





KOF Youth Labour Market Index for Scotland

Report**Author(s):**

[Renold, Ursula](#) ; [Bolli, Thomas](#) ; [Oswald-Egg, Maria Esther](#) ; [Pusterla, Filippo](#) 

Publication date:

2018-10

Permanent link:

<https://doi.org/10.3929/ethz-b-000303353>

Rights / license:

[In Copyright - Non-Commercial Use Permitted](#)

Originally published in:

KOF Studies 117

KOF Swiss Economic Institute

KOF Youth Labour Market Index for Scotland

Dr. Ursula Renold, Dr. Thomas Bolli,
Maria Esther Oswald-Egg and Filippo Pusterla

KOF Studies, No. 117, October 2018

KOF Youth Labour Market Index for Scotland

KOF Swiss Economic Institute
Division Education Systems
ETH Zurich
Leonhardstrasse 21
CH-8092 Zürich

Authors:

Dr Ursula Renold

Dr Thomas Bolli

Maria Esther Oswald-Egg

Filippo Pusterla

Acknowledgements

This study is funded by Skills Development Scotland (SDS). The authors would like to thank Jonathan Clark and David Coyne for their support and their inputs. Furthermore, we gratefully acknowledge Eurostat and UK Data Service for providing the data. A special thank goes to Maike Waldmann from Scottish Government for the helpful assistance in the evaluation of UK microdata.

The content of the study reflects the view of the authors and may not represent the view of SDS. All mistakes remain our own.

Executive Summary

Research question and methodology

The KOF Youth Labour Market Index (KOF YLMI) is a multidimensional tool that allows analysing the situation on the labour market of young people aged 15 to 24 for 178 countries. The twelve indicators composing the index offer a more complete picture than the simple comparisons of for example the youth unemployment rate.

Skills Development Scotland (SDS) commissioned the KOF Swiss Economic Institute to construct a tailor-made version of the KOF YLMI for Scotland. The aim is to develop a tool, which allows comparing the Scottish youth labour market with the situation in other countries. Furthermore, the development of the KOF YLMI for Scotland gives the opportunity to analyse various aspects of the youth labour market situation in Scotland. Evidence gained by this in-depth analysis represents a starting point for policy interventions.

Data Collection

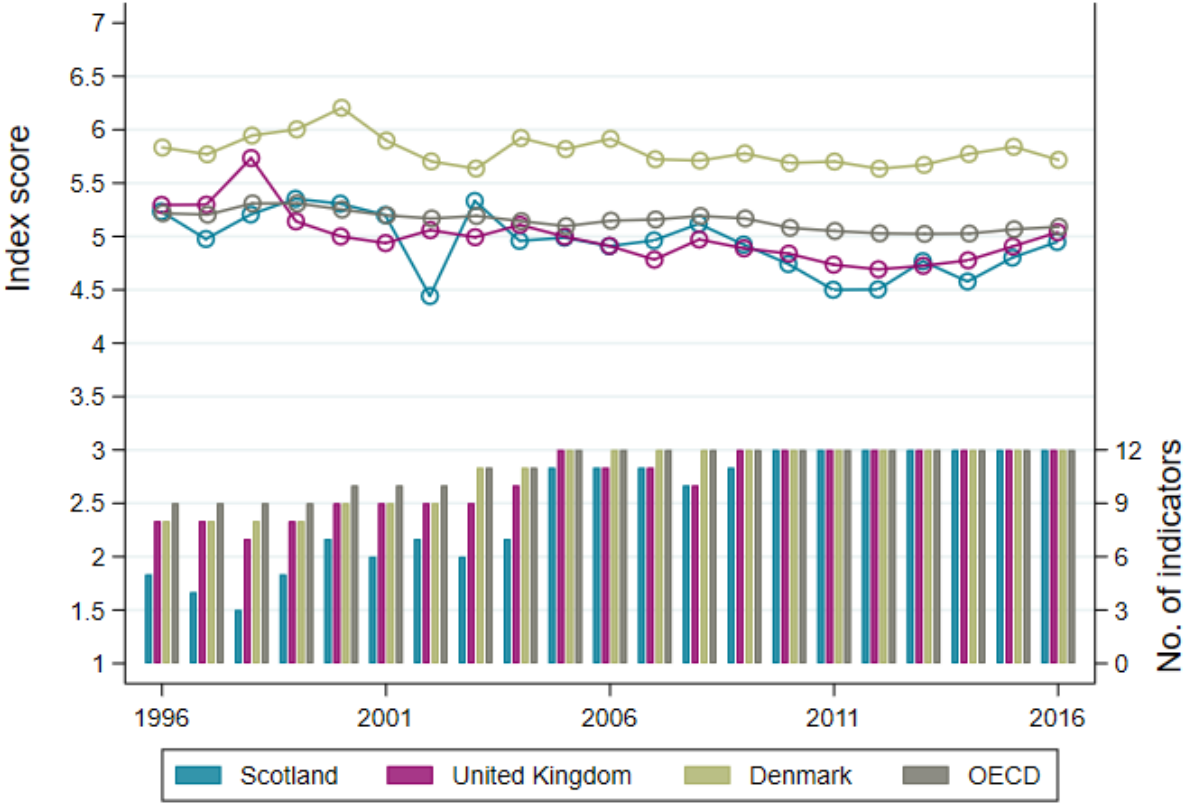
The main data source for the KOF YLMI for Scotland is the European Labour Force Survey, with the exception of the indicator In-work At-risk-of-Poverty Rate, for which the data source is the UK Data Service. After collecting data, we calculate the score of the twelve indicators and conduct a data validation procedure, which indicates comparability for almost all indicators. The only exception is the In-Work at-Risk-of-Poverty Rate, which should be interpreted with caution due to questionable comparability.

Youth Labour Market Situation in Scotland

Figure I presents the evolution of the KOF YLMI in Scotland, the UK, Denmark and the OECD average between 1996 and 2016. We contrast the results for Scotland with the values of the UK to understand how Scotland differs from the national labour market. Denmark represents a comparison to the top-performing youth labour market in 2016. Finally, the OECD values allow benchmarking against a broad set of countries with a comparable development state. The line chart in the top part of the figure (left y-axis) reports the KOF YLMI score achieved by the countries in every year. Scores range on a scale from 1 to 7, where higher scores suggest more desirable outcomes. The bar diagram in the bottom part of Figure I reports the number of available indicator (right y-axis) for each country in each year. The bar diagram suggests that these countries are fully comparable since 2010 onwards.

