

Please cite this paper as:

Spielvogel, G. and M. Meghnagi (2018), "The contribution of migration to the dynamics of the labour force in OECD countries: 2005-2015", *OECD Social, Employment and Migration Working Papers*, No. 203, OECD Publishing, Paris. <http://dx.doi.org/10.1787/a301bef8-en>



OECD Social, Employment and Migration
Working Papers No. 203

The contribution of migration to the dynamics of the labour force in OECD countries

2005-2015

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JEL Classification: F22, J11, J61

**DIRECTORATE FOR EMPLOYMENT, LABOUR AND SOCIAL AFFAIRS
EMPLOYMENT, LABOUR AND SOCIAL AFFAIRS COMMITTEE**

The contribution of migration to the dynamics of the labour force in OECD countries: 2005-2015

JEL Classification:

F22, J11, J61

Keywords:

Migration, Working-age population, Labour force, Education, Occupations

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Acknowledgements

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Co-funded by the
European Union

This document was produced with the financial assistance of the European Union Programme for Employment and Social Innovation “EaSI” (2014-2020).

Abstract

This paper presents the methodology as well as the results of the joint OECD-EC project *Migration-Demography Database: A monitoring system of the demographic impact of migration and mobility*. The objective of the project is to evaluate the contribution of migration to past and future labour market dynamics across OECD countries. After assessing the role of migration over the last five to 10 years in shaping the occupational and educational composition of the labour force, this project looks at the potential contribution of migration to the labour force in a range of alternative scenarios. This paper presents the results from the first part of the project: it focuses on the changes that have taken place in the last 10 years and studies how migration flows have contributed to the dynamics of the labour force, in particular in comparison to other labour market entries. It also analyses the contribution of migration in specific skills categories and in specific occupations.

Résumé

Ce papier présente la méthodologie ainsi que les résultats du projet commun OCDE-Commission européenne *Migration-Demography Database: Un système de suivi de l'impact démographique de la migration et de la mobilité*. L'objectif de ce projet est d'évaluer la contribution de la migration aux dynamiques passées et futures du marché du travail dans les pays de l'UE et de l'OCDE. Après avoir évalué le rôle de la migration au cours des cinq à dix dernières années dans l'évolution de la structure professionnelle et éducative de la population active, ce projet examine la contribution potentielle de la migration à la population active dans divers scénarios alternatifs. Cet article présente les résultats de la première partie du projet: il se concentre sur les changements qui ont eu lieu au cours des 10 dernières années et étudie comment les flux migratoires ont contribué à la dynamique de la population active, en particulier par rapport aux autres entrées sur le marché du travail. Il analyse également la contribution de la migration dans les différentes catégories de qualification et dans des professions spécifiques.

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The contribution of migration to the dynamics of the labour force in OECD countries: 2005-2015

Introduction

EU countries are currently undergoing major demographic changes, as is also the case for most non-European OECD countries. Because of its numerous social and economic implications, population ageing is one of the most significant long-term challenges for many European and non-European OECD countries (European Commission, 2015^[1]; OECD, 2006^[2]; United Nations, 2015^[3]). The median age of the population of the EU has increased from 34 in 1985 to almost 43 in 2015, with differences existing across member countries. A number of non-European OECD countries are also affected by this trend. For example, Japan has experienced very rapid ageing, with a median age that increased from 35 in 1985 to almost 47 in 2015. Although somewhat younger than the European population, Northern American countries are also getting older: in 2015, the median age was 38 in the United States and 41 in Canada, up from 31 in both countries in 1985. A similar trend is observed in Australia and New Zealand.

Countries which have started their demographic transition later remain significantly younger, but are also ageing and will reach the same situation as Europe in the coming decades. This is for example the case of Mexico, which had a median age of 27 in 2015, or Turkey, with a median age of 30 in 2015.

Population ageing in OECD countries is mostly driven by fertility decline and increasing longevity. In most cases, the latter component is predominant. For EU countries as a whole, the population aged 65 and over has increased by about 60% between 1985 and 2015, while the population aged 0-4 has decreased by 15%. In addition, some EU countries have not experienced any significant fertility decline in the recent decades, while the increase of longevity is observed everywhere. In the United States, Canada, Australia and New Zealand, fertility remains quite dynamic, but the 65+ population is increasing more and more rapidly. Among OECD countries, Japan and Korea have experienced especially radical change in their demographic structure: between 1985 and 2015, the population aged 0-4 has declined by 30% in Japan and 40% in Korea, while the 65+ population has increased, respectively, by 170% and 280%. Although the ageing process might start to slow down in the “oldest” countries, it is expected that these trends will continue in the coming decades.

These demographic transformations stem from both economic and social progress. Better than ever, populations in OECD countries are protected against a wide range of deadly diseases and are able to enjoy longer and healthier lives. Individuals are also better able to choose how many children they will have, and when to have them. However, these changes also generate new economic and social challenges that have been extensively documented (Bloom, Canning and Fink, 2010^[4]; Harper, 2014^[5]).

A direct implication of the change in the age structure of the population is the increase in public expenditures on pensions, social security and health care, including services dedicated

to the elderly population (Colombo et al., 2011_[6]). This means that fewer resources are available for other social protection needs. In addition, rising dependency ratios imply that repartition pension systems are under increasing stress, which has led several OECD and EU countries to put in place new pension reforms such as increasing retirement age or mandatory contributions, reducing pensions, or implementing a combination of those options (OECD, 2016_[7]). Due to the changes in the distribution of economic and political resources between generations, intergenerational conflicts are also likely to be more prevalent (Busemeyer, Goerres and Weschle, 2009_[8]; European Commission, 2015_[11]; European Commission, 2015_[9]; European Commission, 2017_[10]).

In addition to these fiscal and intergenerational implications, ageing population has an impact on the size of the working age population (in relative and absolute terms) and consequently on the functioning of the labour market (Borsch-Supan, 2003_[11]; European Commission, 2017_[10]). In particular, labour shortages may emerge in specific regions, sectors or occupations, at different skill levels. The risk of shortages is especially acute in occupations where labour demand is bound to increase because of ageing itself, such as healthcare or domestic services, or as a consequence of ongoing technological changes.

This structural evolution of the labour market is currently combined with two major, more temporary, phenomena. First, a number of EU and OECD countries still suffer from relatively low employment rates in the wake of the Great Recession and the austerity policies that have been implemented to cope with rising public debts (OECD, 2016_[12]; European Commission, 2016_[13]). Second, large cohorts of baby-boomers are exiting the labour force, which may generate tensions in some segments of the labour market. Both issues tend to obscure the long-term outlook of the labour market in EU and OECD countries, and make the policy discussion about potential solutions more polarised.

Another key contextual element that is particularly relevant for current and future evolutions is the rising participation of women to the labour market, which shows an increase of around 3 and 4 percentage points in the OECD area and the EU27 respectively between 2005 and 2015. Women are now also more likely to enter both fast growing and highly-skilled occupations than men (OECD/EU, 2014_[14]), positively contributing to the overall upskilling of the labour force.

Moreover, in the last decade, many OECD countries have experienced an increase in migration inflows, sometimes associated with outward mobility of natives. Compared to births and deaths, migration is still a relatively small demographic component in absolute terms, but it may become pivotal as countries experience near-zero rates of natural increase. With respect to increasing mobility, EU countries deserve special attention, due to the migration opportunities opened by the freedom of movement of workers in the area. In 2015, around 11.4 million of citizens aged 20-64 from the EU28 and the EFTA countries resided in a country different from their country of birth. This figure represents an increase of 5.3% compared to 2014 (European Commission, 2017_[15]).

In this context, the potential contribution of international migration to the mitigation of the economic challenges raised by ageing has been widely discussed (United Nations, 2000_[16]; Coleman, 2008_[17]; European Commission, 2016_[18]). Migration has sometimes been advocated as a “solution” to those problems. Since migrants from less developed countries are on average younger than the population in OECD destination countries, they can help offset issues related to population ageing. In addition, upon arrival, migrants may also tend to have higher fertility norms than host populations, which can slow down the fertility decline. These effects are real, but they are only temporary. The overarching consensus is that international migration cannot offset the negative effects of population and labour force

ageing in the long-term. Migrants themselves get old, and additional migration inflows can only have a temporary effect on the age structure. The impact on fertility is also transitory, since migrants progressively change their fertility behaviours as they integrate into more affluent host societies.

The role of migration can be assessed by looking at the population projections elaborated by the Population Division of the United Nations. Data shows that the working-age population (15-64) of EU countries is expected to decrease by 15% between 2015 and 2050 under the medium-variant scenario, which assumes that net migration towards EU countries is on average 750 thousands per year. In the scenario with zero net migration, a 23% decline of the working-age population is projected. This implies that merely stabilising the size of the working-age population of EU countries until 2050 would require more than doubling net migration compared to its current level; this is not only unrealistic, but would provide only a temporary slow-down in the ageing of the population.

Although the long-term demographic impact of immigration towards OECD countries is now well understood to be limited, its impact on the dynamics of the labour market is more complex and varies across countries. In addition to age structure, there are indeed key differences between natives and immigrants, as well as between different groups of foreign-born, which have implications on labour market structure and composition.

The skill structure of the working-age native and migrant populations is the first important dimension to consider, especially in the context of exit of the post-war cohorts from the labour force. Although these retiring workers are much better educated than the previous generations, the cohorts coming after them in most OECD and EU countries have reached, on average, even higher levels of education. However, since the new entrants belong to smaller cohorts, there might be a potential need for skills at both ends of the educational distribution. This trend is reinforced by current changes in labour demand, which is particularly dynamic for both low-skilled and high-skilled workers in the services sector (Autor and Dorn, 2013^[19]; Goos, Manning and Salomons, 2009^[20]), a situation which is likely to continue (Cedefop, 2016^[21]).

Migrants towards OECD countries come from a broad range of countries and have diverse backgrounds in terms of formal and professional qualifications. There is, however, a bimodal pattern in the education distribution of immigrants in a number of EU and OECD countries: migrants are often overrepresented among both the low and the highly educated (Arslan et al., 2015^[22]). This can be partly explained by the mix of motives for which migrants come to live and work in their respective host countries: some come for family or humanitarian reasons, which rarely involve education-related selection, while others come to study or to work, in which case they are more likely to be – or become – highly-educated.

Beyond skills, the second important differentiating factor to consider when looking at the potential implications of immigration on the dynamics of the labour market is participation. On the one hand, labour market participation of some categories of migrants, especially low-educated women, tends to be below average, sometimes because of insufficient language proficiency. On the other hand, highly-educated labour migrants typically have participation and employment rates that can be higher than those of natives. In the EU context, there is often a contrast in terms of participation between migrants from other EU countries and migrants from third countries: the former generally have participation rates that are as high as natives, or even higher, while the latter may have less favourable labour market outcomes (European Commission, 2016^[18]; OECD/EU, 2015^[23]).

In order to better understand the role of migration in the current and future labour market dynamics it is fundamental to take into consideration country-specific differences in the education structure and participation rates, between immigrants and natives, as well as between different groups of foreign-born. This last point is particularly crucial for EU countries, not only because of the similarity between natives and migrants from other EU countries, but also because the latter benefit from freedom of movement within the EU, which is not the case for third country nationals.

Building on the work carried out jointly by the OECD and the European Commission in the framework of the project on “Matching economic migration with labour market needs” (OECD/EU, 2014^[14]), the objective of this OECD-EC project on “Migration-Demography Database: A monitoring system of the demographic impact of migration and mobility” is to create a database that will update, expand and streamline the analysis of the demographic impact of immigration on the size and composition of the labour force. This project includes both a retrospective analysis over the last 10 years, and projections over the next 15 years.

This paper focuses on the changes that have taken place in the last 10 years and aims at answering the following questions: To what extent have migration flows contributed to the dynamics of the labour market, in particular in comparison to other labour market entries? Has this contribution of migration been concentrated in specific skills categories, or in specific occupations? The analysis complemented with a detailed presentation of the methodology used to produce the backward analysis and the projections (Annex 1).

