high activity rates the potential for encouraging labour participation is much smaller.

b. Preventing people from leaving the labour force

Another strategy is to **retain people on the labour market**. This can be a relevant strategy when confronted with skills shortages. The OECD Skills Strategy (2011) stresses the importance of retaining employees, ensuring that they do not retire prematurely or move to other countries. The former factor is important for all European countries due to the ageing of their workforce, whereas the latter affects especially central and eastern European Member States. Policies to discourage early retirement include the following: ensuring early retirement is not rewarded financially; introducing in-work benefits policies for older worker to remain in employment (e.g. direct wage top-up); increasing statutory retirement age; and improving employment conditions through access to lifelong learning schemes and flexible working hours.

Many countries have adopted such activation measures, but mostly with little consideration to the particular shortages on the labour market. Similarly, measures taken to retain people on the labour market are often motivated by budgetary concerns and part of general labour market strategies. A prime example is the rise in retirement ages throughout several European countries such as the **Netherlands** and **Belgium**, amongst many others.

Box 2: Measures to bring more people into the labour market

In **Austria** we can discern the example of the *Fit-to-work programme*. As Austria faces a relatively tight labour market, ensuring continued employment participation is vital to the labour market. The measure provides information and support to increase the health condition of workers to lower the risk of them leaving the labour market.

In **France** the measure of *generational contracts* which aims at keeping older people (above 55 years old) in employment while young people (up to 26 years old) are hired and trained is relevant. This measure ensures that old people can remain in employment, and the transfer of skills between generations, thus serving multiple goals.

In **Germany** a *vocational return-to-work programme (Betriebliches Eingliederungsmanagement)* was implemented. This programme requires that employers offer employees a return-to-work programme when they are on sickness leave for longer than six weeks. The employee is however, not obliged to accept and participate. The goal of the programme is to clarify the sources of the illness and to develop targeted measures to help the employee to return to work. Such measures could focus, for example, on a reorganisation of the work space, reduction of the work load or a rehabilitation plan. As Germany faces a relatively tight labour market, this programme helps to ensure that qualified workers remain working. Germany has also implemented other measures to ensure participation on the labour market, such as the *establishment of more full-time schools and nurseries* for children under three years old to augment the labour force participation of mothers and the *Perspective 50+ Employment pacts for older people in the regions (Perspektive 50+ Beschäftigungspakte für Ältere in den Regionen).* Another measure is the *Initiative to support structural change (Programm zur Flankierung des Strukturwandels)*. It addresses low-qualified workers and people willing to re-access the labour market by offering them qualification courses in line with qualification needs in the regions. This last measure is a good example of targeted activation measures which direct the activated population towards the needs of the labour market.

In **Italy** we can find the programme *Welfare to Work ("Azione di sistema Welfare to Work per le politiche di reimpiego")* which aims at promoting the re-entering of people into employment through specific actions combining passive and active (training) labour market policies. It focuses on people receiving social benefits, or on workers at risk because of the crisis, who receive guidance and training to (re-)enter the labour market. It was implemented in various regions for the period 2012-2014, and was co-financed by the European Social Fund.[29]

However, the activation of certain target groups also involves breaking established employment patterns. In **Poland** we see that the government initiated several *media campaigns* aimed at employers to encourage the employment of older people (50+), as well as campaigns to support equal participation of men and women in household duties and children care, enabling women to enter the labour market (European Commission, 2014c).

c. Ensuring the inflow in the labour market

A third approach aims to facilitate the **transition from school to work** as it marks the **first entry point of young people into the labour market**. An unsuccessful transition can prove a handicap to both the individual and the labour market for the rest of a person's career. This was especially important during the crisis, as research shows that young people who leave education during economic periods of high youth unemployment are at a

[29] http://www.italialavoro.it/wps/portal/w2w, accessed 15.12.2014.

considerable disadvantage and take much longer to find their first job (European Commission, 2014f). Furthermore, young people still in education can be more easily guided towards employment in sectors or occupations confronted with shortages as they are not yet set in their skills or career path. Combatting the dropout of young people thus forms an essential part of the strategy to ensure a smooth transition between education and the labour market.

An important finding in the statistical report on gender inequalities in the school-work transition (European Commission, 2014a) is that **vocational training with a workplace-based component is an important tool** in getting young people into paid employment. This means apprenticeships form a fundamental part of any strategy to ensure a smooth transition of young people into the labour market (World Economic Forum, 2014). Here employers play an important role as they must be willing to provide these apprenticeships. However, a study for the **United Kingdom** (Hogarth et al, 2014) found that employer's willingness to provide apprenticeships would decrease in some case when they had to co-finance part of the training providers cost, currently paid by the government. Another finding indicates that young people face a more difficult transition when labour legislation is stricter for both permanent and temporary contracts. This means that any approach which aims to support young people on the labour market must also take into consideration labour legislation and protection.

Box 3: Measures ensuring smooth transition of young people into the labour market

Austria, together with **Finland**, was one of the first countries to implement a version of the Youth Guarantee, before the European Youth Guarantee was set up. It aims to help young people under the age of 25 years enter the labour market either through employment, apprenticeships or through further education. A central aspect in the programme is *Youth coaching* which supports young people in the school-to-work transition or in getting training or an apprenticeship. Additionally, every young person under 18 that does not find an apprenticeship (Lehrstelle) on the regular labour market has the right to do an apprenticeship in a *public education centre* to receive equivalent vocational training and the chance to do his or her final apprenticeship examination.

A prime example of a measure to facilitate the transition to work is the dual apprenticeship within the **German** educational system. It ensures young people can learn the right skills to enter the labour market by obtaining a first experience while still in formal education. Employers indicate that they see this system as an important way to alleviate shortages, as it provides them with the possibility to guide and train young people for the skills and professions they need (European Commission, 2012f). These apprenticeships are backed by additional measures such as *financial support for apprenticeships (Förderung dualer Ausbildung)* which, to increase the willingness of employers to offer apprenticeships, provides employers with an additional financial incentive to hire certain target groups as apprentices. However it appears the number of candidates for apprenticeships is also falling, indicating that other factors such as the preferences of young people must also be taken into account to ensure continued success.

Other measures are the *MINToring programme* which is a mentoring programme aimed at reducing drop-out rates among STEM students, and the initiative *"Strengthening young people" (Jugend stärken: Junge Wirtschaft macht mit!)* which helps disadvantaged young people to enter the labour market through a form of dual education which has been received well by both participants and employers (Jugend Stärken, 2014).

In **Greece**, which is experiencing shortages in high-skilled technical professions, we can find the *"Classroom Apprenticeship" initiative* from the Ministry of Education. It is available

to graduates of the Vocational Upper Secondary School specialising in technological applications, economy and management, agronomy, food technology and nutrition and finally shipping professions. It includes one year training in the workplace and course attendance, ensuring that participants have the right skills for the labour market and a higher chance of employment (European Commission, 2014c).

Italy, having no quantitative shortages but lacking workers in specific, mainly technical occupations, has implemented several measures such as the project *FIxO "Scuola & Università"* that ran between 2006 and 2012 with ESF-funding. This project aimed to promote employment opportunities for graduates and postgraduates, creating a direct link between the universities, private and public employment services, and employers. It will be discussed in detail in the next chapter.[30]

Several measures on apprenticeships have been implemented inspired by the youth guarantee: A grant is provided to the trainees and financial incentives to employers that recruit at the end of the traineeship. The *AMVA "Apprendistato e mestieri a vocazione artigianale" project* ran from 2011 to 2014 and aimed to promote the access of young people to employment through the promotion of apprenticeships in the handicraft sector and artisanal occupations.

3.2.2. Using international mobility as a solution, but avoiding a brain drain

To resolve labour shortages employers and Member States can look beyond their own borders and recruit the necessary workers from elsewhere. Enhancing the intra-EU and third country mobility to attract workers might be used as a **general solution to a quantitative shortage**, in order to offset a shrinking labour force, or a **targeted solution to qualitative shortages** by bringing in workers with specific skills and occupations. It provides a fast and direct answer to specific shortages, but also creates problems in terms of sustainability. For countries that are sending out more workers than they receive, this mobility provides challenges as they **risk losing a part of their skilled workforce**. Thus the sending countries must take different approaches than receiving countries.

a. Attracting more workers from abroad

Countries that want to attract workers from abroad have several options. **Replacement migration** is an often discussed solution to a declining labour supply– it refers to the international migration that would be needed **to offset declines in the size of the population of working age** as well as the overall aging of the population (United Nations, 2001; IOM, 2012). Immigration is also commonly seen as a quick and efficient solution to labour shortages (European Commission, 2004).

Attracting workers can thus prove advantageous for countries facing shortages, but might be **less advantageous for the EU as a whole**. While regional labour shortages can be reduced or eliminated by fostering mobility between regions or between EU Member States, according to the European Commission (2004), it remains to be seen to what extent intra-EU mobility can offset labour supply shortages, given that all European states face **similar problems of ageing populations**. Therefore, labour immigration from third countries, especially workers with sought-after skills, might be important to consider in the future. However, as a downside, it is noted that the fertility rate of migrants often adapt quickly to the fertility rate of the host country, which suggests that it is not a long-term solution to ageing societies (IOM, 2012).

[30] http://www.italialavoro.it/wps/portal/fixo, accessed 15.12.2014.

There are also **several difficulties when using immigration** – both intra-EU and from third countries – as a solution to labour shortages (IOM, 2012).

Immigration remains an imperfect solution to labour shortages since **immigrant workers are not perfect substitutes** within the same industry, occupation, or skill level (IOM, 2012). According to the European Commission (2012e: 25), the EU is currently **not attracting the kind of immigrants that it needs** the most in light of the existing skills shortages. It is complicated to develop an immigrant selection mechanism that selects the immigrants most desired. Thus, mobility schemes could add more value if they were more narrowly defined. Another problem is that it is often **not possible to alter immigration flows quickly** in order to respond in a timely manner to the shortage (IOM, 2012). Neither is it always easy to **attract immigrants to the specific region** experiencing shortages. Moreover, the credentials of immigrants are not always accepted in the receiving country. Immigration of low-skilled workers **can also have a negative impact on the economic development** of the host country. If cheap immigrant workers are available, this may discourage employers to invest in high quality labour saving technologies and it may thus contribute to labour-intensive and low-cost production methods. If employers can attract relatively cheap high skilled immigrant workers, they may be discouraged to invest in the training of their current workforce, which may result in a replacement of incumbent workers by immigrant workers (OECD, 2010).

b. Targeting skilled workers from abroad

To deal with qualitative labour shortages, especially skills shortages, both employers and EU Member States can use **targeted migration.**

For **employers, recruiting migrant workers is a common strategy** to counter specific shortages for many occupation groups, with the exception of sales workers (European Commission, 2014a). However, attracting other EU nationals is difficult, especially for small enterprises, as they lack the scale and recourses. Especially when these entreprises cannot participate in a larger national or EU programme.

But many **Member States also try to attract more skilled labour**. Cross-border labour mobility allows some countries a better matching of workers' skills with vacancies, and facilitates a general up-skilling (Heinz and Ward-Warmedinger, 2006). **Mobility schemes, however, need to be narrowly defined in order to be efficient**. For example, some experts suggest that in the short term young people should be the main target group of mobility schemes. Some countries recruit immigrants on the basis of their human capital (OECD, 2003). The UK Migration Advisory Committee (MAC) uses quantitative and qualitative data to produce a list of occupations for which immigration could be used. Once these occupations are determined, governments aim to facilitate labour market access for migrant workers with these particular skills (OECD, 2003). The European Commission (2014a) recommends the following to promote mobility within the EU:

- targeted mobility schemes;
- further reduction of barriers to labour mobility;
- advanced policy in the field of labour migration (with emphasis on third country nationals).

In order to attract non EU-nationals Member States can set up various systems. They can loosen the requirements imposed on employers for hiring workers from abroad, introduce employer-sponsored visas or set up point-systems for foreigners requesting entry (with a ranking based on education, work experience, and so forth). However, except for **Ireland** and the **United Kingdom**, conditions of entry and stay of third-country national workers

applying to work in shortage occupations have not been relaxed within the EU (European Commission, 2013b).

For **EU-nationals, most of these restrictions do not apply** as the free movement of workers is an essential feature of the European Union. To attract those workers Member States must focus on awareness and recruitment campaigns, preferably in cooperation with national PES. The EURES network forms an important tool in the cooperation between Member States to achieve fair mobility (European Commission, 2013c). According to Eurofound (2013), the **level of intra-EU mobility is still low**. One barrier to European labour market mobility is the lack of information on job opportunities, and the persistence of obstacles to recognising qualifications attained abroad (CEDEFOP, 2014: 3).

Sending countries can also target skilled workers, but in their case to encourage their return back to the country of origin. Romanian workers in **Italy** and **Spain** without a job have been approached through organising job fairs to stimulate their return to **Romania**.

Box 4: Measures attracting (skilled) workers

Cyprus has lifted restrictions on employers to recruit workers from abroad directly. However, employers must still submit a request to employ foreign workers to fill the bottlenecks. This has currently been restricted due to the effects of the crisis and the rise in local unemployment (European Commission 2014c).

To promote itself **France** has set up a *dedicated English/French website* for attracting highly skilled workers and was amongst the first to implement the *European Blue Card* to facilitate the entry, residence and work of third-country nationals in France, for the purposes of highly qualified employment.[31]

Germany has introduced new regulation for the recognition of foreign qualifications facilitating the employment of foreign labour in Germany. In addition, several partnership agreements were signed with selected EU and non-EU countries in order to raise labour market mobility to Germany. It has also eased the legal regulations in terms of residency rights and employment permits for (potential) skilled workers from outside the EU for both academic and non-academic qualifications. A specific programme set up in 2013 to enhance mobility to Germany is *Mobipro-EU*. It aims to attract young Europeans to Germany to start a training programme or apprenticeship. It will be discussed in the next chapter.

As early as 2007, **Italy** has set-up the programme *International Labour Mobility* (*Mobilità internazionale del lavoro)* which aims to promote high-skilled immigration to Italy, in response to skill needs of employers. It is funded partially through ESF and consists of specific capacity-building actions addressed at employment services and training programmes implemented in third countries.[32]

The Netherlands have introduced several programmes, some temporary, which aim to facilitate migration. The Highly Educated Migrants Scheme (2008) aimed at reducing shortages by allowing companies to hire foreign employees with specific skills or qualifications in a simplified and rapid manner (European Migration Network, 2011).

In order to attract migration for specific skills the **United Kingdom** has set up Tier 2 visas for immigrants as of 2008. Employers can then offer jobs directly to foreign workers if the occupation is listed as a shortage occupation on the official government approved Shortage Occupation List.

[31] http://www.immigration-professionnelle.gouv.fr/en, accessed 14.12.2014

[32] http://www.italialavoro.it, accessed 12.12.2014

c. Avoiding a brain drain from the sending country

Increased migration also signals increased emigration from 'sending' countries. When the emigration concerns skilled workers or even workers within a specific occupational group, this can create serious skills **shortages in the sending country**. Within the EU, especially in eastern and southern European countries, Member States are affected by possible shortages due to the migration of skilled workers to other EU-countries.

Member States facing high emigration rates therefore try to **avoid or mitigate a brain drain**. Either they can try to retain their skilled workers or they can encourage those who have emigrated to return.

- **Retaining skilled workers**: The most effective policy is to devise targeted incentive measures to convince workers to stay by improving salaries and working conditions instead of trying to restrict emigration (OECD, 2012). Already some countries have introduced such retention policies to mitigate a potential brain drain (OECD, 2010).
- **Encouraging return migration**: Member States can also try to encourage the return of skilled workers through information campaigns and improved working conditions. Receiving countries can also play a role in stimulating the return of migrant workers, yet current practices seem mostly directed to stimulate the return of migrants to third countries outside of the EU (European Migration Network, 2011).

A special case of brain drain in Europe is the **situation of healthcare workers**. The demand for health care workers is high throughout the EU and in many countries they are listed among the top bottleneck occupations (EC, 2014a). To retain health workers the European Commission has initiated an 'Action Plan for the EU Health Workforce' (European Commission, 2012a). The plan aims to improve planning and forecasting to match the demand and supply of health professionals better while offering them long-term job prospects and to stimulate exchange on innovative and effective recruitment and retention strategies for health workers. The migration of health-care workers in Southern and Eastern Europe to other, mainly EU-15, Member States can create shortages in the sending countries. This phenomenon cannot be stopped easily as workers will always be attracted by higher wages as long as wage-rates differ greatly between EU-countries (Ramos et al, 2013). Although relative wages of health professionals increased in many countries, the crisis seems to have cancelled part of this effect. (De Ponte, 2014).

Despite the large outflow and the already visible labour shortages in CEE in occupations such as health care, there are currently no policies in place that aim to attract health professionals from third countries (Eurofound, 2013), although several countries are taking other kinds of measures. In **Romania** the government decided to ease regulations on recognising foreign medical qualifications to allow migrant health practitioners to return more easily. A new residential programme implemented in 2014 and better medical equipment could also help (Rusandu, 2013). Romania has also expanded general practitioners' scope of activity and given them more responsibilities in primary care, which could be seen as a coping strategy in response to shortages (WHO, 2011). Health practitioners in **Bulgaria** have also seen their scope of practise enlarged and health workers have been allowed to engage in dual practice, working for multiple employers (WHO, 2011). It is unclear how successful these measures are in reducing the strain of emigration on the health system.

Box 5: Measures to mitigate or avoid a brain drain

In **Bulgaria** the *programme "Start to the career"* was set up to generate opportunities for young unemployed people with secondary or tertiary level education to gain work experience and thus facilitate the transition from education to employment. The initiative is designed to provide job opportunities at home and thus to prevent the loss of young talent looking for opportunities outside Bulgaria, but has so far only reached a limited number of young people (European Commission, 2014c).

France provides a good example of a receiving country taking measures to avoid a brain drain in third countries. In order to encourage circular migration certain migrants must return to their country of origin after six years (European Migration Network, 2011).

As the crisis affected southern European countries harder in terms of unemployment, many skilled workers left to look for opportunities abroad. **Italy** has therefore resorted to giving tax benefits for workers who have spent three or more years abroad and choose to return and remain in Italy for at least five years (OECD, 2013).

A country with a clear net outflow of labour is **Lithuania**. IOM (2015) estimates the emigration rate at 1.9% for the 2010-2015 period. The country had a high outflow of workers, especially in 2010 due to high unemployment during the crisis. In order to safeguard its professional workforce Lithuania implemented several projects to encourage the migrant return. Those included information fairs for emigrants abroad, publications promoting return and information centres (Macdonald, 2010). In 2008 the Lithuanian government also launched the "*Brain return and attraction programme*" which aimed to attract highly-qualified Lithuanian to return and third-country nationals to do research and increase Lithuanian's competitiveness (European Migration Network, 2011). While Lithuania is still a net emigration country, already in 2011 return migration accounted for nearly 90% of entries into the country (OECD, 2013b).

Some countries respond by attracting more workers from other non EU-countries. **Poland** has implemented a *special simplified procedure* to employ workers from Armenia, Belarus, Georgia, Moldavia, Russia and Ukraine. They can work in all sectors for up to 6 months on the request of a Polish employer. There is no labour market test needed as the employer only has to issue a "statement for employment intention" and register this in a labour office.

In **Romania** the government initiated tax breaks and other financial incentives for skilled workers, with focus on the ICT sector. Indications are that these have been successful in keeping talent from going abroad (European Commission, 2014c)

3.2.3. Getting more out of less labour

An alternative approach when facing labour shortages is not to increase the supply of workers, but to **reduce labour demand**. This boils down to finding alternative ways to **maintain or increase the output without the need for additional workers**.

While many Member States provide grants and subsidies to employers in order to stimulate innovation and boost productivity, these measures are not aimed at reducing shortages by reducing labour demand. On the contrary, they are mostly aimed at creating new opportunities for employment. Similarly, increases in working hours are more often motivated by concerns about competitiveness and wage costs than by the need to alleviate shortages.

However, contrary to public authorities, **employers use this approach more often** (see Table 6). As they have far less power to shape the labour market to their needs, it can be

an important coping strategy to counter a lack of (skilled) labour. Productivity, defined as average production per worker, can be increased by:

- Outsourcing in order to specialise and to focus on core activities;
- Resorting to mechanisation or automation of labour-intensive tasks;
- Providing in-company training;
- Increasing the hours worked.

The consequence is, however, that **these strategies do not contribute to a higher employment level or a reduction of unemployment**. Nevertheless, they may strengthen the position of the enterprise in a competitive climate, thus stimulating growth indirectly.

3.2.4. Facilitating transfers between jobs and regions

Shortages in labour can still occur even if there is a balance between the supply and the demand of labour at the national level. Even when enough workers with the right skills are available, vacancies for particular occupations or in particular regions may be difficult to fill due to a lack of mobility of workers. It can be caused by an unwillingness to move to another job in another region or to change from one job to another. Countries faced with these shortages must try to **increase the mobility of their workforce** to promote a better match between jobs openings and the labour force (OECD, 2005). The crucial precondition therefore is the people's willingness to be mobile between jobs and between regions. Policies to increase both geographical and functional mobility should focus on improving institutional frameworks and welfare systems in order to **facilitate transfers between jobs and regions** (Fasang, 2006).

a. Making people more mobile between regions

A first approach focuses on **increasing the geographical mobility within Member States**. Several EU Members States face regional disparities in the labour market leading to regions of high unemployment and other regions with labour shortages. (Eurostat, 2013) As these disparities occur within countries, aspects concerning international mobility such as language barriers or differences in welfare systems and labour regulation are generally not the main factors, although language barriers may play a role in multilingual countries.

A key-element in devising measures to increase the mobility of workers is the **availability of choice to individuals**. Mobility to another region causes costs for individuals who need to commute over a longer distance or have to relocate (Eurofound, 2007). To compensate for these costs, wage differentials can be an important driver for mobility or might discourage it (Zimmer, 2012). Low income and/or low skilled groups often lack the resources to move in order to find employment and risk becoming locked into their region. An important factor in this lock-in are welfare regimes providing social housing and benefits tied to local administrations or municipalities. (Fasang et al, 2006). Home-ownership is also an important barrier to geographical mobility as it may be difficult to sell a house. Moreover, housing costs can vary between regions, which can hinder especially medium to higher income groups to move to another region.

The welfare system needs to be devised in such a manner that social benefits do not prevent the movement of individuals between regions. In addition, the opportunity costs of moving for individuals could be reduced by providing wage subsidies, movement fees and other financial incentives which might foster the individual's willingness to move.

Box 6: Measures to increase geographical mobility

Italy is one of the Member States facing high regional imbalances in employment, especially between the northern and the southern regions and its urban and rural environments. Supported by the ESF, the region of Sardinia implemented the *Master and Back programme* in order to attract workers. As it is a region lacking high skilled graduates, the programme provided scholarships covering university fees and living costs for young Sardinian residents to take part in higher education outside of Sardinia. More importantly afterward they received wage-subsidies to incentivise their return. Several thousand students were awarded scholarships.

Another *programme Sud-Nord-Sud* promoted South-North geographical mobility and therefore the matching of demand and supply of skills across the country. The project aimed at creating a network between PES, employers and job seekers. It was halted when the crisis forced many unemployed to become more mobile in order to find a job.

In **France** many rural communities face shortages of generalist medical practitioners. In the Allier, the *initiative "Operation Wanted"* was set up, offering a fee for graduates establishing themselves in the area (European Commission, 2014c).

b. Making people more mobile between jobs

Improving functional mobility can help in reallocating workers between jobs in different companies or even within the same company. This approach can be facilitated both by employers as Member States.

Employers can use the **skills already present with other workers and jobseekers** to relieve a shortage. This can be achieved by increasing the functional mobility within the company, allowing tasks and responsibilities to be reshuffled or by attracting workers from related occupations who have most, but not all, of the required skills for the vacancy. This is a strategy currently used by employers, especially in science occupations (European Commission, 2014a). From an employer's perspective these changes can yield short term results.

Measures taken by Member States provide a less direct, but no less important way to relieve shortages by reallocating workers between companies. **At Member State level institutional factors may influence the willingness to switch jobs**: the unemployment welfare regime, trade union power, training possibilities and active labour market policies. However, when labour regulation is altered to favour job mobility, it can become an involuntary decision of the worker due to its loss of protection and security and result in the forced mobility of workers. Weaker groups of workers in particular are more affected by this problem (Eurofound, 2007). The OECD (1999) found that stricter employment protection is quite strongly negatively correlated with labour turnover, which means strict employment protection creates more job security and thus less forced job mobility. Ideally, hiring and firing rules should be devised in such a way to prevent lock-in situations where individuals lose when they move to other jobs, but at the same time limit forced mobility. This is not easy as **high levels of forced mobility often go hand in hand with high levels of voluntary mobility** (Eurofound, 2007).

Box 7: Measures to increase functional mobility

Measures to increase functional mobility are closely tied to national labour legislation. **Belgium** abolished its distinction between blue and white collared workers in 2014, removing barriers between occupations. In the region of Flanders, social partners and government set up Flanders Synergy, a platform to stimulate competences and innovation within companies allowing them to rethink their organisation in terms of job design and skill development. While reducing shortages are not an objective, this initiatives allows employers to develop tools to counter organisation problems, including shortages.

3.2.5. Bringing the skills of the labour force in line with the needs of the labour market

A key-element of shortages is the lack of adequate skills in the labour force. A survey by Eurofound (2013) found that 40% of EU companies have trouble finding workers with the right skills. As many Member States do not face quantitative shortages, this means there are sufficient potential candidates, but they do not possess the necessary skills and/or qualifications. This lack of skills indicates qualitative shortages for specific labour market segments, sectors or occupations, where a mismatch occurs on the level of the skills of the potential candidates.

When the necessary skills are not available within the (potential) labour force, activation measures and enhancing job mobility will prove insufficient for alleviating the skills shortages. In the short term, Member States and employers can resort to training measures to **improve the skill level of the current labour force**. In the medium or long term, Member States can focus on the **promotion of education which leads to qualifications needed on the labour market**.

a. (Re)training the current labour force

A direct solution to skills shortages would be to train either the existing employees or the unemployed to allow them to obtain the skills needed on the labour market. One of the important aspects put forward by the OECD Skills Strategy (2012) is the encouragement of people to learn. This means incentives and investments have to be made in education and training. Policies to lift the skills level can focus on life-long learning activities, promoting on-the job training and links between educational institutions and employers. It also requires investments in high quality educational institutions and programmes to ensure the flexible delivery of training programmes.

To use the full potential of the labour supply, training measures must be available for **the employed as well as for the unemployed population**, while ensuring the accessibility of the programs to the low-skilled.

Employers can play a role by **providing their own training programs and cooperating with public authorities**. Belman and Hübler (2014) find that employer driven apprenticeships and training have proven to be successful in preventing skills shortages. Several examples show that employers can implement their own training programs, either individually or collectively, in order to obtain the skilled workers needed.

In **Italy** for example, the social partners have established different funds *("Fondi Paritetici Interprofessionali"*) supporting the development of vocational training of existing staff. Companies can schedule training plans for their employees according to emerging skill needs. Companies in the **Czech Republic** are setting up projects between education and industry in order to align schools' programmes to the skills required by industry. Similarly, in **Slovakia** employers have provided schools with equipment and training facilities for their students or provided apprenticeship opportunities. In **Estonia** certain large ICT

companies set up summer universities to train software developers, testers and analysts with the objective of employing the best ones (European Commission, 2014a).

Box 8: Measures to train the active population in lacking skills or bottleneck occupations

In **Austria** a measure exists which *provides grants for full-time training (Fachkräftestipendium)* for employees and for unemployed for the duration of the training. The grant is meant to support training for professions with skills shortages such as in health and long-term care and in IT. It will be discussed in the next chapter.