The results show that the KOF YLMI is similar in Scotland as in the UK overall. Both of these values are generally slightly below the OECD average and substantially below Denmark. Hence, the youth labour market situation in Scotland is slightly below average in an international perspective.

Figure I: Evolution over time of the KOF YLMI in Scotland, UK, Denmark and OECD

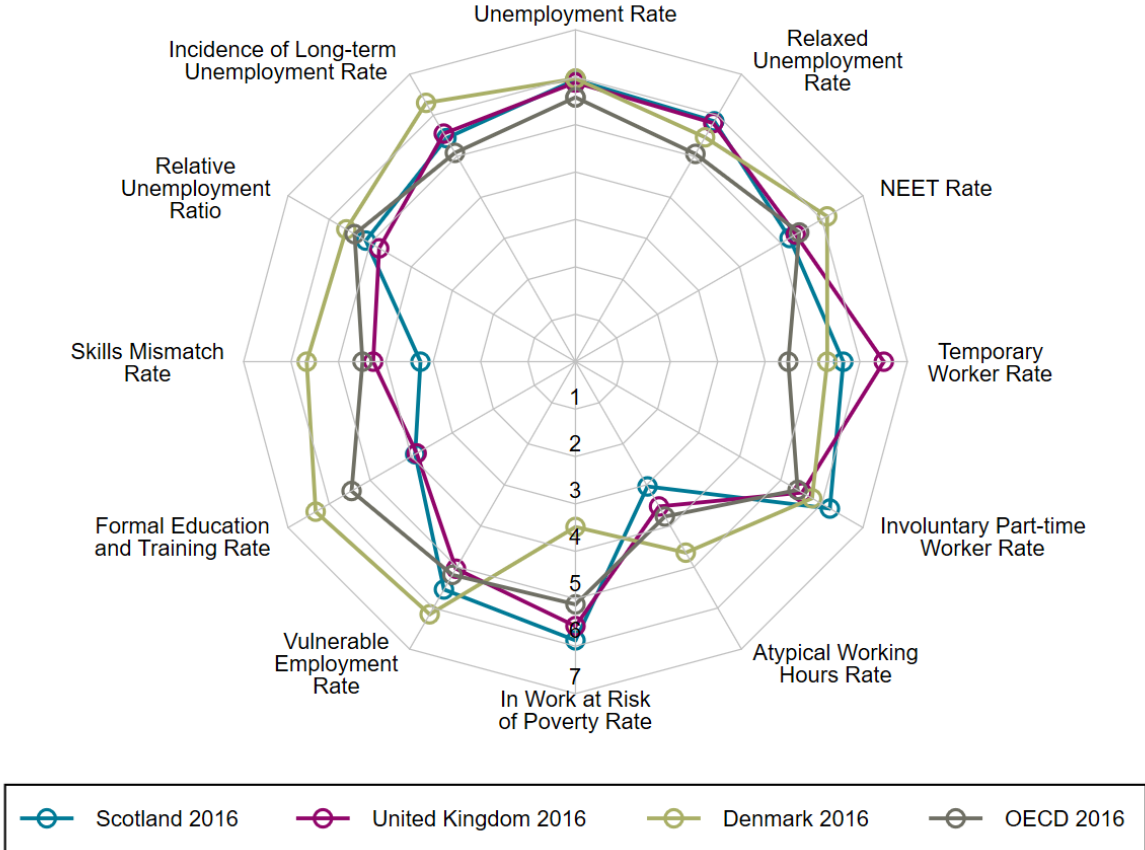


Notes: The line chart in top part of the figure (left y-axis) reports the KOF YLMI score achieved by the countries in every year. Scores range on a scale from 1 to 7, where higher scores suggest more desirable outcomes. The bar diagram in the bottom of the figure (right y-axis) reports the number of available indicators that each country dispose in every year. Interactive tool available at: <http://viz.kof.ethz.ch/public/yunemp/>

To disentangle the different components of the index, Figure II presents a spider web of the scores obtained by every indicator of the index in 2016 (the last available data). The spider web suggests that the score of the Youth Unemployment Rate in Scotland is identical to the one of the UK and Denmark, and slightly higher than the OECD average. As we consider the broader concept of Relaxed Unemployment Rate, we observe larger differences. Scotland shows a situation that is almost identical to the one of the UK. Both Scotland and the UK have scores above the OECD average. Notwithstanding, in case of the NEET Rate, Scotland performs slightly below the UK, which presents a score close to the OECD average. The distance to the score of Denmark suggests that room for improvement exists with respect to this indicator.

Differences between the four countries are notable in the five indicators describing the working conditions. In the Temporary Worker Rate, the score of Scotland suggests a generally good situation. Nevertheless, the Scottish score is below the UK's. This suggests that temporary contracts are more diffused in Scotland than in the UK. However, the score for Scotland is better than in Denmark and clearly above the OECD average. Looking at the Involuntary Part-time Worker Rate, we observe that the score for Scotland is higher than in the UK and the OECD benchmark. Working part-time but desiring to work more is clearly less problematic in Scotland than in the UK. With respect to the Atypical Working Hours, Scotland reports a very poor score. This suggests that in Scotland young people face un-social conditions with respect to the working hours. In contrast, the score of the In-work At-risk-of-Poverty indicator for Scotland is clearly above the OECD average. Finally, the Vulnerable Employment Rate suggests for Scotland a situation similar to the UK and above the OECD average.

Figure II: Spider web for Scotland, UK, Denmark and OECD in 2016



Notes: The spider web reports the score of the twelve indicators composing the KOF YLMI. Scores ranges on a scale from 1 to 7, where higher scores suggest more desirable outcomes. Interactive tool available at: <http://viz.kof.ethz.ch/public/yunemp/>

Concerning the Formal Education and Training Rate, Scotland scores similarly as the UK, but substantially lower than the OECD average or Denmark. By looking at the Skills Mismatch Rate, we observe a very poor situation for Scotland compared to all of the other countries.

Lastly, worth of mention are for Scotland the below OECD average score in the Relative Unemployment Ratio and the above average score in the Relative Unemployment Ratio. These values are however not very different from the ones of the UK. The high scores of Denmark recalls however, that room of improvement exists with regard to both these indicators.