This analysis examines changes in the labour force in the last decade by looking at the contribution of four different demographic groups: (i) young entrants (i.e. people who have finished their studies in the last 10 years and have entered the labour force¹), (ii) recent retirees (i.e. people who have left the labour force in the last 10 years to retire), (iii) recent immigrants (i.e. foreign-born who have been living in the country for less than 10 years), and (iv) ‘prime-age’ individuals, who account for all other changes occurring in the work force (hence including also emigrants and long-standing immigrants). This decomposition is used to explore how each of these groups has impacted the evolution of the labour market in terms of both occupations and education. This analysis covers 25 EU countries², three EFTA countries (Iceland, Norway and Switzerland), Australia and the United States.

Labour market trends

The progressive enlargement of the EU over the past 15 years has influenced the dynamics of the labour force³ for both receiving and sending countries. In 2015, across EU-27 countries, immigrants⁴ represented around 13% of the labour force, an increase of more than three percentage points compared to 2005. The distribution of migrants is uneven across countries: the highest shares of immigrants in the labour force were registered in Luxembourg (55%),

¹ This means that they either start working or searching for a job.

² Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom.

³ In this paper the labour force includes people aged 15-74.

⁴ 'Immigrants' in the context of this study include also mobile EU citizens, i.e., people moving from one EU country to another.

Switzerland (31%), Ireland (21%), Austria (20%), Sweden (19%), Belgium and the United Kingdom (both 17%).

In the same year, recent immigrants (i.e. those arrived in the last 10 years) represented 4% of the overall labour force in Europe. Luxembourg had the highest share of new immigrants, being more than a quarter of the labour force, followed by Switzerland and Ireland at 13% and 12% respectively.

In Europe, recent flows of immigrants from the EU and from third countries are unevenly distributed across countries. For example, in Austria, Iceland, Ireland, Luxembourg and Switzerland, more than 60% of recent immigrants are from the rest of the European Union; on the contrary, Greece, Latvia, Lithuania, Portugal and Slovenia have more than two thirds of migrants coming from non-EU countries. Belgium, Bulgaria, the Czech Republic, Denmark, and the United Kingdom have a similar proportion of new immigrants coming from the EU and third countries,

For European countries, the overall growth of the labour force was 4.5% for the period 2005-2015. In most of them, especially those that were more impacted by the crisis, the years between 2005 and 2010 had seen a higher growth than the following five years. The United States show a slightly higher growth (6.6%), while Australia has seen faster growth, at 10.5%. This last figure can be explained by two main trends that occurred in recent years: the increase in part-time employment that has characterised the Australian labour market (OECD, 2017) and the increase in the number of women participating in the labour market (Australian Government, 2016).

Table 1 below shows the growth of the labour force across Europe, the United States and Australia from 2005 to 2015 as well as the contribution of each demographic group to these changes. For European countries a distinction is made between European vs. third country migrants. In European countries, Australia and the United States, immigration has played an important role to maintain the growth of the labour force between 2005 and 2015. For European countries, overall labour force growth during this period has been 4.5%, with positive contributions of young entrants (16.8% of the 2005 labour force) and new immigrants (4.1% of the 2005 labour force). Although the replacement surplus (i.e. the difference between the number of young entrants and the number of recent retirees) remains positive, changes in participation among prime-age workers (which includes, among other movements, emigration) is negative and practically offsets the replacement surplus. As a result, recent immigrants provide a key contribution to the growth of the labour force.

A similar pattern holds for Australia, although with a higher level of immigration (recent migrants represent 9.5% of the 2005 labour force), and a higher growth of the labour force (10.7%). In the case of the United States, the replacement surplus is lower than in European countries (2.5%), but there is no loss of labour force due to prime age workers.

Compared to the results of the previous OECD/EC project looking at the 2000-2010 period, labour force growth in European countries is significantly lower (8% in 2000-2010 vs 4.5% in 2005-2015), while the migration component is only marginally smaller (5% in 2000-2010 vs. 4.1% in 2005-2015). The contribution of immigration to the growth of the labour force has therefore increased in the recent period.

The age structure of each country affects the contribution of each demographic group to overall labour force growth. As shown in Table 1, different patterns exist across countries. For example, in countries with low shares of young people entering the labour force, like Spain and Italy, immigration has contributed to maintaining a positive growth of the labour force. On the contrary, in countries with low immigration, like Poland, the Slovak Republic

or the Czech Republic, the growth of the labour force relies mostly on the contribution of young entrants which during the period considered has still been positive⁵.

The replacement of the old generations leaving the labour market by young entrants is around 4% across Europe, 2% in the United States and 5% in Australia. This value is always positive except in Czech Republic and in Spain and is close to zero in Italy. Replacement is significantly higher in Iceland and Poland highlighting that new entrants exceeded significantly the exit of older workers in the labour market. This result might be surprising considering relatively old population and high levels of emigration from Poland but can be partially explained by the fact that the participation rate of people above 50 is very low. This means that not all recent retirees are captured in this analysis which only looks at people aged 60 to 74. Hence, those people dropping out of the labour market before aged 60 contribute negatively to the balance of prime-age workers.

⁵ Strongly declining number of births will in many countries translate in young entrants' contribution to drastically decline during the next 20 years.

Table 1. Total growth of the labour force from 2005 to 2015, and contributions to labour force growth by demographic group (in % of the 2005 labour force)

European countries, Australia and the United States

	Total labour force growth	Young entrants	Recent immigrants		Recent retirees	Prime-age workers	Replacement surplus (young + retirees)
	(A+B+C+D)	(A)	(B)	of which EU:	(C)	(D)	(A+C)
Austria	8.9	17.2	7.6	4.8	-12.7	-3.2	4.5
Belgium	7.5	18.7	7.6	4.1	-12.6	-6.2	6.1
Bulgaria	0.7	14.7	0.1	0.0	-12.1	-2.0	2.5
Switzerland	15.6	17.2	15.0	10.6	-11.7	-4.9	5.5
Czech Republic	2.5	16.0	1.1	0.6	-16.6	2.0	-0.6
Germany	4.7	19.9	4.1	1.8	-14.2	-5.1	5.7
Denmark	1.4	14.9	6.0	2.9	-14.5	-4.9	0.4
Estonia	3.6	17.3	0.8	0.2	-12.2	-2.3	5.1
Spain	9.8	13.0	6.2	1.9	-13.9	4.5	-0.9
Finland	0.2	18.3	2.3	0.9	-16.9	-3.5	1.4
France	4.9	18.4	2.8	0.8	-15.7	-0.6	2.6
Greece	-0.8	15.5	2.1	0.5	-14.5	-3.9	1.0
Hungary	7.5	18.4	0.6	0.4	-15.9	4.4	2.5
Ireland	7.4	16.3	12.5	8.2	-9.7	-11.7	6.6
Iceland	16.6	18.5	4.6	3.6	-8.1	1.6	10.4
Italy	4.2	12.3	4.8	1.7	-12.2	-0.8	0.2
Lithuania	-8.8	18.4	0.3	0.0	-10.0	-17.4	8.4
Luxembourg	37.1	16.8	38.1	30.2	-14.2	-3.6	2.6
Latvia	-12.4	16.4	0.4	0.0	-10.9	-18.4	5.6
Netherlands	4.8	16.5	2.1	0.9	-10.3	-3.5	6.2
Norway	15.6	19.0	9.1	5.2	-11.4	-1.1	7.6
Poland	1.4	22.4	0.4	0.1	-10.3	-11.1	12.2
Portugal	-6.2	14.3	1.4	0.2	-11.7	-10.3	2.7
Romania	-6.7	15.6	0.0	0.0	-8.4	-14.0	7.2
Sweden	10.8	20.5	8.2	2.2	-16.5	-1.4	4.0
Slovenia	-0.7	15.3	3.0	0.3	-13.2	-5.7	2.1
Slovak Republic	3.5	20.1	0.2	0.1	-13.2	-3.5	6.9
United Kingdom	10.0	19.4	8.8	4.8	-12.2	-6.1	7.2
EU-27	4.5	16.7	4.1	-	-13.0	-3.4	3.8
Australia	10.7	19.6	9.5	-	-14.3	-4.0	5.3
United States	6.8	23.6	4.4	-	-21.1	0.0	2.5

Note: Data refers to 2005–2015 for the EU, to 2006–2015 for the United States and to 2011–2016 for Australia. In order to ensure comparability across countries, for Australia and the United States, labour force growth has been annualised and rescaled to reflect a 10-year period.

Source: EU Labour force survey, American Community Survey and Education and Work for Australia.

The demography of education

Across the OECD area, the latest decades have been characterised by an overall increase in the level of education of the working age population and consequently of the labour force. This is confirmed by the data analysed in this study, which shows that young entrants have higher levels of education than recent retirees. This also reflects the ongoing structural changes on the labour demand. It implies that younger workers and those leaving the labour

force cannot replace each another as they have different skills, as broadly demonstrated in the literature (Eichhorst et al., 2014_[24]).

As shown in Table 2 below, between 2005 and 2015, at the European level, the share of the labour force with high levels of education⁶ increased by 40%. While this increase is higher than both Australia and the United States, the contribution of recent immigrants is lower. More precisely, it is 16% in Europe, 40% in Australia and 23% in the United States⁷. This might imply that recent immigrants, even if fundamental in increasing or maintaining the size of the labour force, still have a limited impact in contributing to the upskilling of the labour force.

In the European Union, the share of recent retirees with low educational attainment is four times as high as the share of young entrants; the difference between these two groups is particularly high in Southern European countries, meaning that the educational composition of the labour force has experienced a faster increase in this region.

Compared to young entrants the share of low-educated recent immigrants also tends to be higher. Countries with low education levels amongst recent retirees, such as Greece, Italy and Slovenia, also tend to also see high share of low-educated recent migrants.

In line with findings from previous work (OECD/EU, 2014_[14]), these results show that, for most countries, recent immigrants tend to be better educated than the cohorts leaving the labour market but are less educated than young entrants. This is, however, not the case in Germany and Finland, where recent migrants are less qualified than recent retirees, and in Luxembourg, Switzerland and the United Kingdom where recent migrants are more qualified than young entrants.

In the United States, the distribution of education among new immigrants is more polarised than in the European Union, meaning that they have higher shares of both low and high educational attainment when compared to recent retirees. Compared to new entrants, recent immigrants have similar shares of high education, but much higher shares of lower education, meaning that they are overall less educated than the native-born young entrants.

In Australia, due to the selective migration policy, recent immigrants have on average a higher level of education compared to young entrants in the labour market, with 62% having tertiary education (vs. 55% for the young entrants). The gap between young entrants and retirees is more marked than in most countries of our sample, which implies a sharper rise of educational attainment in the country in the forthcoming years.

⁶ High educational level corresponds to categories 5 to 8 of the ISCED11 (International Standard Classification of Education) classification.

⁷ The contribution is calculated as the share of recent immigrants to total growth.

Table 2. Total growth of the labour force with higher education from 2005 to 2015, and contributions by demographic group (in % of the 2005 labour force)

Selected European countries, Australia and the United States

	Total labour force growth (A+B+C+D)	Young entrants (A)	Recent immigrants (B)	Recent retirees (C)	Prime-age workers (D)
Austria	31.9	24.7	14.9	-9.7	1.9
Belgium	26.3	27.7	8.3	-10.1	0.3
Denmark	10.5	19.4	8.5	-11.5	-5.8
France	40.8	33.5	4.0	-11.4	14.6
Germany	19.9	22.2	4.9	-12.3	5.1
Greece	35.7	37.0	1.2	-12.3	9.8
Ireland	55.2	30.4	20.3	-8.3	12.8
Italy	44.3	30.2	4.5	-10.4	20.1
Netherlands	23.7	26.5	2.6	-10.0	4.7
Norway	47.0	30.3	11.9	-9.8	14.7
Spain	35.6	23.3	5.9	-9.3	15.6
Sweden	47.3	31.4	12.5	-15.6	19.0
Switzerland	62.0	27.5	28.7	-11.7	17.6
United Kingdom	51.3	31.1	14.9	-9.8	15.1
EU-27	39.7	31.1	6.4	-10.9	13.1
Australia	36.8	27.7	15.0	-22.1	16.1
United States	20.9	26.4	4.9	-17.1	6.8

Note: Data refers to 2005-2015 for the EU, to 2006-2015 for the United States and to 2011-2016 for Australia. In order to ensure comparability across countries, for Australia and the United States, labour force growth has been annualised and rescaled to reflect a 10-year period.