In **Belgium**, unemployed persons can receive *income support* when attending training programmes for bottleneck occupations. Individuals choosing to follow an educational programme such as nursing or a technical profession maintain unemployment benefits throughout the training and an additional subsidy provided they take on a job on graduation. Employers can also employ workers trough an *Individual Training Programme (IBO*) which allows them to train the worker to their specific needs reducing mismatches in necessary skills. The worker continues to receive his unemployment benefits, topped up by the employer for the salary, reducing the labour cost. In practice this system is applied with larger scope than only for bottleneck occupations however. In one region in Antwerp, local PES have set up *'Talenthouses'* in cooperation with local sector organisations and educational institutions for the logistical sector, the metal and chemical sector and the construction sector. Based on the PES data and employer's vacancies and requests in each sector, they look for candidates for bottleneck occupations through trainings and campaigns supporting vocational training.

Germany also set up a training programme, *WeGebAU*, to train low-skilled workers and older employees in companies. The focus of the programme is to support SMEs in training and further qualification of their employees. As well as the training of low-skilled workers, the programme tries to improve and update skills of older employees corresponding to the changing needs of the job market.

As of 2013 **France** has set up *professional training centres (Campus des métiers et des formations)* to support the needs of the local labour market through vocational and professional training. They are oriented around a "pole of excellence" in the region. Poles of excellence allow the training offer to be adapted to local needs.[33]

In **Ireland** government and employers have set up *Skillnets* which delivers training to unemployed and current employees according to the employer's needs.[34] This allows the training of workers to obtain the skills otherwise unavailable on the labour market and tailored to the most recent needs of companies. Especially in ICT this has proven an effective way of countering shortages.

In **Italy** *higher technical institutes* were created in 2011 to provide vocational training at the intersection between upper secondary school and university (CEDEFOP, 2011). These institutions work closely with employers and focus on local labour market needs and personalisation of training, for example by making courses accessible to people already in employment.

In **Poland** the regional PES agencies work closely with employers to set up specific training programmes for the unemployed adapted to the needs of employers, including training courses for job candidates that do not fully meet the job requirements (European Commission, 2014c).

[33] http://www.cfmfrance.fr/, accessed 8.12.2014

[34] http://www.skillnets.ie/, accessed 9.12.2014

Malta also experiences shortages in high skilled occupations and has therefore undertaken significant investments in upgrading the infrastructure of postsecondary education by increasing the capacity, the offer and the flexibility of the courses (European Commission, 2014c) especially for ICT and health professions.

In the **United Kingdom** the government financially supported the employer-led initiative of the *Employer Investment Fund (*EIF). The intention is to help address skills shortages and mismatches across all sectors through funding new skills development, training approaches and their supporting infrastructure. Public funding was used to lever in resources from the private sector (employers) through 'matched' contributions in terms of cash and other 'in kind' contributions. The broader rationale was to improve the quality and relevance of training by ensuring greater responsiveness to the demands of employers.

b. Promoting education leading to qualifications needed by the labour market

When insufficient students with the necessary qualifications enter the labour market to meet a rising demand or replace previous cohorts, skills shortages can prove to be persistent. To resolve these shortages Member States must **ensure a higher take up of those studies which lead to the qualifications needed on the labour market**.

This can be achieved by **promoting specific educational programmes** and by **guiding especially young people** towards those studies. As educational programmes tend to have a longer duration than specific training programmes, the effect of these measures is only visible after some time. Therefore, the success of these measures relies on correctly mapping the future skill needs and potential shortages in the labour market. Special attention is needed for measures **promoting gender equality** within certain educational fields. These aim to increase the number of women in technical studies such as ICT or engineering or the number of men in studies related to care and teaching.

A basic precondition to lead more people towards specific educational choices is the existence of sufficient capacity and quality of educational programmes and educational institutions. If these are lacking, measures should also focus on strengthening the institutional capacity and ensuring the quality of educational programmes.

Box 9: Measures to attract individuals to specific educational programmes

In **Austria** the *Frauen in Technik (Women in Technical Occupations*) programme is a good practise project which intends to promote participation of women and interest of female school leavers in technical occupations (European Commission, 2009). As Austria has a relatively tight labour market, the measure addresses the shortage in qualified workers in crafts and mechanical professions. It consists of information seminars followed up by vocational courses. Over 7,300 women followed the programme in 2013 with an employment rate of 81% after 12 months.

Poland has set up various programmes to promote technical occupations. One programme, *"kierunki zamawiane*", aims to increase the number of students in technical courses, especially those which lead to shortage occupations, by granting scholarships. The focus of the programme will be changed in the future to emphasise shortage skills instead of occupations. The programme is discussed in the next chapter. Another programme is *"Girls for Technical Universities" (Dziewczyny na politechniki)* aimed at increasing the number of girls in STEM-education by sparking girls' curiosity in science, technology, engineering and maths. Both are funded through the ESF.

Another method is the approach taken in **Malta** to award stipends to postsecondary students following scientific courses in order to increase the number of students.

3.2.6. Making sectors and occupations more attractive

Even when the right skills and workers are available, some sectors and occupations can experience shortages due to the preferences of individuals who are dissuaded by the image of the sector or the working conditions which are offered.

a. Improving working conditions

In order to resolve such preference mismatch **the attractiveness of these sectors or occupations must be enhanced**. Policies for improving working conditions and wages in the low skilled segment of the labour market are crucial to diminish shortages in this area (European Commission, 2014a).

One solution is to increase starting salaries or improve fringe benefits to attract applicants to hard-to-fill vacancies. Policy-makers should also assess whether more flexible and decentralised tools of pay at enterprise level can contribute to reducing shortages. When employers are incapable of raising wages or providing other benefits because of national labour law or collective agreements, they cannot use these tools to retain or attract workers. This results in higher employee dissatisfaction and labour market turnover among mismatched employees, and can potentially hinder career progression (CEDEFOP, 2012b). Shortages in health care and ICT resulted in better wages and working conditions for health care professionals and programmers in **Malta**, especially through non-salary benefits.

b. Improving the image of jobs and sectors

Furthermore, employers can partly reduce shortages through **reputation building**. Backes-Gellner and Tuor (2010) showed that a sample of German employers that advertised their commitment to training, the skill-intensity of the workplace and the presence of a good working environment to potential employees significantly reduced their vacancy rates. It is also important to promote gender neutrality of occupations (European Commission, 2014a). Awareness-raising campaigns to attract employees to particular sectors can be considered a viable strategy to alleviate the lack of interest for these occupations. In many countries employers resort to public campaigns, sometimes gender oriented. In **Sweden** the IT and telecommunications sector has awareness-raising campaigns in schools. Mentoring programmes have also been set up to find (and keep) female managers. In **Norway**, employer organisations are also trying to attract young people, starting in secondary school, to vocational education by showing possible career paths and improving the image of the jobs. In the **Netherlands** women re-entering the labour market are targeted by image and recruitment campaigns to enter the health care sector. Something similar can be seen in **Finland**, where campaigns and websites are launched to attract men to health care occupations (European Commission, 2014c).

Box 10: Measures making work in these sectors or occupations more attractive

In **Belgium** a measure to provide *income support (IGU)* is provided to part-time workers with low wages, under the condition that the worker is available for full time work. While designed as a measure to avoid wage traps, it has proven to be effective in activities where strong (international) competition diminishes the possibilities to increase wages such as low-service jobs (logistics, cleaning). This makes it possible to attract workers who would otherwise not be available causing shortages for low-desired jobs.

In **Cyprus** the government has conducted several *campaigns* to improve the image of technical occupations, both to increase the number of students in the technical secondary education and to increase the number of people taking up these technical occupations such as electrical technicians.

Finland focused on improving the working conditions in health care. Two good examples are the *KASTE and HYVÄ programmes*, which aim at improving working conditions and welfare of workers, the attractiveness of care work and the quality and productivity of health care, while ensuring the ready supply of workforce (European Commission, 2014c).

Germany has problems attracting workers to take up care professions. Therefore the federal and state governments and concerned associations in the care sector made a pact to improve working conditions. The pact also led to regional service points offering consulting services for personal care workers and health care schools (European Commission, 2014c).

3.2.7. Making the labour market more transparent for all actors

A final approach to labour shortages is addressing the problem of **information mismatch**. Increased transparency of the labour market will make it easier for each actor (employers, jobseekers and government) to take the right decisions. This can be done by providing qualification frameworks, developing forecasting tools and ensuring high quality matching services.

a. Developing qualification and skill frameworks

In order to improve the flow of information, it is important to guarantee that qualification and skill profiles are well understood by employers, and that job vacancies are advertised in a way that meets potential labour supply. **National qualification frameworks** are one way to improve the transparency of qualifications for employers and job-seekers and to enhance their comparability at the national and the international level (CEDEFOP, 2013d). Schemes for the **validation of prior formal or informal learning** through reliable methods of assessment and certification are additional instruments to address shortages due to information mismatch.

At European level this transparency can be augmented by **linking the national qualification frameworks to the European qualification framework**. It provides a common way of understanding and scaling qualifications and facilitates labour mobility within the EU. At the European level, ESCO, the European classification of Skills, Competences, Qualifications and Occupations is a multilingual classification that adopts a standard terminology in 25 European languages to categorise skills, competences, qualifications and occupations that are deemed relevant for the EU labour market and European education and training systems.

b. Developing labour market forecasting tools

To alleviate future shortages in the medium to long term, **information on future needs** and potential shortages in the labour market is essential. By gathering data on skill demands through forecasting and case studies, combined with data on educational outflow and demographic changes, potential shortages can be discovered early on, allowing both employers and jobseekers to anticipate these changes and allowing government to take supporting measures. Despite the importance of forecasting for anticipating future staffing requirements, results from the third European continuing vocational training survey (CVTS3) indicate that only 26% of surveyed establishments regularly assess their future skill needs. However, forecasting is not infallible and should always be used cautiously, focussing on main trends. The first CEDEFOP forecast of 2007 for example provides interesting trends, but its estimates have been completely negated by the financial and economic crisis which started shortly afterwards.

c. Ensuring high quality guidance services

An information mismatch could also be resolved by developing **high quality career guidance and counselling activities,** to help people make well-informed choices about the segment of the labour market for which they intend to qualify (OECD, 2012). Both employers and jobseekers need to be provided with correct information about the opportunities on the labour market. Employers should be guided in drafting their vacancies to focus solely on the skills and qualifications they need. Jobseekers should receive correct information of their chances on the labour market with their current skills and qualifications and, if necessary, receive help to obtain other skills through additional training.

Box 11: Measures to make the labour market more transparent

Throughout the EU, Member States PES and other institutions play an important role in making the labour market more transparent for both employers and jobseekers, yet they differ in the tools they have available to fulfil their role.

A large number of Member States compile shortage lists to determine labour market needs in specific sectors (**Austria, Finland, France, Germany, Ireland, Lithuania, Malta, Poland, Spain, Sweden and United Kingdom**). These shortage lists are compiled on the basis of information of regional or national authorities, specific policy boards or committees or through discussions with employers. In each of these Member States except Sweden, these lists are used to determine whether an employer may recruit a third-country national to a particular vacancy. This only applies when no suitable national or EU candidate can be found (European Commission, 2013b).

In **Denmark**, the government and municipalities have undertaken significant work in analysing how the skills needed in the labour market are likely to develop. This information is made available to young people by a dedicated website, so students can take this information into account when choosing their education.

In **France**, vocational platforms (*Plateformes de vocation (PFV)*) have been set up to identify capacities of low-skilled young people (16 to 25 years old) compared to the skills needed in the labour market. The focus of the platforms lies on young people with low qualifications and who have been unemployed for at least 10 months in the last year and a half. The PFV use the *Méthode de Recrutement par Simulation* (MRS), which investigates their actual skills instead of their qualifications. This recruitment method is based on transferable competences and aims to provide employment for those young people in sectors such as industry, transport, construction, household services… depending on the shortages encountered. (European Commission, 2014a).

A second tool used in France is the *national survey on employment needs (Enquête besoins*

en main d'œuvre). It is conducted each year by the National Employment agency to identify labour shortages, by sector and by region, resulting in a list of bottleneck occupations.

A final French example is the *Répertoire National des Certifications Professionnelles* which provides individuals and enterprises with a permanently updated list of professional qualifications. New professional training can be certified to be added to the repertoire. It aims at increasing the transparency on training by branch of activities, supporting human resource management, mobility of workers and the access to employment as employers can compare qualifications and look for comparable profiles (European Commission, 2014c).

In **Italy** the *POLARIS-network* is a specialised desk network for students, schools, universities and enterprises for the online management of all information related to education. The portal serves as a contact point, platform for exchange and 'virtual market place' allowing for all partners to better understand the available profiles and jobs availabilities (European Commission, 2014c).

3.3. How does the EU contribute to reducing shortages?

The EU **contributes substantially** in a number of domains to allow both Member States and employers to counter shortages effectively.

- Activation of workers is supported through use of the **EU structural funds** such as the European Social Fund and the European Globalisation Adjustment Fund. This is complemented by **initiatives focussing on young people**, supporting their activation and especially the school to work transition, such as the *European Youth Guarantee*.
- Intra-EU mobility is strongly supported by the EU's efforts to **reduce barriers to mobility** by stimulating convergence and transferability of national regulations and labour laws and by setting up **targeted mobility schemes** such as the EURES network and *Your first EURES job*.
- Member States experiencing skill mismatches are supported through **EU skill strategies** and by the **European Social Fund**, which provides a **framework and funding for skill policies and training**.
- Through **EU labour law,** several non-wage areas of working conditions are regulated at EU level, ensuring adequate working conditions and providing a level playing field for the attractiveness of jobs.
- **Labour market transparency is supported through monitoring tools** such as, for example, the European Vacancy monitor and the EU Skills Panorama, and by the introduction of **frameworks for qualifications and skills** throughout the EU such as the European Qualifications Network (EQF).

3.3.1. Supporting the activation of (skilled) workers within Member States

Currently the European labour market does not experience quantitative labour shortages. However, to resolve qualitative shortages at Member State and regional level, an essential strategy is to bring and retain enough workers with the right skills into the labour market. This is also in line with the EU2020 strategy to reach an employment rate of 75% throughout the EU.[35]

The EU plays an active role in supporting policies and measures to activate target groups in the labour market, the retention of older workers and facilitating the transition between school and work. The Parliament specifically supports such measures, urging the Council and the Commission to take further action.[36]

[35] Communication from the Commission Europe 2020 – A strategy for smart, sustainable and inclusive growth, COM (2010) 2020 of 3 March 2010; European Council Conclusions of 17 June 2010.

[36] Demonstrated by following resolutions:

- European Parliament resolution of 18 May 2010 on 'An EU Strategy for Youth –Investing and Empowering' (P7_TA(2010)0166)
- European Parliament resolution of 16 June 2010 on EU 2020 (P7_TA(2010)0223)
- European Parliament resolution of 6 July 2010 on promoting youth access to the labour market, strengthening trainee, internship and apprenticeship status (P7_TA(2010)0262)
- European Parliament resolution of 7 September 2010 on the role of women in an ageing society (P7_TA(2010)0306)

a. Using the structural funds

The EU supports the Member States in their activation policies by **providing an EU wide framework to coordinate their actions and by providing EU funding**. The *European Social Fund* provides an important source of funding to develop new initiatives and measures to counter shortages such as the activation of target groups, the transition of young people, and training both the employed and unemployed population. In Member States experiencing shortages, these are often targeted to develop the necessary skills, with a focus on vocational training. These measures also focus on gender balances by training men for health and care professions, while training women in technical occupations (ESF, 2015). For the new programming period 2014-2020 the objectives are

- Getting people into jobs by supporting training and entrepreneurship. Helping young people enter the labour market will be a top priority for the ESF in all EU countries;
- Social inclusion through providing employment opportunities;
- Improve education and training, ensuring young people complete their education and get the necessary skills.
- Improve the quality of public administration and governance.

Specific funds such as the *European Globalisation Adjustment Fund* also contribute by retaining workers on the labour market and ensuring their skills are not lost.

b. Setting up specific initiatives for young people

As many young people have become unemployed or lack opportunities on the European labour market after the crisis, the EU has defined **young people as a priority** in several measures over the last years. Some measures focus on **facilitating the transition from school to work**, thus reducing youth unemployment, while others focus on **labour market participation in general**.

The flagship initiative *Youth on the Move*[37] was complemented by the "*Youth Opportunities Initiative" (YEI)*[38] in 2011 which called for a stronger partnership between the Commission and national governments, particularly in countries with the highest youth unemployment rates. This included using EUR 30 billion of ESF funds not yet allocated to projects in 2007-2013 for youth initiatives and the launch of a preparatory action on the Youth Guarantee. The Youth Opportunities Initiative also supported transitions by boosting the mobility of young people through the **preparatory action for "Y*our first EURES job"***.

In 2012 the Commission rolled out the *Youth Employment Package*[39].The package contained several measures, including a proposal for a **Recommendation to Member States on introducing the Youth Guarantee** as requested by the European Council and the European Parliament:

- Foremost, the **Youth Guarantee**[40] stands out. The Commission proposed a Council Recommendation on Establishing a Youth Guarantee which aims to assist young people to make the transition between school and work by ensuring that, within 4 months of leaving school or losing a job, under-25s receive a quality offer of employment, continuing education, an apprenticeship or traineeship;
- The package also contains measures to ensure that traineeships offer high-quality work experience under safe conditions, such as a consultation on the development

[37] Communication from the Youth on the Move COM (2010)477 of 15 September 2010
[38] Communication from the Youth opportunities Initiative COM (2011)933 of 20 December 2011
[39] Communication from the Commission Towards a job-rich recovery COM (2012)173 of 18 April 2012
[40] Council recommendation of 22 April 2013 on establishing a Youth Guarantee

of a quality framework on apprenticeships. In order to stimulate the quality and supply of apprenticeships, the EU has also set up **a partnership with the European Alliance for Apprenticeships**;

- The package also further develops the initiative of *Your first EURES job* to give young people more opportunities to train and work abroad.

The Employment package was followed by the *Youth Employment Initiative* (2013)[41], containing several measures aimed at providing better opportunities for young people to enter the labour market. The Youth Employment Initiative, proposed by the European Council on 8 February 2013, provided EUR 6.4 billion **additional funds for regions with youth unemployment** above 25%.

Box 12: The role of the European Youth Guarantee in reducing shortages

Based on successful approaches to youth unemployment in several Member States, specifically in **Austria** and **Finland**, the European Commission proposed the adoption of the EU-wide *Youth Guarantee* in 2012. The Youth Guarantee should ensure that young people under 25 can either find a good-quality job or an apprenticeship, traineeship or continued education within four months of leaving school or becoming unemployed. Special focus is placed on reaching young NEET who are not registered into national data and strengthening the capacity of PES to reach young people and provide adequate matching. The Youth Guarantee Recommendation was formally adopted by the Council on 22 April 2013.

An important aspect of the *Youth Guarantee* is its structural component which aims at facilitating the school-to-work transitions. In order to find a place on the labour market young people must receive the necessary education, skills and experience. If left in unemployment or even inactivity, the scarring effects of unemployment would not only damage the future prospects of the individual person, but also the potential future contribution to society. Viewed through a perspective of labour and skills shortages, leaving a young generation in unemployment and inactivity would contribute to a rising skill mismatch, causing further shortages in the future. If not addressed early on, youth unemployment may turn into structural unemployment, depriving the labour market of the skilled workers it needs (European Commission, 2012g).

As such the *Youth Guarantee* is both an investment in the activation of young people as in providing them with either basic or more advanced skills and an important tool to reduce both current and future labour and skills shortages by ensuring the availability of labour with the adequate skills. This is done by providing guidance, training and work experience to young people, but also by setting up partnerships with education institutions, training providers and other actors working with young people. The latter to ensure that education, training and guidance for young people incorporates labour market needs in the programmes.

While the *European Youth Guarantee* provides the overall framework, Member States had to submit their Youth Guarantee Implementation Plans adapted to their national or regional context. These have been reviewed by the Commission and provided with country specific recommendations and are being implemented in all Member States. The focus of each plan depends on the national context, but demand driven training towards skills needs on the labour market can be seen in for example **Ireland**. In several countries such as Finland, supply driven training for basic skills and advanced qualification are included.

The ILO (2012) estimated the total yearly cost for implementing the Youth Guarantee at

[41] Communication from the Commission Youth Employment Initiative COM (2013)144 of 12 March 2013

EUR 21 billion or 0.22% of European GDP. Funding must come from the Member States, who should prioritise youth employment in their national budgets. The European Commission will provide matching funding for the National Youth Guarantee plans through allocations from the EUR 86 billion budget of the European Social Fund for 2014-2020. Regions with youth unemployment above 25% can receive additional support through the Youth Employment Initiative for which the Commission has also dedicated EUR 6.4 billion, which means 20 Member States are eligible for YEI funding. The funding comprises EUR 3.2 billion from a specific new EU budget line dedicated to youth employment matched by at least EUR 3.2 billion from the European Social Fund national allocations.

Prior to the Council recommendation, the European Parliament has asked the Commission to implement a preparatory action to support the setting-up of pilot Youth Guarantee (YG) in the 2012 budget. In its report on the first findings of the Youth Guarantee preparatory action the European Commission (2014g) finds that the implementation of the Youth Guarantee drives on finding the right partnerships between PES, educational institutions and social partners.

It is not possible yet to determine the exact impact of the *Youth Guarantee* or its impact on shortages within Member States as the measure and its monitoring framework are only now being established. A first pilot on data collection within the Indicator Framework for monitoring the Youth Guarantee has been launched at the end of 2014 with the intention to start annual data collection of administrative data by 2015 (EMCO,2014).

However, the Commission (2015) provides some indications in its communications that the *Youth Guarantee* is providing concrete and positive results in several Member States both in terms of structural reforms and effects on youth unemployment with the example of the Brussels Region in **Belgium**.

3.3.2. Enabling intra-EU and cross-border mobility

One of the pillars of the EU is the **free movement of workers**. EU citizens have the right to free movement and residence, the right to work in another Member State, with in addition the rights of entry and residence for family members. The European Commission and the Parliament have made it their goal to **increase the mobility of workers throughout the EU**.

All of the initiatives taken to foster this mobility aim to **lower the barriers between Member States** and allow the European labour market to function more coherently, thus reducing shortages caused by European imbalances in labour and skills. Some initiatives explicitly aim to reduce shortages in Member States through intra-EU mobility.

Past European initiatives which were significant in reducing barriers to mobility include the directive on recognising qualifications across borders, the introduction of a European health insurance card and a directive on cross-border healthcare and the coordination of social security schemes. Both the Commission and the Parliament continue to promote and facilitate mobility through the *Agenda for New Skills and Jobs*[42] and the flagship initiative '*Youth on the move'*. The Parliament explicitly adopted a resolution on promoting workers mobility in 2011.[43]

The Commission has also taken an **active role in promoting workers' mobility by setting up direct mobility schemes or support systems**. As of 2014, the Erasmus+

[42] Communication from the Commission An Agenda for new skills and jobs: A European contribution towards full employment COM (2010)682 of 23 November 2010

[43] European Parliament resolution of 25 October 2011 on promoting workers' mobility within the European Union (P7-TA(2011)0455)

programme allows internships and traineeships for vocational students in other Member States. The Commission also supports the *EURES network* between PES from Member States and EEA members. EURES supports the Job Mobility portal making profiles of jobseekers and vacancies available. Within the EURES network PES also collaborate to receive or send out workers. While EURES advisers support workers in their mobility across the EU, most PES focus on using intra-EU mobility to attract workers capable of filling shortage occupations in their national labour markets. Based on the EURES network a preparatory action was launched by the Commission on request of the Parliament, *Your first EURES job (yfEj)*, enabling the mobility of young people.

Box 13: Reducing shortages through Your First EURES Job

Within the EURES network the participating national PES provide information, advice and recruitment/placement services to promote intra-EU mobility of workers. Based on these experiences with the EURES network and confronted with high youth unemployment throughout Europe, the Commission proposed the development of *Your first EURES job* as part of the measures introduced in the Youth Opportunities Initiative and the Youth Employment Package. The preparatory action for *Your first EURES job* was launched through pilot projects set up between 2011 and 2013 to support intra-EU mobility of young workers.

The new action aimed at providing an answer to the simultaneous existence of high levels of youth unemployment and vacancies that are hard to fill with domestic jobseekers across the EU. It also coincides with the reform of EURES into a network focused on employment results. While the action was managed by the European Commission's unit on EURES, non-EURES members such as regional and private employment services could also participate.

The action is a test of a 'Targeted Mobility Scheme' for young people, allowing young people under 30 to gather experience by filling in available vacancies abroad. It is clear from the aims of the action that *Your first EURES job* can be catalogued as a measure to reduce shortages by targeted migration. The action was delivered through a set of projects for which three calls of proposals were launched, providing support to PES and financial incentives to participants. The Commission earmarked EUR 12 million for the period 2011-2014 with a target of 5,000 placements of young people by 2015. In total 15 projects were selected.

The evaluation report of first projects of the preparatory action (European Commission, 2014h) states that all stakeholders involved agree that EU schemes like *Your first EURES job* are necessary because quite a few EU Member States are confronted with similar sector shortages and that a labour mobility scheme can partially provide a solution to fill bottleneck vacancies at SMEs in particular. The evaluation also deems the action to be very relevant as it remedies existing needs of both young jobseekers and employers with (bottleneck) vacancies by matching labour supply and demand. The action also provides a relevant service package to reduce the obstacles to first time labour market entry and thereby facilitating the transition from education to work.

In terms of filling in bottleneck vacancies the results depend on the project within the national labour market context. Beneficiaries are not obliged to fill bottleneck vacancies only. Each project has a different approach to recruitment, matching and placement services. Only in **Italy** and **Germany** searching appropriate people for specific (bottleneck) vacancies was the main approach, as other beneficiaries find that supporting jobseekers to take up work in a different EU Member State has priority over the filling of bottleneck vacancies. The project with the German PES strived explicitly to fill (bottleneck) vacancies in Germany with young people from abroad and to reduce the labour shortages in the country. Another obstacle in the aim of the programme to fill bottlenecks is the age of the

participants (18-30) as bottleneck vacancies often require a certain level of experience among candidates that cannot be expected among the current target group (European Commission, 2014h).

According to the latest progress summary (European Commission, 2014i) all projects together achieved 64% of the *Your first EURES job* overall target representing an expenditure of around EUR 5.2 million for the third quarter of 2014 with an average cost per placement of approximately EUR 1,650 so far. In terms of occupations service workers and shop and market sales workers (ISCO 1D-08) proved the most popular occupational group. Manual and lower skilled occupations remain a significant share of all vacancies filled. The top 3 sectors (NACE) in terms of placements are Information and Communication, Administrative and Support Service Activities and Human Health and Social Work Activities.

Based on the evaluation of the '*Your first EURES job*' preparatory action, the initiative seems to be successful so far. One option is to continue it in its present form, rolled out across Member States. Another would be to integrate it fully in the EURES network, while a final option would be to design and promote it as a new standalone programme (European Commission, 2014h).

3.3.3. Putting skills at the top of the agenda

Ensuring the **availability of the right skills is a major concern of the European Commission and the Parliament**, and was therefore put forward into the overall European Strategies. The *Agenda for new Skills and Jobs* set up in 2010 forms a fundamental part of the overall *EU2020* strategy launched by the Commission. The agenda follows up on the *New Skills for New jobs* initiative (2008)[44] where the EU developed skills classification, needs and forecasts. However, these initiatives are classified as measures increasing the transparency of the labour market, as they help reducing the information mismatch between employers, jobseekers and PES. The European Parliament has adopted several resolutions to urge both the Commission as well as the Member States to take action and invest in these areas.[45]

The EU plays an important role in the **re-skilling and upskilling of workers, especially through the *European Social Fund***. Through the priorities of the ESF activities, Member States are encouraged to invest in the adaptability of workers, vocational education and life-long learning. Many initiatives to reduce shortages concerning the transition of school to work, reskilling or guiding people towards specific educational programmes are co-funded through the ESF programme.