Need of policy interventions

By commissioning the creation of the KOF YLMI proxy for Scotland, SDS has now a tool, which helps them to understand the Scottish youth labour market situation in-depth. The insights presented in this paper empower SDS to design appropriate research topics and interventions as well as shape their strategic responses. Specifically, our analysis of the youth labour market in Scotland indicate four areas where more information and intervention might be advisable:

1. The NEET Rate is slightly higher in 2016 than in 2008, suggesting that the proportion of young people neither in employment, nor in education or training has widened in the aftermath of the Great Recession. Policy intervention should target this tendency of growing inactivity.

2. The increase in the atypical working hours we observe since 2010 is driven by a rise in the share of youth that works on Sunday or shift. In contrast, the proportion of employees working at night has decreased since 2010. Policies aiming to increase work readiness of young people should overcome this negative shift toward 'weekend work'.
3. In Eastern and South Western Scotland, the enrolment rate in formal education or training has increased from about 50% in 2004 to about 55% in 2016. However, in the regions Highlands and Islands as well as in North Eastern Scotland the trend is decreasing over time. In these regions, the enrolment rate in formal education or training has decreased from about 55% to less than 50%. Considering the already relatively low values of this indicator in the international comparison, this evolution in the two latter regions should be analysed in more detail.
4. Our measure of skills mismatch indicates an over-supply of primary educated workers and an over-demand of tertiary educated workers. During the period 2008-2016, the gap between the demand and the supply of workers with tertiary level of education has increased. This implies that the Scottish labour market might be able to absorb a larger number of workers with tertiary education. This is particularly relevant in the context of the stagnating participation in formal education and training mentioned above. However, we would like to point out that tertiary education does not necessarily mean only academic education. We recommend that SDS also consider the possibilities of non-university tertiary education called Professional Education and Training (PET). Such degrees are formal and are aimed at people with several years of professional work experience.

Content

1	Introduction	7
2	Data Collection and Index Calculation	7
2.1	Data Collection	8
2.2	Indicator Definitions and Index Calculation	9
2.3	Data Validation	12
3	Youth Labour Market Situation in Scotland	13
3.1	Youth Labour Market Situation in Scotland in 2016	13
3.2	KOF YLMI evolution between 1996 and 2016	15
3.3	The Consequences of the Great Recession	15
4	Comparison of Scotland with the UK, Denmark and the OECD	21
5	Summary	24
	Annex	25
	Literature	25
	Biographies of Authors	25

1 Introduction

The KOF Youth Labour Market Index (KOF YLMI, Renold et. al, 2014; Pusterla, 2015, 2016 and 2017) is a multidimensional tool that allows to analyse the situation on the labour market of young people aged 15 to 24 for 178 countries for the years 1991 up to 2015¹. The index consists of twelve indicators from four dimensions: Activity State, Working Conditions, Education and Transitions Smoothness. The KOF YLMI is available as an interactive web tool², which allow comparisons among up to four countries or comparison over time. Hence, the tool provides the opportunity to compare a broad set of indicators to get an overview over the youth labour market situation.

In this context, the director of Skills Development Scotland, Jonathan Clark, and his colleague, David Coyne, commissioned the KOF Swiss Economic Institute to construct a KOF Youth Labour Market Index (KOF YLMI) for Scotland. Their aim is to have a tool, with which they can analyse in-depth the situation on the Scottish youth labour markets so that they are empowered to design appropriate research topics and interventions as well as shape their strategic responses. As the inclusion of Scotland in the existing KOF YLMI is not feasible, we devolved a tailor-made version of it – the Scottish KOF YLMI – that this report presents.

In this report we first collect the data of the twelve indicators for Scotland. The data source is Eurostat with the exception of the indicator In-work At-risk of Poverty Rate, for which the data source is the UK Data Service. With the data we calculate the scores of each indicator and the aggregated index. We validate the comparability of the Scottish data by comparing the values generated with the new data source for the United Kingdom with the data of the United Kingdom in the KOF YLMI.

Second, we describe the situation on the Scottish youth labour market in 2016 by category and by summarizing the values and scores of the twelve indicators. Also we analyse the development of the indicator over the years 1996 to 2016 and put thereafter a special focus on the consequences of the Great Recession on the Scottish youth labour market.

Third, we compare the situation for Scotland with the one in the United Kingdom, Denmark and the OECD average. The summary in the end highlights the main findings for the Scottish youth labour market.

2 Data Collection and Index Calculation

To build the KOF YLMI for Scotland we first collect data, we then calculate the index and finally we validate it. The following subsections describe the methodological aspects of our procedure. In particular, this section focus at first on data sources, which in the case of the Scottish KOF YLMI are partially different from the ones of the KOF YLMI. Afterwards, we briefly recall the definition of the indicators included into the index and describe the calculation process. The last part of this section presents the data validation procedure. Indeed, since data sources of the KOF YLMI and the Scottish KOF YLMI are not identical, we perform validation checks to ensure comparability. The data validation procedure allow us to compare Scotland with other countries included in the KOF YLMI.

¹ Despite including 178 countries, the KOF YLMI presents full data availability on the whole set of indicators only for about 30 countries.

² See <http://www.kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-youth-labour-market-index.html>

2.1 Data Collection

The KOF YLMI consists of data from the ILO, the OECD and Eurostat and the Swiss Federal Statistics Office³. The calculation of the KOF YLMI for Scotland requires regional data, as Scotland is part of the United Kingdom and thus its data is not reported separately in the KOF YLMI. Of the four original sources, only Eurostat publishes regional statistics or extracts them upon request. From Eurostat we could gather data for 11 out of the 12 indicators. Only in the case of one indicator, the In-Work at-Risk-of-Poverty Rate, Eurostat was not able to provide regional data. However, motivated by the willingness to present the most complete version of the KOF YLMI for Scotland, we collect micro data from the UK Data Service and calculate a proxy version of this indicator as discussed in detail below.

Table 1 presents an overview of the data sources. In particular, this table shows the original source of each indicator in the KOF YLMI, the source for the KOF YLMI for Scotland, and the years for which data is available. The earliest data is from 1996 and the latest data refers to 2016. However, the data series are not complete. Some indicators report missing values mainly due to breaks in time series. Only for the period 2010 to 2016 do all indicators have complete data series available.