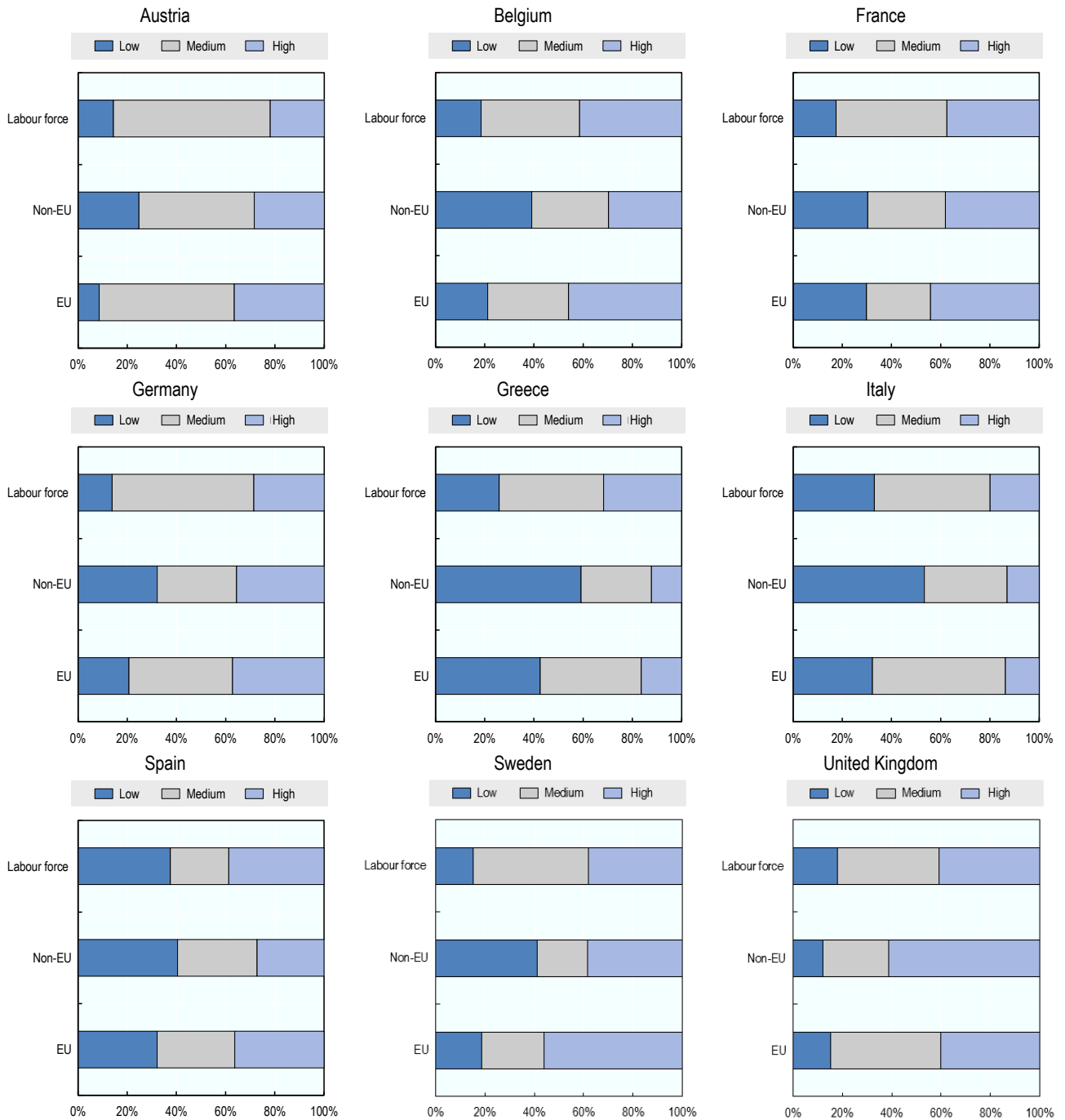
Source: EU Labour force survey, American Community Survey and Education and Work for Australia.

Educational attainments of the migrant population are very heterogeneous and this relates to a number of factors, including the diversity of origin countries, migration motives and the policies – more or less selective – of each country. In most European countries, immigrants from the EU have higher levels of medium and high education than those coming from non-EU countries, except for France where they have a similar distribution and the United Kingdom, where non-EU migrants are more educated than EU migrants (Figure 1).

In addition to the educational composition of each demographic group, Figure 2 and Figure 3 shows how they have shaped the labour force in the last decade. While all countries included in this study have seen an increase in the level of education of the labour force in the last decade, there was sharper rise of highly qualified workers in the EU (+40%) and in Australia (+37%) than in the United States (+19%).

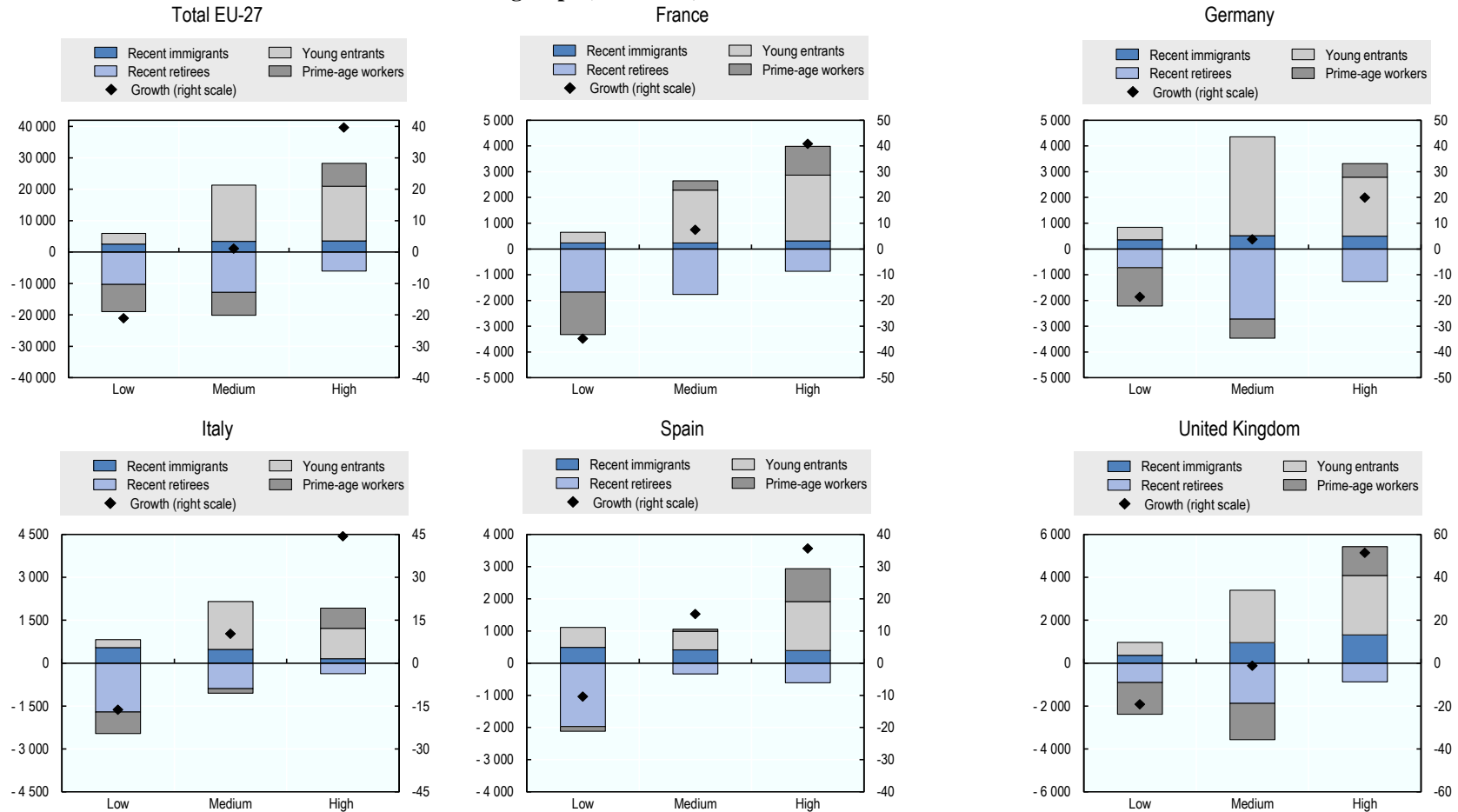
Figure 2 also shows that young entrants in the EU have contributed the most to the increase in the supply of medium and high qualifications and that young entrants are more numerous than recent retirees. For example, across the EU, the number of young entrants with high education is around three times higher than the number of high-educated people leaving the labour force; this relationship is 1.5 in the United States and 1.2 in Australia (Figure 3). Within Europe, differences exist across countries. For example, in Germany and Italy new entrants contributed more to the increase of medium than high levels of education.

Figure 1. Educational attainment of recent EU and non-EU immigrants and the total labour force, selected European countries, 2015



Source: EU Labour Force Survey.

Figure 2. Total growth of the labour force from 2005 to 2015 by education level (%) and contribution of the different demographic groups (thousands) in selected EU countries



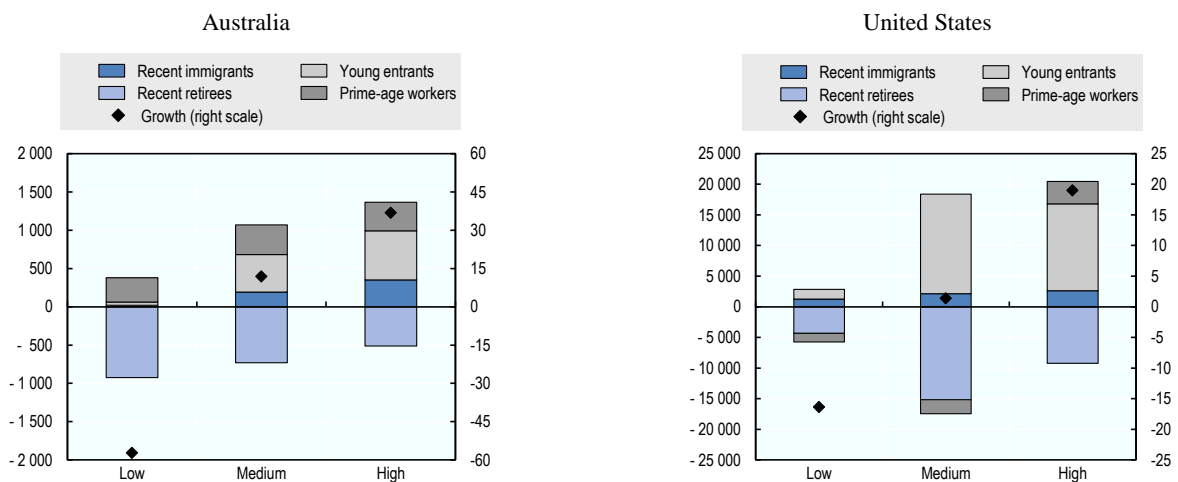
Note: Data refers to 2005-2015 for EU countries.; Source: EU Labour Force Survey.