Moreover, several **European initiatives have been launched to encourage taking up certain studies.** For example, inGenious is the European Coordinating Body in Science, Technology, Engineering and Maths (STEM) education, one of the largest projects in science

[44] Communication from the Commission New skills for new jobs: Anticipating and matching labour market and skills need COM (2008)868 of 16 December 2008

[45] See Resolutions :

- European Parliament resolution of 18 May 2010 on key competences for a changing world: implementation of the Education and Training 2010 work programme (P7-TA(2010))
- European Parliament resolution of 6 July 2010 on the contribution of EU regional policy towards fighting the financial and economic crisis, with a special reference to Objective 2 (P7-TA(2010)0255)
- European Parliament legislative resolution of 8 September 2010 on the proposal for a Council decision on guidelines for the employment policies of the Member States: Part II of the Europe 2020 Integrated Guidelines (P7_TA(2010)0309)
- European Parliament resolution of 26 October 2011 on the Agenda for New Skills and Jobs (P7-TA(2011)0466)

education undertaken in Europe. It brings teachers and industry together to ensure STEM education is both up-to-date and relevant to the job skills young people need, and to increase young pupils' interest in science education and career options by exposing them to real-life applications of science in class.

3.3.4. Ensuring adequate working conditions throughout the EU

The actual working conditions in the Member States are subject to social bargaining between the social partners. However, EU labour law regulates non-wage areas of working conditions. By **creating a level playing** field, the EU diminishes competition between Member States on working conditions and provides a minimum threshold for different sectors.

While Member States are free to set their own standards in labour law and working conditions, the EU complements policy initiatives taken by individual EU countries by setting **minimum standards,** especially in regards to **employment and working conditions**, such as (sectoral) working time, part-time and fixed-term work and health and safety at work. The Commission checks that EU directives are incorporated into national law and ensures through systematic monitoring that the rules are correctly implemented.

Additionally both the Commission and the European Parliament **support the European social dialogue**, between the two sides of industry (employers and workers). At European level this can take place at cross-industry level and within sectoral social dialogue committees. In some cases, financial support is given to transnational projects carried out by social partners through the social dialogue budget lines.

3.3.5. Increasing transparency in the European labour market

An important and large role of the EU is to provide more transparency in the European labour market for all actors involved: employers, jobseekers and governments. European institutions and agencies have a number of tools which map the European labour market, which in turn can be used to detect and counter shortages. While these initiatives are not set up as tools to counter shortages per se, they are essential to provide adequate information at European level.

The first tools to mention are the Commission's **tools to monitor the job market** such as the *European Vacancy Monitor* and the *European Vacancy and Recruitment report*, with in addition the *Eurostat LFS* data on the evolutions in the labour market.

To detect and anticipate the future skill needs, the European Centre for the Development of Vocational Training (CEDEFOP) provides **skills forecasting tools**. The Commission also set up the *EU skills Panorama*, which maps trends for sectors, occupations and jobs in all EU Member States. In the future the *European Sector Skills Councils,* set up with support from the Commission following the Agenda for New Skills and Jobs (2014), will further contribute to mapping out the skills needs in the European sectors.

A third set of tools concerns the **frameworks and classifications set up by the European Commission** which allow jobseekers and employers to exchange information more efficiently: e.g. (i) the *ESCO-classification* which identifies and categorises skills, competences, qualifications and occupations in a standard way, and (ii) the *European Qualifications Network (EQF)* which makes national qualifications more readable across Europe. The European Credit System for Vocational Education (ECVET) promotes geographical mobility by helping validate, recognise and accumulate work-related skills and knowledge during a stay in another country, so that the experiences abroad would count as vocational qualifications (European Commission, 2012).

Eurofound's *European Monitoring Centre on Change (EMCC)* tracks changes in labour markets, particularly changes due to restructuring. It aims to help policymakers monitor, anticipate and manage change. The *European Restructuring Monitor (ERM)* is a tool to track major restructuring events and enable analysis of shifts in the employment structure across Member States and sectors. The ERM can be used to identify patterns of skill upgrading or of polarisation with regard to both wage and non-wage attributes.

4. LESSONS FROM GOOD PRACTICES TO COUNTER SHORTAGES

KEY FINDINGS

- Several Member States have developed good practices to alleviate their labour shortages. **Italy** and **Germany** focus on young people by providing better matching services or by attracting young students from other Member States. In **Ireland** and the **UK**, employer-led initiatives were developed to counter shortages, allowing them to respond to specific local needs. **Austria** and **Poland** deal with shortages by guiding respectively (un)employed and students towards specific technical training and educational programmes.
- The Italian programme builds a **more durable matching system** which can be applied in countries with weak transitions of young people into the labour market. It is suited to counter **the presence of skills mismatches and high unemployment** such as in the Italian labour market. Using **mobility to attract young people is better suited to tight labour markets** as in **Germany**. The focus on apprenticeships is tied to the German dual education system, but **the principles can be used elsewhere.** However, the German measure *MobiPro* shows **mobility schemes need supportive measures** reducing barriers to mobility.
- The Irish and **UK** examples of *Skillnets* and the *Employer Investment Fund* show that integration within a larger policy framework makes **measures more durable**, which in turn convinces employers to participate. Allowing employers to develop an appropriate response to skill shortages, backed by government funding, can be an example for other Member States, especially to **counter shortages at employer level in a flexible manner**. However, they can be most useful for Member States with weak links between government and employers. Using **project funding** as in the **UK** can help in **targeting shortages effectively.**
- Member States willing to implement measures to influence educational choices as in **Austria** and **Poland** must take the **time-lag between the measure and its result** into account, by also **estimating future shortages**. Implementation should always **involve educational institutions,** including a review of the **quality of education.** However, the **grant system itself is easily transferable** to other Member States and can be more successful now in times of high unemployment.
- The case studies provide overall lessons for the design of shortage measures. Measures to counter shortages should be **adaptable to the labour market** either by an employer based approach as in the **UK** or **Ireland**, or by the possibility to revise goals and tools on a regular basis as is the case in **Italy, Poland, Austria and Germany**. The **involvement of all relevant stakeholders** is also essential as top-down public initiatives may lack feeling with local factors as was proven in the first design of *MobiPro*. However, to adapt a measure correctly, **continued monitoring and follow-up** must be ensured to provide the necessary feedback for revision as shown in the example of *Skillnets* in **Ireland.**

4.1. What are examples of good practices to counter shortages?

Several Member States have **developed good practices** to counter their particular shortages. We discuss six good practices selected by exerts, grouped into three categories:

- Measures in **Italy** and **Germany** focus on **activating young people** by providing better matching through guidance and apprenticeships in the Italian case, or by attracting young students from other Member States to fill apprenticeships in the German case.
- In **Ireland** and the **UK**, skills shortages are mitigated by **employer-led initiatives**. These initiatives use training or related tools to formulate a response adapted to the employer's or sectoral need.
- The final category concerns measures **influencing educational choices**. **Austria** and **Poland** deal with shortages by guiding respectively the (un)employed and students towards specific technical training and education.

An overview of six measures is provided in the table below, structured according to the typology put forward in the previous chapter, together with their budget and the shortage they are designed to counter. The examples focus strongly on measures aimed at reducing skills shortages through training or education. The full case studies are included in Annex 2.[46]

Within the six measures, we distinguish three main categories:

- The first category includes the measures aimed at **activating young people**, especially by facilitating the transition from school to work. In **Italy** this is realised by matching young people to the employer's needs through better guidance and the provision of internships, while in **Germany** the measure aims to attract and train young people from abroad. Both these measures focus on young people as a target group and help countering shortages on a short term basis.
- The second category focuses on **employer-led initiatives** to counter shortages. In **Ireland** and the **UK**, measures were designed which allow a flexible response to employer's training needs. It enables employers to train their workers, but also the unemployed, in the skills needed on the labour market. These measures are also effective to respond to relative short-term needs.
- A final category looks at measures influencing **educational choices**. In **Austria** and **Poland**, we see a focus on formal education. In **Austria**, employees are targeted to change their career by following educational programmes, mainly technical, leading to qualifications necessary to fill shortage occupations. In **Poland**, young people are encouraged to take up technical studies as well, by providing scholarships to students with high grades and by improving the educational programmes. As formal education takes a longer period to complete, the effect on shortages is less immediate than for other measures.

For each category these measures are analysed according to how they are adapted to the national labour market context and policy framework, followed by an evaluation of their results and their transferability.

[46] The measures selected are all designed to counter shortages and were selected by national experts, based on their results and transferability.

Table 8: Six good practises to counter shortages

Typology	Country	Measure	Budget	Shortage rationale
Increase participation through school-to work transition	Italy	*FixO Scuola & Università*	EUR 53 million (2006-2014)	Employers in Italy have difficulty finding skilled young people, while youth unemployment remains higher than the EU average. The programme aims to generally uplift their skills on the one hand and to create a better match between the education system and the labour demand through apprentice and traineeships, career services, and financial incentives to employers to hire students
Increase intra-EU mobility by attracting skilled workers	Germany	*MobiPro*	EUR 550 million (2013-2018)	Germany experiences skills shortages in technical occupations and healthcare occupations. The programme tries to remedy these by attracting young people from abroad to complete vocational education in Germany and take up shortage occupations, thus also reducing youth unemployment in the EU.
Change the skill level by providing training	Austria	Skilled Workers Grant - *Fachkräftestipendium*	EUR 50 million (2013-2014)	Austria experiences shortages for specific, mainly technical, occupations. A grant system was set up, providing income support for beneficiaries in fulltime training for shortage occupations.
Change the skill level by providing training	Ireland	Skill nets	Approx. EUR 35 million (2009-2014)	The measure was designed to allow employers to respond to skill needs suited to their requirements through sector based training programmes.
Change the skill level by providing training	United Kingdom	*Employer Investment Fund (*EIF)	EUR 80 million (2011-2014)	The *EIF* is set up as an investment fund, levering private investments from companies by matching their contributions with public funding. The *EIF* finances company projects in which employers try to respond to skills shortages and mismatches through training and related approaches. It is therefore not designed for one specific shortage, but adaptable to the employer's needs.
Change the skill level by making education more attractive	Poland	Programme to increase inflow in education for shortage occupations (*kierunki zamawiane*)	PLN 1.1 Billion (2008-2013)	Poland had a lack of engineers and is facing a growing shortage. The programme set up through ESF allowed scholarships for students in mathematics, natural and technical science, other initiatives to make these subjects more attractive, supplementary courses to enhance competences and increase success rates, and initiatives to improve the quality of the study programmes.

4.2. How to reduce shortages by activating young people?

Both **Italy** and **Germany** have implemented measures to counter shortages aimed at young people to support their transition from school into employment. *Fixo Scula & Universita* in **Italy strengthens the institutional capacity of educational institutions** to match young people with vacancies and employers, including **offering apprenticeships**. *MobiPro* **attracts abroad candidates for German apprenticeships**.

Other Member States can draw lessons from their experience. The Italian programme builds a **more durable matching system** which can be applied in countries with weak transitions of young people into the labour market. It is suited to counter **the presence of skills mismatches and high unemployment** such as in the Italian labour market. Using **mobility to attract young people is better suited to tight labour markets** as in **Germany**. The focus on apprenticeships is tied to the German dual education system, but **the principles can be used elsewhere.** However, the German measure *MobiPro* shows **mobility schemes need supportive measures** reducing barriers to mobility.

To counter shortages, Member States can facilitate the transition of young people into employment. A common tool to ensure a successful transition is the use of apprenticeships which allow young people to gain experience and useful skills. Both **Italy** and **Germany** have implemented measures which incorporate parts of this approach in order to alleviate shortages on their labour markets.

4.2.1. Designing measures within the national labour market context

The situation on the Italian and German labour market is markedly different. **Italy** was already confronted with a skill mismatch before the crisis. After the crisis this was exacerbated through **rising unemployment**, especially among young people for whom the unemployment rate attained 44.5% in 2014. At the same time, almost a third of employers report having difficulties in finding the right skills in the labour market, indicating a **mismatch between employer's needs and the skills of graduates** on the labour market. Specific bottlenecks for skilled technical workers and ICT professions occur, but the overall mismatch is much broader. Especially the lack of technical and specific medium-high skills reduces the probability of young people accessing the labour market. Even with high unemployment disparities throughout the country, the mismatch is a national problem.

By contrast, the German labour market is **characterised by low unemployment rates and a relatively 'tight' labour market**, in spite of the crisis. Shortages are therefore more specific. There is a lack of skilled workers in technical occupations and health and long-term care occupations. Interestingly, this shortage is already visible in the educational system. **Germany** is characterised by its dual educational system that combines vocational training and formal education. This has proven to be an efficient way to prepare the entry of young people in the labour market. However, due to the increasing importance of higher education, many young people in **Germany** seek a university degree. As a consequence and due to low fertility rates in **Germany**, the number of **young people starting initial vocational training, including apprenticeships, is decreasing**. As these apprenticeships are often the starting point of a career within vocational occupations, this signals shortages in these occupations could persist.

The differences on the labour market and the shortages experienced **result in clear differences in the design of the measures**.

- The Italian programme *FixO Scuola & Universitą*, aims to reduce the skill mismatch experienced by employers and to provide a solution to youth unemployment. The programme, launched in 2011 was an update of previous programmes implemented as of 2006. It brings together PES, educational institutions and employers and strengthens the approach towards university and high school graduates. Through the developed partnership, better placement services are provided by more specific guidance, but especially by expanding the number of internships and apprenticeships for Italian graduates.
- The German *MobiPro* measure, launched in 2013, aims to reduce the shortage in candidates for apprenticeships, especially in SME's and more rural regions. Instead of focussing on German students to fill these apprenticeships, it looks for candidates abroad. As a secondary goal and in response to the crisis, the measure would contribute to reducing youth unemployment in other Member States.

In terms of labour market response, this means the Italian measure could be seen as a **more durable**, strengthening institutional capacity to provide relief for current and future shortages. While the results can be seen on relatively short term basis, the effect of the institutional framework will also provide results on the long term. Educational institutions have set up their own employment services towards their graduates and have developed better ties with employers, allowing them to offer internships and apprenticeships. The **German approach is more short term** as it does not address the lack of German candidates for the apprenticeships.

However, as **Italy** does not have the same shortage problem nor dual educational system as in **Germany**, the two measures must be seen as complementary instead of opposed to each other. The Italian measure focuses on the transition of graduates of higher education, while the German measure is oriented towards vocational education. Moreover, *MobiPro* also acts as a support for the German dual educational system which already facilitates the transition of young people, *while Fixo Scula & Univesita* focuses on developing its own system for facilitating the transition of young people into employment.

4.2.2. Framing measures within a larger policy approach

Both **Italy** and **Germany** have implemented their measures within a broader framework. In **Germany**, the government launched a broad concept in 2011 to secure a skilled work force (*Fachkräftekonzept*). The Federal Ministry of Labour and Social Affairs, the Federal Ministry for Economic Affairs and Energy and the Federal Employment Service have also launched a campaign to secure a skilled work force (*Fachkräfte-Offensive*). Part of this campaign is the *Partnership for skilled labour (Partnerschaft für Fachkräfte)* between the several Federal Ministries, the Federal Employment Service, the Federal Association of German Employers' Associations, the German Trade Union Confederation and several trade unions and employers' associations. The policy framework therefore resonates the need to counter shortages in skills.

In **Italy**, the measure was developed within the operational programme of ESF, where both reducing the skill mismatch and reducing unemployment are key-objectives. The measure also fits into national developments to encourage the use of apprenticeships. In the years preceding the programme, a legal framework has been set up to facilitate the school to work transition by putting emphasis on skill requirements instead of qualifications during job matching and by standardising apprenticeships. However, the approach is more focused on improving the employment prospects of young people than directly focusing on shortages for the demand side of the labour market.

The stronger focus on shortages in German policy also resonates with the German labour market situation which faces skills shortages as a more serious problem, while the Italian labour market is characterised by high unemployment and skills mismatch.

Comparing these policy approaches, **both countries frame their measures within a broader policy framework** which is developed in cooperation with other actors, either through specific partnerships as in **Germany** or through ESF as an instrument to bring partners together. Interestingly, when the measures in each country have been developed, both countries adopted an **opposite approach**. The programme *FixO Scuola & Universita* was initiated by the Ministery of Labour but **developed and implemented** involving **all stakeholders**. Indeed, the programme launched in 2011, specifically added more partners to the programme than previous versions to strengthen the impact. *MobiPro*, while fitting in a larger policy concept involving social partners, was initially designed by the federal Ministery of Labour and Social affairs and the federal PES **without involving other actors**. The latter was one of the reasons why the initial implementation of the *MobiPro* measure was not a success as it did not prepare the candidates sufficiently for realities of working and living in **Germany**. This might have been prevented with a less top-down approach.

4.2.3. Evaluation of the results

Looking at the outcome of the measures, the programme in **Italy** succeeded in involving a much higher number of institutes for Higher Education than previous projects. The number of university career services increased by 52% and the number of school career services increased by 10%. More than 700 apprenticeships and almost 10,000 extra-curricular internships were provided, together with guiding actions for over 51,500 students. The Italian programme shows that the development of the intermediary role of educational institutions **requires times and constant** effort and thrives when the cooperation between employers and careers services is **complemented by structural cooperation** between research within educational institutions and manufacturing. The latter provides the best opportunities to develop apprenticeships and internships for graduates. These lessons were learnt during the previous versions of the programmes, but also better absorbed because of the effect of the crisis, showing the need to put more effort into better matching systems.

MobiPro in **Germany** was also redesigned, after an initial lack of success due to high dropout rates (70%). In its current version it is expected to fill about 3,000 of 37,000 vacant apprenticeships in 2015 in SME's and rural areas by attracting young people from across the EU for technical positions, resulting in a reduction of shortages by 5% or even up to 10%. This means the measure provides a significant contribution in alleviating the shortage for apprenticeships, but does **not suffice to counter the shortage completely**. For this, more interventions are needed focussing on the root causes of the shortage. These are the lack of inflow from German students into vocational education, caused by a preference mismatch and the lack of candidates for apprenticeships in more rural areas caused by a geographical mismatch.

The German measure also provides some important lessons when it comes to realising effective outcomes. Drop-out was high because applicants did not complete language courses and were ill prepared to integrate into German society. The authorities also had little information about the goals and motivation of the applicants. The new set-up of the programme reduces this problem by better screening the candidates and working with project-based applications from employers, allowing for better guidance. This shows that countries willing to implement mobility schemes must examine the **need for preparatory measures to reduce barriers to mobility** such as language, general information, cultural

education etc., as setting up these additional activities in the programme are crucial to its success.

4.2.4. Transferability of the measures

The comparison of the design and results of the measures' situation provides us with **information on the transferability** of similar measures to other EU Member States. **Italy** can serve as an example for countries with little existing measures focusing on the transition of young people and provide insights in how to **introduce better matching through setting up partnerships with educational institutions**, **PES and employers** and increase the use of apprenticeships. Within the programme, tools and methodological approaches were developed, which could be used when transferring knowledge to other Member States.

As the German apprenticeship system is more specific and rather unique in Europe, *MobiPro* as a mobility scheme *for apprenticeships* does not provide an immediate response to other countries' shortage needs. Yet the scheme could be transferred, if other countries implement similar education systems. However, the experiences of *MobiPro* as a mobility scheme do provide multiple aspects of **transferability when applied to mobility schemes** in general, not focused on apprenticeships. It shows that mobility schemes must be accompanied by **supporting measures to reduce barriers to mobility**. Yet, from the *MobiPro* experience, it is clear that a mobility scheme can only partially address shortages. This means Member States trying a similar approach must see **mobility schemes as complementary**, but not as a single solution.

4.3. How to reduce shortages though employer-led initiatives?

Ireland and the **UK** have implemented employer-led initiatives. *Skillnets* in **Ireland** supports training networks with training designed on employer's needs. The *Employer Investment Fund (EIF)* in the **UK** supports projects by employers to alleviate their skill needs.

Both practices show that integration within a larger policy framework makes the **measures more durable**, which in turn convinces employers to participate. The approach in *Skillnets* and the *EIF* can be examples for other Member States, especially to **respond to shortages at employer level in a flexible manner**. However, they can be most useful for Member States with weak links between government and employers. Using **project funding** as in the *EIF* can help in **targeting shortages effectively.**

When confronted with skill mismatches and shortages, an often used approach is to resort to training measures. There are several ways, however, in which training measures can be designed. One possibility is a **bottom-up approach, designing training programmes for specific shortages at company-level**. This approach has been followed in **Ireland** and the **UK**, where employer-led training initiatives have been implemented.

4.3.1. Adapting measures to the national context

Ireland and the **United Kingdom** have similarities in their labour markets, based on Anglo-Saxon models. Before the crisis performance was similar, with unemployment hovering around 6%. However, performance diverged after the crisis with **Ireland** experiencing a sharp rise in unemployment. The **UK** was also affected but unemployment rates rose only moderately. The shortage situation for both countries remains similar, however. Both the **UK** and **Ireland** experience occupational and skill shortages especially related to IT, Engineering, Healthcare, Finance, Science and Administration.

Both countries have implemented measures to counter these shortages at different times, as skills shortages have been prevalent in both countries long before the crisis.

- In 1999, in order to become more responsive to training opportunities and skill needs of employers, the **Irish** government set up *Skillnets*. In turn, *Skillnets* set up training networks which group companies or sectors, especially SMEs. The training networks analyse the skill needs and provide training adapted to the employer's needs. Funding is supported by a government grant, and augmented by matched funding from employers.
- The *Employer Investment Fund* in the **UK** is similar in nature, but has a broader scope. It was set up in 2011 by government and social partners through the Commission for Employment and Skills. It works through projects calls, requesting employers to propose projects aimed at strengthening employment and skills. This allows for the financing of specific training measures, but also projects reaching out to certain target groups or redesigning jobs in order to attract workers.

Comparing the set-up of both measures, the **focus on the needs of employers is a clear similarity**. We can see however that *Skillnets* is more targeted towards training as a solution to shortages, specifically for SMEs, while the **UK** takes a broader approach. This can be explained through the date of implementation, but also through the situation on the labour markets. **Ireland** has experienced a rise in unemployment, causing it to adapt the *Skillnets* programme by putting greater focus on training for the unemployed and aligning the programme more closely to other Irish Government initiatives to increase employment and tackle unemployment. By contrast, the **UK** has not seen the same increase in unemployment, forcing them to put possible skills shortages in a larger perspective, resorting not only to training but also to improving job design and attractiveness. Its project-based approach allows for even more flexibility than *Skillnets* by supporting different types of projects which might correspond better to local needs.

4.3.2. Framing measures within a larger policy approach

Both the **UK** and **Ireland** have framed their measures within a larger policy approach. The **UK** has set out an **overall approach to skills shortages** based on several initiatives and policy areas, including a pillar 'Creating a more educated workforce', in the UK's Plan for Growth of 2011. The measure operates through Sector Skills Councils (SSCs) including developing strategic partnerships with priority sectors and working with Local Enterprise Partnerships. One of the goals within this policy framework has been to **shift the balance between public and private investment** for training and skills, with increased investment expected from the individuals and employers that directly benefit from training. The overall approach thus combines national and local level interventions with a focus on meeting employer needs through sector based support and engaging the private sector in developing skills solutions.

Similarly to the **UK**, employers play a key-role in the skills approach in **Ireland**. Its training authority has developed a five year Further Education and Training strategy for 2014-2019. The strategy notes that "**employers lie at the heart of skills needs**, while the learner lies at the heart of the Further Educational and Training service (FET)". This reflects a general aim to ensure that employers have a key role in articulating skills needs and that FET services and programmes respond to these. The design of the *Skillnet*s was to increase the influence of the demand side in skills development rather than just anticipating employer needs.

Both the *EIF* and *Skillnets* are clearly imbedded within the policy approach taken at national level. This ensures **continued and clear government support** for the measures, which is essential to **convincing employers to participate**. *Skillnets* exists for over 15 years, but

still emphasises its need for branding in order to reach SMEs, showing the measures need long-term perspective in order to fulfil their potential.

4.3.3. Evaluation of the results

The results of both measures are **clearly positive**. In **Ireland**, *Skillnets* achieved training for about 45,000 people in 2013, including both the employed (83%) and unemployed (17%). These actions resulted in significant skill enhancements, and full retention in employment. Around 50% of the unemployed found a job in vacancies otherwise difficult to fill.

An evaluation of the *Employers Investment Fund* in the **UK** showed that the projects reached over 5,000 people, and fulfilled the employers' short term needs and goals. Due to the diffused and specific nature of the *EIF*, the impact of the measure is difficult to measure in PES shortage data. A qualitative evaluation concluded that Sector Skills Councils had generally taken an efficient approach to developing skills solutions. All projects had a sound rationale for market failure, which means the solution would not be implemented without outside support. Most projects were expected to be sustained in the near future and therefore provide a return on investment. A quantitative evaluation, including a control group, of impact of the measure is still on-going.

Perhaps the most interesting result of both measures is the way both succeeded in **levering significant contributions from employers** through matched government funding. For the *EIF*, this amounted to more than 100% of the initial public contribution.

However, the effectiveness of the measures is dependent on several aspects in the design and adaption of the measures. The *EIF* provides an interesting case in **targeting the measure towards real shortages**. This was done by using a project-based approach with competitive funding. In order to obtain funds for their project, employers had to explain how their proposed projects intended to identify and respond to shortages. The nature of the data and research used to explain this varied between projects, but typically drew on sources such as the Employer Skills Survey and on data, research and surveys undertaken by Sector Skills Councils involved. This approach means employers are forced to carry out introspection when declaring a skill shortage. This can provide an interesting method for other Member States developing programmes based on employer-demands as it can reduce dead-weight effects from the start.

The **adaptability of project or training programmes** can be seen as an important asset to ensure continued success. Both measures have the ability to be adaptable and responsive to any changes in context, policy or regulatory environment, through their continued contact with local stakeholders as through the continued monitoring of both labour market situations and the output of the programmes. The design of both the training networks of *Skillnets* and the *EIF* project-based approach allows for targeting interventions in different ways and at different sectors.

4.3.4. Transferability of the measures

In terms of **transferability**, the design of both measures can be easily duplicated. The need for significant employer involvement and investment in skills development and the establishment of solutions to skills shortages and mismatches could be seen as universal, irrespective of prevailing economic conditions. Its basis lies in **cooperation between social partners with government providing a framework and basic funding**. The social partners complement by matched (or higher) funding and by detecting the needs and developing the corresponding training or project.

However, the need for the *EIF* in the **UK** was also partially due to the very weak tripartite arrangements linking government to employers and trade unions relative to elsewhere in Europe. Member States with strong social dialogue and involvement of social partners in the design of labour market polices in general and specifically training, might therefore experience less need to adopt this approach.

4.4. How to reduce shortages by influencing educational choices?

In **Austria** and **Poland** measures were designed to influence educational choices to ensure more people obtain the qualifications needed on the labour market. **Austria** awarded **grants to the employed and unemployed** choosing to obtain these qualifications. **Poland awarded grants to students** choosing fields of study such as math and sciences in higher education and supported projects improving the quality of those educational programmes.

Other Member States willing to implement similar measures must take the **time-lag between the measure and its result** into account, by also **estimating future shortages** as was done in **Poland**. Implementation should always **involve educational institutions,** looking also at the **quality of education. However, the grant system itself is easily transferable** to other Member States and can be more successful now in times of high unemployment.

One of the reasons for the occurrence of skills shortages and occupational shortages might be a lack of graduates with the necessary skills and qualifications entering the labour market. If this is the case, skills shortages might be persistent as it concerns shortages which cannot be remedied by short-term training. In this case, countries can alleviate shortages by **trying to increase the number of graduates with the qualifications lacking in the labour market**. This means they must ensure sufficient people choose to follow a certain education or long-term training, but also that the **quality of education and/or training provided is in line with the needs on the labour market**.