Table 1: Data sources

KOF YLMI Indicator	Data source	Provider in KOF YLMI	Provider in KOF YLMI for Scotland	Available years in KOF YLMI for Scotland
Activity State				
Unemployment Rate	Labour Force Survey	ILO	Eurostat	1999-2016
Relaxed Unemployment Rate	Labour Force Survey	Eurostat	Eurostat	2005-2016
NEET Rate	Labour Force Survey	ILO, Eurostat	Eurostat	2000-2016
Working Conditions				
Temporary Worker Rate	Labour Force Survey	Eurostat	Eurostat	1996-2004; 2008-2016
Involuntary Part-time Worker Rate	Labour Force Survey	OECD, FSO	Eurostat	1996-2007; 2010-2016
Atypical Working Hours Rate	Labour Force Survey	Eurostat	Eurostat	1996-2007; 2009-2016
In-work at-Risk-of-Poverty Rate	European Statistics on Income and Living Conditions	Eurostat	UK Data Service	2005-2016
Vulnerable Employment Rate	Labour Force Survey	ILO	Eurostat	2005-2016
Education				
Formal Education and Training Rate		Eurostat, FSO	Eurostat	2004-2016
Skills Mismatch Rate	Labour Force Survey	ILO, Eurostat	Eurostat	1996; 2002; 2005-2016
Transition Smoothness				
Relative Unemployment Ratio	Labour Force Survey	ILO	Eurostat	1999-2016
Incidence of Long-term Unemployment Rate	Labour Force Survey	ILO, OECD, Eurostat	Eurostat	1996-1997; 2000; 2005-2016

³ See Renold et al. (2014) for further details about data sources

2.2 Indicator Definitions and Index Calculation

This section provides an overview over the calculation of the KOF YLMI. Hereafter, we give a short summary of the formulas of all indicators. Subsequently, we shortly recall the procedure of standardisation and aggregation into the index. For a detailed description of all the calculations, please refer to Renold et al. (2014).

Activity State

The first dimension is called the activity state. It contains three indicators, and captures to what extent the youth are active. Youth refers to all individuals aged 15-24.

The Unemployment Rate is calculated as all unemployed divided by the labour force, whereby the labour force consists of the employed and the unemployed.

$$\text{Unemployment Rate} = \frac{\text{Unemployed}}{\text{Employed} + \text{Unemployed}} * 100$$

The Relaxed Unemployment Rate is different to the Unemployment Rate in so far that it not only considers unemployed people but also people who would like to work, but have given up looking for a job, i.e. got discouraged to find a job. We calculate this indicator according to the following formula:

$$\text{Relaxed Unemployment Rate} = \frac{\text{Unemployed} + \text{Discouraged workers}}{\text{Employed} + \text{Unemployed}} * 100$$

The NEET Rate looks at the share young people who are neither in employment nor in education and training out of the total young population.

$$\text{NEET Rate} = \frac{\text{Youth neither in employment nor in education and training}}{\text{Population}} * 100$$

Working Conditions

The working conditions dimension consists of five indicators that capture the quality of employment. Those are the Temporary Worker Rate, the Involuntary Part-time Worker Rate, the Atypical Working Hours Rate, the In-work At-risk-of-Poverty Rate and the Vulnerable Employment Rate.

The Temporary Worker Rate is the proportion of employees with a contract duration below 18 month to all the employees.

$$\text{Temporary Worker Rate} = \frac{\text{Employees with a contract} < 18 \text{ months}}{\text{Employed}} * 100$$

For the Involuntary Part-time Worker Rate we consider all employees working part-time but wanting to work more as a percentage of all employees.

$$\text{Involuntary Part-time Worker Rate} = \frac{\text{Involuntary part-time employment}}{\text{Employed}} * 100$$

The Atypical Working Hours Rate reports the share of employees either working on Sunday, at nights or shift.

$$\text{Atypical Working Hours Rate} = \left(\frac{\text{Working on Sunday}}{\text{Employed}} + \frac{\text{Working at night}}{\text{Employed}} + \frac{\text{Working shift}}{\text{Employed}} \right) * \frac{100}{3}$$

The In-work At-risk-of-Poverty Rate considers the share of employees being at work but at risk of poverty. Poverty is defined as living in a household with an equivalised disposable income below the risk-of-poverty threshold, which is set at 60% of the national median equalised disposable income.

$$\text{In-Work at-Risk-of-Poverty Rate} = \frac{\text{In-work at-risk-of-poverty employees}}{\text{Employed}} * 100$$

The Vulnerable Employment Rate reports the share of own account workers and unpaid family workers out of total employment.

$$\text{Vulnerable Employment Rate} = \frac{\text{Own account workers} + \text{Unpaid family workers}}{\text{Employed}} * 100$$

Education

Education, the third dimension, aims to capture the quantity and quality of education and training via two indicators: the Formal Education and Training Rate and Skills Mismatch Rate.

The Formal Education and Training Rate considers the share of young people in formal education and training.

$$\text{Formal Education and Training Rate} = \frac{\text{Participant in formal education and training}}{\text{Population}} * 100$$

The Skills Mismatch Rate compares the ratio of employed young people with a certain education level with the unemployed young people at the same education level. Economically inactive and young people in education are not considered by this indicator. This measure of skills mismatch is lowest if the share of unemployed is similar to the share of employed in all education levels. Conversely, it increases if unemployment is particularly prevalent in one education level, suggesting that labour demand for individuals with this education level is lower than labour supply. This composite index considers three education levels: primary (ISCED level 1-2), secondary (ISCED level 3-4) and tertiary education (ISCED level 5-8).

$$\text{Skills Mismatch Rate} = \frac{1}{2} * \sum_{k=1}^3 \left| \left(\frac{\text{Employed with education } k}{\text{Employed}} - \frac{\text{Unemployment with education } k}{\text{Unemployed}} \right) \right|$$

Transition Smoothness

The Transition Smoothness dimension describes the dynamics of the transition process between school and work. The indicators Relative Unemployment Ratio and Long-Term Unemployment Rate compose this dimension.

The Relative Unemployment Ratio relates the unemployment rate of the young people to the one of adults.

$$\text{Relative Unemployment Ratio} = \frac{\text{Young unemployment rate (15-24)}}{\text{Adult unemployment rate (25+)}}$$

Lastly, the Incidence of Long-term Unemployment shows the share of young people who are unemployed for longer than one year out of the total number of unemployed youth.

$$\text{Incidence of Long-term Unemployment} = \frac{\text{Unemployed} > 12 \text{ months}}{\text{Employed}} * 100$$

Score calculation

Before aggregating the indicators into a single index, we rescale each indicator value into an indicator score that takes values between 1 and 7. We do this for three reasons. First, while most indicators are expressed as rates that vary between 0 and 100, most of the indicators also take values within a relatively narrow range that differs substantially across indicators. Hence, rescaling improves readability. The second motive for rescaling indicators arises because for some indicators higher values indicate an improvement, while in other cases higher values indicate a deterioration. Rescaling harmonizes the direction of indicators. Third, rescaling indicators allows us to compare indicators that have different scales, as in the case of Skills Mismatch Rate and Relative Unemployment Ratio.