Concerning recent immigrants, the breakdown by country sheds light on their different contribution to educational changes of the labour force. While in France and in the United Kingdom, recent immigrants were mainly highly educated, in Spain and Italy they were more often on the other end of the education spectrum. This is probably due to the inflows of low-educated migrant workers that have occurred in these countries in the last decade in response to the demand for low-educated workers. In both Australia and the United States, similarly to the EU average, recent immigrants were mainly medium and highly educated. Especially for Australia, this is the effect of the selective immigration policy which has favoured the entrance of highly educated migrants.

For recent retirees the picture is mixed. For the EU as a whole, France and the United Kingdom they seem to have equally contributed to the decrease of both low and medium education groups. While in Germany and in the United States the decrease is much stronger for medium levels of education, in Australia, Spain and Italy recent retirees have left mainly occupations requiring low levels of education.

The findings of this section show that the overall increase of the labour force between 2005 and 2015 was driven significantly by the entry of highly educated cohorts of younger workers and the retirement of less educated cohorts. On the other hand, the contribution of recent immigrants to the supply of higher qualifications tends to have been modest even if it differs across countries. Those differences are due mainly to the countries of origin of immigrants, the migration policies and the skills needs in the hosting countries.

Figure 3. Total growth of the labour force from 2005 to 2015 by education level (%) and contribution of the different demographic groups (thousands) in Australia and the United States



Note: Data refers to 2006-2015 for the United States and to 2011-2016 for Australia. In order to ensure comparability across countries, for Australia and the United States, labour force growth by education has been annualised and rescaled to reflect a 10-year period.

Source: American Community Survey and Education and Work for Australia.

The evolution of occupations⁸

In the last decades, OECD countries have been also characterised by significant changes in terms of the occupational composition of the labour market. Most countries have seen a progressive polarisation of the labour force with medium skilled jobs stagnating while high and low-skilled jobs growing at a faster pace. This also corresponds to a greater increase of both high and low paid occupations. While this trend is clear in countries like Canada and the United States, different patterns exist within Europe (Institute for Public Policy Research, 2014_[25]).

The evolution of the occupational structure can be explained by a number of factors and can be analysed from two different perspectives; either from the demand side which corresponds to the skills needed by employers or by the supply side which indicates the skills owned by the labour force.

This analysis focuses on the latter and highlights changes based on the characteristics of people entering and exiting the labour force. In this framework, young entrants and recent migrants provide a positive contribution to growth while recent retirees induce a negative one. This translates into either the creation of new jobs or the replacement of retirees by other people in the labour force.

Figure 4 shows how each demographic group has contributed to net employment changes in five quintiles of growth in European countries⁹. Interesting findings emerge when comparing the contribution of young entrants and recent immigrants at the top and bottom quintiles in Europe (Figure 4) and the United States (Figure 5). While recent immigrants in Europe and in the United States have a similar distribution in the fastest growing occupations (top quintile), where they represent respectively 20% and 15% of entries (including both young entrants and recent immigrants), recent immigrants are many more in the strongest declining occupations (bottom quintile) in Europe than in the United States (30% and 9% of entries respectively).

In Europe, when looking at the distribution of the different demographic groups across quintiles, new entrants are more concentrated in growing occupations, with 47% being in the fastest growing occupations (fourth and fifth quintiles). Recent retirees show a distribution opposite to that of young entrants with more than 40% of them being in the two bottom quintiles and around a third in the top two quintiles of growth.

More than half of recent immigrants have entered fast growing occupations (fourth and fifth quintile) and around a third entered declining occupations. While this result confirms their contribution to employment growth, it is worth highlighting that the occupations included in the top two quintiles, as well as in the other quintiles, are a mix of high and low qualified, paid and productive occupations. This means that the allocation of immigrants across occupations is not always effective, meaning that the potential contribution of immigrants to economic growth is not fully achieved. Similar results also emerge when looking at the employment distribution of immigrants across industrial sectors in Europe. A recent analysis conducted by the European Commission highlights that there is room for improvement in

⁸ Due to limited data availability, Germany and Australia are not included in the analysis of occupations.

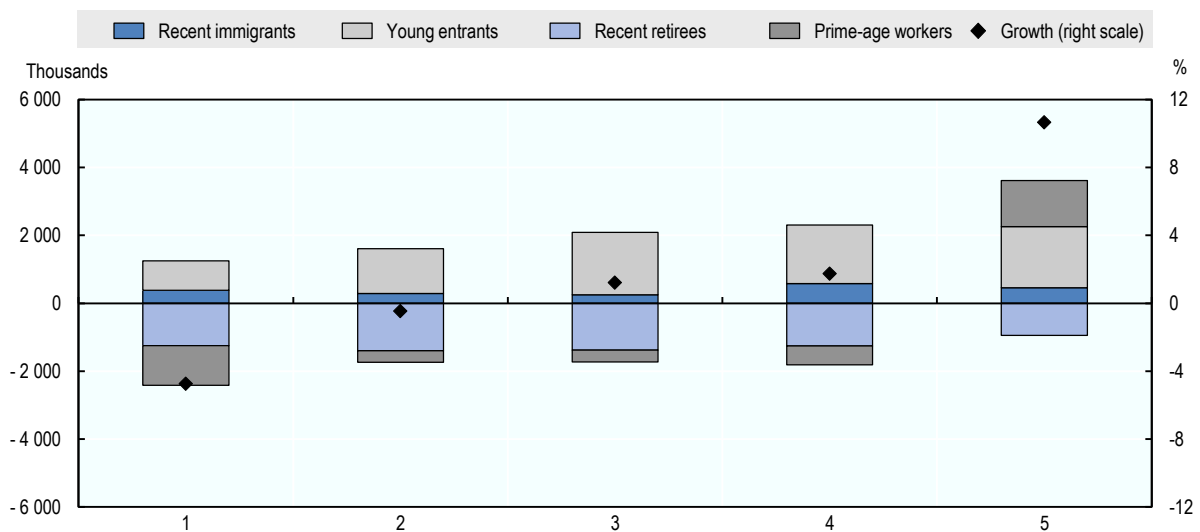
⁹ The analysis included in this section focuses on the 2011-2015 period. Following a change in the ISCO classification in 2011, trends in the employment by occupation cannot be analysed for previous years for European countries. In order to ensure some comparability across countries, a similar period of time has been analysed also for the United States and Australia.

attracting immigrants towards more fast-growing and higher productive activities (European Commission, 2016_[18]).

In the United States, similarly to European countries, slightly less than half of both new immigrants and young entrants are in the top two quintiles of growth (46% and 43% respectively) (Figure 5). Another similarity relates to the distribution of prime-age workers and recent retirees, of which the vast majority have left mainly the bottom two quintiles. The main difference with the previous chart is related to the distribution of young entrants in declining occupations, who are 40% in the United States and 29% in Europe.

The different distribution of the demographic groups across quintiles suggests that, in line with results from the previous OECD/EC report, new entrants in the labour market are employed in occupations which are not necessarily those left by recent retirees. This is probably related to the different skills level of the younger generations and to the fact that some occupations have become obsolete as a consequence of technological change. These results also support findings from the literature showing that there seems to be little competition among these two groups (Eichhorst et al., 2014_[24]) or between natives and migrants (Munnell and Wu, 2013_[26]).

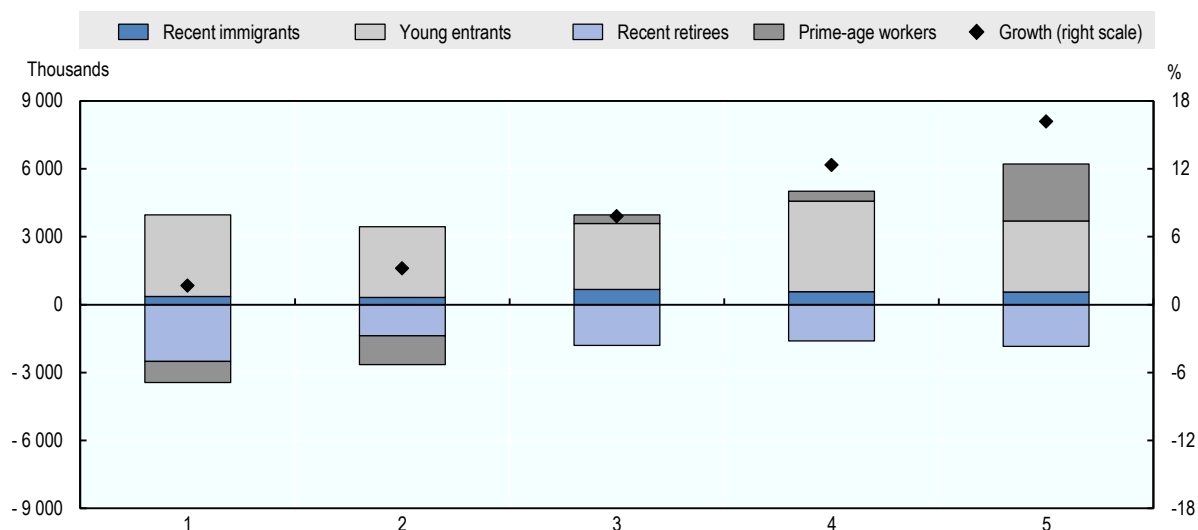
Figure 4. Demographic components of net occupational change across quintiles of growth, EU-27 countries, 2011-2015



Note: EU Labour Force Survey.

Source: Bulgaria, Estonia, France, Norway and Romania are not included in the EU-27 total due to unavailable data on a number of indicators. Quintiles have been defined on the basis of the increase of employment in each occupation at the 2 digit level over the period 2011-2015. The first quintile includes occupations with the slowest growth, while the fifth quintile includes the fastest growing occupations.

Figure 5. Demographic components of net occupational change across quintiles of growth, United States, 2010-2015



Note: American Community Survey.

Source: Quintiles have been defined on the basis of the increase of employment in each occupation at the 2 digit level over the period 2011-2015. The first quintile includes occupations with the slowest growth, while the fifth quintile includes the fastest growing occupations.

In addition to the employment in growing and declining occupations, Figure 6 shows how young entrants and recent migrants have contributed to the evolution of the skills levels of occupations in EU countries. Nearly half of the young entrants are employed in high-skilled occupations, as a consequence of their higher levels of education. This is above average in comparison to total employment and also exceeds the share of immigrants both from EU and non-EU countries in high-skilled occupations. At the other end of the scale, the share of migrants in low-skilled occupations is relatively high especially for non-EU migrants. Their share of employment in low-skilled occupations is more than double of the total employment and more than three times higher than that of young entrants (23% and 7% respectively).

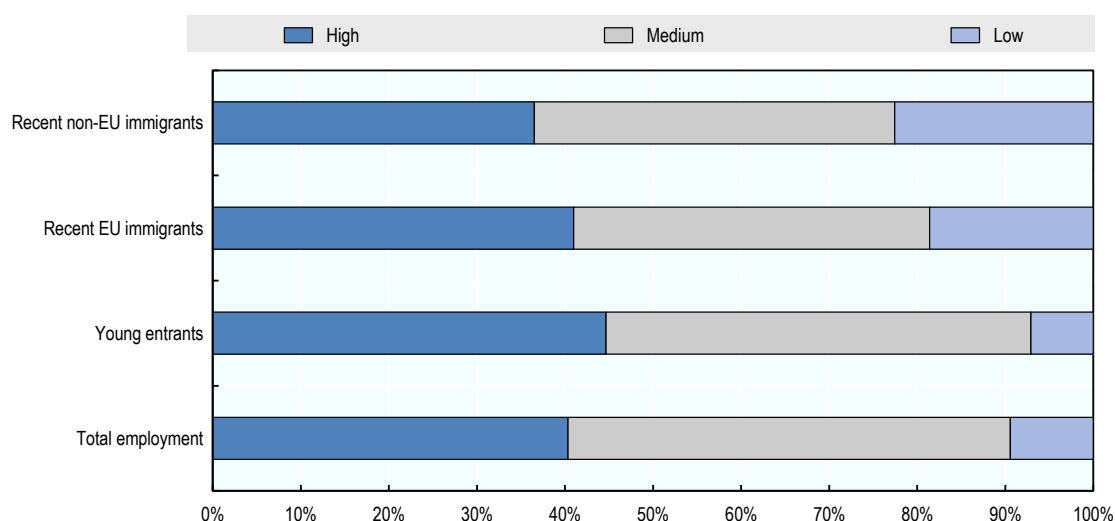
When looking at the aggregated level, EU and non-EU migrants present a similar distribution. However differences exist when analysing more detailed occupations at all skills levels. Among high skilled occupations, immigrants from third countries are underrepresented in occupations in the ISCO¹⁰ major groups 1 and 3 (i.e. managers; and technicians and associate professionals), while they have shares similar to immigrants from EU countries in occupations in the ISCO major group 2 (i.e. professionals). In comparison with the overall labour force, both EU and non-EU recent migrants are underrepresented in occupations as technicians and associate professionals, while they are overrepresented as professionals.