4.4.1. Adapting measures to the national context

Such measures have been introduced in **Austria** and **Poland**, two countries with very different labour market and educational systems. **Austria** has a labour market with low unemployment, making it relatively tight compared to other European countries. It was also barely affected by the crisis. However, the Austrian labour market does not experience quantitative shortages but faces skill mismatches in some sectors and regions. In particular, shortages relate to different types of handicrafts (typically covered by apprenticeship trainings), engineering, primary school teaching, nursing and caring. The Polish labour market is characterised with a higher unemployment rate and a much looser labour market, yet shortages occur mostly in technical occupations and high-skill professions. A common feature for both countries is the lack of people with the necessary qualifications to fill these shortage positions. In **Poland** this was strengthened by a forecast of future needs of the labour market, showing that without intervention the shortage for skilled graduates would increase even further.

Therefore measures were designed trying to attract more students towards the educational programmes leading to the necessary qualifications. In **Poland** the measure focused on science, engineering and mathematics, while the Austrian measure allowed more flexibility towards healthcare, technical occupations, engineering or social services. The choice of shortages occupations and corresponding educational programmes to support are made by PES in both countries.

- The Austrian measure, the *Fachkräftestipendium (FKS)*, consists of a grant scheme to provide income support to beneficiaries. The grant is awarded to those following full time training for occupations experiencing skills shortages. It is therefore not aimed at young people starting their career, but rather to both employed and unemployed without high qualifications, who are willing to retrain.
- The Polish programme was conceived with the ESF operational programme and has a two-handed approach. On the one hand it tries to encourage students to take up science and maths by rewarding the best students with grants. On the other hand it also provides project-based funding for educational institutions to improve the quality of the educational programmes.

A comparison of both measures shows both use the same tool, a **grant scheme**, as the basis for their measure. However there is a large difference in target group as the Austrian measure put the **emphasis on people already on the labour market**, while the Polish programme aims at young people. A grant system can be very effective when financial aspects prove a barrier towards the entry into education. Counterintuitively the need for a grant can be higher for people already on the labour market, even if they already have an income, as they face higher opportunity costs when returning to education. This also explains the high demand for the grants in **Austria**.

The **time-aspect is another difference** between both countries. The Polish measure was designed with a **forward looking objective**, to counter shortages of high skilled profiles in the future. The Austrian measure based itself on the current labour market situation, which means in theory the shortages could already be resolved by the time beneficiaries complete their training or education. However, due to the rather structural nature of the shortages this is unlikely.

4.4.2. Framing measures within a larger policy approach

In **Poland** the programme to strengthen the educational quality and increase the number of graduates in specific educational fields was devised within the strategy set out through the national ESF-programme. This also means it was developed involving multiple stakeholders.

This is not entirely the case in **Austria**, where the **measure was designed to fill a gap in the existing institutional framework,** but lacked a broader policy approach. The *FKS* measure was initiated by the government and PES as an **addition to the training programmes** of the PES as they do not support long-term training. Against this background, the Austrian government intended to fill this gap by providing income support for low(er) qualified workers to raise their qualifications in shortage professions by full-time schooling. Yet it was **not incorporated into a wider educational framework**, involving the educational institutions directly. This is a missed opportunity as this could have contributed to a more specific orientation to the education or training programmes which can be taken up. Effectiveness and efficiency could be increased by an overall strategy with respect to labour shortages, involving all responsible institutions at the federal and regional level.

4.4.3. Evaluation of the results

Both measures had proved to be very successful in achieving their objective to increase the number of people taking up certain educational programmes. In **Austria** as of 2013, 5,260 people received a grant in the following 18 months, much more than anticipated. The educational choices vary from health care (39%), to social services (47%) or engineering

(14%), matching the shortage occupations in the labour market. The full effect on shortages seems positive, but must be evaluated over a longer period due to the length of the educational programmes. The Polish measure also had great success in attracting more students to the educational fields supported in the programme. Beginning in 2008, the measure aimed to attract 20,800 students by 2015, of which about 18,000 would graduate. Instead 93,500 started the required studies necessary to fill shortage occupations, of which over 43,000 received a grant from the measure. The current count of graduates is exceeding 21,000. Therefore, the aim, changing the structure of higher education in **Poland** in favour of more graduates from technical, natural sciences and mathematics, was achieved. Moreover, current surveys show that employers consider the graduates well qualified to take up the needed positions.

As the success of the Austrian measure surprised the PES, responsible for managing the system, initially insufficient funding was available and had to be adapted. This shows the **need for a systemic framework** which is devised to support the programme in the long run. The Polish case also demonstrated the need for **flexibility and a project-based approach** to improving the quality of educational institutions and programmes. Working through a project-based approach ensures sufficient competitiveness to fund only the best projects, ensuring better results.

4.4.4. Transferability of the measures

In **terms of transferability**, Member States **can apply grants within most of the existing institutional frameworks**. Especially in countries with high-unemployment, a grant might prove even more attractive for people to enter full-time education.

The grant could be aimed at lowering the direct cost of education or providing income-support. The first method would be more attractive for young people, while the second is better suited for the employed and unemployed population as they face higher opportunity costs. However, before implementing such measures the institutional capacity of the educational system must be analysed to ensure the education or training meets the necessary quality standard. If not, this must be addressed first or through supportive measures.

A clear difference between both analysed measures is the integration of the aspect of quality of education within the Polish programme as opposed to the Austrian measure. This could be very normal as other quality mechanisms already ensure the quality of the Austrian educational system However, in order to implement similar measures in other Member States, **educational institutions should be involved** to ensure the quality dimension is taken into account.

To take the time lag between the start of these measures and the first results into account, Member States should **incorporate forecasts** into the design of measures concerning education or long-term training. This way they can ensure that the results obtained correspond to the actual needs of the future labour market.

4.5. What are overall lessons in the design of shortage measures?

The case studies provide overall lessons for the design of shortage measures. Measures to counter shortages should be **adaptable to the labour market** situation. This can be ensured by using a flexible employer based approach exemplified in the *EIF* and *Skillnets* or by including the possibility to revise goals and tools on a regular basis as is the case in **Italy, Poland, Austria and Germany**. The failed first design of *MobiPro* showed that the **involvement of all relevant stakeholders** is also essential to ensure all aspects of the measure are considered. However, **continued monitoring and follow-up** is necessary to provide feedback for adapting a measure. This is shown in the example of *Skillnets* in **Ireland.**

Based on the overall experiences of the different cases, **several success factors** can be drawn **to implement successful measures.**

A **first** success factor concerns the **design of the programme which must be adaptable** and thus able to be modified to fit circumstances. The German *MobiPro* measure had to be redesigned after realising that it did not reach its intended target. Now yearly projects are set up to make it possible to alter the targeted occupations and groups annually. The same is true for the Austrian skilled workers' grant which can be directed to different educational programmes when different shortages arise. The Polish measure allowed for a main tool in granting scholarships to students, but backed this up by several other initiatives to strengthen the educational programmes themselves. Those initiatives could be altered every year. In the future, this programme will be adapted to focus more on competences rather than qualifications to fulfil shortages in a more targeted way. The most flexible measures are the **Irish** *Skillnets* and the *Employment Investment Fund* in the **UK** as they allow response to employer needs by setting up on-demand training programmes and projects. In **Italy** the programme has built up a self-sustaining network which can respond to new expectations from graduates and employers in its matching process.

A **second** success factor includes the **involvement of all the relevant stakeholders**. A weakness of the **German** measure was its lack of involvement of local institutions and social partners, partially explaining the failure of the initial set up. The **Irish** measure is so successful because it is supported by a widespread buy-in by employers within particular sectors within which *Skillnets* operates. The same goes for the **UK**, where the need for early employer engagement to define the issues for possible interventions and on-going employer engagement from a wide range of employers are deemed essential to a successful roll-out of the programme. For the **Italian** measure it is stressed that it was necessary to involve all stakeholders from the beginning and asses their different needs.

A **third** success factor is to set up **systems of continued monitoring**. As the labour market is in constant flux, the needs identified may change over time. Forecasting provides some answers, but must always be adjusted for actual outcomes. This allows the **Irish** *Skillnets* to adapt training programmes in a timely fashion to respond to the required needs.

5. CONCLUSIONS AND RECOMMENDATIONS

KEY FINDINGS

- There are **no overall quantitative labour shortages** in the EU, though **qualitative shortages occur** in specific Member States, regions and sectors. These shortages are **relative however to wage conditions** within sectors and occupations. When shortages occur, skill mismatch resulting in skills shortages is one of the important causes. As the labour market still experiences the aftermath of the crisis the **possibility for future quantitative shortages** must be taken into account.
- Depending on the cause of the shortage, employers, Member States and the EU can take several measures to alleviate them. **Rarely a single measure is sufficient** to counter shortages completely. Good practices show that **cooperation between PES, educational institutions and employers** can reduce the skill mismatch between graduates and employers through **better matching.** Cooperation between employers and government to support skill development can also reduce shortages and lever **substantial funds from the private sector**. **Mobility schemes** can offer a **short term, partial solution**, but need sufficient supporting measures. **Influencing educational choices** can relieve shortages in the long run, but care must be taken to **ensure the quality of the education provided**.
- All actors, employers, Member States and the EU should take up their role in countering shortages. **Structural partnerships for the alleviation of shortages** could be set up. The Parliament can support the use of the ESF as a common framework and call for further development of the European Sector Skills Councils.
- An important way to alleviate skills shortages now and in the future is to **increase the adaptability of the workforce**. Member States and employers can focus on training, supported by the funding and framework of the European Social Fund. The Parliament can support the use of ESF funding to reduce shortages by investing into the adaptability of workers.
- **Mobility schemes can be an effective, but partial solution** to shortages. The Parliament can call to expand initiatives such as *Your first EURES job*. Mobility can also be viewed beyond mobility of workers by looking into possibilities to move companies and to compensate Member States for providing education to emigrants.
- When designing measures, **these must be adaptable to local labour market needs and changing circumstances**. They must also be designed within broader labour market policies. The Parliament can encourage the use of ESF to develop these measures as it provides flexibility within a general framework.
- The EU and Member States can further **increase the transparency of the European labour market by developing additional and more detailed monitoring and forecasting tools**.

5.1. Conclusions

5.1.1. Labour shortages come in various types

When individual employers cannot find the workers they need to fill open vacancies, labour shortages occur. Labour shortages refer to a situation in which labour demand exceeds

labour supply. However, a distinction should be made between quantitative labour shortages and qualitative labour shortages.

- In case of a ***quantitative*** **labour shortage**, there is an **absolute lack of workers** in the labour market. Labour demand is larger than labour supply, resulting in a large share of difficult-to-fill vacancies and a small unemployment rate.
- In case of a ***qualitative*** **labour shortage**, labour demand and labour supply are roughly in equilibrium (balanced), but a **large share of unfilled vacancies and a high unemployment rate** exist simultaneously. This signals a qualitative mismatch between supply and demand.

An **important cause** of these qualitative labour shortages is the existence of a **skill mismatch** between supply and demand. Other causes can be the lack of functional mobility, the negative image of certain sectors or occupations or the existence of asymmetric information between jobseekers and employers.

A skill shortage can be caused by changes in the required skills due to technological change, changes at the sectoral or occupational structure of labour demand, recruitment rigidities, an increase in replacement demand and "wrong" choices in the fields of study chosen by students and the type of qualifications demanded by employers. Skills shortages can be observed for low, medium and high-skilled jobs.

It should be noted that a **labour shortage is always relative** in the sense that it refers to labour demand in excess of labour supply *willing to work at a particular wage and working conditions at a particular place and point in time*. This means that, if an employer cannot find a person for a certain wage, wages may need to be raised to find someone willing to fill the vacancy. Therefore, the ultimate indicator for measuring the presence of labour market shortages is changes to wage-levels. When wages do not increase, employers indicate that they expect to find a candidate at the current wage and labour conditions. Shortages are therefore relative to the terms offered, as these provide the incentive for jobseekers to choose their education and occupation.

5.1.2. The EU currently experiences qualitative shortages

The tightness of the labour market has decreased substantially compared to the pre-crisis period. Although there are differences between Member States, there is, at an aggregate level, **no evidence of quantitative shortages where labour supply falls short of demand**. However, we do observe tighter labour markets in some Member States than others, highlighting that labour demand and supply are not balanced across Member States. Moreover, there are **geographical mismatches within countries**, i.e. a shortage of workers in one region and a surplus in another region. This is true for regions in **Belgium**, **Italy** and **Spain**, for example. As the crisis has largely decreased the tightness of labour markets throughout Europe, quantitative shortages may grow if the economic recovery picks up.

We also **observe qualitative shortages.** Employers indicate **difficulties recruiting people with the required skills** and there is evidence of a **qualification mismatch**. **Sectoral shortages have decreased** strongly after the crisis, but **specific occupational shortages remain**. This implies that, on one hand, companies have difficulties recruiting people with the required skills and, on the other hand, that jobseekers have difficulties in finding a job matching their preferences or qualification level. Throughout Europe there is some consistency across Member States when it comes to occupational groups with shortages: metal, machinery and related trade workers, science and engineering as well as ICT professionals. However, when analysed in detail, specific occupations experiencing shortages differ between Member States. Consequently, although at macro level we

cannot discern a quantitative shortage of labour supply in the European or Member State labour markets, there are **real skill mismatches, in particular between geographical areas, qualifications and occupations.**

The occurrence of qualitative shortages and especially skill mismatches indicates that additional training and retraining is necessary to counter these shortages, which take time to have an effect. This implies that **filling open vacancies with the unemployed is often not an option in the short-term** and reducing the current labour market shortages is therefore not a quick-fix for unemployment.

It is important to point out though, that different European labour markets may have very different needs for workers at different qualification levels. This implies that an optimal allocation is not necessarily achieved when the majority of workers and/or jobseekers obtain high qualifications, and there may be an equal need for people with specific skills (but not necessarily qualifications) for lower skilled jobs.

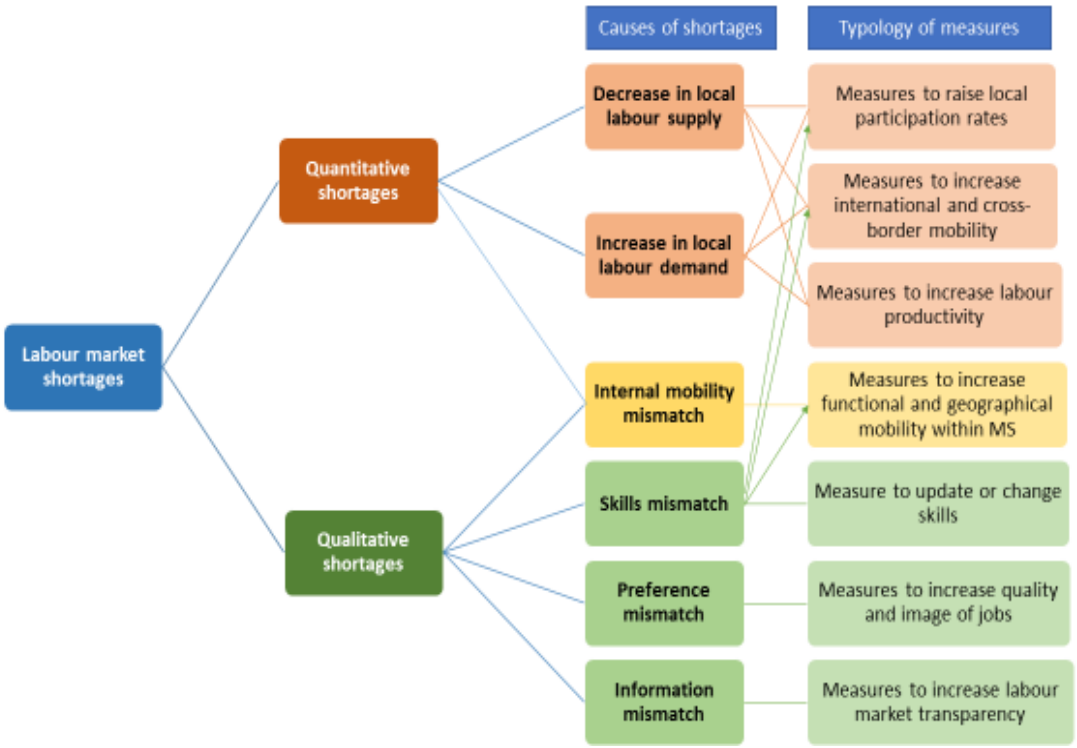
However, when considering how to counter shortages, a forward-looking perspective should certainly be taken into account. Even if today mostly qualitative shortages are present, quantitative shortages may arise in the future when the labour force shrinks due to decline in working-age population (e.g. due to ageing, low fertility rates and emigration) or due to a decline in labour force participation.

5.1.3. Different types of measures can be used to tackle shortages

Shortages may arise at regional, national, or even EU level. In order to respond to the various causes of labour shortages, ranging from a lack a workers to a lack of specific skills **different policy reactions** are required.

The figure below illustrates potential policies or measures that can be taken to alleviate labour shortages. We can distinguish a **typology of seven different types of measures**, each containing a range of more specific measures. These types can be classified according to their aim: bringing more people into the labour market through activation strategies, using international mobility to attract workers, getting more out of less labour by increasing productivity, bringing the skills of the workforce and unemployed up to the level requested by the labour market through training and education, making sectors and occupations more attractive by improving working conditions and increasing the transparency on the labour market. These measures can be **enacted by employers, Member States or EU institutions**.

Figure 12: Typology of measures responding to shortages



Source: Own assessment based on literature.

Employers practices in countering shortages

Employers are often the first ones to encounter a particular shortage, especially when identifying a bottleneck occupation. Measures taken by employers focus more heavily on resolving shortages in the short run. They will be less involved in strategies to raise participation rates or to provide more transparency on the labour market, but will use other means to alleviate their shortages.

Individual **employers often upgrade the skills of their (potential) staff** to counter shortages through (re)training, or offering internships, apprenticeships and supporting education systems, including working and learning. Experiences in **Ireland** with *Skillnets* and the **United Kingdom** with the *Employers Investment Fund* have shown that an employer-led approach, supported the government can reduce shortages by starting from the lowest level. The cooperation between government and employers can also attract significant private investment through matched contributions.

Other employers resort to **targeted migration**, obtaining the skilled workers they need from elsewhere. Some employers, when confronted with shortages, also resort to measures that **increase the productivity** of their workers through outsourcing or automation. In other words, the shortage is alleviated by lowering the demand for labour. Although this might strengthen the competitive position of the enterprise and thus be at the basis of its long-term growth, clearly it does not contribute to the inclusion of more vulnerable groups in the labour market.

As employers control **job design and working conditions**, they have important tools at their disposal to alleviate shortages. Evidence shows that some employers change job content to better match profiles available on the labour market, while others raise the wage or improve other working conditions to make their jobs more attractive.

Measures implemented by Member States to counter shortages

Member States can and will pursue various strategies to reduce shortages, as they have a **large arsenal of instruments** at their disposal. Contrary to employers they can use activation strategies to bring more people into the labour market and have the means to provide labour market transparency through PES and other institutions. They can also implement measures to increase international and EU-mobility, increase geographical and functional mobility, set up training or related measures to increase the skill level and improve working conditions to make jobs more attractive. However, they will **rarely focus specifically on increasing productivity in order to reduce shortages**, since this will decrease employment opportunities. Contrary to employers, Member States will also implement measures which can counter shortages in the medium or long run.

Increasing participation in the labour market through activating target groups and retaining workers on the labour market is often a general objective of Member States' labour market policy, but also helps in reducing shortages. Ensuring a smooth transition from school to work allows to mitigate shortages early on by providing young people with experience and skills. In **Italy**, cooperation between PES, universities and employers has proven to be a good practice by reducing the skills gap between graduates and employers' needs through better matching and the use of apprenticeships.

When resorting to mobility, Member States can **target their mobility** to the specific type of labour needed. A good example of a target mobility scheme is the experience of *MobiPro* in **Germany**. However, this example proves mobility can only provide a **partial, short term solution**. In order to avoid brain drain and hindering economic development in the sending country, Member States should cooperate when using mobility schemes. When brain drain does occur, as is the case for medical practitioners in Eastern Europe, sending countries resort to retention policies focussing on improved working conditions and return policies of emigrated skilled workers.

Member states also reduce skill mismatches by (re)training **the active population**. When done in cooperation with employers, this training can prove to be very effective as it allows for a flexible approach towards the employer's needs.

Equally, guiding (young) people towards **educational choices** leading to employment in (future) shortage sectors or occupations is a policy implemented by Member States, but can be a more long-term strategy. When using such measures, Member States have to detect future shortages, strengthen educational institutions in the fields required and lead people towards these educational programmes. In **Poland,** a programme was developed to attract more students towards education in mathematics and science, thus countering future shortages in engineering. By using ESF financing to provide scholarships and to improve the quality and institutional capacity of higher education, the programme succeeded in dramatically increasing the number of students. In **Austria**, many unemployed workers took up studies for technical occupations after being provided with a grant. The examined cases show grant systems can prove successful, but **quality of educational providers must be ensured**.

When **geographical and functional mobility** is limited due to lock-in effects of the welfare system or labour law, Member States can reform their welfare system creating more portable rights and removing restrictions in labour regulations. However, the more mobility between jobs is facilitated through loosening labour regulation, the greater the chance of forced mobility to occur as well.

Labour law also provides Member States with the means to **improve working conditions** in certain sectors and occupations, reducing the chances of shortages through preference mismatches.

Through national qualification frameworks, forecasting tools and especially high quality matching, Member States can **increase transparency** and reduce shortages caused by insufficient information between employers and jobseekers. Strengthening PES and their tools is an essential responsibility for Member States.

The role of the EU in countering shortages

The **EU contributes substantially in a number of domains** to allow both Member States and employers to counter shortages effectively. In some cases it can intervene directly, while in other it must support measures indirectly. **Activation of workers** is supported **through use of the EU structural funds** such as the European Social Fund and the European Globalisation Adjustment Fund. This is complemented by **initiatives focussing on young people**, supporting their activation and especially the school to work transition such as the *European Youth Guarantee*.

Mobility is strongly supported by the EU's efforts to reduce barriers to mobility by stimulating convergence and transferability of national regulations and labour laws and by setting up targeted mobility schemes such as the EURES network and *Your first EURES job*. Member States experiencing skill mismatches are supported through EU skill strategies and by the European Social Fund, which provides a **framework and funding for skill policies and training**.

Through EU labour law, several non-wage areas of working conditions are regulated at EU level, **ensuring adequate working conditions** and providing a level playing field for the attractiveness of jobs.

Labour market transparency is supported through monitoring tools such as, for example, the European Vacancy monitor and the EU Skills Panorama and by the introduction of frameworks for qualifications and skills throughout the EU such as the European Qualifications Network (EQF).

5.2. Recommendations

5.2.1. Call upon all actors to counter shortages within their responsibility

Countering shortages is the responsibility of all actors in the labour market, employers, Member States and the EU.

Before calling upon public authorities, **employers should investigate whether the cause of shortages lies within their own possibilities to resolve**. Vacancies can be too demanding compared to the skills actually needed. In cooperation with PES vacancies can be adapted to better suit the skills needed to fulfil the occupation. When the candidates are not available, employers should examine if working conditions and wage are not responsible and could be improved or if the job design cannot be altered to fit the available candidates.

If shortages are more widespread or caused by other factors, **public authorities in Member States must take up their role** and intervene by implementing activation policies or increasing mobility through reform of labour law and welfare systems. This can be complemented by targeted mobility. The responsibility for up-skilling the employed and unemployed population clearly lies with both **Member States** and **employers**.

The **EU also has a role to play** by increasing mobility between Member States and by providing labour market transparency. Additionally, the EU, both Commission and Parliament, play an active role in supporting policies and measures to activate target groups in the labour market, the retention of older workers and facilitating the transition between school and work.

However, even when responsibilities can be distinguished, all actors should cooperate within a general framework to counter the shortages within regions, Member States or at European level. In the design of the measures **an important lesson from the cases** is that **involvement of all relevant stakeholders** is key to success.

This means **calling upon structural partnerships for the alleviation of shortages**: between social partners, sectors and education actors for a better school to work transition or a better match and between employers and PES for increased transparency and training. Both sectoral skills councils and temporary employment agencies should be involved. The EU has provided a good example by setting up its European Sector Skills Councils as their main aims are to share information and experiences, learn from each other, and ensure that national organisations cater more effectively to the needs of the various sectors.

These structural partnerships allow for a comprehensive approach to shortages where all aspects can be taken into account. The cases studied also **reveal that supporting measures and policies** should form an integral part of the framework **to address shortages**. Good measures can prove to be ineffective because underlying problems or barriers are not addressed at the same time, such as the cultural problems experienced with participants in the German *Mobipro* measure. Guidance to young graduates through university and schools careers counselling, language and cultural learning when devising mobility schemes, and availability of affordable child care facilities for activation of young parents, are all examples of such supporting measures.

The European Parliament could **call upon the Commission to urge Member States to collaborate with employers in countering shortages**. It could also **call upon the Commission to use the European Social Fund as a framework to bring employers and Member States together to counter shortages**. Additionally, the Parliament could **encourage the Commission and the social partners to spread the European Skill Councils to many more sectors**.

5.2.2. Increase the adaptability of the workforce

As evidence shows that current shortages in Europe mainly relate to skill mismatch and might grow as unemployment in Europe remains high, a key part of the solution is **to increase the adaptability of the workforce**. This can be done by improving skills of the workers, especially by **investing in the key competences.**

The more general the skills – basic competences such as (digital) literacy, basic qualifications - the greater the role of the government. The more specific the skills, the greater the responsibility of the employers will be.

Within Member States, the ministries of education should put more emphasis on education & training programmes **that enforce basic skills and more general skills** – such as learning to learn – and that for all skills' level and all ages. Member States are also responsible for providing sufficient and adequate educational institutions and programmes, also of post-secondary education. Their educational programmes must be sufficiently aligned to the needs of the labour market. This means Member States and higher education institutions must modernise and improve the quality of education.

The European Parliament could call on the Commission to **support the process of quality assurance and labour market adaptability by giving more importance to employability and labour market adaptability** in the European Standards and Guidelines for Quality Assurance.

In general, individual **employers** have a major role to play in terms of **up-skilling their (potential) staff** to the specific skills needed within the sector or occupation. They can do this through (re)training, offering internships, apprenticeships and by supporting education

systems, including working and learning. When skills needed are sector specific (technical) skills, then **national sector federations** and **European Sectoral Skills Councils** are relevant actors. However, the key role of sectors and individual employers not only lies in training, but also in restructuring the sector or the companies.

The Parliament could also **encourage and inspire European companies to invest** more in their workforce, moving on from the crisis mind-set. The good practice cases have clearly shown that **well-designed measures responding to employers' needs** and devised in cooperation with employers or sectors **are able to leverage large amounts of private funding,** above 100% matching of public funds.

Furthermore the EU provides support for measures increasing the adaptability of the labour force through the European Social Fund, the European Globalisation Adjustment Fund, and initiatives as the Youth Guarantee. These provide adaptable frameworks for Member States to work with employers. Moreover, such EU level policies play an important role in raising awareness on the issues at stake. The Parliament can **support the use of these funds to increase the adaptability of the labour force with an enhanced focus on up-skilling**.

5.2.3. Broaden the view on intra-EU mobility

The EU has a main role to play in removing barriers for migration. Obviously there are personal obstacles to moving to another Member State for work, such as language, culture and family. But other issues such as transferability of social security rights and welfare benefits still need to be developed further.

The recently upgraded EURES programme is crucial in supporting targeted EU mobility. More specifically the action "***Your first EURES job*" can be catalogued as a targeted mobility scheme for young people** and thereby reduce particular shortages. The last evaluation of the preparatory action indicated its successfulness, but a choice on its future direction still has to be made. As it can draw upon the experience of the EURES network, it can more easily overcome cultural barriers which hamper purely national mobility schemes such as *MobiPro* in **Germany.**

Nevertheless, as shown above, mobility between Member States can be a controversial "solution" to labour market shortages, resulting in negative effects for Member States with relatively high emigration rates. To counter such effects the European Parliament could investigate a return on education within the EU.