As mentioned above, we have two ways of calculating the scores, depending on whether a high indicator's value is favourable or not. The Formal Education and Training Rate is the only indicator that increases if the youth labour market situation improves. In this case, we calculate the score as:

$$\text{score}_{nit} = 6 * \left(\frac{\text{indicator}_{nit} - \text{lower bound}}{\text{upper bound} - \text{lower bound}} \right) + 1$$

The n stands for the indicator number, the i for the country and the t specifies the year.

For the case in which a low value is more desirable, for example the unemployment rate, which is the case for all remaining indicators, we calculate the score as:

$$\text{score}_{nit} = -6 * \left(\frac{\text{indicator}_{nit} - \text{lower bound}}{\text{upper bound} - \text{lower bound}} \right) + 7$$

The lower and upper bounds used in the standardization, not presented in this report, are set according to Pusterla (2016). The bounds account for the values the data takes for different countries over the whole period covered by the KOF YLMI.

Index calculation

To calculate the index we sum the scores of all indicators, whereby we weight all dimensions the same, and the indicators within the dimensions are also equally weighted. For example, the Activity State has three indicators, each of which receives a weight of one third for the calculation of the Activity State score. This score in turn is one of four dimensions and hence receives a weight of one fourth in the calculation of the KOF YLMI. The formula looks as follows:

$$\text{KOF Youth Labour Market Index}_{it} = \frac{\sum_{c=1}^4 w_c * \frac{\sum_{n=1}^{m_c} \text{score}_{cnit} * w_{cn}}{\sum_{n=1}^{m_c} w_{cn}}}{\sum_{c=1}^4 w_c}$$

In the formula, the i stands for the country, the t for the year, the c for the dimension, the m_c for the numbers of indicators within a dimension, the w_c for the dimension weight and the w_{cn} for the weight of the indicator within the dimension.

2.3 Data Validation

General procedure for data validation

This section describes the validation procedure we adopt to ensure comparability between the Scottish data collected from sources different from the ones of the KOF YLMI. As previously mentioned, the KOF YLMI is the result of a combination of multiple data sets provided by the ILO, the OECD, Eurostat and the Swiss Federal Statistics Office. On the contrary, the KOF YLMI for Scotland uses data from Eurostat for 11 indicators and data from the UK Data Service for one indicator. In order to validate the Scottish data, we have to compare the data for the UK coming from Eurostat with the UK data already existing in the KOF YLMI, which comes from sources different than Eurostat. High correlation between the two time series implies that the regionalisation of the UK data is unproblematic, and hence that the Scottish values are reliable. Low correlation coefficients suggest that a regionalisation of UK data might be problematic and that the derived Scottish values have poor reliability.

Table 2 summarises the results of this validation procedure. For almost all indicators the correlation is higher than 0.9, suggesting high reliability of our procedure. If we consider the time series in the more recent years (after 2004), then for all these 11 indicators the correlation is higher than 0.95. The only exception is the In-Work at-Risk-of-Poverty Rate indicator, which the following paragraphs discuss.

Table 2: Correlation of Indicators in KOF YLMI and KOF YLMI for Scotland having different data source

KOF YLMI Indicator	Provider in KOF YLMI	Provider in KOF YLMI for Scotland	Time period	Pairwise correlation
Unemployment Rate	ILO	Eurostat	1999-2016	0.9999
NEET Rate	ILO, Eurostat	Eurostat	2000-2016	0.9594
Involuntary Part-time Worker Rate	OECD	Eurostat	1991-2007 2009-2016	0.9119
In-Work at-Risk-of-Poverty Rate	Eurostat	UK Data Service	2005-2016	0.0425
Vulnerable Employment Rate	ILO	Eurostat	1991-2016	0.9985
Skills Mismatch Rate	ILO, Eurostat	Eurostat	1992-1997 1999-2016	0.9237
Relative Unemployment Ratio	ILO	Eurostat	1999-2016	0.9976
Incidence of Long-term Unemployment Rate	ILO, OECD, Eurostat	Eurostat	1992-2001 2004-2016	0.9272

Validation of the In-Work at-Risk-of-Poverty Rate

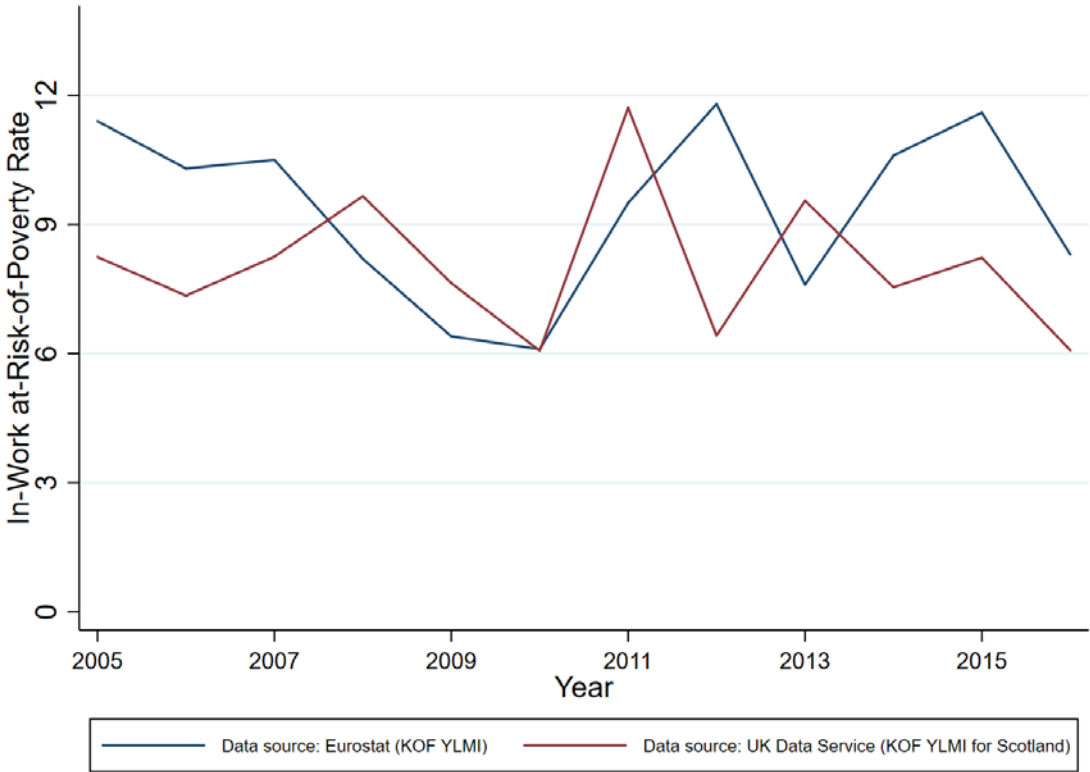
In-Work at-Risk-of-Poverty Rate is the only indicator in the KOF YLMI for Scotland for which Eurostat provides no regionalised data. Nevertheless, as already mentioned in Section 2.1, motivated by the willingness to present the most complete version of the KOF YLMI for Scotland, we collect micro data from the UK Data Service and calculate a proxy version of this indicator.