¹⁰ ISCO stands for International Standard Classification of Occupations. The major groups of the classification are: 1: Managers; 2: Professionals; 3: Technicians and Associate Professionals; 4: Clerical Support Workers; 5: Services and Sales Workers; 6: Skilled Agricultural, Forestry and Fishery Workers; 7: Craft and Related Trades Workers; 8: Plant and Machine Operators and Assemblers; 9: Elementary Occupations; 0 Armed Forces Occupations.

Among medium skilled occupations, the most common group of occupations for non-EU recent immigrants is ISCO 5 (i.e. services and sales), which employs 23% of them, vs. 16% of EU recent immigrants and 18% of the total labour force. As employment in this occupation group is also high for immigrants who have lived in destination countries for a longer time, it can potentially represent an easier path to enter the labour force for recent immigrants. For EU recent immigrants, employment is relatively high in ISCO group 7 (i.e. craft and related trades workers), similarly to the total labour force and higher than non-EU recent migrants.

Not surprisingly, the gap between the overall labour force and recent migrants is particularly large in elementary occupations: the share of EU and non-EU migrants employed in low skilled occupations is respectively 21% and 20%, while it is less than 10% for the overall labour force.

Figure 6. Share of employment by skills level of the occupation for recent immigrants, young entrants and the labour force, EU-27, 2015



Note: Skills levels are based on the ISCO classification at 1 digit. Occupations with the first digit between 1 and 3 are considered as highly skilled (H); those with the first digit between 4 and 8 are considered as medium skilled (M) and those with the first digit equals 9 are considered as low skilled (L).

Source: EU Labour Force Survey.

In order to assess more precisely the characteristics of employment for new entrants, Table 3 shows changes over time for detailed occupations (2 digit level) and compares the employment shares of new entrants with the total labour force.

In comparison with young entrants, recent immigrants, both from the EU and from third countries, are underrepresented in a higher number of highly skilled occupations. While immigrants have a similar distribution across occupations, regardless their origins, non-EU recent migrants have higher share of employment compared to EU-migrants in two occupations: information and communications technology professionals (high skilled) and cleaners and helpers (low skilled). These findings suggest that recent migrants, especially from non-EU countries, are concentrated in few occupation groups that are mainly at the extreme of the skills spectrum.

Considering that nearly half of the recent immigrants in European countries have high educational attainment, the high share of recent immigrants in low-skilled occupations reflects considerable over-qualification. This may be related to the difficult recognition of

foreign qualifications or discrimination towards foreign born people (OECD/EU, 2014_[14]). In addition, some immigrants have limited language abilities that prevent them from fully using their knowledge acquired abroad and having successful labour market integration (European Commission, 2016_[18]).

Young entrants are overrepresented in eight high-skilled occupations, with most of them having seen positive growth between 2011 and 2015. Both of these trends highlight that new entrants gave a significant contribution to the overall employment increase in occupations that require high levels of skills. Notwithstanding the differences across European countries with respect to their economic prosperity and institutional framework, the analysis highlights the fact that, for EU migrants, the recognition of foreign qualification within the EU is easier and this lowers their risk of over qualification and facilitates their integration in the labour market (European Commission, 2016_[18]).

Table 3. Average annual growth of employment by occupation and ratio of employment shares of different groups compared to the total labour force, European countries, 2011-2015

Occupations (ISCO 2008 classification)	Skill level	Average annual growth (%)	Ratio of employment shares		
			Recent EU migrants vs total labour force	Recent non-EU migrants vs total labour force	Young entrants vs total labour force
34 Legal, social, cultural and related associate professionals	H	6.4	0.7	1.1	1.7
24 Business and administration professionals	H	5.9	1.4	1.3	1.2
25 Information and communications technology professionals	H	4.4	1.9	3.1	1.5
13 Production and specialised services managers	H	3.9	0.5	0.7	0.4
96 Refuse workers and other elementary workers	L	2.6	0.6	0.7	0.7
32 Health associate professionals	H	1.9	0.6	0.3	1.3
26 Legal, social and cultural professionals	H	1.6	1.2	1.1	1.3
22 Health professionals	H	1.6	0.8	0.9	1.5
51 Personal service workers	M	1.4	1.8	1.6	1.3
21 Science and engineering professionals	H	1.4	1.6	1.5	1.7
81 Stationary plant and machine operators	M	1.0	1.6	1.1	0.8
41 General and keyboard clerks	M	0.8	0.3	0.3	0.9
42 Customer services clerks	M	0.5	1.2	0.7	1.5
91 Cleaners and helpers	L	0.5	2.1	3.2	0.4
52 Sales workers	M	0.4	0.6	1.1	1.3
74 Electrical and electronic trades workers	M	0.4	0.6	0.3	1.0
43 Numerical and material recording clerks	M	0.2	0.4	0.4	1.0
54 Protective services workers	M	0.1	0.1	0.7	0.7
31 Science and engineering associate professionals	H	0.0	0.4	0.2	0.9
75 Food processing, wood working, garment, related trades workers	M	-0.1	0.9	0.7	0.7
53 Personal care workers	M	-0.2	1.0	1.4	1.3
23 Teaching professionals	H	-0.2	0.7	0.7	1.1
83 Drivers and mobile plant operators	M	-0.7	0.8	0.5	0.4
72 Metal, machinery and related trades workers	M	-0.7	0.6	0.3	0.9
33 Business and administration associate professionals	H	-1.0	0.6	0.5	0.9
12 Administrative and commercial managers	H	-1.2	1.9	1.1	0.4
61 Market-oriented skilled agricultural workers	M	-1.3	0.2	0.3	0.6
14 Hospitality, retail and other services managers	H	-1.4	0.9	0.5	0.6
71 Building and related trades workers, excluding electricians	M	-1.5	1.4	0.9	0.6
93 Labourers in mining, construction, manufacturing and transport	L	-1.6	2.9	1.7	1.2
44 Other clerical support workers	M	-8.3	1.0	1.4	1.3
Other (occupations with less than 1% employment)		-0.3	1.4	1.4	0.9

Note: Skill levels are based on the ISCO classification at 1 digit. Occupations with the first digit between 1 and 3 are considered as highly skilled (H); those with the first digit between 4 and 8 are considered as medium skilled (M) and those with the first digit equals 9 are considered as low skilled (L). Ratios above 1 indicate that the demographic group has higher shares of employment than the total labour force. Occupations with less than 1% of employment are grouped in the category “Other”.

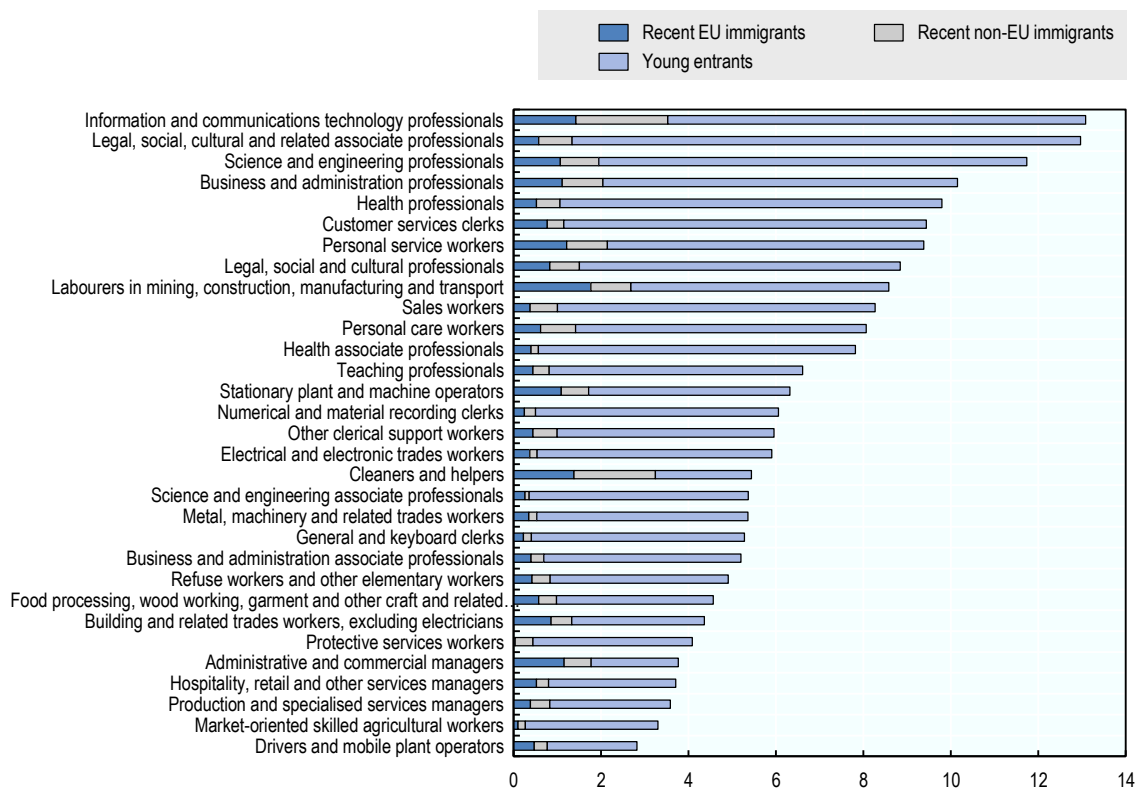
Source: EU Labour Force Survey.

In order to analyse the different role of all new entrants in the labour force, Figure 7 shows the contribution to employment growth by occupation for both young entrants and recent migrants. The overall contribution of new entrants in the labour market varies between 2.8%

for drivers and mobile plant operators (medium skills) and 13% for information and communications technology professionals (high skills). The latter category is also the one in which recent immigrants (both from EU and non-EU countries combined), have contributed the most.

Interestingly, even if the number of recent migrants from EU and non-EU countries is very close, recent non-EU migrants have contributed slightly less to employment growth in most occupations.