If Europe promotes free movement of education similarly to free movement of workers, then more European funding for education might be advisable. When education or training is enjoyed in a certain country, the return on investment should perhaps not only be personal but also revert to the Member States investing in the education.

The European Parliament could **call upon the Commission to expand on the experience of *Your first EURES job* and further develop targeted mobility schemes** at European level.

5.2.4. Design flexible shortage measures within broader labour market policies

Many measures that can help in overcoming labour shortages are not designed in the first place to reduce labour shortages but to address other labour market issues. Consequently, there is not so much a need for separate policies that focus only on labour market shortages per se, but rather for incorporating the objective of reducing labour **shortages as an additional goal into labour market policies in general**.

For example, the primary motivation to **invest in education programmes for the long-term** (e.g. in the promotion of STEM subjects) is not to reduce skills shortages, but rather

the importance of building a knowledge economy. At the same time, that investment creates adaptability of the labour force and may thus help in reducing future labour shortages

In particular there is a high level of gender segregation of the labour market– e.g. a lack of men in the care sector or women in manufacturing and construction. **Achieving a more balanced gender distribution could also contribute to overcoming certain shortages/mismatches**.

A third example relates to using the full potential of the population at working age. Many of these measures are useful for reducing shortages but are not directly targeted to specific shortages, e.g. **training of skills for activation can be more effective if you direct the training directly to bottleneck occupations**. Trainees will then also be more likely to find a job. For general activation policies, every Member State should identify priority groups for activation (e.g. women through the availability of affordable and good quality childcare in the **UK** or **Germany**). Such policies are necessary to reduce unemployment and to make optimal use of the potential labour pool, while also providing a solution to shortages.

However, the experience of the different cases studied has shown that **a main success factor** to implement a measure countering (an) identified shortage(s) is a **programme design adaptable to fit changing circumstances.** Europe is confronted with mainly qualitative shortages linked to specific regions, skills or occupations, the ability to focus and target interventions in different ways and at different sectors also drives success. There are several ways to achieve the adaptability of a measure without hindering its smooth implementation:

- Incorporate the opportunity for yearly adaptations in training or education priorities to alter the targeted occupations or occupational groups;
- Build in self-sustaining networks (e.g. career services in universities and schools) that can respond to new expectations from either graduates or employers;
- Involve local actors through a network approach;
- Use a project based approach allowing variation in the interventions depending on the local needs.

This means **measures tackling labour shortages should be designed as flexible** as possible, but **embedded within active labour market policies.** At European level the European Social Fund (ESF) is the perfect tool to provide a general framework for labour market policies within the Member States, providing them with guidelines, funding and the necessary flexibility to keep measures adaptable to changing circumstances. The ESF also allows for project-based funding, which helps to target measures to the most urgent shortages.

The European Parliament could **call upon the Commission to use the European Social Funds as a tool to support shortages policies within Member States, especially focussing on skills shortages.** Member States could be advised to take labour market shortages into account when designing the National Operational Programmes (OPs).

5.2.5. Invest in monitoring and forecasting

A last recommendation concerns the availability of data to design effective policies. Tackling shortages is dependent upon adequate information on current and future labour market needs.

Firstly, to identify current shortages, **investment in better monitoring of vacancies** similarly to the US Job Opening and Labour Turnover Survey, could be of great value. Currently, only (limited) information is available on open vacancies through employers advertising them through local PES and developments such as the European Vacancy Monitor. Current employer surveys produce some information, but they could be significantly improved and collect information on actual job openings, hiring's and separations, rather than just subjective skills shortages. Continued monitoring allows for detection of trends.

Better monitoring also allows for better management at a micro level. The good practice cases clearly illustrate that the close follow-up of needs and results is essential for devising effective measures which respond in a timely fashion to the required needs. In other words, appropriate monitoring facilitates the adaptability of the measure.

Secondly, the development of long-term strategies requires powerful **tools to predict** labour market **evolutions** and future skills requirements. Investing in such tools has significant value for preparing solid labour market policies and programmes. Nevertheless, it is important to guard against blind trust in those same tools. They are essential but **should be used only to the extent of their possibilities**. Predictions very often do not come true because of (i) the inherent difficulty in predicting, (ii) macro-economic factors such as the business cycle, and finally, (iii) (successful) policy factors.

Through, amongst others, its Agenda for New Skills and jobs, the EU already invests in several labour market monitoring and forecasting tools; in particular the Skills panorama, Cedefop's skills forecasts, and the EU Vacancy Monitor. The European Parliament could **support all efforts to strengthen the further development of these tools** and **urge the Commission to support individual Member States to incorporate their information into** the design of their **labour market policies** to increase quality and effectiveness of Member State programmes.

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ANNEX 1: TABLES

Table A 1: Top 20 bottleneck vacancies at European level (ISCO 4-digit)

Rank at ISCO 4-digit level	ISCO code and description	Number of bottleneck vacancies reported
1	5120 Cooks	17
2	7223 Metal working machine tool setters and operators	9
3	5223 Shop sales assistants	6
4	2221 Nursing professionals	10
5	8332 Heavy truck and lorry drivers	8
6	7212 Welders and flamecutters	10
7	2144 Mechanical engineers	9
8	2512 Software developers	9
9	2212 Specialist medical practitioners	10
10	7115 Carpenters and joiners	11
11	3322 Commercial sales representatives	6
12	2151 Electrical engineers	8
13	5131 Waiters	7
14	2142 Civil engineers	6
15	2511 Systems analysts	7
16	2341 Primary school teachers	6
17	7126 Plumbers and pipe fitters	8
18	2411 Accountants	7
19	7411 Building and related electricians	6
20	5321 Health care assistants	3

Source: EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final: p. 21

Table A 2: Specific bottleneck occupations among metal, machinery and related trades workers[47]

Country	3 or 4-digit occupations[37]	Regional aspects
France	7211 Metal moulders and coremakers (7) 7213 Sheet-metal workers (specifically: sheet-metal workers (5); Pipefitters (2)) 7214 Structural-metal preparers and erectors (8) 7223 Metal working machine tool setters and operators (4) 7231 Motor vehicle mechanics and repairers (9)	
Austria	7212 Welders and flamecutters (6) 7223 Metal working machine tool setters and operators workers (specifically: Metal turners (2)) 7222 Toolmakers and related workers (15) 7224 Metal polishers, wheel grinders and tool sharpeners (specifically: Milling machinists (1)) 7233 Agricultural and industrial machinery mechanics and repairers (9)	7223: both rural and urban areas are affected 7224: rural areas affected In particular metal turners and milling machinists are lacking in rural regions characterized by intensive industrialisation. The regions of Steiermark, Niederösterreich, and Oberösterreich have a high share of industrial production and require large numbers of employees in craft and related trades.
Italy	7214 Structural-metal preparers and erectors (14) 7223 Metal working machine tool setters and operators (specifically: Lathe turner (3)) 7231 Motor vehicle mechanics and repairers (17) 7233 Agricultural and industrial machinery mechanics and repairers (8)	7223: both rural and urban areas are affected Concerning lathe turners recruitment difficulties are registered on the whole national territory. However in the region Lombardia the level of firms expecting recruitment difficulties is higher than the national average.
Slovenia	7212 Welders and flamecutters 7222 Toolmakers and related workers 7223 Metal working machine tool setters and operators 7233 Agricultural and industrial machinery mechanics and repairers	7222: both rural and urban areas are affected 7233: both rural and urban areas are affected
United Kingdom	7214 Structural-metal preparers and erectors (specifically: Metal plate workers. and riveters (13)) 7222 Toolmakers and related workers (specifically: Toolmakers and CNC machinists (9)) 7223 Metal working machine tool setters and operators (4) 7231 Motor vehicle mechanics and repairers (specifically: Vehicle body builders & repairers (10))	
Belgium	7223 Metal working machine tool setters and operators (20) 7233 Machinery mechanics and repairers (16) 7231 Motor vehicle mechanics and repairers (19)	
Czech Republic	7212 Welders and flamecutters (7) 7222 Toolmakers and related workers (18) 7223 Metal working machine tool setters and operators (11)	
Estonia	7212 Welders and flamecutters 7223 Metal working machine tool setters and operators 723 Machinery mechanics and repairers	723: both rural and urban areas are affected 7212: both rural and urban areas are affected 7223: both rural and urban areas are affected

[47] Countries are ranked according to the number of reported bottleneck vacancies in this occupational group, with the country with the highest number of reported bottleneck vacancies ranked first.

Country	3 or 4-digit occupations[37]	Regional aspects
Hungary	7212 Welders and flamecutters (16) 7222 Toolmakers and related workers (8)	
Latvia	7212 Welders and flamecutters (1) 7214 Structural-metal preparers and erectors (2)	
Lithuania	7212 Welders and flamecutters 7231 Motor vehicle mechanics and repairers	7212: both rural and urban areas are affected 7231: both rural and urban areas are affected
Slovakia	7212 Welders and flamecutters (12) 7224 Metal polishers, wheel grinders and tool sharpeners (11)	
Sweden	7213 Sheet-metal workers (13) 7231 Motor vehicle mechanics and repairers (12)	
Bulgaria	7212 Welders and flamecutters	
Cyprus	7215 Riggers and cable splicers (13)	
Denmark	7213 Sheet-metal workers (20)	
Iceland	721 Sheet and structural metal workers, moulders and welders, and related workers	721: both rural and urban areas are affected
Germany	7214 Structural-metal preparers and erectors	
Ireland	7223 Metal working machine tool setters and operators (specifically: Precision toolmakers and CNC)	
Malta	7232 Aircraft engine mechanics and repairers	
Norway	7212 Welders and flamecutters (15)	7212: both rural and urban areas are affected
Poland	72 Metal, machinery and related trades workers (6)	
Romania	723 Machinery mechanics and repairers (14)	

Source: EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final: p. 47

Table A 3: Specific bottleneck occupations among science and engineering professionals[48]

Country	3 or 4-digit occupations[37]	Regional aspects
Bulgaria	2132 Farming, forestry and fisheries advisers 2141 Industrial and production engineers 2142 Civil engineers 2151 Electrical engineers 2163 Product and garment designers	2132: rural areas affected
Germany	2149 Engineering professionals not elsewhere classified 2142 Civil engineers 2151 Electrical engineers 2144 Mechanical engineers	2149: both urban and rural areas affected 215: both urban and rural areas affected 2144: both urban and rural areas affected, particularly Western states and Thuringa
Greece	2141 Industrial and production engineers 2149 Engineering professionals not elsewhere classified 2152 Electronics engineers 2153 Telecommunications engineers	2149: both urban and rural areas affected
The Netherlands	2144 Mechanical engineers 2149 Engineering professionals not elsewhere classified 2152 Electronics engineers 216 Architects, planners, surveyors and designers	2144: both urban and rural areas affected 2149: both urban and rural areas affected
Sweden	2142 Civil engineers (6) 2144 Mechanical engineers (14) 2146 Mining engineers, metallurgists and related professionals (4) 2151 Electrical engineers (8)	2146: rural areas affected Most mines are located in the NUTS region SE33 (North-Western Sweden) 2151: both urban and rural areas affected
Estonia	2144 Mechanical engineers 2151 Electrical engineers 2152 Electronics engineers	2144: both urban and rural areas affected 2151: both urban and rural areas affected 2151: both urban and rural areas affected
Ireland	2113 Chemists (Scientists (biologists. chemists and biotechnologists) especially niche skills for the roles in Bio-pharmaceutical industry such as covigilance and product formulation and analytical development (10)) 2141 Industrial and production engineers (8) 2151 Electrical engineers (9)	
Lithuania	2141 Industrial and production engineers 2151 Electrical engineers 2152 Electronics engineers	2144: both urban and rural areas affected 2149: both urban and rural areas affected
Austria	2144 Mechanical engineers (11) 2151 Electrical engineers (5)	
Belgium	214 Engineering professionals (excluding electrotechnology) (2)	214: both urban and rural areas affected
Croatia	2142 Civil engineers (6) 2151 Electrical engineers (9)	2142: urban areas affected 2151: urban areas affected

[48] Countries are ranked according to the number of reported bottleneck vacancies in this occupational group, with the country with the highest number of reported bottleneck vacancies ranked first.

Country	3 or 4-digit occupations[37]	Regional aspects
Slovakia	2142 Civil engineers (2) 2144 Mechanical engineers (3)	
Slovenia	2144 Mechanical engineers 2151 Electrical engineers	2144: both urban and rural areas affected 2151: both urban and rural areas affected
Denmark	2144 Mechanical engineers (5)	2144: both urban and rural areas affected
France	2161 Building architects (specifically: Building designer (18))	
Italy	2144 Mechanical engineers (10)	2144: both urban and rural areas affected
Norway	2142 Civil engineers (19)	2142: both urban and rural areas affected
Poland	21 Science and engineering professionals (8)	
Portugal	2152 Electronics engineers (15)	2152: both urban and rural areas affected
Romania	2151 Electrical engineers (specifically: Electrotechnology engineers(12))	2151: urban areas affected
United Kingdom	2152 Electronics engineers (17)	

Source: EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final: p. 54

Table A 4: Specific bottleneck occupations among information and communications technology professionals[49]

Country	3 or 4-digit occupations[37]	Further specification (when relevant)	Regional aspects
Ireland	2512 Software developers 2513 Web and multimedia developers 2514 Applications programmers 2519 Software and applications developers and analysts not elsewhere classified 2523 Computer network professionals	2513: Cloud computing specialists (e.g. Shell. Pearl. Python and Virtualisation Technologies. namely FlexNetwork and Microsoft Application Virtualization) Web and multimedia developers - Web development (e.g. HTML/XHTML. JavaScript. and CSS). and client computing Web and multimedia developers - Animation 3D (gaming industry). C++/Java.net	2512: rural and urban areas affected 2513: rural and urban areas affected. The recruitment difficulty follows the pattern of sector activity, jobs are mainly in Dublin. Galway and Cork. 2514: rural and urban areas affected 2519: urban areas affected 2523: rural and urban areas affected
Spain	2514 Applications programmers 2519 Software and applications developers and analysts not elsewhere classified 2521 Database designers and administrators	2521: ABAP Programmer Oracle Database Administrator Cobol Programmer JAVA Architect	
Greece	2512 Software developers 2513 Web and multimedia developers 2521 Database designers and administrators 2522 Systems administrators 2523 Computer network professionals	2512 and 2513: Mobile applications, Java, J2EE, .NET, C#, PHP and Drupal Framework, web user interface designing, Web Developments, LINUX and system testing for specific protocols (e.g. TCP/UDP/GTP/SIP)	
The Netherlands	2511 Systems analysts 2512 Software developers	2511: Computer scientists Systems Analysts Technical Systems Analysts	2511: rural and urban areas affected 2512: 2511: rural and urban areas affected
Iceland	2511 Systems analysts	n/a	
Malta	2512 Software developers 2519 Software and applications developers and analysts not elsewhere classified 2522 Systems administrators	2519: Software testers	
Sweden	251 Software and applications developers and analysts (see further specification) 2511 Systems analysts (16) 2512 Software developers (2)	251: IT architects (5)	2511: urban areas affected

[49] Countries are ranked according to the number of reported bottleneck vacancies in this occupational group, with the country with the highest number of reported bottleneck vacancies ranked first.

Country	3 or 4-digit occupations[37]	Further specification (when relevant)	Regional aspects
Bulgaria	251 Software and applications developers and analysts 252 Database and network professionals	n/a	
Italy	2511 Systems analysts (1) 2512 Software developers (see further specification)	2512: IT system designer (18)	2511: rural and urban areas affected 2512: rural and urban areas affected
Lithuania	251 Software and applications developers and analysts 252 Database and network professionals	n/a	251: urban areas affected 252: urban areas affected
Austria	2512 Software developers (see further specification)	2512: Systems analysts; Software developers; Computer network and systems	
Belgium	251 Software and applications developers and analysts (4)	n/a	251: rural and urban areas affected
Czech Republic	2514 Applications programmers (15)	n/a	
Denmark	2519 Software and applications developers and analysts not elsewhere classified (see further specification)	2519: Software and applications developers and analysts (3)	2519: rural and urban areas affected
Estonia	251 Software and applications developers and analysts	n/a	251: rural and urban areas affected
Germany	2521 Database designers and administrators 2523 Computer network professionals	n/a	
Latvia	2512 Software developers (5)	n/a	
Poland	25 Information and communications technology professionals (12)	n/a	25: urban areas affected
Portugal	2511 Systems analysts (17)	n/a	2511: rural and urban areas affected
Romania	251 Software and applications developers and analysts (16)	n/a	251: urban areas affected

Source: EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final: p. 61

Table A 5: Specific bottleneck occupations among health professionals[50]

Country	3 or 4-digit occupations[37]	Regional aspects
Finland	221 Medical doctors (2) 2221 Nursing professionals (specifically: Nurse; Laboratory nurses and radiographers (1)) 2261 Dentists (7) 2262 Pharmacists (16) 2266 Audiologists and speech therapists (17) 2269 Health professionals not elsewhere classified (15)	221: rural and urban areas affected. There is a shortage of labour in the whole country (all NUTS 3 regions). Remote areas have particularly had trouble attracting qualified doctors. 221: urban areas affected 2262: rural and urban areas affected
Croatia	2211 Generalist medical practitioners (7) 2212 Specialist medical practitioners (8) 222 Nursing and midwifery professionals (20) 2262 Pharmacists (19)	222: rural and urban areas affected. Particular problem in isolated areas and on islands. 2211: rural and urban areas affected 2212: rural and urban areas affected 2262: urban areas affected
Malta	2212 Specialist medical practitioners 222 Nursing and midwifery professionals 2240 Paramedical practitioners 2250 Veterinarians	
France	2211 Generalist medical practitioners (12) 2212 Specialist medical practitioners (15) 2261 Dentists (1)	2211: rural areas affected 2212: rural areas affected 2262: rural areas affected. Strong disparity is observed between the north (less attractive excepted for Alsace Bretagne and Ile-de-France) and the south in terms of dentists density. Density in attractive regions like Provence-Alpes-Côte d'Azur is more than twice compared to some unattractive regions like Basse-Normandie. Picardie or Haute-Normandie. But even in high density regions 100% recruitment difficulties are observed as in Alsace. The 100% recruitment difficulties régions are listed in Nuts code.
Romania	2211 Generalist medical practitioners (20) 2212 Specialist medical practitioners (20) 2221 Nursing professionals (20)	
Bulgaria	2212 Specialist medical practitioners 2221 Nursing professionals	
Czech Republic	2211 Generalist medical practitioners (20) 2212 Specialist medical practitioners (3)	
Denmark	221 Medical doctors 2221 Nursing professionals (16)	221: rural and urban areas affected
Germany	2211 Generalist medical practitioners 2212 Specialist medical practitioners 2221 Nursing professionals 2222 Midwifery professionals	2211: rural and urban areas affected 2212: rural and urban areas affected 2221: rural and urban areas affected 2222: rural and urban areas affected
Iceland	2211 Generalist medical practitioners 2212 Specialist medical practitioners	2211: rural and urban areas affected
Lithuania	2211 Generalist medical practitioners 2221 Nursing professionals (specifically: Nurses of general practice)	2211: rural and urban areas affected
Netherlands	2212 Specialist medical practitioners (specifically: Specialist medical doctors, especially geriatric medicine. doctors for	2212: rural and urban areas affected 2221: urban areas affected

[50] Countries are ranked according to the number of reported bottleneck vacancies in this occupational group, with the country with the highest number of reported bottleneck vacancies ranked first.

Country	3 or 4-digit occupations[37]	Regional aspects
	mentally handicapped. First aid doctors (specific certified education) and psychiatrists.) 2221 Nursing professionals	
Norway	2221 Nursing professionals (specifically: Nurses (2); Specialist nurses (13))	2221: rural and urban areas affected
Sweden	221 Medical doctors (7) 2221 Nursing professionals (specifically: Operation theatre nurse (15); Psychiatric nurse (17); Emergency care nurses (19))	221: rural and urban areas affected 2221: rural and urban areas affected
Belgium	2221 Nursing professionals (6)	2221: rural and urban areas affected
Estonia	221 Medical doctors	221: rural areas affected
Ireland	2212 Specialist medical practitioners (specifically: Non-consultant hospital doctors - trainee doctors who have not yet reached the rank of specialist hospital consultant)	
Italy	2262 Pharmacists (6)	2262: rural areas affected
Latvia	2212 Specialist medical practitioners (13)	2212: rural areas affected
Poland	22 Health professionals (9)	22: rural areas affected
Spain	2263 Environmental and Occupational Health and Hygiene Professionals 2262: Occupational therapist	

Source: EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final: p. 69

Table A 6: Specific bottleneck occupations among building and related trades workers, excluding electricians[51]

Country	3 or 4-digit occupations[37]	Regional aspects
Austria	7115 Carpenters and joiners (specifically: Carpenter (7); Joiner (13); Construction- and furniture joiner (16)) 7121 Roofers (4) 7126 Plumbers and pipe fitters (12)	The regions of Steiermark, Niederösterreich, and Oberösterreich have a high share of industrial production and require large numbers of employees in craft and related trades.
Croatia	7112 Bricklayers and related workers (13) 7115 Carpenters and joiners (14) 7126 Plumbers and pipe fitters (15)	7112: urban areas affected 7115: rural areas affected 7126: rural areas affected
Cyprus	7115 Carpenters and joiners (12) 7124 Insulation workers (16) 7131 Painters and related workers (14)	
Denmark	7115 Carpenters and joiners (specifically: Carpenter (7); Joiner (13); Construction- and furniture joiner (16))	
Iceland	7111 House Builders 7114 Concrete placers, concrete finishers and related workers 7126 Plumbers and pipe fitters	7111: rural and urban areas affected 7114: rural and urban areas affected 7126: rural and urban areas affected
Romania	711 Building frame and related trades workers (9) 712 Building finishers and related trades workers (2) 713 Painters, building structure cleaners and related trades workers (3)	
Slovenia	7115 Carpenters and joiners 7123 Plasterers (specifically: Workers in drywall construction and similar) 7126 Plumbers and pipe fitters	7115: rural and urban areas affected 7123: rural and urban areas affected 7126: rural and urban areas affected
France	7121 Roofers (6) 7126 Plumbers and pipe fitters (specifically: Pipe fitters(20))	
Greece	7115 Carpenters and joiners 7126 Plumbers and pipe fitters	
Italy	7126 Plumbers and pipe fitters (specifically: Plumbers (5)) 7127 Air conditioning and refrigeration mechanics (specifically:Heating system mechanic (2))	7126: rural and urban areas affected. Difficulties in recruitment for plumbers in the Lazio region are higher than the national average
Latvia	7123 Plasterers (16) 7132 Spray painters and varnishers (10)	
Malta	7114 Concrete placers, concrete finishers and related workers 7127 Air conditioning and refrigeration mechanics	
Norway	7115 Carpenters and joiners (4) 7126 Plumbers and pipe fitters (14)	7115: rural and urban areas affected 7126: rural and urban areas affected

[51] Countries are ranked according to the number of reported bottleneck vacancies in this occupational group, with the country with the highest number of reported bottleneck vacancies ranked first.

Country	3 or 4-digit occupations[37]	Regional aspects
Portugal	7119 Building frame and related trades workers not elsewhere classified (2) 7131 Painters and related workers (20)	7119: rural and urban areas affected 7131: rural and urban areas affected
Czech Republic	7112 Bricklayers and related workers (specifically: Bricklayers (16))	
Estonia	711 Building frame and related trades workers	711: rural and urban areas affected
Hungary	7112 Bricklayers and related workers (18)	
Poland	71 Building and related trades workers, excluding electricians (1)	

Source: EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final: p. 77

Table A 7: Specific bottleneck occupations among personal service workers[52]

Country	3 or 4-digit occupations[37]	Regional aspects
Italy	5132 Bartenders (19) 5141 Hairdressers (9) 5142 Beauticians and related workers (16)	5132: rural and urban areas affected 5141: rural and urban areas affected 5142: rural and urban areas affected
Bulgaria	5120 Cooks 5131 Waiters	
Croatia	5120 Cooks (2) 5131 Waiters (1)	5120: urban areas affected. In particular Adriatic Croatia with the touristic regions by the sea. 5131: rural and urban areas affected
Denmark	5120 Cooks (specifically: highly experienced chefs (6)) 5131 Waiters (10)	
Iceland	5113 Travel guides 5131 Waiters	
Romania	512 Cooks (11) 513 Waiters and bartenders (11)	512: urban areas affected 513: urban areas affected
Slovakia	5120 Cooks (5) 5131 Waiters (13)	
United Kingdom	5120 Cooks (8) 5141 Hairdressers (specifically: Hairdressers and beauticians (6))	
Cyprus	5120 Cooks (Specifically: Cooks (specialized in Asian cuisine) (4)	
Czech Republic	5120 Cooks (13)	
Estonia	5120 Cooks	5120: rural and urban areas affected
Finland	5120 Cooks (specifically: Chefs and cooks (20))	5120: rural and urban areas affected
Hungary	5120 Cooks (5)	
Latvia	5120 Cooks (4)	
Lithuania	5120 Cooks	
Malta	5131 Waiters	
Norway	5120 Cooks (10)	5120: rural and urban areas affected
Poland	51 Personal service workers (3)	
Slovenia	5120 Cooks	5120: rural and urban areas affected
Sweden	5120 Cooks (11)	5120: urban areas affected

Source: EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final: p. 84

[52] Countries are ranked according to the number of reported bottleneck vacancies in this occupational group, with the country with the highest number of reported bottleneck vacancies ranked first.

Table A 8: Specific bottleneck occupations among science and engineering associate professionals[53]

Country	3 or 4-digit occupations[37]	Regional aspects
Austria	3115 Mechanical engineering technicians (specifically: with higher level of training (3); Mechanical engineering technicians (14)) 3113 Electrical engineering technicians (18) 3114 Electronics engineering technicians (10) 3119 Physical and engineering science technicians not elsewhere classified (20)	
Norway	3112 Civil engineering technicians (11) 3115 Mechanical engineering technicians (20) 3117 Mining and metallurgical technicians (17) 3119 Physical and engineering science technicians not elsewhere classified (9)	3112: rural and urban areas affected 3119: rural and urban areas affected
France	3118 Draughtspersons (specifically: Draughtspersons (electric and electronic) (14); Draughtspersons (metal industry) (13)) 3139 Process control technicians not elsewhere classified (19)	
Sweden	3112 Civil engineering technicians (18) 3117 Mining and metallurgical technicians (3) 3151 Ships engineers (20)	3112: rural and urban areas affected 3117: rural areas affected. Most mines are located in the NUTS Region SE 33 in North-Western Sweden.
United Kingdom	3118 Draughtspersons (20) 3123 Construction supervisors (5) 3152 Ships deck officers and pilots (7)	
Belgium	311 Physical and engineering science technicians (specifically: Technicians (3); Draughtsperson (industrial. electric/mechanic. civil) (17))	311: rural and urban areas affected
Bulgaria	3114 Electronics engineering technicians 3115 Mechanical engineering technicians	
Cyprus	3113 Electrical engineering technicians (15)	
Iceland	3151 Ships‘ engineers	3151: rural and urban areas affected
Ireland	3122 Manufacturing supervisors (pecifically: Process control technicians - production and process engineers. Especially process automation & system control engineers.)	
Malta	3141 Life science technicians (excluding medical)	
Poland	31 Science and engineering associate professionals (13)	
Portugal	3139 Process control technicians not elsewhere classified (8)	3139: rural and urban areas affected
Romania	311 Physical and engineering science technicians (7)	311: urban areas affected

Source: EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final: p. 90

[53] Countries are ranked according to the number of reported bottleneck vacancies in this occupational group, with the country with the highest number of reported bottleneck vacancies ranked first.