More precisely, the calculation of the In-Work at-Risk-of-Poverty Rate proxy requires to match two data sets: the Household Below Average Income (HBAI) and the Family Resources Survey (FRS). The former provides information on the number of households having less than 60% of the median equalized disposable income. The latter contains information of the employment status of the individuals living in each household. The replication of the In-Work at-Risk-of-Poverty Rate by matching these two data sets was complex due to multiple reasons. First, the data from the HBAI is based on civil year, while FRS data follows the fiscal year. Second, the FRS survey considers individual aged 16 or above, while the Eurostat variable covers youth from age 15. Third, the Eurostat measure excludes ‘non-monetary income components, in particular [...] social transfers in kind [...]’ from household income. In contrast, the HBAI does include the cash value of free school meals and Healthy Start vouchers.

These differences partially explain the low correlation coefficient in Table 2 between our proxy and the existing value in the KOF YLMI. To understand the severity of these calculation problems, Figure 1

displays the time series of the In-Work at-Risk-of-Poverty Rate for the UK in the KOF YLMI and compares it to the corresponding time series that aggregates the micro data for all of UK. This shows that both time series are quite volatile and do not always change in the same direction. This explains the low correlation between the two series. However, despite showing low correlation, both time series present very similar levels, as Figure 1 reports. The trends over the period 2005-2016 are not statistically different. For this reason, and because no other alternative measurement of the In-Work at-Risk-of-Poverty Rate is feasible, we include this indicator in the current study. Nevertheless, we stress the necessity to interpret this indicator with caution and to consider principally its level – which is comparable – and not the evolution over time.

Figure 1: Validation of calculation method of the In-Work at-Risk-of-Poverty Rate for the UK



3 Youth Labour Market Situation in Scotland

Scotland has about 3,448,100 inhabitants aged 15 to 64 in 2016 (European Union Labour Force Survey). Out of them, 630,000 are aged 15 to 24 and thus considered young. From them, 382,000 individual are in the labour force, i.e. employed or unemployed. The next part discusses the situation on the labour market for the economically active young people and for the entire youth cohort.

3.1 Youth Labour Market Situation in Scotland in 2016

Table 3 provides an overview of the youth labour market situation in Scotland in 2016. Concretely, it displays the original values of the indicators and their corresponding scores as they enter the KOF YLMI.

Activity State

Focusing first on the Activity state, we see that about one in every ten young person in the labour force is unemployed, and it rises up to one in every eight when including the discouraged people⁴. Ten percent of all young people are neither working nor in education or training. The scores indicate a favourable situation in the Activity State given that scores ranges in a scale from 1 to 7, where higher scores suggest more desirable outcomes.

Working Conditions

Next we see the values for the Working Conditions. Approximately 14% of all employed young people have a contract for less than 18 month. Almost one in four of all young employed people would like to work more, but cannot find a full-time job. Then, roughly one in four young people works shifts, at night or on Sundays. About 7% of young people are at-risk-of being poor⁵ although being in employment. Finally, almost one in ten young people is self-employed or works for his or her family. The scores indicate that the Working Conditions are also favourable given that scores ranges in a scale from 1 to 7, where higher scores suggest more desirable outcomes.

Education

In the Education dimension, we see that slightly more than half of all young people is enrolled in a formal education and training programme.

Transition Smoothness

With respect to the Transition Smoothness dimension, we observe that youth have a probability of being unemployed approximately three times higher than adults. Additionally, almost 20% of young people who are unemployed have been so for more than one year.

Table 3: Value and Scores of the KOF YLMI Indicators for Scotland in 2016

KOF YLMI Indicator	Original Value	KOF YLMI Score
Activity State		
Unemployment Rate	12.30%	5.95
Relaxed Unemployment Rate	16.23%	5.85
NEET Rate	11.90%	5.22
Working Conditions		
Temporary Worker Rate	13.51%	5.65
Involuntary Part-time Worker Rate	4.02%	6.20
Atypical Working Hours Rate	23.11%	3.04
In-work At-risk of Poverty Rate	6.55%	5.88
Vulnerable Employment Rate	9.68%	5.55
Education		
Formal Education and Training Rate	54.20%	3.90
Skills Mismatch Rate	24.87	3.27
Transition Smoothness		
Relative Unemployment Ratio	3.15	5.11
Incidence of Long-term Unemployment Rate	18.16%	5.44

⁴ Discouraged are persons who, while willing and able to engage in a job, are not seeking work or have ceased to seek work because they believe there are no suitable available jobs.