Figure 7. Contribution of recent immigrants and young entrants to net employment change by occupation (%), European countries, 2011-2015

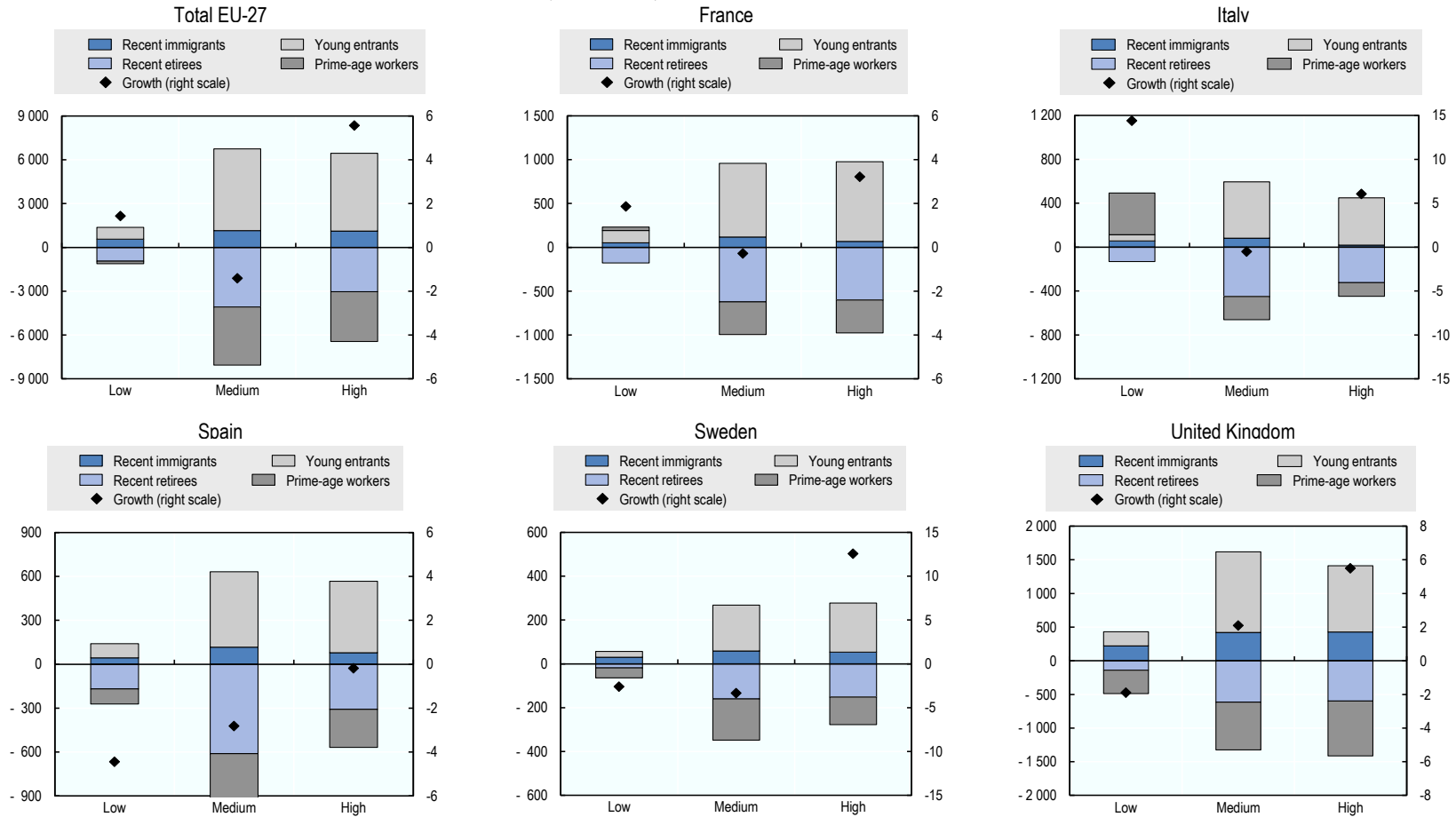


Note: The contribution of each category for the period 2011-2015 is computed as its share in the total employment in the same occupation in 2011.

Source: EU Labour Force Survey.

The overall improvement in the level of education of the labour force in recent years as well as in the post-crisis period had an impact on the distribution of employment within the labour force. Across the EU, the rise of occupations requiring high skills is much stronger than that of the other groups of occupations, with (i) professionals and (ii) technicians and associate professionals being the fastest growing occupations between 2011 and 2015. However, as mentioned above, different patterns exist within Europe (Figure 8).

Figure 8. Total growth of the labour force by skill level of the occupations (%), and contribution of the different demographic groups (thousands) in selected EU countries



Note: Skill levels are based on the ISCO classification at 1 digit. Occupations with the first digit between 1 and 3 are considered as highly skilled (H); those with the first digit between 4 and 8 are considered as medium skilled (M) and those with the first digit equals 9 are considered as low skilled (L). Source: EU Labour Force Survey.

In France and Italy, similarly to the aggregate pattern observed for European countries, changes in the employment composition have a U-shape: employment growth is positive for low-skilled and highly skilled occupations, but is close to zero for medium-skilled ones. In the case of Spain, as a consequence of the overall decline of the labour force in the wake of the economic crisis, employment growth is negative for all categories of occupations. The strong labour market segmentation in Spain is also documented by the more severe decline in low-skilled occupations than in highly-skilled ones. In the United Kingdom, where overall employment growth has been positive, the highly-skilled occupations are the ones which have grown the most, a result also observed in Sweden.

Regardless of the evolution of the occupational structure, young entrants in all EU countries have contributed to a greater extent to the growth of both high and medium skilled occupations than to low-skilled ones. Although recent migrants have generally contributed more in absolute terms to highly-skilled occupations than to low-skilled ones, their relative contribution is higher in low-skilled occupations because much fewer young workers choose these jobs. This is for example the case in the United Kingdom where recent migrants outnumber young entrants in low-skilled jobs (even though recent migrants are much more numerous in highly-skilled occupations than in low-skilled ones).

In the United States, between 2010 and 2015 the employed labour force grew by 8.1%. Data shows that growth has been positive in all occupations, with the four occupations at the top being high skilled and having an average annual growth above 2% (Table 4). On the contrary, occupations with the lowest growth are mainly medium or low skilled. In comparison to the total labour force, young entrants have higher shares of employment in all high skilled occupations, except for management occupations, meaning that their skills are well matched with their jobs.

Recent immigrants in the US are equally distributed across highly and medium/low skilled occupations, showing a more heterogeneous distribution across skill levels. At the same time, recent immigrants are significantly over-represented in three specific occupations: computer and mathematical occupations; and life, physical, and social science occupations - which are both highly skilled - and farming occupations which are medium/low skilled.

In the case of the United States, in comparison to young entrants are less represented in occupations which had a slow growth in the analysed period. This result is different from the one obtained for European countries, where recent migrants, especially from EU countries, tend to be more represented in declining occupations than young entrants.

Table 4. Average annual growth of employment by occupation and ratio of employment shares of different groups compared to the total labour force, United States, 2010-2015

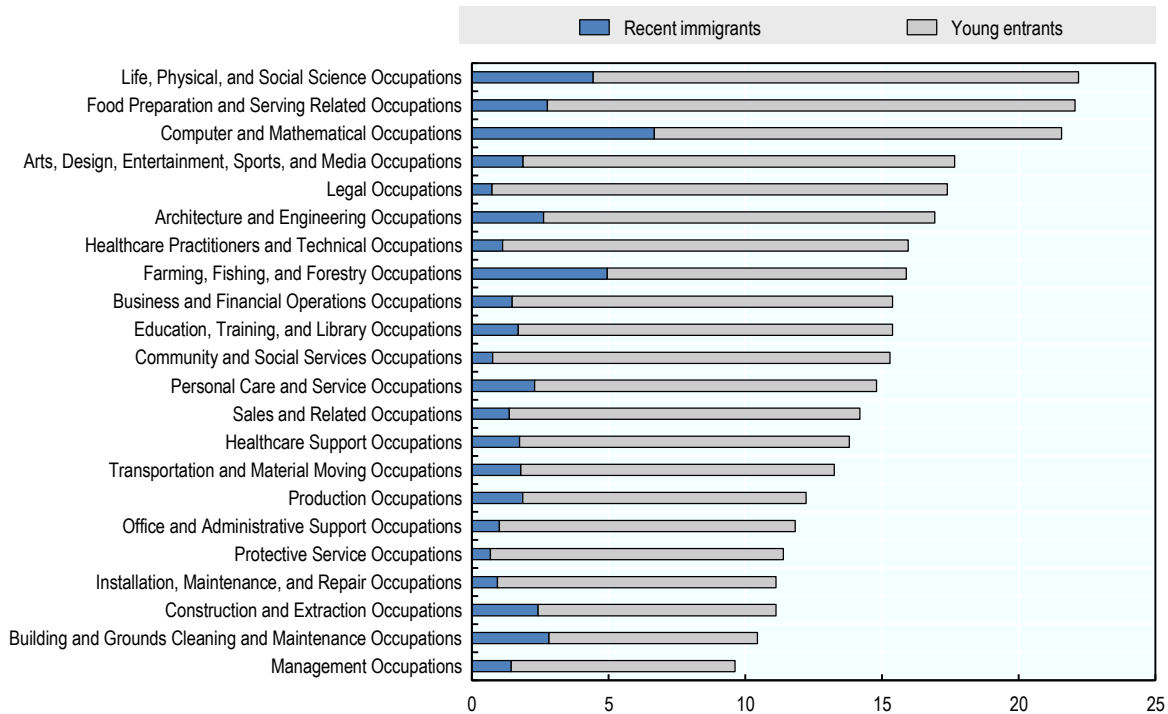
Occupations (2010 SOC Classification)	Skill level	Average annual growth (%)	Ratio of employment shares	
			Recent immigrants vs total labour force	Young entrants vs total labour force
11 Management Occupations	H	2.8	0.8	0.6
13 Business and Financial Operations Occupations	H	2.2	0.8	1.1
15 Computer and Mathematical Occupations	H	4.4	3.2	1.1
17 Architecture and Engineering Occupations	H	1.4	1.5	1.2
19 Life, Physical, and Social Science Occupations	H	1.5	2.5	1.5
21 Community and Social Services Occupations	H	1.7	0.4	1.2
23 Legal Occupations	H	0.8	0.4	1.4
25 Education, Training, and Library Occupations	H	0.6	1.0	1.2
27 Arts, Design, Entertainment, Sports, and Media Occupations	H	2.8	1.0	1.2
29 Healthcare Practitioners and Technical Occupations	H	2.8	0.6	1.2
31 Healthcare Support Occupations	M/L	0.6	1.0	1.0
33 Protective Service Occupations	M/L	0.5	0.4	0.9
35 Food Preparation and Serving Related Occupations	M/L	2.2	1.5	1.5
37 Building/Grounds Cleaning and Maintenance Occupations	M/L	0.9	1.6	0.7
39 Personal Care and Service Occupations	M/L	2.3	1.2	1.0
41 Sales and Related Occupations	M/L	0.6	0.8	1.1
43 Office and Administrative Support Occupations	M/L	0.2	0.6	1.0
45 Farming, Fishing, and Forestry Occupations	M/L	1.3	2.8	0.9
47 Construction and Extraction Occupations	M/L	1.8	1.3	0.7
49 Installation, Maintenance, and Repair Occupations	M/L	0.7	0.5	0.9
51 Production Occupations	M/L	1.7	1.0	0.8
53 Transportation and Material Moving Occupations	M/L	2.7	0.9	0.9

Note: Skill levels are based on the 2010 SOC classification. Occupations with the first digit equals to 1 or 2 are considered as highly skilled (H); all the others are considered as medium and low skilled (M/L). Ratios above 1 indicate that the demographic group has higher shares of employment than the labour force in the occupation.

Source: American Community Survey.

As shown in Figure 9, for the United States, among the occupations to which new entrants in the labour market – including both young entrants and recent migrants - have contributed the most, have relatively high shares of employment in four of them, namely: i) life, physical, and social science occupations; ii) food preparation and serving related occupations; iii) computer and mathematical occupations; iv) Arts, design, entertainment, sports, and media occupations. Three of these occupations are highly skilled meaning that both groups have a key role in enhancing the overall skills levels existing in the labour market.

Figure 9. Contribution of recent immigrants and young entrants to labour force growth by occupation (%), United States, 2010-2015



Note: The contribution of young entrants and recent immigrants is calculated as share of the 2011 labour force.

Source: American Community Survey.

Conclusion

Across the OECD, the last decades have been characterised by deep changes in the structure of the labour market, both in terms of educational attainments and occupational composition. Thanks to the increasing educational levels of new generations entering the labour market and the retirement of less educated cohorts there has been an overall shift towards a more educated labour force.