Table A 9: Specific bottleneck occupations among sales workers[54]

Country	3 or 4-digit occupations[37]	Regional aspects
Norway	5223 Shop sales assistants (3) 5244 Contact centre salespersons (7)	5223: rural and urban areas affected
Belgium	5244 Contact centre salespersons (10)	5244: rural and urban areas affected
Denmark	5223 Shop sales assistants (4)	5223: rural and urban areas affected
Finland	52 Sales workers (specifically: Sales worker and telemarketer (4))	
Hungary	5223 Shop sales assistants (4)	5223: rural and urban areas affected
Iceland	5246 Food service counter attendants	
Italy	5246 Food service counter attendants (4)	
Lithuania	5223 Shop sales assistants (4)	
Poland	52 Sales workers (4)	
Portugal	5223 Shop sales assistants (6)	5223: rural and urban areas affected
Romania	522 Shop salespersons (17)	
Spain	5249 Sales workers not elsewhere classified (specifically: Energy performance salesperson)	
United Kingdom	5223 Shop sales assistants (specifically: Merchandisers and window dressers (3))	5223: urban areas affected

Source: EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final: p. 96

[54] Countries are ranked according to the number of reported bottleneck vacancies in this occupational group, with the country with the highest number of reported bottleneck vacancies ranked first.

Table A 10: Specific bottleneck occupations among drivers and mobile plant operators[55]

Country	3 or 4-digit occupations[37]	Regional aspects
Denmark	832 Car, van and motorcycle drivers (8) 8322 Car, taxi and van drivers (specifically: Taxi drivers (17))	
Italy	8331 Bus and tram drivers (12) 8342 Earthmoving and related plant operators (specifically: Mechanical digger driver (13))	
Norway	8331 Bus and tram drivers (18) 8332 Heavy truck and lorry drivers (16)	8331: rural areas affected 8332: rural areas affected
Portugal	8322 Car, taxi and van drivers (19) 8343 Crane, hoist and related plant operators (11)	8322: rural and urban areas affected 8343: rural and urban areas affected
Romania	832 Car, van and motorcycle drivers (20) 833 Heavy truck and bus drivers (18)	
Belgium	8332 Heavy truck and lorry drivers	8332: rural and urban areas affected
Bulgaria	833 Heavy truck and bus drivers	
Czech Republic	8332 Heavy truck and lorry drivers (2)	
Hungary	8332 Heavy truck and lorry drivers (specifically: Truck driver (3))	8332: rural and urban areas affected
Iceland	8331 Bus and tram drivers	
Latvia	8332 Heavy truck and lorry drivers (3)	
Lithuania	8332 Heavy truck and lorry drivers	8332: urban areas affected
Poland	83 Drivers and mobile plant operators (2)	
Slovakia	8332 Heavy truck and lorry drivers (8)	
Slovenia	8332 Heavy truck and lorry drivers (specifically: Lorry and hauler driver)	8332: rural and urban areas affected

Source: EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final: p. 101

[55] Countries are ranked according to the number of reported bottleneck vacancies in this occupational group, with the country with the highest number of reported bottleneck vacancies ranked first.

Table A 11: Specific bottleneck occupations among food processing, wood working, garment and other craft and related trades workers[56]

Country	3 or 4-digit occupations[37]	Regional aspects
Hungary	7511 Butchers, fishmongers and related food preparers (specifically: Meat processor (7)) 7512 Bakers, pastry-cooks and confectionery makers (specifically: Baker, confectionery maker (6)) 7531 Tailors, dressmakers, furriers and hatters (specifically: Tailor, sewer (10))	
Latvia	7511 Butchers, fishmongers and related food preparers (14) 7531 Tailors, dressmakers, furriers and hatters (12) 7533 Sewing, embroidery and related workers (9)	
Romania	751 Food processing and related trades workers (15) 752 Wood treaters, cabinet-makers and related trades workers (8) 753 Garment and related trades workers (1)	752: urban areas are affected
Croatia	7511 Butchers, fishmongers and related food preparers (17) 7512 Bakers, pastry-cooks and confectionery makers (16)	7511: rural and urban areas are affected 7512: urban areas are affected
Portugal	7522 Cabinet-makers and related workers (18) 7523 Woodworking-machine tool setters and operators (10)	7522: rural and urban areas are affected 7523: rural and urban areas are affected
Bulgaria	7533 Sewing, embroidery and related workers	
Cyprus	7512 Bakers, pastry-cooks and confectionery makers (11)	
Czech Republic	7533 Sewing, embroidery and related workers (5)	
France	752 Wood treaters, cabinet-makers and related trades workers (11)	
Norway	7549 Craft and related workers not elsewhere classified (12)	7549: rural and urban areas are affected
Poland	75 Food processing, wood working, garment and other craft and related trades workers (11)	
Slovakia	7543 Product graders and testers (10)	

Source: EC (2014), Mapping and Analysing Bottleneck Vacancies in EU Labour Markets, Overview report, Final: p. 101

[56] Countries are ranked according to the number of reported bottleneck vacancies in this occupational group, with the country with the highest number of reported bottleneck vacancies ranked first.

ANNEX 2: CASE STUDIES

Case study 1: FixO Scuola&Università - Italy

Short description and functioning	FIxO Scuola&Università ('Vocational Training and Innovation for Employment – School and University') aims to facilitate education-to-work transition of young people, while reducing the job-mismatch phenomenon. This mismatch has been especially persistent for young people in Italy. The programme aims to strengthen the skills handoff young people and to create a better match between the education system and the labour demand through apprentice and traineeships, career services, and financial incentives to employers to hire students.
Designed to counter which shortage	Employers experience difficulties in finding and hiring skilled staff, even in times of considerably high youth unemployment and inactivity rates. The measure counters these shortages by facilitating the transition from education to work of young people thereby also avoiding job-mismatches.
Implementation date	September 2011 – December 2016
Responsible authority	Promoted by the Italian Ministry of Labour and Social Policies in agreement with the Regions and the involvement of the Ministry of Education, University and Research, and Ministry of Youth, and designed and implemented by Italia Lavoro, the Ministry of Labour's in-house executive agency.
Partners involved	Italian Regional Governments and Administrations are involved in the programme through the Regional Education Offices with a role of coordination at regional level, and with the aim to implement specific actions, including pilot ones, together with 75 Universities and 650 High Schools.

Context of the measure

What shortages are detected in the country/region/sector?

Already in 2007 23% of employers in Italy indicated difficulties in finding skilled workers. Despite the crisis and high youth unemployment, this increased to 27% in 2011. The main problem for Italy points towards skill mismatch instead of skill shortages. The OECD (2012) recommended Italy *to tackle high youth unemployment as a top priority by reinforcing its efforts, first, to ensure that youth leave school with the skills required by employers and, second, to remove labour market barriers preventing young people from finding rewarding and productive jobs*.

Employers thus indicate that the skills and professional qualifications of graduates of many educational institutions do not match those required on the labour market. Universities and schools have to work together to reduce this mismatch between graduates' skills and the skills needed on the labour market. They must also work simultaneously to alleviate the

difficulties of (high school and university) graduates entering the labour market. Some attempts to overcome this long-standing issue have already been taken such as reforming the university system in order to bring it closer to the needs of employers, but further action was needed.

The programme was designed to provide young graduates with a faster transition from school and university to the world of work. In addition to swifter entry in the labour market, it is important that jobs of young people can find work which corresponds to their field of study and the level of qualification obtained. This became even more important as of 2009. Since then, a progressive deterioration of Italian labour market has been observed, which has resulted in a significant reduction of employment opportunities for young people. The total number of employed aged 15 to 29 years has decreased by 727,000 between 2008 and 2012 and their employment rate fell by about seven percentage points to 32.5%. Istat (Italian National Statistical Office) data displays an extremely critical picture: in 2013 in Italy the total employment rate was 56%, the unemployment rate was 12% and the youth unemployment rate (15 to 24 years) was 40.5%. The latter rose to 44.5% in 2014.

In what main occupations and/or skills levels?

Specific bottlenecks for skilled technical workers and ICT professions occur, but the overall mismatch is much broader. In Italy the lack of technical and specific medium-high skills reduces the probability of young people accessing the labour market. In fact, 53% of young unemployed individuals are young individuals with a low level of education (primary or lower secondary education), while 37% are high school graduates and only 10% hold a university degree. The analysis of the skill needs of enterprises highlights how many businesses, despite the economic crisis, are unable to find skilled staff.

In 2014 there were about 39,000 unfilled job vacancies. Especially vacancies concerning engineering remain unfilled. The reason is often a lack of qualified candidates for these vacancies. However, it has been noted that the lack of qualifications and skills is also due to a preference mismatch. Young people consider some careers as less attractive, which is why they choose not to pursue the necessary skills or qualifications.

What are the main reasons?

Nowadays, young people accessing the labour market are confronted with a situation in which the degree they hold does not correspond automatically to a specific vocation or area of employment. Occupations today have very different characteristics from the past. New occupations display a great versatility, as they require skills hardly matching a single specific scientific knowledge. Required skills are, in fact, referring to different scientific and technical fields but also to different social and personal dimensions. As the relation between job and education has become less straightforward, so has the matching process.

What is the general policy approach in the country regarding shortages?

The long-term strategy - with guidelines identified by Europe 2020 and by ‘Italy 2020 Action Plan for youth employment’ and designed jointly by the Ministry of Labour and Social Policy, Ministry of Education, University and Research and Ministry of Youth – is to promote the convergence of employment rates of Italian young graduates to the EU average, and to improve the quality of jobs for skilled workers such as high school graduates, graduates and PhD holders.

In order to facilitate the transition from education to employment, the Law 30/2003 was introduced. Its aim was reforming the labour market, including high schools and universities, by facilitating the transition to employment of young graduates. In order to ensure the highest matching between qualifications obtained and job requirements, it is

necessary to link the educational offer with the skills required by the employers. Articles 48/50 of Legislative Decree no. 276/2003 and subsequent amendments and, later, the Consolidated Law on apprenticeship (Legislative Decree 167/11) have standardized the apprenticeship contract, which is a useful tool to promote earlier entry of young people into the labour market, while supporting the matching between theoretical training and employers' needs.

Is the approach national/regional/local?

The programme has been designed by the Ministry of Labour and Social Policy, in agreement with the Ministry of Education, University and Research and the Ministry of Youth, and the Regional Governments. The latter are involved in the programme with a role of coordination at regional level, and with the aim of implementing specific actions, including pilot ones.

Is there coordination in the approach between the different levels?

The Ministry of Labour and Social Policy has signed an agreement with each of the Regions involved in the program FIxO S&U in order to ensure the objectives and operational methods are shared. The assessment of progress of the project, the identification of critical issues and the possible introduction of corrective actions are managed by Italia Lavoro, the Italian national administration for Labour, and communicated to the Ministry and the Regions through monthly and quarterly reports. In this way Italia Lavoro supports national and regional institutions in the defining the objectives and common guidelines for the interventions and determining the investments in the field of employment of young people. Particular attention is paid to the implementation of the reform of apprenticeships, and the design of guidelines for training, through support to the Regional Governments.

What was the rationale for introducing the measure?

The qualitative and quantitative mismatches between the skill needs of employers and the educational programmes, leading to poor employment opportunities for young people holding specific degrees, was the main motivation behind the measure. The rationale for introducing the programme FIxO S&U is also to grant official recognition, at national and regional/local levels, of universities and schools as labour market intermediaries, in addition to public and private employment centres and to other employment services. The proximity of schools and universities to their students allows for effective support, which increases the chances of labour demand and supply matching. Schools and universities should now be able to implement actions of guidance and support to their graduates for getting a job.

How are the shortages identified in order to target the measure?

The action was designed on the basis of national statistical data on youth unemployment in Italy, and data provided by universities and educational institutions collected directly through their counselling and placement services ('Career Service').

How was the measure conceived?

The measure was promoted and funded by the Ministry of Labour and Social Policy in agreement with the Regions and the involvement of the Ministry of Education, University and Research, and Ministry of Youth, and designed and implemented by Italia Lavoro. The operational steps have been defined by Italia Lavoro in collaboration with the Regions, the universities and the schools and are regulated by Regional operational plans and by development and consolidation plans of universities and educational institutions.

The programme started in 2011, and this new edition involves also high schools, whereas in previous editions during the period 2006-2011 it involved only universities. The

programme implements the following activities: 1) technical assistance to universities and high schools to design and implement their own counselling and placement services (called 'Career Services') and to develop networks with other relevant actors (employers, private and public employment services); 2) promoting available contracts to facilitate the education-to-work transition, such as the apprenticeship contract and traineeships, and promoting entrepreneurship; and 3) financial incentives to employers in order to promote hiring of students, high-school graduates, undergraduates and graduates and PhD candidates and holders.

Results of the measure

Shortly describe the implementation of the measure.

The programme FIxO S&U was started on the basis of two previous editions of the programme called FIxO which, from 2006 to 2011, ensured the creation and consolidation of 'University Career Services' in up to 75 universities by 2011. FIxO S&U, for the first time, will involve 650 high schools. The programme, through its specialised staff, provides technical assistance to the Career Services in universities and high schools. The aim is to ensure transferral of service models, methodologies and tools for the placement of young people and students and to encourage implementation of these services to the required standards. The Career Services in the previous editions were able to strengthen their organizational structure and provide customised actions to promote employability.

What is the budget allocated and spent?

The programme has been funded by the Ministry of Labour and Social Policies with a EUR 53,050,000 budget proceeding from the 'Rotation Fund for Vocational Training and for the Access to the ESF' ('Fondo di Rotazione per la Formazione Professionale e per l'Accesso al FSE') for the 2006-2014 period. About half of the budget is allocated to Italia Lavoro, with the rest divided between the partners involved in the programme:

- EUR 4.8 million have been allocated to Universities involved
- EUR 11 million have been allocated to Schools involved
- EUR 8.8 million have been allocated for incentives to promote hiring of young people.

Lombardy, Abruzzi and Molise Regions have assigned additional resources (around 2.2 million in total) to allow a higher number of schools in their territory to be covered by the programme.

Financial resources are allocated to universities and schools to carry out the programme's activities and paid according to the actual results achieved.

Provide descriptive data for the implementation of the measure

The program involved a total of 19 Regions and the two autonomous provinces (Trento and Bolzano), 75 universities, 650 high schools. As of 31 December 2014, the following results were achieved by the University Career Services:

- 75 universities involved in a project of Standards Setting aimed at identifying the main quality standards of the services of placement and to test them operationally;
- 1,600 customised paths for students with specific characteristics (people with disabilities, PhD holders, young people holding degrees hardly required by employers, etc.);

- 221 university courses (undergraduate, master, doctorate) were created as the training offer catalogue for apprenticeships;

At the same date, the School Career Services have achieved the following results:

- 650 guidance and placements made within the schools involved in the project;
- 50,000 young students of the fourth and fifth grade (aged 17-18) involved in customised individual actions of guiding and placement (minimum 7 hours for each young individual) aimed at enhancing their employability.

In total 2,300 new staff members of School and University Career Services were also trained for the organization and delivery of counselling and placement services aimed at young students and enterprises.

What is the impact of the measure on the specific shortage situation?

Existing employment services only included job centres and other public and private entities. FIxO S&U has allowed for expanding and strengthening the regional networks of employment services, providing more opportunities to young people to get in touch with the labour market after graduating. The Career Services which have been set up are a lasting effect of the programme, as they now provide matching services to graduates and will continue to do so after the programme.

As reported by the responsible of the programme, the School and University Career Services are contributing to the aim of aligning the employment rate of Italian graduates to the corresponding EU average rate and also to the objectives of Europe 2020 Strategy, focusing on reducing the gap between skills supply and demand and reducing the time required for the education-to-work transition. Employers have better access to a wider pool of skilled workers to recruit from and thus help to overcome the high skilled shortages which they incur.

What was the effect of the measure for the specific shortage it was targeted on?

The main effect of the measure was the presence of Career Services in universities and schools. To date, Career Services are present in almost 100% of Italian universities and in 10% of high schools. The trend is on a sharp rise also because, as part of the EU Programme on Youth Guarantee, the aim is to promote the creation of such services in 40% of schools. Moreover, as a result of promotion and support carried out by FIxO S&U, the number of apprenticeships for higher level training and research has been multiplied by a factor five since the beginning of the project. Networks and relationships between actors, especially employers, have greatly increased. The networks and partnerships now integrate all relevant actors involved in the intermediation between demand and supply.

Are there data available on effectiveness and efficiency?

Data available to display effectiveness and efficiency of the measure:

- Increase in number of University Career Services by 52% since the beginning of measure and of staff employed in such offices by 83%;
- Increase in number of School Career Services by 10%, with plans for a 15% increase by the end of 2015, and by the end of 2016, 40% ;
- 726 apprenticeship contracts for higher level training and research (out of 900 planned) and an increase in the number of such contracts by 500% since the start of the measure;
- 9,800 extracurricular internships (8,000 initially planned) carried out by recent graduates within 12 months of obtaining their degree;

- 363 enterprises were funded following the signing of apprenticeship contracts for higher level training and research and/or the hiring of PhD holders.

Is the impact visible in the local PES data?

Networks between universities and PES were set up (e.g. Roma3, Tor Vergata and La Sapienza Universities in Rome have internal public employment centres which collaborate with the corresponding university Career Service). Some high schools also work regularly together with the PES and other actors in the civil service market, but there are no publicly available PES data about the evolution in unemployed young people registered by them.

How do social partners and/or the responsible authority estimate the impact of the measure?

The impact of the measure is assessed positively, as it has contributed to strengthening the role of high schools, colleges and universities as intermediaries in the labour market. The measure thus facilitates access to employment of young graduates and sets the conditions for establishing a virtuous relationship between employers and educational institutions through apprenticeships aimed at obtaining a degree.

Review of the measure

Is the measure adaptable to changes in the situation on the labour market?

If yes, how can this be achieved?

The Italian experience shows that the Career Services may represent a real lever to redesign the educational offer bearing in mind skill needs. The contact between businesses and educational organisations within the activities organized by the Career Services can be more effective in detecting skill and training needs of businesses, compared to a formal consultation of the business community. Career Services are useful to establish on a daily basis a vital network of cooperative relationships. The cooperation between universities and schools on the one hand, and employers on the other provides a flexible way for employers to meet their needs and reduce shortages within the skilled workforce.

Is the measure specific to the context of the economic crisis

or is it generally applicable?

The measure is generally applicable because it supposes the activation of a mechanism which, once established, is self-sustaining. The measure introduced a new way – for all the actors involved - of working together.

How do the (social) partners and/or the responsible authority view the measure?

Social partners attribute importance to the measure and the need to rely on effective Career Services in schools and universities. Career Services increase opportunities for students, graduates, and employers to get together. Therefore, in the light of the importance attributed to the project by the social partners, it was refinanced by the Ministry of Labour and Social Policy.

Can the measure be transferred to other EU-countries?

The program was conceived based on a service model. It integrates measures of technical assistance, training and incentives together with processes, methodologies and outputs modelling aimed at the capitalisation of acquired know-how. The technical and methodological assistance for Career Services development makes the measure applicable to different territorial contexts and the integration of different actors in the labour market. For these reasons, all the methodologies and tools products are characterised by

transferability. The measure can thus be transferred to other EU-countries, as demonstrated by existing similar experiences in France, Spain, and Germany.

What are key-success factors/enablers?

- Reinforcement of mechanisms for matching demand and supply of skills: development of intermediation role of universities;
- Innovative service models for Career Services: establishment or strengthening of job demand and supply brokerage or in other words establishment of effective Career Services leading to opportunities for enhancing employability and to create employment;
- Relationship between manufacturing and university research centres: technology and research products transferred to businesses;
- Involvement of all stakeholders leading to construction of sustainable networks connecting labour supply and demand;

What are key-obstacles?

- Difficulty for small and very small enterprises to enable collaborations with schools and universities;
- Innovative nature of proposed actions makes it difficult to achieve quantitative targets;
- Schools and universities entered only recently in the panorama of labour market intermediation.

Were there other important lessons learnt?

- The need of involving from the very beginning all relevant institutions through a careful analysis of the stakeholders and their different needs;
- The development of Career Services requires times and constant effort and has to be customised to the different contexts across each country;
- The importance of supporting the development of Career Services involving the Ministry of Education and the Regional Education Offices in order to raise awareness about the content of teaching programmes;
- The usefulness of sharing tools, methodologies and documentation within a professional community.

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Case study 2: MobiPro – Germany

Short description and functioning	The programme MobiPro-EU promotes vocational mobility in the EU. Young EU citizens between 18 and 27 years are given the opportunity to move to Germany to take up vocational training with a German employer. The purpose of the programme is to secure skilled workers in Germany, to help German employers to find young workers for vocational training and to (symbolically) contribute to reducing youth unemployment in Europe. The original programme ran in 2013 (launched in December 2012 and ending early 2014), met a very high demand and had to be stopped because it ran out of resources. The budget for the whole period 2013-2018 is EUR 550 Million.
Designed to counter which shortage	Shortage of workers seeking initial vocational training for technical skilled occupations countered with a vocational mobility programme so as to contribute at the same time to the reduction of youth unemployment in the EU.
Implementation date	30 July 2014 until 2018
Responsible authority	Federal Ministry of Labour and Social Affairs - Bundesministerium für Arbeit und Soziales (BMAS)
Partners involved	Federal Employment Agency/International Placement Services (Bundesagentur für Arbeit/Zentrale Auslands- und Fachvermittlung)

Context of the measure

What shortages are detected in the country/region/sector?

According to the German Federal Employment Agency (Bundesagentur für Arbeit, BA) there is no general skill shortage in Germany. It is important to note however that the data from the Federal Employment Agency focus only on the vacancies notified (roughly every second job) and the registered unemployed. Thus, important sources of skilled workers are not included in the analysis such as recent graduates, potential workers of the hidden reserve and part-time workers that intend to expand their working hours.

However, there is a skill shortage in some technical occupations and health and long-term care occupations: shortages are increasingly observed not only for skilled workers with a university degree, but also for skilled workers without a university degree. Consequently, there is a debate about the reality of labour market shortages in Germany. Opponents point to the absence of wage increases, which would be expected in the case of shortages. But important aspects (e. g. the free movement of workers within the EU) are ignored in the debate, and the labour market's ability to adjust is underestimated (e. g. via firms' possibilities to invest in human capital or in process innovations if wages rise due to labour

scarcities), according to the assessment of economists of the German Institute for Economic Research (DIW 2014).

Shortages are observed mainly in:

- (1) technical occupations for skilled workers with and without an academic degree: mainly mechanical engineering, metal engineering, electrical engineering, but also in the areas of waste management, plumbing, sanitary/heating/air-conditioning technology, IT occupations and technical occupations in the area of railway traffic
- (2) health and long-term care occupations: human medicine, skilled nurses, skilled long-term care workers, skilled workers in the area of orthopaedics and rehabilitation, and hearing aid acoustician.

While the shortage in technical occupations is observed mainly in the western Länder, shortages in health and long-term care occupations are observed in nearly all Länder. Additionally, there are specific shortages in some regions (e.g. regional shortages in Baden-Württemberg like in the area of civil engineering and automotive manufacturing).

Data of the Federal Employment Agency show a long average duration of vacancies in the above mentioned occupations (e.g. mechanical engineering with degree: 120 days in 2014, human medicine: 167 days in 2014, skilled workers in long-term care: 129 days in 2014) which might show shortages beyond usual labour market frictions. Skilled labour supply in the above mentioned areas cannot meet labour demand for skilled workers.

What is the general policy approach in the country regarding shortages?

The German government has launched a broad framework to secure a skilled work force (Fachkräftekonzept) in 2011, and labour market shortage measures are part of that framework. Agreed paths to secure a skilled work force are (1) mobilisation and securing employment through focus on older workers, women with children, long-term unemployed, people with disabilities; various programmes to support these groups to remain in the labour market, (2) better reconciliation of work and family, (3) better chances from the beginning for all through more and better kinder gardens, school support for migrant families, (4) qualification: training and further education, (5) integration and skilled migration.

Additionally, the Federal Ministry of Labour and Social Affairs, the Federal Ministry for Economic Affairs and Energy and the Federal Employment Service have launched a campaign to secure a skilled work force (Fachkräfte-Offensive). Part of this campaign is the “Partnership for skilled labour” (Partnerschaft für Fachkräfte) between the Federal Ministry of Labour and Social Affairs, the Federal Ministry for Economic Affairs and Energy, the Federal Ministry for Education and Science, the Federal Employment Service, the Federal Association of German Employers’ Associations, the German Trade Union Confederation and several trade unions and employers’ associations. These partners have agreed upon policies to improve the integration of women, older workers and workers with a migration background within the labour market. Policy measures are planned to be better coordinated and regularly assessed. The plan consists of five fields of operation: (1) common agreement upon barriers and measures, (2) securing workers’ capacity to work, (3) strengthening quality of work in firms, (4) support of negotiated solutions, (5) information, networking and consultation.

What was the rationale for introducing the measure?

MobiPro-EU was introduced as a model project to support young people from the EU MS to come to Germany to successfully complete vocational training. The programme was designed to make a (small) contribution to reducing youth unemployment in Europe, but

also to reducing skilled labour shortages within Germany. The measure was launched in December 2012 for the first time. However, the implementation of the programme was ill-conceived which led to a very high drop-out rate and was, despite the unexpectedly high demand, not very successful. Consequently, the programme was significantly altered and re-launched in 2014. While the original programme was also designed to support the mobility of (younger) skilled workers to Germany, the re-launched programme only focuses on initial training.

How are the shortages identified in order to target the measure?

According to the German Public Employment Service (BA) there were more than 37,000 vacant positions for vocational training in 2012/2013 (referring to the school year as most training periods begin in late summer), part of an increasing trend.

How was the measure conceived?

The programme (the original version as well as the revised version) was developed by the Federal Ministry of Labour and Social Affairs in cooperation with the Public Employment Service. One critique was that the social partners, the regions (Länder) and the vocational schools that provide dual education have been poorly involved. It is financed exclusively from the federal budget.

The re-launched programme supports projects that help young Europeans to finish vocational training in Germany. Accompanying measures which help to reduce difficulties in recruiting young Europeans are also financially supported: language courses; information about the content of vocational training; internships; social/pedagogical and professional accompanying measures; and travel costs for regular visits to the home country. Projects that give 10-30 participants the opportunity and support to finish vocational training programmes (according to a list of training programmes with state recognition) can receive support. Project applicants can be public institutions (e.g. regional employers' associations, chambers of handicrafts, collective organisations in the area of long-term care) or private companies that agree to implement the measure (with a supplement of their own funds of 10%). The projects consist of the preparatory measures (e.g. language course, internships, cultural seminars), the vocational training itself and the final examination. The application and selection process takes place in two stages: first a pre-selection based on a project draft and then the preselected candidates are allowed to hand in a final project. This final deadline was only at the end of January this year. Thus, it is still too early for an evaluation of the revised version of the programme.

Results of the measure

Shortly describe the implementation of the measure.

In its first version, EUR 139 Million were allocated for the programme for the period 2013-2016. For the revised programme this amount was augmented to EUR 550 Million for the period 2013-2018.

For 2015, the BMAS expects to support around 3,000 young persons to take up vocational training in Germany. As vocational trainings in Germany take at least 3 years, the BMAS has to negotiate with the Federal Ministry for Finance for a continuation of the programme beyond 2018 to secure new entrants in 2016 and later. Most of the young Europeans that applied originate from Spain, followed by Romania, Bulgaria, Poland and Hungary. Most applications are in the area of long-term care, tourism and various handicraft professions – professions where it is traditionally difficult to attract young workers. The institutions or companies that hand in project applications are mostly situated in the rural areas of Germany and represent small and medium sized companies.

What is the impact of the measure on the specific shortage situation?

The measure is rather small scale compared to the vacant positions for vocational training and also compared to the youth unemployment rate in the EU. 3,000 young persons are expected to take up vocational training for the training period 2015-2018 out of the 37,000 vacant positions for vocational training. So, if successful, the measure can reduce the shortage of apprentices by roughly 5 - 10%.