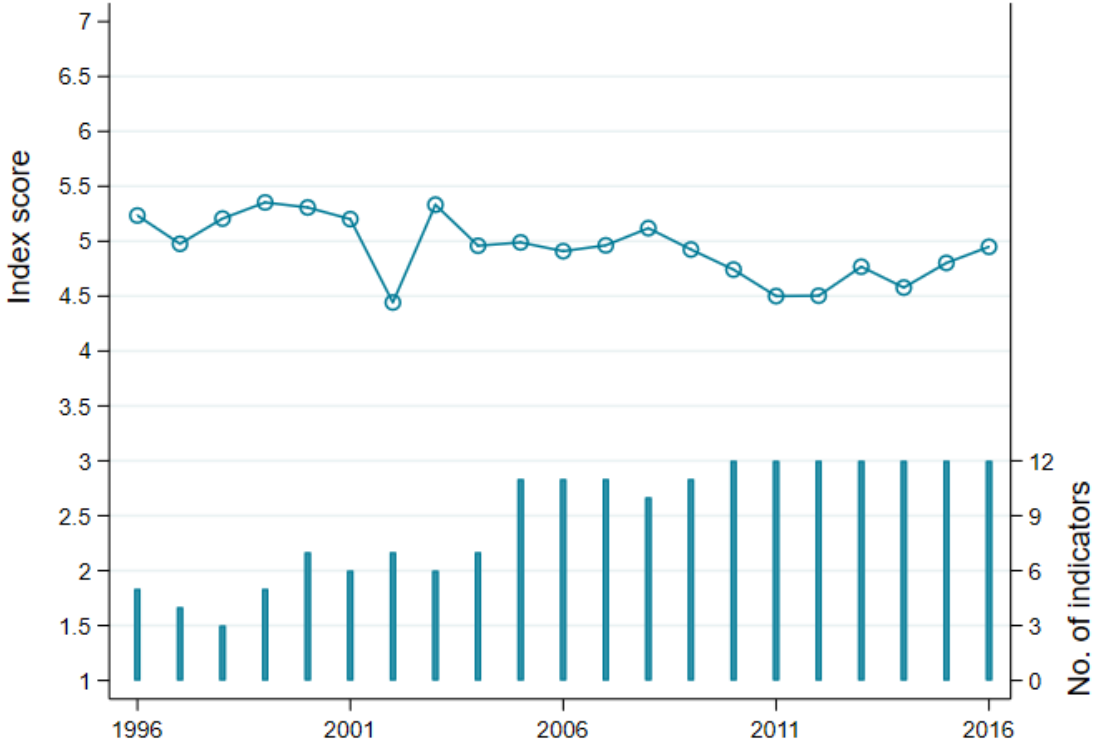
⁵ Poor is defined as living in a household with an equivalised disposable income below the risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income.

3.2 KOF YLMI evolution between 1996 and 2016

Figure 2 shows the evolution of the KOF YLMI for Scotland between 1996 – year in which data availability starts – and 2016. The line chart in the top part of the figure (left y-axis) reports the KOF YLMI score achieved by Scotland in every year. The bar diagram in the bottom of the figure (right y-axis) reports the number of available indicator in each year.

The number of indicators is unstable until 2009 and this might have a large impact on the volatility of the index measure. From 2010 onwards, data for all 12 indicators are available. Therefore, interpretation about the change in the index before 2010 have to be made very carefully. For example, we cannot certainly state from this figure that there was a drop of the index in 2002 indicating a deterioration of the youth labour market situation. It might also just have been a matter of change in the available indicators. However, observing the general pattern suggests that the youth labour market situation has been relatively stable between 1996 and 2008. In the wake of the financial crisis, the KOF YLMI for Scotland dropped substantially. It falls until 2011 and has been recovering since then. In 2016 it has almost reached the level before the financial crisis, suggesting that Scotland has mostly recovered.

Figure 2: Evolution between 1996 and 2016 of the KOF YLMI for Scotland



Notes: The line chart in the top part of the figure (left y-axis) reports the KOF YLMI score achieved by Scotland in every year. Scores ranges on a scale from 1 to 7, where higher scores suggest more desirable outcomes. The bar diagram in the bottom part of the figure (right y-axis) reports the number of available indicators in every year.

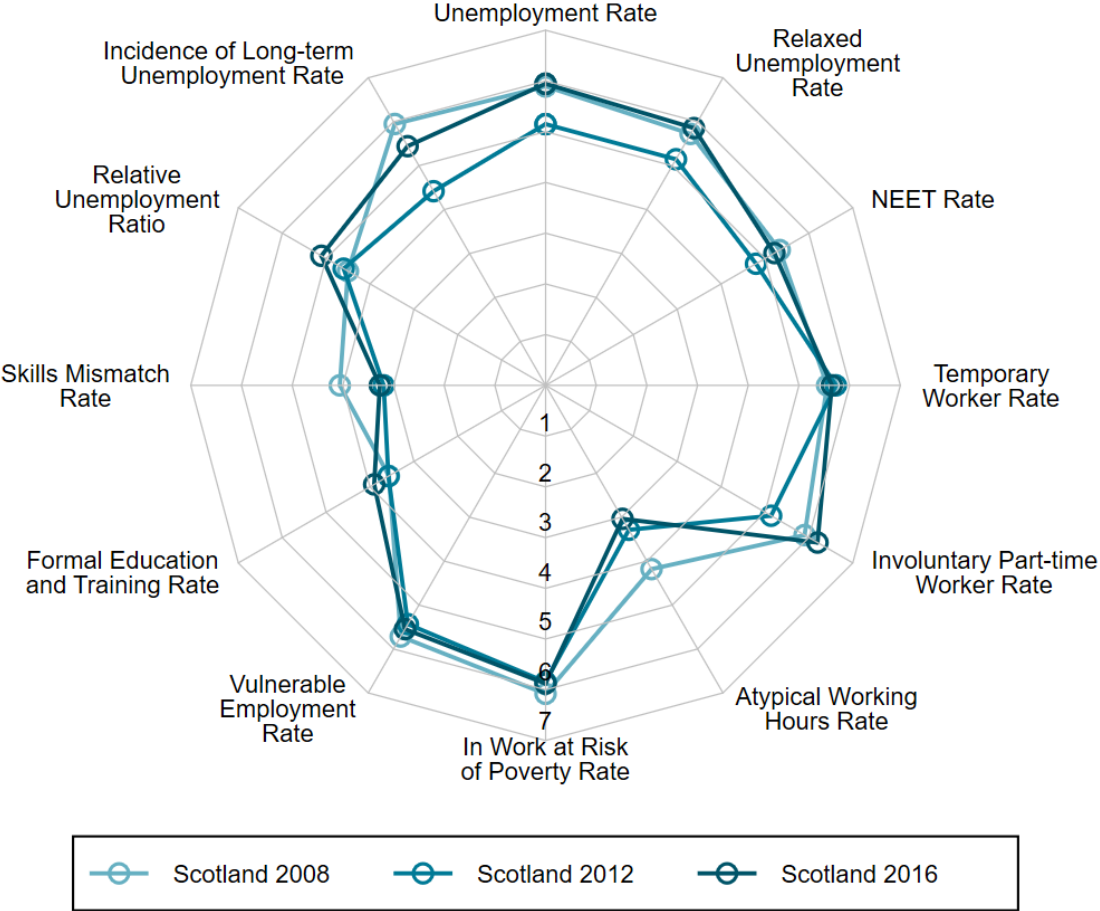
3.3 The Consequences of the Great Recession

In 2008, the Great Recession hit the economy worldwide leading to a difficult situation in the labour market for many people. However, not all countries suffered equally and in the aftermath, some were able to recover faster than others. In the following, we present an analysis of how the twelve indicators composing the KOF YLMI have reacted for Scotland during the financial crisis.