Immigrants have had an impact on those changes as their presence in the labour market has increased over the last decade. Today they represent around one in eight workers across Europe. Their characteristics vary significantly across countries, but a common feature in both Europe and in the United States is that they are generally less educated than young entrants of natives but more educated than recent retirees. Within Europe, immigrants from the EU generally have higher levels of education than those coming from third countries. In Australia, because of the highly selective nature of immigration policies, immigrants tend to be more educated than the young entrants.

Both the improvements of educational attainments and the replacement of old cohorts by new more qualified cohorts have had an impact on the occupational composition of the labour force which is characterised by a stronger growth of medium and highly skilled occupations. In particular, thanks to their skills, young entrants in the labour force tend to be employed in occupations different from those left by recent retirees. In other words, these two groups are not in competition on the labour market.

When compared to the overall labour force, recent migrants tend to be overrepresented in a number of low skilled occupations where they often work below their qualifications. More attention should therefore be given to reducing skills mismatch for immigrants, especially those coming from non-EU countries. The situation is different in the United States, where both young entrants and recent migrants are well represented in three important high-skilled occupations (Computer and mathematical occupations; life, physical, and social Science occupations; architecture and engineering occupations) meaning that both groups play a key role in enhancing the skills levels of the workforce.

While new entrants in the labour force – both young entrants and recent migrants from the EU and from third countries – see a similar share of employment in fast growing occupations, recent migrants have higher shares of employment in declining occupations. In addition, the contribution to labour force growth varies across groups of migrants, with EU migrants having contributed most that non-EU migrants to employment growth in most occupations. This is probably related to their more heterogeneous composition, which is influenced by a number of factors including countries of origin, migration motives and host country policies. In the case of the United States, in comparison to young entrants, new migrants have lower shares of employment in both declining and growing occupations.

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Appendix 1: Methodology

Over the last decades, the labour market structure of OECD countries has seen significant changes, not only in terms of its size but also in its composition. With the retirement of the baby-boom generation and the entrance of new more educated cohorts into the labour force, there was an overall increase of the educational attainment and consequently a fast growth of skilled occupations and a sharp decline of a number of low skilled occupations. In addition to the young and old generations, recent migration flows played a role in shaping the labour force with significant differences existing across countries.

The main objective of the Migration-Demography (Mig-Dem) project is to evaluate the contribution of migration to the dynamics of the labour market in EU and OECD countries by analysing both the historical role of migration and to project its role forward for the next five to ten years.

Structure of the project

The development of the Mig-Dem database consists of two phases:

(1) In the first phase, the project examines how the labour force has evolved over the past ten years. Changes in the labour force can come from the entry of young workers, the retirement of old workers, the arrival of recent immigrants, and various changes in status of those in the ‘prime working-age’ group. Our analysis decomposes changes into these four groups. This exercise represents both an update and an improvement of previous OECD-EU work (OECD/EU, 2014). For European countries, the project investigates differences in labour force dynamics between immigrants from EU vs. third countries, when data is available.

(2) In the second phase, the project looks at labour force dynamics in the future. This examines the labour supply by presenting a range of alternative scenarios for future migration flows by age, sex and education level.

A specific investigation into how *immigrants* have affected the labour market underlies the Mig-Dem project. Questions that the database will help answer include, among others:

- How do migrants affect the size and composition of the labour force?
- Does migration help counterbalance demographic change?
- Do migrants enter jobs that native-born leave or do they also enter growing occupations?

Country coverage and data sources

This analysis is performed for 25 EU countries¹¹ as well as Iceland, Norway, and Switzerland (EFTA countries) and selected other OECD countries (Australia and the United States) for which sufficient data is available. Data for the EU and EFTA countries come from the European Union Labour Force Survey (EU-LFS); Australian data come from the Work and Education Survey (WES); and data for the United States come from the American Community Survey (ACS).

¹¹ Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom.

In order to avoid issues related to the different incidence of missing data across countries in the EU LFS and to calculate the demographic groups in a more robust way, data imputation was conducted for some variables, including migration status, duration of stay, current education status, year of education completion, year of exit from the labour force and highest educational attainment. Imputations are carried out for a limited number of observations, less than 1% in most cases. Imputation models are based on observed individual characteristics - such as gender, age and education – as well as their interactions to estimate values for missing observations.

Due to data limitations with small sample sizes not exceeding reporting thresholds, certain analyses cannot be performed for every individual country within the EU and must be undertaken at the EU-wide level. This clearly hides differences between countries. For example, there are clear differences in migration patterns across countries, with Western and Northern European countries generally being net recipients of immigrants while Eastern European countries being net senders of emigrants.

In addition, when sample sizes allow it, a distinction is made for European Union countries between immigrants born in the EU and those born outside the EU.

Age is presented as a disaggregated variable in some data sources, while in others – notably the EU-LFS – it is aggregated into 5-year groups. This will not be problematic in most cases except in some methods of identifying retirees, where knowing an individual's exact age in relation to the official or average retirement age is important for accuracy.

Education is also classified differently across the different surveys. For consistency, we consider three educational levels: the low-educated (with less than upper secondary attainment, corresponding to ISCED levels 0, 1, and 2), the medium-educated (with upper secondary attainment but not tertiary attainment, corresponding to ISCED levels 3 and 4); and the highly-educated (with tertiary attainment, corresponding to ISCED levels 5, 6, 7, and 8).

On the other hand, the classification of occupations has not been standardised across surveys due to a lack of exact correspondences. Separate tables and charts are therefore presented for the EU and the other countries analysed in this project.

Finally, several countries have recently changed how they report their data. Between the 2010 and the 2011 survey, the coding of occupations in the EU-LFS was changed from ISCO-88 to the more recent ISCO-08. Since the correspondence between the two classifications is not feasible for all occupations, recent data on occupations cannot be compared to those prior to 2011.

The contribution of migration to past labour market dynamics

For each country, changes in the labour force over time can be decomposed into the following components, each of which will be described in further detail below:

- Recent immigrants who have entered the labour force,
- Young entrants who have just entered the labour force,
- Recent retirees who have left the labour force,
- Other residual changes among the rest of the population, the so-called 'prime age' labour force, which may include death, emigration and return migration, temporary exits, and returns to the labour force.

These four components can be related to the overall change by the following equation:

Change in the labour force = recent immigrants + young entrants – recent retirees + (net) changes in the prime-age group

Moreover, this equation can also be applied to any subset of the labour force, such as the high-educated or those who work in any specific occupation or sector.

The Mig-Dem database examines the role of each of these components to the evolution of the labour force between 2005 and 2015. Different options exist to compute these components using available data, each having specific advantages and drawbacks. These alternatives are considered in the next sections, with detailed explanations on the choices made for this study.

Recent immigrants

Recent immigrants are those who have entered the country between 2005 and 2015. More precisely, they are identified as those:

- who were not born in the host country, and
- whose most recent continuous stay in the host country is less than 10 years long.

As this database specifically investigates the demographics of the labour force, only new immigrants in the labour force (either employed or unemployed) are included¹². Moreover, as this database also investigates the dynamics of the labour force, only the flow of immigrants is relevant, not the stock of immigrants present in the country. In other words, this work examines the impact of the process of immigration on the dynamics of the labour force, not the impact of migrants as a whole. Long-standing migrants with over ten years of residency in the host country are considered as part of the long-standing workforce. Indeed, they are included in the other three components of the above equation – either as new entrants, recent retirees, or as residual changes in the prime-age group.

As indicated above, immigrants who arrived before 2005 are not included as they do not represent a change in the population – they were already present in the host country. However, immigrants might require some time to establish themselves in their host country and only first enter the labour force several years after they arrive. In this situation, where an immigrant arriving before 2005 first enters the labour force after 2005, he would not be included in the “new immigrants” group but rather included in the “other changes/prime-age group.”

Note also that in most cases, immigrants who arrived as children will never be classified as ‘new immigrants’ as they will not start to work until more than 10 years after their arrival. In particular, those who arrive between the ages of 0 and 4 will never be considered ‘new’ because the labour force only potentially includes those aged 15 and older. This is not problematic when one remembers that it is not the effect of all immigration on the demographics of the labour force that is investigated here but only the effect of recent immigration. In order not to double count recent immigrants and to highlight the role of migration in labour market dynamics, being a recent immigrant takes priority over being a new entrant.

¹² This definition also includes immigrants who may have arrived before 2005, returned to their home country or moved somewhere else also before 2005, and then returned again after 2005 – while these may conceptually not be ‘new’ immigrants, they are ‘new’ when compared to the population in 2005.

Another way to count the number of new immigrants is through entry permits. This method, though, does not provide additional micro-level information on immigrants, such as their educational background and more importantly, whether they are actually in the labour force. Furthermore, most immigrants do not arrive as labour migrants but through family reunification or refugee channels, and a large share of these immigrants enters later the labour force. As a result, the use of population surveys to identify those who are indeed in the labour force is preferred.

Young entrants

Young entrants are young people who are entering the labour force for the first time in the period of analysis. In this project new entrants are defined as those who, in 2015:

- are aged between 15 and 34,
- have obtained their highest degree in the last ten years,
- are in the labour force,
- are no longer studying, and
- are not recent immigrants.

The definition of new entrants does not capture the generally lower-skilled and part-time jobs held by the young who are still in education. The omission of such jobs is preferable to their inclusion as they are temporary by nature and do not reflect the actual entry of graduates into the labour force. In most cases, graduates will enter jobs that better reflect the occupation for which they have studied, which will also be at a higher level to their student jobs. Indeed, including student jobs among new entrants would understate the number of tertiary graduates and overstate the number of entrants with only secondary education, leading to a level of ‘upskilling’ in younger generations that is biased downwards.

Apprentices and interns are treated in the same manner as students even though they may be working full-time when the survey is conducted. These jobs are more likely to be aligned with participants’ future jobs than part-time jobs, and such students will generally graduate and enter similar jobs in the near future. However, since they have not graduated yet, they are not counted as ‘new entrants’.

Before choosing this approach to define new entrants, a number of tests have been conducted; a short explanation is presented below:

1. In previous OECD-EU work, they were identified as all individuals between 15 and 24 years of age, since they could not have been part of the labour force 10 years before. However, many individuals in this age group have not yet completed their education and not yet joined the labour force. Moreover, those who work in conjunction with their studies often do so in temporary jobs that do not reflect the jobs they will hold after graduating.
2. A similar approach defines new entrants by age, including those from 15 to 24 who are no longer in education. As mentioned above, the majority of youth in the OECD area have not yet completed their education by this age. Also, most of the 15 to 24 cohort would not have their education levels correctly captured by this purely age-based definition and a large proportion would not have begun to work yet and would not be included in the labour force. The size of the entering cohort would be underestimated.
3. The last approach compares the cohort of individuals aged 15-29 who are not recent immigrants and who are in the labour force in 2015 and the 15-19 cohort

who were already in the labour force in 2005. This method follows the same cohort over time (noting that those who were between 5 and 14 in 2005 would not have been in the labour force). It captures new entrants by removing those who were already in the labour force in 2005, who would have been new entrants that year. As explained above, young people often work during their secondary and post-secondary education – such workers would be counted as new entrants when they first enter the labour force out of secondary school, which is not desirable. Moreover, this method would require that the two cohorts are comparable over time. Although ten-year death rates of 15-19 year olds are small in OECD and EU countries, emigration rates are not insignificant, particularly in many new EU member states. By including these emigrants in 2005 (before they leave the country) but not doing so in 2015 (after they leave), we may be underestimating the number of new entrants.

Table A1 presents the results using alternative methods to calculate the number of new entrants using the methodologies explained above. Data from the EU Labour Force Survey shows that when using the method chosen for this study (1st column of the table) the number of new entries is greater than the age-based approach in all countries (2nd and 3rd column) and in most countries is lower when compared with the difference between the cohorts between 2005 and 2015 (4th column).