The original programme has been revised because of its low level of effectiveness. Despite very high demand, the drop-out rates were also very high. The authorities had little information about the goals and motivation of the applicants. Only 30% of those starting with the programme as participants in the German language course started vocational training later on. Thus, the drop-out rate was 70%. The new set-up of the programme reduces this problem by better screening the candidates.

For all involved parties, including the social partners, it is clear that this programme is operating on a small scale and its impact on overall labour shortages is limited. However, it can alleviate the shortages for apprentices. The programme might be seen as a model project to establish a European training market for young people.

Review of the measure

Is the measure adaptable to changes in the situation on the labour market? If yes, how can this be achieved?

Yes, the measure is adaptable since every year there is a new deadline to hand in new projects. So far, the programme runs until 2018, but is very likely to be prolonged. Thus, the main focus of supported projects can be changed from year to year according to the needs of the labour market.

Is the measure specific to the context of the economic crisis or is it generally applicable?

Initially, this measure was clearly a reaction to the economic crisis. Germany wanted to show good will and offer a concrete measure to reduce youth unemployment in Europe. Furthermore, the dual educational system in Germany, that combines vocational training and school training, has proven to be an efficient way to train young people who leave school. However, due to the increasing importance of higher education, many young people in Germany seek a university degree. As a consequence and due to low fertility rates in Germany, the number of young people starting initial vocational training is decreasing. The goal of the measure is both to make a contribution to lowering the youth unemployment rate in the EU and to increase the number of young people starting vocational training.

How do the (social) partners and/or the responsible authority view the measure?

All interviewees (from the German Trade Union Federation, the opposition party “The Greens” and from the Federal Ministry of Labour and Social Affairs) agree that:

- the original programme headed in the right direction, but there were major problems that led to the revision of the programme, e.g. the administration of the PES could not meet the high demand, the coordination with employers, training schools and communities was insufficient, and the language training and cultural training was inadequate.
- the revision of the programme, especially the re-orientation from direct support for individuals to projects (i.e. not the young person him/herself handing in the application, but an institution - e.g. a regional employers’ association - that designs

vocational training programmes for 10 to 30 persons, giving the institution also the responsibility for implementation) and higher financial resources, were both necessary to increase the effectiveness of the programme.

- the programme is seen as positive as it supports labour mobility across Europe, but all interviewees mentioned the limited scope of the programme overall.

The interviewee from the Federal Ministry of Labour and Social Affairs (BMAS) recognizes that:

- the BMAS underestimated the demand for the programme. After a slow start in 2013, applications had considerably increased by the beginning of 2014.
- this large number of applications led to a moratorium on the handling of further applications because the programme ran out of money. The stop meant not only bad publicity but also high uncertainty for candidates about the continuation of their plans.

The representative of the German Trade Union Federation (DGB) criticised:

- the missing involvement of the social partners when the programme was designed.
- that every job in this programme is highly subsidized (roughly by 30,000 EUR) and consequently that it is a rather costly programme per young worker.
- that, if the degrees and the training the applicants have already finished in their home countries could be better recognized, then the training period could be shortened and costs reduced.

A representative of an opposition party (Bündnis 90/Die Grünen) recognises:

- That the BMAS tried to avoid many of the initial problems in the revision of the programme (e.g. an increase in the quality of the programme including components such as its language training, support for the applicants, and better selection of partner institutions).
- MobiPro-EU as a pilot project for a European training market.

Can the measure be transferred to other EU-countries?

This programme is only possible for countries with a well-established and high-quality vocational training system and is therefore hardly transferable to other EU MS (except Austria). However, many EU MS are interested in the setup of the German dual educational system and start programmes to install similar systems on a small scale. It is important to note that a well-functioning dual educational system requires a well-functioning social partnership system leading to a vocational school system and, especially, employers that are willing to build up these systems and to train young people in their establishments.

Key obstacles are that the young workers sometimes have a wrong picture of the dual educational system in Germany since these systems are not established in the countries where the candidates come from. This is the reason for the preparatory measures (language, general information, cultural education) mentioned above.

Were there other important lessons learnt?

The demand for vocational training in Germany from young Europeans is high, meaning that the potential for such a programme is high. However, the screening of the candidates has to be improved and more information should be provided about the content of the vocational training and about the realities of working and living in Germany (very often in

quite rural areas). Nevertheless, the programme has the potential to be a pilot project for a European training market.

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Case study 3: Grant for Skilled workers - Austria

Short description and functioning	The grant scheme FKS (Fachkräftestipendium) is intended to provide income support while beneficiaries are trained in occupations with skills shortages, therefore facilitating the participation of adults in full time training (minimum 3 months and maximum 3 years). This measure intends to raise labour market prospects of employed and unemployed without higher education through training courses and qualifications. It supports career shifts or helps workers to enhance their skills in their hitherto occupational field of employment. Moreover, this grant is supposed to give workers a chance to acquire missing additional qualifications in order to obtain recognised certificates in occupations with skills shortages. The programme was incorporated into law under the Skilled Workers' Package (Fachkräftepaket) and entered into force on 1 July 2013. Under the current law, the training for which a grant can be received has to be started before the end of 2017. The demand for the grants is high and the FKS was at risk of running out of resources. Therefore in autumn 2014 the list of eligible training programmes was shortened.
Designed to counter which shortage	Designed to reduce skilled labour shortages in professions which require certificates below a university degree or a degree of a university of applied sciences. The list of eligible training courses is drawn by the PES based on data about current labour shortages (relationship between registered unemployed and vacancies in different occupations), labour market forecasts, and occupational forecasts and requires an agreement between the social partners. Currently it concerns jobs in sectors as health and long-term care, nursery, teaching, and IT.
Implementation date	1 July 2013 – 31 December 2017
Responsible authority	Arbeitsmarktservice (Public employment service)
Partners involved	Ministry of Labour, Social Affairs and Consumer Protection. Social Partners

Context of the measure

What shortages are detected in the country/region/sector?

Except for particular professions in specific regions there are no quantitative skills shortages in Austria. Labour supply increased remarkably over the last years due to immigration, increasing employment of people commuting from the neighbouring countries, and higher labour market participation rates of women and older workers (following

reforms of the pension systems). However, local authorities and representatives of the Austrian Economic Chambers report skills mismatches in some sectors and regions. In particular, the shortages relate to different types of handicrafts (typically covered by apprenticeship trainings), engineering, primary school teaching, nursing and caring. The main reasons for the shortages are: A) Changing labour demand caused by structural changes to the economy accompanied by the trend towards occupations requiring higher qualifications and a decrease in apprenticeship training. B) Demography – ageing of the work force and increasing life expectancy of the population (increasing the need for long-term care services). C) Institutional/regulatory changes with consequences for labour demand for example the introduction of an obligatory kindergarten year for 5-year-old children. D) In some sectors, working conditions are demanding while jobs are low paid.

In addition, as the registered unemployment rates differ significantly by educational level, an upgrading of educational attainment is seen as an effective way of reducing unemployment (the unemployment rate of workers with only compulsory schooling was 23.2% in 2014, whilst the unemployment rate of workers with a successfully completed apprenticeship was 7.1%, and other educational attainments less than 5%: AMS, 2015).

What is the general policy approach in the country regarding shortages?

In addition to regulations regarding employment opportunities for people from abroad and training measures for youth there are different instruments to support training of adults. Most of these instruments are part of active labour market policies. The organization of the PES (with about 100 local offices) allows for a coordinated nationwide implementation with enough space for adaption to regional and local needs. However, generally the PES does not support long-term training within the school/university system and it does not support career shifts in other sectors as long as an unemployed person can be placed in their previous field of work.

What was the rationale for introducing the measure?

Against this background, the Austrian government intended to address the lack of support for long-term training by providing income support for low(er) qualified workers to raise their qualifications in shortage professions through full-time schooling. As the labour market institutions in Austria are much more adaptable than the educational system, the PES was chosen as the responsible authority for the FKS. Furthermore, the PES has long-term experience in flexibly handling and administering different types of labour market measures.

How are the shortages identified in order to target the measure?

Shortages are identified by the PES using data about current labour shortages based on the relationship between the registered unemployed and vacancies in different occupations, by monitoring of the labour market development in different occupational sectors (accounting for the fact that the share of vacancies registered at the PES differs between occupations and industries), and by using labour market and occupational forecasts. In practice, the representatives of the social partners in the Administrative Board of Public Employment Service bargain over the professions eligible for the FKS against the background of these data and budgetary restrictions. The trainings eligible for the FKS are published as an annex to the Federal PES Guideline, the list for 2015 comprises 110 different trainings.

How was the measure conceived?

The skilled workers' grant provides income support for full-time training i.e. training comprising at least a weekly average of 20 hours and lasting for at least three months. Grants are available for the training period with a maximum of 1,096 days or three years.

The amount of the grants is based on the equalisation supplement reference rate (Ausgleichszulagenrichtsatz) for single persons, which is EUR 27.60 a day or roughly EUR 840 a month in 2015. No other PES or unemployment insurance benefits can be claimed for the period in question.

To be eligible for these grants, applicants must:

- have been in unemployment insurance-covered employment or social pension insurance-covered self-employment for 208 weeks within the past 15 years;
- have qualifications below those from universities of applied sciences;
- provide proof that they have passed the entrance examination, or that they meet all the other conditions for enrolment, or that they participated in education and career counselling sessions, and provide satisfactory evidence that they are suited for the chosen kind of training (through preceding career counselling);
- have their permanent residence in Austria;
- conclude an agreement with the PES on the training chosen as a result of previous counselling.

Results of the measure

Briefly describe the implementation of the measure.

Funding of the FKS is provided by national PES resources which come from contributions to unemployment insurance. In 2013 and 2014 the PES got an additional budget of EUR 25 Mio. per year for active labour market policies (financed by unemployment contributions). Starting with 2015, the FKS will be financed by the overall PES-budget for active labour market policies without additional funding.

Due to the surprisingly high number and relatively high cost of training programme applications most of the planned budget was already assigned by autumn 2014. The high cost is tied to the duration of the grant which follows the training programme. On average the training programmes last for two years. Therefore, a limit of EUR 30 Mio was set for 2015 (with only EUR 5 Mio for new applicants). Supplementary funding comes from unemployment benefits and unemployment assistance for unemployed applicants which are used for the FKS-grant. With respect to the stock of participants at the beginning of December 2014, the PES expects EUR 50 Mio of spending in 2015 (AMS, 2014).

In the first 18 months 5,260 people received a grant (3,520 females and 1,740 males) with the highest inflow in September 2014 (start of the school year) with 2,095 entrants. 30% were younger than 25 years old, 59% between 25 und 45 years, and 11% 45 years and more (AMS, 2014). About a third of the participants had not more than compulsory schooling (AK, 2014).

As the grant is dedicated for full-time schooling most of the participants are not employed (94%) and only 6% employed. 67% of the beneficiaries were registered as unemployed immediately before entering the programme (59% for less than six months and 8% for more than six months), but 27% were not registered as unemployed at all.

Most of the grant holders applied for programmes in health and care (39%) or primary education and social services (47%). Relatively few applied for technical or engineering occupations (14%). On average, the training programmes last for 788 days (male 798 days, female 783 days) (AMS, 2014).

Overall, the skilled workers` grant is an important and innovative measure. To the surprise of the involved institutions demand was high, and this was partly due to systematically

informing potential pupils by educational institutions, especially those with programmes in care and nursing. Such high demand may be seen as an indicator for the need for a measure like the FKS. There is a strong interest of persons willing to change their employment career and interest as late starters in full-time education.

What is the impact of the measure on the specific shortage situation?

According to the evaluation-report of the PES, the satisfaction of the beneficiaries is high compared to other measures of the PES as the training is based on their own initiative and demand. As a consequence, the share of dropouts is rather low with less than 10% so far.

Noticeable effects regarding the specific shortages require quantitative or qualitative changes initiated by FKS. A quantitative impact may result from a better utilisation of training capacities or by increasing the capacities. The FKS raises incentives for adults to pass fulltime training by providing income support but it does not implicitly increase the capacities of training institutions. Therefore the PES does not expect major effects of the FKS on labour shortages as long as the measure is not complemented by investments in higher capacities of the respective training institutions.

However, irrespective of quantitative aspects, a positive effect will occur if grant holders are substitutes for other pupils with a lower propensity to pass the training or a lower probability to stay in the specific occupational field.

More information on effectiveness and efficiency will become available later as the measure came into force only 18 months ago and the mean duration of training is more than two years. An evaluation of the FKS will start in 2015 and hopefully helps the Austrian authorities with its evidence based assessment to decide about the future implementation of the programme.

Review of the measure

Is the measure adaptable to changes in the situation of the labour market?
If yes, how can this be achieved?

By changing the list of training programmes eligible for the FKS, the measure is easily adaptable to labour market changes. It is important to note, however, that most programmes run for more than two years, meaning that skills shortages cannot be eased so quickly. In addition, shortages may be more prevalent in periods of low overall unemployment. Consequently, when there is an overall quantitative shortage, programmes like the FKS may pull too many people into full-time education if they are designed on a large scale. This means the programme would aggravate the short-term shortage on the labour market by lowering the number of people available on the labour market.

However, as there are no quantitative skill shortages on the Austrian labour market, but only selective shortages in specific occupations and regions, these potential negative impacts seem not to be very relevant in the immediate years.

Is the measure specific to the context of the economic crisis
or is it generally applicable?

The FKS is a grant for people starting full-time education after periods of labour force participation and is thus not specific to the crisis. Nevertheless, full-time education may be more attractive in periods of high unemployment.

How do the (social) partners and/or the responsible authority view the measure?

Between social partners and responsible authorities the following are issues of concern:

- Funding: First of all, the FKS is financed by contributions from the unemployment insurance, (not by taxes). Second, the programme was at risk of running out of resources resulting in additional budget requirements for the measure. But at the same time, the overall budget for active labour market policies was reduced in 2015 while unemployment is rising.
- Definition of eligible shortages: If skills shortages should be reduced by training it is necessary for the PES to define the types of training measures which are able to provide the needed skills. To set limits for future spending it was necessary to restrict the types of trainings eligible for the grant.
- The perceived response of the educational institutions offering training (capacity and adaption of schedules): Some institutions did not adjust their training capacities, while others increased them. In addition, for training institutions it may be attractive to comply with the requirements of the FKS to attract more trainees (for example by changing the weekly hours to more than 20 hours).

The assessment of the FKS differs remarkably between the social partners:

- The Federal Chamber of Commerce (WKÖ) questions the FKS because of the encouragement of full-time schooling. People would leave the labour market for too long. In their view, it would be more effective to broaden training supply, for example with more modular schedules. Overall, they prefer part-time training programs or other forms of education which are reconcilable with employment.
- For the Federal Chamber of Labour (AK) the FKS is an important instrument to increase the educational attainment of people in shortage occupations and to raise the qualified labour supply – not immediately in the short run, but in the long run. In their view, skills shortages are a big problem, therefore it is very important to give workers the opportunity to participate in forms of life-long learning which they can afford and really attend.
- Although the PES handled the new instrument in a professional way, the PES underlines that the counselling of individuals in order to lead them to FKS remains challenging. The Federal Ministry for Labour and Social Affairs (BMASK) acknowledges the challenge imposed on the PES, but it sees the FKS as a necessary and innovative measure.

All interviewed Austrian authorities agree about the following aspects of the FKS:

- The need for the broadening of the strategy and involved partners: Effectiveness and efficiency could be increased by an overall strategy with respect to labour shortages, involving all responsible institutions at the federal and regional level.
- The grant should not be financed solely by contributions from the Unemployment Insurance as it is done so far.
- Generally, it is too early to evaluate the measure with respect to its impact and efficiency.

Can the measure be transferred to other EU-countries?

It is not possible to give a general answer to the question of transferability to other EU-countries as the answer depends on a broad range of aspects in the individual country, for example the specific institutional setting, the educational system, which measures are already in force and the available budget. In Austria there are several measures to stimulate further education and training e.g. (i) income support for educational purposes when you reduce working time (up to 2 years) or suspend a job (up to 1 year), (ii) after

four years of work you can apply for a scholarship to study at a university, and (iii) benefits for people not employed during training given by PES. But the support for long-term training such as that provided by the FKS was not available. As such, the measure filled a gap within the existing institutional framework.

Were there other important lessons learnt?

The experiences with the FKS in Austria point to options for improving the implementation and the (potential) effectiveness and efficiency of the measure. In particular the following factors would be helpful for increasing the success of the measure in the view of the BMASK:

- comprehensive political commitment regarding the strategy of a grants system;
- budgeting – no 'stop and go' policy, but conditions which facilitate long-term strategic planning and reduce uncertainty for all involved parties (individuals, educational system, training institutions, PES);
- systemic thinking – the integration of the measure in an overall strategy and active integration of the education system would be important.

Linked to the last point, according to the PES, the funds might be spent more efficiently and effectively by directly investing in higher capacities of the respective educational institutions.

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Case study 4: Skillnets - Ireland

Short description and functioning	Skillnets delivers sector and employer-based training to the unemployed and current employees according to employer's needs. Training is delivered through a series of employer networks under the Training Network Programme (TNP) and Finuas programme (similar but specific to the International Financial Services sector). These programmes, funded from the National Training Fund (NTF) through the Department of Education and Skills, operate on the basis of a networks model, whereby networks of enterprises engage in the design, management and delivery of specific training programmes to employees as well as to jobseekers across a broad range of industry and service sectors nationwide.
Designed to counter which shortage	Skill shortages in particular sectors and mainly experienced in SMEs. The measure does not aim at one specific shortage, but allows for adapting the training to the needs of the employers.
Implementation date	1999 to present
Responsible authority	Department for Education and Skills (DES)
Partners involved	Skillnets Ltd. (organisation running the programme), DES (Government Department and funder), range of Skillnets Training Networks comprising private sector companies

Context of the measure

What shortages are detected in the country/region/sector?

The National Skills bulletin (2014) reports a number of vacancies which are more difficult to source. It mostly concerns vacancies within IT, Engineering, Healthcare, Finance, Science and Administration.

The approach taken under Skillnets has been developed on the basis that the need to improve skills levels, often in response to skills shortages and mismatches, is relevant across all sectors. The approach aims to ensure that, through employer led networks, different sectors can develop approaches suited to their requirements. The approach thus covers a wide range of sectors and skills levels, but the measure itself is each time, through its design, specifically tailored to a particular sector.

What is the general policy approach in the country regarding shortages?

Skills and vocational training policy in Ireland is primarily the responsibility of An tSeirbhís Oideachais Leanúnaigh agus Scileanna (SOLAS), Ireland's Further Education and Training Authority, which operates under the DES and is responsible for funding, planning and co-ordinating training and further education programmes. Established in 2013, SOLAS works with 16 local Education and Training Boards (ETBs) that are intended to link national and

local levels (SOLAS 2014a). SOLAS has developed a five year Further Education and Training (FET) strategy (SOLAS 2014b) that covers 2014-2019 within the context of the government's wider Public Service Reform programme. The strategy notes that "employers lie at the heart of skills needs, while the learner lies at the heart of the FET service" (SOLAS 2014b, p.4). This reflects a general concern with ensuring that employers have a key role in articulating skills needs and that FET services and programmes respond to these. However, employers in Ireland also recruit a significant number of jobseekers from the EEA to fill in positions experiencing shortages.

What was the rationale for introducing the measure?

The rationale for the approach was to improve the responsiveness of training opportunities and skills development approaches to employer needs, particularly amongst small and medium enterprises (SMEs), hence the decision to set up training networks led by partnerships of employers. This was seen as increasing the influence of the demand side in skills development rather than just anticipating employer needs. The dynamic and changing nature of technology also underpinned this approach in that the networks would be able to respond quickly to changes in skills needs within particular sectors.

How are the shortages identified in order to target the measure?

Shortages and particular skills needs are identified by the individual occupational and sector based training networks; in some cases networks are also based in particular regions or local areas allowing them to respond to particular geographical skills shortages or needs. Nationally, SOLAS has a Skills and Labour Market Research Unit reporting on current and future skill needs.

How was the measure conceived?

In the late 1990s the Irish Government moved towards ensuring that the skills development needs of SMEs could be more effectively met (the assumption being that larger firms faced less challenges in arranging and undertaking their own training). Skillnets was thus established based on the belief that SMEs were responsible for their own training needs and had to work more closely together to enhance skills development. Within Skillnets training programs could be developed either for (re)training the existing employees in new skills or unemployed towards needed skills for the sector. As noted in a 2011 evaluation of Skillnets, the structure and approach came from "a combination of social partnership…, the concept of the learning organisation, and networks - from the extensive and successful use of networks in Denmark in the early 1990s." (Circa Group, 2011). This shows that the good practice in Denmark has influenced the setup of Skillnets.

Results of the measure

Shortly describe the implementation of the measure.

Overall Funding for Skillnets provided by the DES has remained fairly consistent over the past five years (being between EUR 14.5 million and EUR 16.595 million between 2009 and 2014). The 9,283 companies within the TNP networks themselves (93% of which were SMEs) added to the available budget through match funding contributions. In the last year for which detailed figures are available (2013), the actual expenditure of the 59 TNP networks and three Finuas networks was EUR 21.45 million, of which EUR 9.98 million came in the form of company match funding with the remainder being from public funds (Indecon, 2014). This was within the profiled budget (Indecon, 2014). Table 1 shows a breakdown of expenditure against budget just for the TNP element of the programme.

Table B 1: Example Breakdown of TNP Expenditures in 2013 against budget

Category	Budgeted Expenditure(EUR)	Actual Expenditure(EUR)	Actual as % of Budget
Training Expenditure	€ 12,418,352	€ 13,144,271	106%
Management Expenditure	€ 5,047,500	€ 4,006,642	79%
Total Expenditure*	€ 17,465,852	€ 17,150,913	98%
*Of which, State funds	€ 8,624,159	€ 8,069,068	94%

Source: Indecon, 2014

Funding from DES is distributed through Skillnets Ltd, the company which oversees the programme, to the individual networks. Each network has a steering group comprised of member companies and a network manager. An impression of how this works, and the outcomes generated (taken from a 2014 evaluation in the form of a case study), is presented below.

Table B 2: TNP Member Company Case study

TNP Member Company Case study	
Company Name	Comeragh Veterinary Clinic, Kilmacthomas, Co. Waterford.
Brief description of firm (and owner)	Comeragh Veterinary Clinic is a 5-vet, primarily large animal practice which has been based in Kilmacthomas for 50 years. Ger Cusack is a Veterinary Surgeon who took over the practice with his business partner 20 years ago. Most of Ger's time is spent treating dairy cows and he has developed a special interest in the costs, causes, treatment and prevention of lameness on dairy farms.
Reason(s) for participation	Comeragh Veterinary Clinic is a member of XLVets Skillnet, promoted by XLVets, a group of progressive practices working together to share experience, knowledge and skills, in order to deliver excellence in veterinary practice and pass on expertise and savings to clients. Ger's practice is committed to up-skilling staff and also local dairy farmers who are clients of the practice. In order to generate new business, the Comeragh Veterinary Clinic participated in a Bovine Ultrasound Scanning programme. The aim of the course was to provide farm animal vets with the skills to make accurate pregnancy diagnosis and the confidence to deliver a comprehensive fertility service to livestock farmers.
Experience of programme	XLVets Skillnet secured the services of an international expert from Italy to provide the training over 3.5 days. The provider had previously facilitated over 100 classes across 4 continents and 23 countries, as well as having spoken at circa 25 international conferences. For Ger Cusack's Clinic, the programme represented a rare opportunity to learn from someone with academic and practical expertise in embryo transfer, bovine reproduction management and bovine survey.
Business impact	Participation in the training has yielded a very positive, tangible impact on the Comeragh Veterinary Clinic, which generated circa EUR 20,000 in additional revenue within 6 months of training completion. According to Ger, at least two thirds of this revenue can be attributed directly to the training. Previously, Comeragh Veterinary Clinic employed a vet on a seasonal basis to provide the fertility service. As a result of participating in the programme organised by XLVets Skillnet, the Clinic has upgraded a temporary, seasonal veterinary position to a full-time position and can now provide the service and advice to farmers on a year-round basis.

Source: Indecon, 2014

In the last year for which figures are available (2013), training activities and performance against output targets were as follows (Indecon, 2014):

- Total Trainees = 45,878 in 2013 (versus DES target of 40,000), 4% more compared with 2012.
- Total Training Days = 280,175 (vs. DES target of 200,000), 20% more compared to 2012.
- 64,567 training days to 7,306 Unemployed/Jobseeker Trainees (vs. DES target of 47,500 days).
- 36,543 employed trainees within the TNP, > 14% above Skillnets' target
- 191,513 employed trainee training days within the TNP, on target
- Moreover, over 82% of TNP employed training days during 2013 were certified, in which participants received certification in the skills or qualifications learned.

What is the impact of the measure on the specific shortage situation?

Key impacts from the 2013 programme are published in a 2014 evaluation (Indecon, 2014) and include the following (based on a survey sent to 25,436 stakeholders with almost 14% response rate):

- Most trainees who undertook the training reported positive impacts on skills enhancement, while 88% indicated that they were satisfied that the training met their overall expectations.
- 82% of TNP member companies indicated that training had a very high or high impact in addressing skills gaps within their business.
- Over 90% of TNP companies indicated that training met their overall expectations.
- Over 98% of individuals who undertook employee training under the TNP during 2013 were still in employment by April 2014.
- 42% of jobseeker trainees under the TNP main programme have taken up paid employment since completing their training, with 8% becoming self-employed.

In terms of efficiency the 2014 evaluation reported that both the overall cost per training day and cost per trainee within the main TNP fell in 2013 (EUR 82.91 and EUR 421.36 respectively in 2013 compared to EUR 96.00 and EUR 435.35 in 2012), suggesting that TNP employed training was delivered in a more cost effective manner (Indecon, 2014). It was also noted that a high degree of leveraged funding through member companies was achieved - TNP networks achieved matching funding from their Member Companies which was just above the matching funds target at 103% (Indecon, 2014).

The above reported impacts on trainees and member companies in respect of skill enhancement and skills gaps also suggest that the programme achieved a high level of effectiveness in terms of its 2013 operation. The evaluation confirms this in highlighting positive progression outcomes for trainees, including high levels of employment retention and entry to work amongst unemployed trainees.

No evaluation data are available relating to effects on overall PES data. However, given the numbers of trainees involved (particularly unemployed trainees) relative to the overall (unemployed) population in Ireland any such effects would not be discernible, either at local or national levels.

Review of the measure

Is the measure adaptable to changes in the situation of the labour market?

If yes, how can this be achieved?

The design of Skillnets and the main TNP component indicates that the approach should be adaptable to changes in the labour market, both in terms of new or changing skills gaps or training needs in particular sectors/occupations along with local geographical labour market conditions (given the nature of networks which cover both). As the networks are comprised of employers, they can be expected to be responsive to, and have a strong impression of, current and future training needs.

One of the key conclusions of a 2011 evaluation of Skillnets was that: "The Skillnets' model is dynamic and suitable for the purposes it serves. Its checks and balances stimulate and support its effectiveness and efficiency" and the report also noted that "The system works well. It is enterprise-led, innovative and capable of adjustment where necessary." (Circa Group, 2011). Equally, evidence from the most recent 2014 evaluation showed that Network Managers had high levels of satisfaction with the Skillnets model (Indecon, 2014). Equally, Network Managers reported that the approach enables training to be employer rather than provider driven, helps companies' competitiveness and performance, and meets employers' workforce development needs (Indecon, 2014). Again this suggests, and particularly given that the programme has run since 1999, that the network approach is able to be flexible and responsive to employer and labour market needs.

Is the measure specific to the context of the economic crisis

or is it generally applicable?

Given that the approach has been running since 1999, and Ireland has gone through various macro-economic changes and contexts since then, it would appear that the measure is generally applicable. However, it is interesting that the Skillnets programme did evolve in response to the economic crisis; in particular, through adopting a greater focus on training for the unemployed and aligning more closely to other Irish Government initiatives to increase employment and tackle unemployment. As SOLAS' five year Further Education and Training (FET) strategy (SOLAS 2014b) indicates, the Skillnets approach sits within, and is a key contributor to, goals around enhancing employment levels through key initiatives such as the 'Action Plan for Jobs', a government initiative under which all Government Departments and Agencies work together to deliver on the agreed action points focussing on the economy and employment and 'Pathways to Work', a supportive government initiative which aims to help long-term and young unemployed people find a route back into employment.

How do the (social) partners and/or the responsible authority view the measure?

As indicated by surveys of network members in the 2014 evaluation of Skillsnet, the approach is viewed very positively by employers. Just over 90% of employers surveyed answered 'very good' or 'good' when asked to rate the extent to which the TNP met their overall expectations. The programme has continued to have the support of successive Governments and Government Departments since its launch in 1999, again suggesting that the model is both well received and sustainable.

Can the measure be transferred to other EU-countries?

The network based approach embodied in Skillnets and the TNP appears to be transferrable to other EU countries and contexts. It is similar to other network based approaches used in this policy area across Member States and was itself partly based on learning from other European contexts at the outset. The key success factors and enablers are related to: (i) widespread buy-in by employers within particular sectors within which networks operate;

(ii) ensuring effective monitoring and evaluation during initial implementation and on an on-going basis; and (iii) making sure that any approach that cuts across sectors and geographies has a strong overall unifying structure and identity.

The evidence reviewed does not serve to highlight any likely obstacles as such, beyond the need to gain support from employers and willingness to participate. Feasibility work to assess this would thus be required in addition to potentially running small scale pilot schemes within particular sectors prior to rolling out any approach more widely.

Were there other important lessons learnt?

Successive evaluation reports of Skillnets (Circa Group, 2011; Indecon, 2014) indicate that a series of lessons have been learned. These include: the need to streamline documentation and information flows as far as possible; the need to focus on ensuring that unemployed trainees are matched to relevant training as far as possible through pre-screening and interviews; the need to minimise deadweight by carefully considering training design and eligibility criteria for participants; and the importance of 'brand awareness'.

References

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- SOLAS (2014b). Further Education and Training Strategy 2014 – 2019
- SOLAS (2014c). National Skills bulletin 2014

Case study 5: Employer Investment Fund (EIF) – UK

Short description and functioning	The EIF is set up as an investment fund, levering private investments from companies by matching their contributions with public funding. The EIF finances company projects in which employers try to respond to skills shortages and mismatches through training and related approaches. The projects are developed by employers and Sector Skills Councils (SSCs), bodies established to oversee sectoral development including skills in the UK. The projects are various, but mainly concern employer led and partly employer financed training of unemployed and the employed including development of an infrastructure for the training The EIF channelled £87 million project funding through UK Sector Skills Councils on the basis of competitive bidding to support a range of employer led projects.
Designed to counter which shortage	Employer identified skills shortages
Implementation date	2011 - 2014
Responsible authority	United Kingdom Commission for Employment and Skills (UKCES)
Partners involved	UK Sector Skills Councils and a range of employers

Context of the measure

What shortages are detected in the country/region/sector?

Employers in the UK experience specific shortages in recruiting workers or experience skill gaps for their own employees. For 2015 shortages are foreseen especially within IT, medicine and engineering. The EIF was a large scale programme of investment intended to improve skills supply across all sectors of the UK economy. In the context of restricted public finance to support skills development, the EIF was part of a wider approach to supporting a shift in the balance between public and private investment, with increased investment expected from the individuals and employers that directly benefit from training. The intention was to help address skills shortages and mismatches across all sectors through funding new skills development and training approaches including their supporting infrastructure. Public funding was used to lever in resources from the private sector (employers) through 'matched' contributions in terms of cash and other 'in kind' contributions. The broader rationale was to improve the quality and relevance of training by ensuring greater responsiveness to the demands of employers (i.e. responding to what employers felt was required for skills development).

What is the general policy approach in the country regarding shortages?

The UK Government's approach to skills shortages is reflected in several linked initiatives and policy areas:

- 'Creating a more educated workforce', one of the four pillars of the UK's 'Plan for Growth' (HMT, BIS, 2011), through increasing the participation of 16-24 year olds in learning and employment along with supporting a growth in apprenticeships and related measures
- Developing an Industrial Strategy oriented around five strands covering skills investment, technology development, improving access to finance, using government procurement to support industry, and providing support to all sectors through Sector Skills Councils (SSCs) including developing strategic partnerships with priority sectors (BIS, 2014a; BIS, 2014b)
- Supporting business and skills development through developing a local infrastructure and initiatives based on Local Enterprise Partnerships (LEPs) and initiatives such as Enterprise Zones, intended to support business and skills development attuned to the local economic context.

The overall approach thus combines national and local level interventions with a focus on meeting employer needs through sector based support and engaging the private sector in developing skills solutions. There is no formal coordination between the national level and LEPs; rather, LEPs have local skills boards / partnerships within them that are intended to set the local strategic context within the overall framework of national policy.

What was the rationale for introducing the measure?

As above, the rationale was to improve skills levels across multiple sectors through driving training developments based on employer inputs, requirements, and contributions to funding.

How are the shortages identified in order to target the measure?

The EIF was a competitive funding opportunity; SSCs and employer partners bid into the available funding pot and as part of this had to explain how their proposed projects intended to identify and respond to shortages. The nature of the data and research used to explain this varied between projects, but typically drew on sources such as the UKCES Employer Skills Survey and on data, research and surveys undertaken by the respective SSCs involved.

How was the measure conceived?

UKCES led on the development of the measure which stemmed from its policy approach to advance an employer-led approach to skills as recommended in the 2006 Leitch Review of Skills (HMT, 2006). It also reflected the policy focus of the Coalition Government which took power in 2010 around stimulating skills development and using market based mechanisms to encourage new approaches and develop innovation. The decision was thus made to develop a programme that SSCs and employers could bid into on a competitive basis to try and develop employer led approaches to enhancing the skills development infrastructure. Projects were encouraged to develop a range of possible 'skills solutions' covering, for example, apprenticeships, electronic skills portals to match supply and demand, toolkits to help develop skills in particular sectors, 'learning hubs' where expertise and training capacity could be brought together, training networks and group training partnerships wherein employers could collaborate to develop and deliver training.

Results of the measure

Shortly describe the implementation of the measure.

The UKCES outlined the programme and invited bids through a prospectus, call for expressions of interest from all SSCs, and an event. Resulting bids were subject to assessment using a scoring system against set criteria and moderation prior to being signed off and approved by UKCES Commissioners. Key aspects for approving bids were that projects had good quality employer leadership, that aims were realistic and that they had a focus on sustainability and / or leaving a legacy. The projects themselves vary depending on the needs of the employer/sector. Projects include apprenticeships within the manufacturing sector, redesign of jobs for health workers, raising the sector profile of the energy sector to attract jobseekers, and raising the skills of female workers to increase their participation.

The overall budget allocated was £70.3 million which was distributed to 97 projects over 3 phases of delivery. Phase one supported 24 projects and acted in part as a pilot in terms of informing later rounds of delivery. Phase two was the main delivery phase wherein a further 63 projects were funded for two years between April 2012 and March 2014. There were a further 10 projects supported under Phase three – the latter were short six month projects intended to capitalise on some of the successful approaches in previous rounds with a focus on those securing large participation rates from individuals being supported.

Management information (MI) data on the implementation of the programme is subject to final collation and checking prior to being published shortly – as such it was not yet in the public domain and as such unavailable at the time of this study.

What is the impact of the measure on the specific shortage situation?

As the measure was not targeted at a specific shortage situation, at least at the programme level, data on the effect of this will not be available. However, the MI will demonstrate volumes achieved against output measures by project (number of participants etc. when published). In addition an impact evaluation in three phases is underway (see below) which follows an initial largely qualitative evaluation published in 2013 (UKCES, 2013). As recognised by the interviewees consulted, and by a prior feasibility study undertaken to inform the impact evaluation, no impact will be visible in PES data due to the scale of the intervention relative to the overall labour market, the way UK PES data is collated and reported, and the diffuse nature of the projects, their aims, and the sectors within which they operated.

The findings of the evaluation mentioned above, based on the phase one projects, reveal that the 24 initial projects supported over 5,000 young people through apprenticeships and other training activity. The evaluation also reported that all of the projects had made progress in developing their tools and products. Six out of the eight ‘innovation projects’ had achieved all their contracted milestones. The two projects, which had not achieved all their milestones, had made the progress expected in developing their products but had underperformed in attracting the expected volume of employers. Data was reported on another sub-set of the phase 1 projects, these being ‘Women into Work’ projects. These projects supported 2,507 women against a forecast figure of 2,297. All of these projects also met or exceeded their targets for learner starts.

An assessment of effectiveness was undertaken by examining whether the solutions developed were sustained in the short term. The evaluation concluded that the phase one projects were effective against this criterion in that all projects were sustained and further developed following their initial year of operation. Efficiency was assessed in terms of whether the approach taken by SSCs to implementing solutions was the most appropriate

one. The evaluation concluded that SSCs had generally taken an efficient approach to developing skills solutions; that all projects had a sound rationale for market failure; and that most were expected to be sustained in the near future and hence provide a return on investment. The interviewees revealed that £92.5 million has been levered in from employers against the £70.3 million public funding (cash and 'in-kind' contributions).

Interviewees recognised that a more robust and fuller assessment of impacts will only be available in the longer term, in part through a planned programme impact evaluation. The first impact evaluation report is currently being finalised and is expected to be available in a few weeks. This will include full assessments of efficiency and effectiveness along with assessing impact on the basis of a counterfactual. A beneficiary survey of 2,000 interviews has been undertaken with businesses benefitting from the funded projects to form the treatment group. A control group was developed on the basis of 2,000 interviews drawn from the annual UKCES Employer Survey. It was noted by interviewees, however, that full impacts will only be realised over a longer time frame. The nature of the projects supported, in that many develop an infrastructure to support training and skills development, entails that the impacts on the workforce in different sectors will take time to materialise.

While interviewees were confident that positive impacts would be evident, it was also noted that the evidence gathered to date offers a slightly mixed picture in terms of the sustainability of the projects funded. Projects in some sectors have proved stronger than others in this respect. It was also noted by one interviewee involved with the impact evaluation that the EIF had probably achieved 80% of what it set out to do in terms of outputs.

Review of the measure

Is the measure adaptable to changes in the situation on the labour market? If yes, how can this be achieved?

The nature of the intervention indicates that it should be very adaptable to changes in the labour market. This rests on several factors including, as interviewees argued, the flexible nature of the EIF's design in terms of (i) being formed of successive rounds of projects which can be adapted as required, (ii) the focus on being responsive to employer needs, (iii) employer involvement in the design and development of projects to meet specific skills needs, and (iv) the ability to focus and target interventions in different ways and at different sectors (given the competitive, project based approach to procurement).

Is the measure specific to the context of the economic crisis or is it generally applicable?

As reflected by interviewees, the general view was that this type of approach is more widely applicable than simply being deployed in response to the economic crisis. The need for significant employer involvement and investment in skills development and the establishment of solutions to skills shortages and mismatches was seen as being universal, irrespective of prevailing economic conditions (certainly in the UK context). Similarly, the demand led nature of the intervention was seen as applicable in times of economic crisis as well as favourable (growth) conditions.

How do the (social) partners and/or the responsible authority view the measure?

The intervention was reported to have been well received and supported by key social partners, including trade-unions and employer representative organisations, and was seen by UKCES itself as an important source of learning through which to influence future programmes and investments. Interviewees noted that learning from the programme had

influenced the UKCES' Employer Ownership Pilot, Growth and Innovation Fund, and UK Futures Programme, in addition to being an influence on the Government's development of Industrial Partnerships.

Can the measure be transferred to other EU-countries?

Interviewees had mixed views on the transferability of the approach to other EU countries. It was noted that the UK has very weak tripartite arrangements linking government to employers and trade unions relative to elsewhere in Europe, hence in part the need for the EIF type approach in the UK context. However, equally, the broad principle and design of the demand led aspect of EIF was seen as applicable elsewhere, as was (though perhaps to a lesser degree) the market driven aspect to the approach.

Were there other important lessons learnt?

Important lessons were drawn by interviewees and the qualitative evaluation with respect to the conditions for success behind taking a similar employer led or influenced approach to addressing skills needs. These success factors are: (i) the need for early employer engagement to define the issues that such an intervention seeks to address; (ii) the importance of on-going employer engagement from as wide a range of employers as possible; (iii) the need for rigorous monitoring of milestones and outputs to ensure projects are and remain on track; (iv) the need for strong leadership of projects; (v) the importance of effective governance arrangements (good steering or advisory groups etc.); and (vi) the ability to be adaptable and responsive to any changes in context, policy or regulatory environment.

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Case study 6: Encouraging students for “kierunki zamawiane” (qualifications in shortage in the labour market) – Poland

Short description and functioning	The Polish programme was developed by the Ministry of Science and Higher Education together with the National Centre for Research and Development. Using the ESF, it aimed to encourage students to take up studies leading to qualifications and occupations for which shortages were foreseen (so called "kierunki zamawiane"). The programme was established between 2008 and 2013 for a number of studies (mathematics, science …) and aimed to attract more students by offering special scholarships to well performing students and by improving the quality of the educational programmes in higher education by providing project funding.
Designed to counter which shortage	A future shortage of graduates with technical and scientific qualifications was forecast, leading to a programme to increase the number of university graduates from mathematical, natural and technical sciences.
Implementation date	1 October 2008 - 2013
Responsible authority	The National Centre for Research and Development (NCBR, EFS intermediary institution)
Partners involved	Ministry of Science and Higher Education, Department of Innovation and Development; Foundation for Polish Science (implementing institutions)

Context of the measure

What shortages are detected in the country/region/sector?

The changes in the Polish economy in the 1990s raised the educational aspirations of youngsters in Poland, resulting in the increase in the number of students taking up higher education. However, this positive increase was to a large extent in favour of the humanities and social sciences, whereas the STEM studies attracted much less students. At the same time, labour market analyses showed a significant shortage nationwide in the number of highly-skilled graduates in these areas.

According to CEDEFOP projections for Poland, 1,442,000 total job openings are expected in professions that require high qualifications (managers, specialists, technicians) for the period covered by the Europe 2020 Strategy. The greatest demand on the Polish labour market will be, according to the forecast, for technical science graduates (71% of employers said that within the next 7 years there will be a demand for such graduates), then exact science (34%), social science (28%) and medicine and health science (16%).

Other studies show that in order to achieve the implementation of the objectives of the Europe2020 Strategy in Poland and maintain the competitiveness of the Polish economy, it is necessary to achieve a greater employability of highly-skilled graduates in the sectors that offer high quality jobs and are competitive on the global market. The most crucial sectors are architecture, industrial process design and processing design, construction and civil engineering, technology and IT, electronics and communication, energy, environmental engineering, environmental protection, logistics and transport, management and production technology in industry, processing, agricultural sciences, nutrition technology, environmental protection, medical sciences.

What is the general policy approach in the country regarding shortages?

The general approach for identifying and dealing with shortages in the labour market is described in the two national strategies (National Reforms' Programme for Implementation of Europe2020 Strategy and National Action Plan for Employment) and relies on monitoring of shortages in the labour market by local PES. The PES interventions to address the identified shortages mainly focus on training, individual counselling and employment benefits. However, this monitoring system does not capture the shortage of highly-skilled professionals, which are in practice not the target group of PES interventions. Therefore, the described intervention for addressing the shortage in graduates from mathematical, natural and technical sciences was planned independently from the overall system of monitoring skills demands in Poland. The programme was initiated by the Ministry of Science and Higher Education and identified the shortages through specially commissioned studies.

What was the rationale to introduce the measure?

The main reasons to increase the inflow in of student into certain educational programmes were the following were:

- An insufficient number of students choosing to study technical and exact science coupled with the dynamic process of development of the universities offering humanities and social sciences and the decline of the technical universities;
- the high diversity of education quality;
- the slow increase in the number of academic staff, compared to the large increase in the number of students in Poland.

These reasons lie at the basis of the aim to not only address labour shortages, but also to induce changes in the development of the market for higher education in Poland.

How are the shortages identified in order to target the measure?

The strategic decision concerning the fields of study, which were supported within the programme, was based on the findings of two reports – an employer's survey on the deficits in the national labour market, especially of highly-skilled engineering specialists and graduates from technical studies, and a study measuring the demand for highly-skilled graduates from mathematics, natural and technical sciences by representatives of regional PES and universities. In total, the programme promoted studies in 14 subjects: automation and robotics, biotechnology, construction and civil engineering, chemistry, energy, physics, computer science, material engineering, environmental engineering, mathematics, mechanical engineering, mechatronics, environmental protection, design.

How was the measure conceived?

The intervention was planned within the ESF funded national Operational Programme for Human Capital (PO KL, Program Operacyjny Kapitał Ludzki) 2007-2013, where the Priority

IV was devoted to "Higher Education and Science". Within this Priority the Activity 4.1 "Enhancement and development of educational potential and increasing the number of graduates in subjects of key importance for developing knowledge-based economy" was launched and within it – sub-activity 4.1.2 "Increasing the number of graduates from subjects of key importance for knowledge based economy" (which is described here). Among the key aims of this Activity were: increasing the percentage of graduates of mathematics, natural and technical subjects to 22% and decreasing by 33% the percentage of students not continuing their education in mathematics, natural and technical subjects after the 1st year of studies. The Activity 4.1.2 consisted of several interventions such as:

- increasing the attractiveness of higher education in the field of mathematics, natural and technical sciences through scholarships for students ("O")[57] ;
- developing and implementing supplementary courses for 1st year students to enhance their basic competences (e.g. in mathematics) necessary to continue and succeed in their studies ("O");
- implementation of new or changing existing study programmes ("S");
- additional lectures with practitioners or foreign academics, study visits, attendance of foreign conferences by students and other forms of support for international mobility ("S");
- internships and trainings ("O" for certain study subjects, otherwise "S"): trainings in economics and business were obligatory for students of environmental studies, trainings in environment protection and environment-friendly solutions in production process were obligatory for students of engineering, whereas trainings in eco-innovations, renewable energy, environmental management in enterprises, environment-friendly technologies, as well as trainings in entrepreneurship were optional for different study programmes;
- other forms of educational activity aimed at improving the attractiveness of commissioned subjects (e.g. fellowships, special awards).

As the programme was implemented on a competitive basis, the choice for specific interventions in each project was decided by the applying universities, the interim beneficiaries of the programme, and adjusted to local labour market needs and universities' specificities.

Results of the measure

Briefly describe the implementation of the measure.

Preceding the implementation of the measure on a larger scale, the Ministry of Science and Higher Education ran a pilot project in 2009-2013 to increase the number of graduates in mathematics, natural and technical sciences, which engaged 45 universities in Poland. 4,300 students started their studies in the piloted subjects and 3,200 graduated. The pilot project was used to test tools and interventions which could then be further applied in the competitive procedure.

Between 2009 and 2012 there were 4 calls for projects on promoting studies in mathematical, natural and technical sciences (so called "kierunki zamawiane") and 994 applications from the public and private universities in Poland were submitted. Altogether

[57] "O" stands for obligatory elements of the intervention for all applying universities, whereas "S" stands for selective.

270 projects were chosen with a total budget of 1.1 bln PLN (approx. 256 mln EUR). The programme's indicators assumed that by 2015 20,800 students would be admitted for studies of strategic importance for the economy and that 18,000 would graduate. After the 4 application rounds altogether 93,500 students started their studies; the current number of graduates exceeds 21,000.Within the programme, 126 universities offered their 1st year students supplementary courses in mathematics, physics or chemistry in order to upgrade their secondary-level knowledge to the level necessary for studying. With regard to the funded scholarships – in the academic year 2009/2010 4,725 students received scholarships of altogether 32.9 mln PLN (about 7.6 mln EUR); in 2010/2011 8,254 students received 61.9 mln PLN (about 14.4 mln EUR); in 2011/2012 – 12,606 students received 101 mln PLN (ca. 23.5 mln EUR); and in 2012/2014 – 17.5 thousand of students got 143.5 mln PLN (ca. 33.4 mln EUR). Apart from scholarships and supplementary courses, several other forms of interventions were implemented within the programme. The table below presents the different kinds of interventions supported within the programme, and indicates the percentage of projects that implemented them.

Table B 3: Use of interventions within the programme

Interventions	Used in % projects
Scholarships for students	100%
Supplementary courses in mathematics, physics and/or chemistry for 1st year students	100%
Additional lectures, courses and trainings, which include:	93%
• foreign language trainings	30.9%
• lectures of foreign experts	20.8%
• highly specialized professional or IT courses	62.9%
• lectures of practitioners and outstanding academicians	50.2%
• trainings in environmental protection	17.4%
• trainings in entrepreneurship	24.3%
• trainings in innovation	2.3%
• trainings supporting entry on the labour market and career planning	14.7%
• soft-skills trainings	12.7%
• professional certification trainings	42.5%
• meetings with potential employers	8.5%
Internships	82%
Study visits, practical classes and field trips	60%
Supporting students' participation in fairs and conferences	32.4%
Support for disabled students, access to e-learning platforms	10.4%
Mentoring	7.7%
Grants and financial and non-financial rewards for the best students	13.9%
Purchase of necessary technical equipment	13.5%

Source: own elaboration based on Grotkowska, G., Gajderowicz, T., Wincenciak, L., Wolińska, I. (2014). Raport końcowy z badania: „Ocena jakości i skuteczności wsparcia kierunków zamawianych w ramach Poddziałania 4.1.2 PO KL".

What is the impact of the measure on the specific shortage situation?

The described measure has successfully contributed to increasing the attractiveness of studying mathematics, natural and technical science. In the first place, it did so by increasing the number of students applying and enrolled for the studies, increasing the number of graduates and increasing the retention rate after one year of study. Secondly, the measure contributing to an increased appreciation of graduates' skills by the employers and a better matching of their skills with the skills required in their jobs.

Findings from the programme's evaluation show that it successfully contributed to the increase in the number of students in the promoted subjects. Although in the last years the number of newly enrolled students in Poland systematically dropped due to the demographic changes, the number of students in the promoted subjects increased.

The data of the Ministry of Science and Higher Education on the most popular subjects of studies show that six of the promoted subjects were among the top-15 subjects in 2013/2014 – computer science, civil engineering, mechanics and machine building, automatics and robotics, environmental engineering and biotechnology. The most spectacular changes in attractiveness were reported for computer science (between 2009/2010 and 2013/14 its attractiveness increased from 5th to 1st place), mechanics and machine building (from 20th to 5th place) and automatics and robotics (from 19th to 8th). Civil engineering remains at 4th place, and there was a slight increase in the attractiveness of studying biotechnology (from 17th to 15th place). The attractiveness of these fields of studies was reflected in the number of students. Whereas in 2009/2010 students of mathematics, natural and technical sciences accounted for 22.5% of the total student population, three years later they accounted for 25.8% (a statistically significant change). This change is in particular attributable to the increase in the number of students in technical subjects, whereas the number of students in mathematics and natural sciences is oscillating. It is worth mentioning that the increased attractiveness of studying technical subjects continued after the end of the programme.

Moreover, the programme also contributed (although less so) to the increased retention of students in mathematics, natural and technical studies. The percentage of students dropping out of their study programme after the 1st year decreased in particular for technical studies (by 10.1%) and in computer sciences (by 11.9%). However, this indicator increased between 2009 and 2012 for a number of subjects – biological sciences (increase by 23.1%), physical sciences (23.6%), mathematics and statistics (by 26.3%).

The findings from the employers' survey show that students and graduates from the promoted subjects are slightly better regarded than graduates of other similar courses. The employers regarded them as well qualified for professional duties, although they sometimes lack soft skills and general analytical competences. Due to the fact that the programme has stopped only recently, it is currently difficult to assess the medium and long-term effects of the programme.

Graduates from the programme reported that their work responsibilities are closely related to the area of their studies (53%). Comparing these opinions to a similar pool of graduates from subjects, who did not receive any support, we can observe a significant difference. Only 27% of the latter agreed that their work responsibilities are closely related to the area of their studies. The highest match between the area of study and work experiences was observed for students of computer science (72%) and electro-technics (77%). A much smaller match was observed for students of environmental protection (44% of former students work in unrelated fields) and environmental engineering (34% work in unrelated fields).

Finally, it is important to mention that the job satisfaction of graduates from the programme is significantly higher than the satisfaction of the graduates from the same fields who did not receive support.

Review of the measure

Is the measure adaptable to changes in the situation of the labour market?

If yes, how can this be achieved?

One of the main advantages of the described measure is that it is adaptable to labour market situation. The main reason is that the design of the measure depends to a large extent on the universities who apply for support. The universities can adjust their applications to their specificities and the situation on the local labour market. The implementing authority can influence the measure by setting the necessary conditions required for the applicants. These conditions were only slightly changed during the duration of the programme: 3 additional study programmes were added to the list of those eligible for support; namely in 2009 the interdisciplinary study programmes were added, and in 2012 two additional chemical specialties. In addition, there were also changes concerning the obligatory and selective elements of projects.

Is the measure specific to the context of the economic crisis

or is it generally applicable?

The measure is generally applicable.

How do the (social) partners and/or the responsible authority view the measure?

Although the evaluation of the programme pointed out numerous positive impacts on increasing the attractiveness of studying mathematical, natural and technical subjects in Poland, the programme is not going to be continued and it is going to be replaced in the period 2014-2020 by a programme promoting special competences rather than graduates from particular fields of study. It is assumed that, for example, IT competences should be acquired while studying any subject, instead of only during studies in computer science. The evaluation report pointed out that, whereas the aims of the programme were achieved (the structure of higher education in Poland evolved in favour of more graduates from technical, natural sciences and mathematics), currently employers stress the lack of specific competences of graduates rather than specific qualifications (mainly soft skills, business orientation, international mobility).

Moreover, the problem of promoting studies leading to qualifications in shortage on the labour market lies also in the difficulty to establish proper, medium and long-term prognosis of the changes on the labour market. Experts claim that there is an insufficient analysis of labour market needs both preceding the implementation of the programme as well as in general. The two studies which formed the basis for choosing the ordered subjects were both limited to the graduates of mathematics, natural and technical sciences, whereas the shortages in graduates from other fields of studies were not included in the studies. Generally speaking, there is no efficient system to analyse labour market demand and supply in Poland. It is worth mentioning that the Ministry of Labour and Social Policy was not engaged in the planning or implementation of the programme, even as the analysis of further labour market demands lies within their key competences.

Although the short-term effects of the programme are very positive (the attractiveness of studying mathematics, natural and technical sciences has increased significantly), it is too early to properly analyse the long term effects. However, the National Centre for Research and Development, which was responsible for the design and implementation of the

programme, is planning to commission a study focused on the programme's impact on local labour market outcomes. However, no due date of such evaluation has been established.

Can the measure be transferred to other EU-countries?

The idea of promoting specific qualifications in shortage on the labour market is interesting. Increasing the attractiveness of certain fields of studies which are less popular among students and which are important for increasing the economy's competitiveness can be a valid method for other countries. The method could also easily be transferred to other EU Member States, in particular as the programme, including the grant-system and support for educational institutions, allows for flexible adjustment to national, regional and local labour market needs. The key to success is having an effective system of assessing labour market needs, as well as constant monitoring and evaluation of the outcomes. The bigger challenge is the cost of the intervention. In the case of the Polish programme the cost efficiency of the interventions has not yet been evaluated.

Were there other important lessons learnt?

The main advantage of the programme is its flexibility – it is possible to change the promoted subjects at the beginning of each academic year, although the effects of these changes are visible only after some time due to the long duration of the education cycle. Finally, it must be mentioned that the programme was supplemented by other measures aimed at supporting business-university cooperation and that its implementation was motivated by the Lisbon Strategy and further Europe2020 Strategy objectives.

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NOTES

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