Table A1. Comparison of measures of the number of new entrants in the labour force, 2005-15 (thousands)

	Population in the labour force aged 15-34 who obtained their highest degree in the last 10 years (in 2015)	Population in the labour force aged 15-24 (in 2015)	Population in the labour force aged 15-24 no longer in education (in 2015)	Population in the labour force aged 15-29 in 2015 — Population in the labour force aged 15-19 in 2005
AUT	691	523	306	744
BEL	862	371	326	848
BGR	486	182	148	515
CHE	713	570	245	731
CZE	825	342	297	861
DEU	6,616	4,451	2,083	6,914
DNK	431	430	144	489
EST	114	57	39	129
ESP	2,717	1,372	969	2,808
FIN	490	320	168	440
FRA	5,027	2,609	1,916	5,066
GRC	749	270	225	719
HUN	775	339	323	785
IRE	327	169	120	276
ISL	30	31	12	37
ITA	3,005	1,440	1,314	3,039
LTU	296	125	92	273
LUX	34	19	11	38
LVA	187	83	62	179
NLD	1,404	1,379	414	1,675
NOR	453	352	156	485
POL	3,837	1,372	1,055	3,270
PRT	781	357	291	717
ROU	1,532	684	654	1,556
SWE	964	612	379	938
SVN	154	69	36	154
SVK	532	209	196	515
GBR	5,801	4,289	3,007	5,728

Note: For all methodologies, new immigrants (i.e. people arrived in the last 10 years) are excluded from this group in order to avoid double counting.

Recent retirees

Retirees are those older people who have left the labour force and will not return in the future. According to data availability, in this study two different ways of identifying recent retirees have been used. For European countries and the United States they are defined as people who, in 2015:

- are aged between 60 and 74,
- are no longer in the labour force,
- have worked in the past ten years.

For Australia the definition of recent retirees is only based on the first two variables as no information was available about the year of exit from the labour force.

Before choosing this approach for measuring recent retirees, several tests have been conducted. They will be detailed below highlighting their pros and cons.

4. Past OECD-EU work identified recent retirees as the labour force cohort that was aged between 55 and 64 in 2005 and is aged between 65 and 74 in 2015. Recent OECD data shows that across OECD and EU countries people do not exactly retire at 65. Tables A3 and A4 in Annex 2 show the effective retirement age. These ages have often decreased over time (but are likely to increase in the future in many countries due to longer life expectancies and smaller working-age cohorts) and differ markedly between men and women. Moreover, the effective retirement age is also affected by the type of occupation the workers have (e.g. strenuous and dangerous jobs). This method identifies as retired those who are still working, ignores those who retired before the age of 65, and does not take country and gender differences in retirement age into account. Moreover, it includes people as ‘new retirees’ who are, for instance, 71 now but retired at the age of 60, more than ten years ago. It is not clear whether these effects mitigate each other.
5. A second approach is based on the definition of new retirees as those who self-declare as being retired (i.e. not those who are still working past 65) but this definition does not assess whether the person was in the labour force before and hence may overestimate the retiring cohort.
6. One can also take the difference between the retired population aged 65-74 in 2015 and the population aged 55-64 who were already retired in 2005. This method follows the same age cohort over time and extracts the number of ‘new’ retirees. It also does not take national and gender differences in retirement age into account. For instance, this method would show that apparently no people retired in a country where everyone retired before the age of 65 and undercount the number of new retirees in a country where the average retirement age is less than 65.
7. Another approach considers the average retirement age for each country and each gender. For example, if the average retirement age in a country is 60 for men and 58 for women, new retirees will be men aged 60-69 and women aged 58-67 who have retired since 2005. This method, using ‘refined’ ages, still ignores individual variation in retirement age. Being an average, a non-negligible portion of the retiring population will retire before this age and thus not be counted among new retirees. However, in practice, using refined ages might not differ from using the standard age of 65 as ages are reported in the EU Labour Force Survey in five-year intervals.

8. A similar approach looks at those who self-declare as being retired and are aged between the average retirement age and the average retirement age plus 9.
9. Similarly to the approach proposed to calculate new entrants, to account for individual variation in retirement ages, one can subtract the retired population over 55 years of age in 2005 from the retired population over 65 years of age in 2015. This would follow the same cohort over time and show the number of ‘new’ retirees in the ten year period of interest. Mortality rates must be taken into account and are particularly important as they are non-negligible for the older population (compared to the working-age or entering cohorts). Mathematically, this corresponds to the following equation:

New retirees in 2015 aged 65 and above = Retirees in 2015 aged 65 and above –
(Retirees in 2005 aged 55 and above × 10-year survival rate for each age group above 55)

Table A2 shows the number of recent retirees from the labour force in EU countries, as measured by the alternative methods described above.

Table A2. Comparison of measures of the number of recent retirees, 2005-15 (thousands)

	People aged 60-74 who worked in the past 10 years (in 2015)	People aged 65-74 (in 2015)	Self-declared retired population aged 65-74 (in 2015)	Self-declared retired population aged 65-74 in 2015 — Self-declared retired population aged 55-64 in 2005	Population aged between the average retirement age and age plus 9 (in 2015)	Self-declared retired population between the average retirement age and age plus 9 (in 2015)	Self-declared retired population aged 65-69 in 2015 — Population aged 55-59 in 2005, adjusted for death rates	Self-declared retired population older than the average retirement age in 2015 — Same population older than the average retirement age minus 10 in 2005, adjusted for death rates
AUT	510	824	747	223	888	730	283	600
BEL	583	1,024	935	514	1,252	871	866	1,171
BGR	402	838	760	n.a.	n.a.	n.a.	n.a.	n.a.
CHE	487	782	566	n.a.	782	566	n.a.	1,104
CZE	858	1,231	1,159	514	1,078	947	656	949
DEU	4,715	9,113	7,491	4,775	4,107	3,215	5,090	5,090
DNK	421	638	569	412	653	486	451	517
EST	80	126	100	57	126	100	85	85
ESP	2,907	4,328	2,885	2,491	3,507	1,886	4,319	4,629
FIN	453	613	580	438	563	414	463	528
FRA	4,305	5,989	5,617	2,865	7,540	5,642	3,919	6,116
GRC	700	1,097	779	473	1,270	703	561	820
HUN	670	1,006	963	347	944	782	473	664
IRL	194	349	199	151	272	167	188	188
ISL	13	25	10	10	11	7	10	6
ITA	2,968	6,459	4,494	1,844	7,139	3,680	2,141	3,246
LTU	161	277	240	134	n.a.	n.a.	n.a.	n.a.
LUX	29	37	28	13	47	32	18	33
LVA	123	197	168	75	n.a.	n.a.	n.a.	n.a.
NLD	877	1,733	1,180	914	1,886	1,036	944	1,004
NOR	272	478	279	n.a.	478	279	n.a.	244
POL	1,754	3,230	2,786	1,386	4,663	3,026	1,955	3,179
PRT	636	1,081	826	494	811	603	618	395
ROU	826	1,822	1,560	390	n.a.	n.a.	n.a.	n.a.
SWE	778	1,077	923	842	1,077	923	851	851
SVN	133	203	194	48	180	167	65	104
SVK	350	451	444	128	617	524	203	466
GBR	3,647	6,253	4,716	3,445	4,843	3,502	4,038	4,038

Note: New immigrants (i.e. people arrived in the last 10 years) are excluded from this group in order to avoid double counting.

Some problems in common with all of the above definitions, however, still remain. Firstly, there are those who retire abroad and are no longer observed in the survey, leading to an underestimation of the retiring cohort. Secondly, there may be people who continue to work in their 'retirement.' These are often part-time or contract jobs of lower intensity than the prime-age jobs that these people earlier occupied. As such, though they continue to earn money, their full-time equivalent contribution to the labour force is smaller than their numbers would indicate. As with young people working part-time jobs during their studies, we will ignore this segment of the labour force. Thirdly, people may first be unemployed for some time before deciding to retire (perhaps prematurely). Even though they were still in the labour force while unemployed, the exact transition between the two states is not clear – not in the survey and often not to the person him/herself, either. This employment-based definition would require the person to have been employed, not simply in the labour force, at some point in the past ten years. Moreover, because this definition relies on survey participants self-declaring that they are retired,

one who was unemployed in 2005 and only considered himself retired sometime after that would never be counted as a ‘new retiree’ and new retirees would be underestimated. On the other hand, those who leave the labour force temporarily intending to return later (and doing so) are, correctly, not included among new retirees until their last and final exit from the labour force.

Recent immigrants who have retired are not included at all in this analysis. Indeed, they do not represent a change between 2005 and 2015, as they were not present in the country in 2005 and are no longer in the workforce in 2015.

Prime age population

Finally, changes in the *prime age group* are the last component of changes in the labour force. This can be calculated as a residual through the equation presented above. This means that defining and measuring recent immigrants, new entrants, and recent retirees will affect the residual prime-age changes. In addition, this residual will include death, emigration, return migration, and certain irregular work/education and work/retirement transitions, in addition to what it is conceptually intended to measure.

Appendix 2: Tables

Table A3. Average male retirement age in OECD and EU countries, 1980 and 2010

Country	Average male retirement age in 1980	Average male retirement age in 2010	Country	Average male retirement age in 1980	Average male retirement age in 2010
Australia	64.1	65.0	Netherlands	63.0	62.9
Austria	64.8	59.7	New Zealand	66.3	65.9
Belgium	61.5	60.9	Norway	67.3	64.2
Canada	64.9	63.5	Poland	68.0	61.6
Chile	69.0	70.1	Portugal	68.5	66.5
Czech Republic	..	62.3	Slovak Republic	..	59.8
Denmark	65.5	64.0	Slovenia	..	61.4
Estonia	65.5	65.6	Spain	64.8	62.3
Finland	65.9	61.6	Sweden	65.3	65.4
France	63.5	59.3	Switzerland	69.5	65.4
Germany	..	62.0	Turkey	68.4	63.3
Greece	65.9	61.9	United Kingdom	66.0	64.1
Hungary	65.2	60.1	United States	66.4	65.6
Iceland	70.0	68.4	Bulgaria	62.4	62.9
Ireland	68.2	63.4	Croatia	..	61.7
Israel	..	67.6	Latvia	..	64.5
Italy	61.9	60.6	Lithuania	..	62.2
Japan	71.0	70.1	Romania	65.2	67.9
Korea	68.4	71.2			
Luxembourg	60.8	57.8			
Mexico	80.4	72.4			

Source: OECD data, taken from national labour force surveys, European Union Labour Force Surveys, and national censuses.

Table A4. Average female retirement age in OECD and EU countries, 1980 and 2010

Country	Average female retirement age in 1980	Average female retirement age in 2010	Country	Average female retirement age in 1980	Average female retirement age in 2010
Australia	60.1	63.1	Netherlands	64.1	61.4
Austria	62.6	57.8	New Zealand	63.8	65.5
Belgium	59.0	59.0	Norway	65.9	63.7
Canada	63.9	62.4	Poland	65.1	59.1
Chile	66.6	68.9	Portugal	67.6	64.7
Czech Republic	..	58.9	Slovak Republic	..	56.9
Denmark	64.3	61.9	Slovenia	..	58.0
Estonia	60.6	63.6	Spain	66.6	63.0
Finland	62.7	61.5	Sweden	64.0	63.3
France	64.1	59.6	Switzerland	66.8	63.6
Germany	..	61.2	Turkey	64.8	64.9
Greece	63.0	60.3	United Kingdom	62.6	61.9
Hungary	61.8	58.9	United States	66.3	65.3
Iceland	70.7	66.4	Bulgaria	55.9	60.6
Ireland	70.0	63.8	Croatia	..	59.1
Israel	..	65.0	Latvia	..	63.6
Italy	61.6	59.0	Lithuania	..	60.4
Japan	66.6	67.0	Romania	62.6	64.4
Korea	64.4	69.7			
Luxembourg	64.0	58.6			
Mexico	80.5	71.3			

Source: OECD data, taken from national labour force surveys, European Union Labour Force Surveys, and national censuses.