The spider web in Figure 3 displays the indicators of the KOF YLMI for Scotland in 2008⁶, in 2012 and in 2016. The 2008 values represent our benchmark by showing us the situation before the starting of the crisis. The values in 2012 and in 2016 allow us to observe which indicator suffered the most and how quickly they reacted.

By looking at the spider web from a general perspective, we observe that mainly all indicators worsened between 2008 (light-blue line) and 2012 (blue line). On the contrary, the evolution between 2012 (blue line) and 2016 (dark-blue line) shows evidence that the recovery occurred in almost all indicators. In the next part of this section, we take a closer look at the single indicators.

Figure 3: The development of the indicators after the Great Recession



Notes: The spider web reports the score of the twelve indicators composing the KOF YLMI. Scores ranges on a scale from 1 to 7, where higher scores suggest more desirable outcomes. Values for Involuntary Part-time Worker Rate and Atypical Working Hours in 2008 refer to 2007.

Activity State

Between 2008 and 2012 all three indicators composing the Activity State dimension show a clear deterioration of the scores. The Great Recession pushed an increasing number of young people towards unemployment and inactivity. The dark-blue line suggests however that this shift was essentially temporary. Indeed, in 2016 the scores of the Unemployment Rate and the Relaxed Unemployment Rate suggest a situation similar or even better than in 2008. Only the score of the NEET Rate in 2016 presents a score slightly lower than in 2008, suggesting that eight years after the crisis the proportion of young people neither in employment, nor in education or training is still lower.

⁶ Due to missing values, the Involuntary Part-time Worker Rate and the Atypical Working Hours Rate show the 2007 scores for 2008.

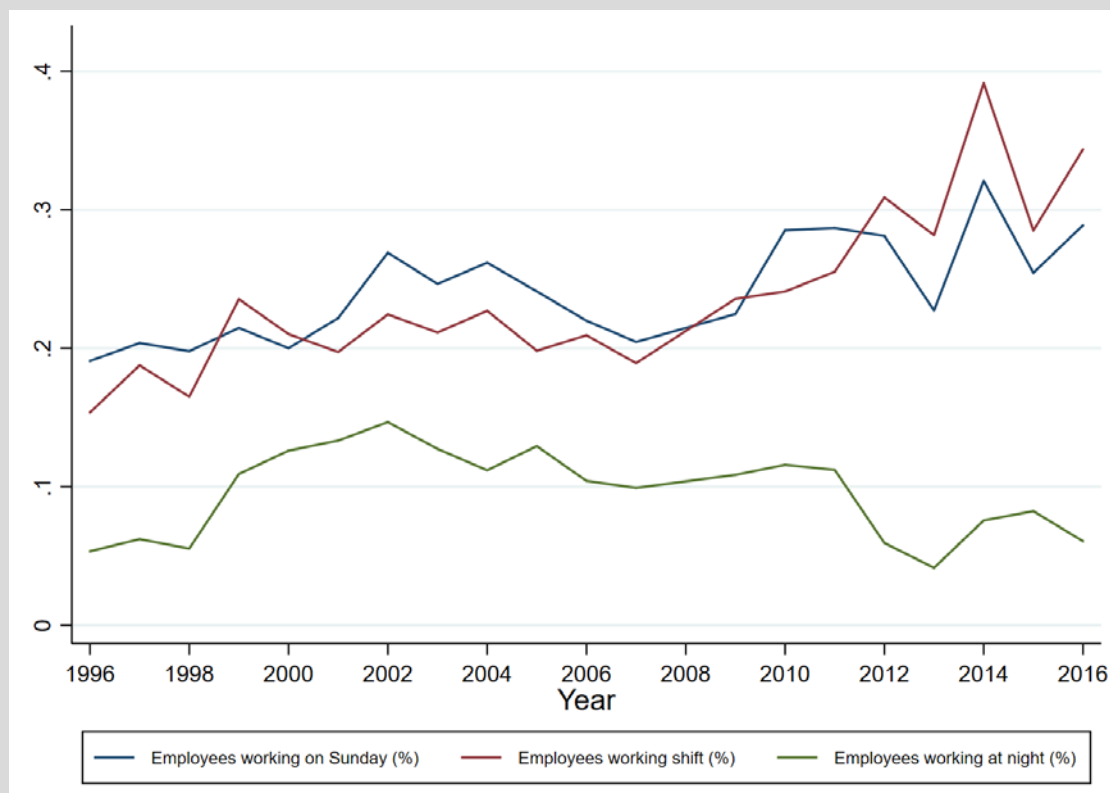
Working Conditions

Most of the Working Conditions indicators react less heavily to the recession. In particular, the Temporary Worker Rate, the In Work at Risk of Poverty⁷ and the Vulnerable Employment Rate do not evidence large changes in the years following the Great Recession. Noteworthy is the evolution of the indicator Involuntary Part-time Worker Rate, which shows at first a clear deterioration. However, the score in 2016 suggests that a clear recovery has occurred. In this year, the share of workers having a temporary contract is even lower than in the per-crisis period. On the contrary, the deterioration in the Atypical Working Hours Rate continued after 2012, as the score in 2016 suggests. Hence, Box 1 provides an in-depth analysis on the causes of this deterioration.

Box 1: Atypical Working Hours Rate in Scotland

Figure 4 shows the evolution of the three components of the Atypical Working Hours Rate between 1996 and 2016. These are the shares of employees working on Sunday, shift and at night, respectively. From a general perspective, we observe that the share of employees working on Sunday and shift are very similar, and that these phenomena are clearly more frequent than working at night. With respect to the evolution over time, the figure presents three main traits. In a first period, going from 1996 to 2002, all three components evidence an increasing trend. The period between 2002 and 2010 is characterised by an almost constant evolution of all three indicators. Finally, from 2010 onward, we observe a massive increase in the share of employees working on Sunday or shift, while a decrease in the proportion of employees working at night. Hence, the increase in the share of youth with atypical working hours increases due to a rise in the share that works on Sunday or shift.

Figure 4: Evolution of the Atypical Working Hours components



⁷ Please note, as previously mentioned in Section 2.3, that the evolution over time of the In-Work at-Risk-of-Poverty Rate should be interpreted with caution due to an alternative data source for this indicator.

Education

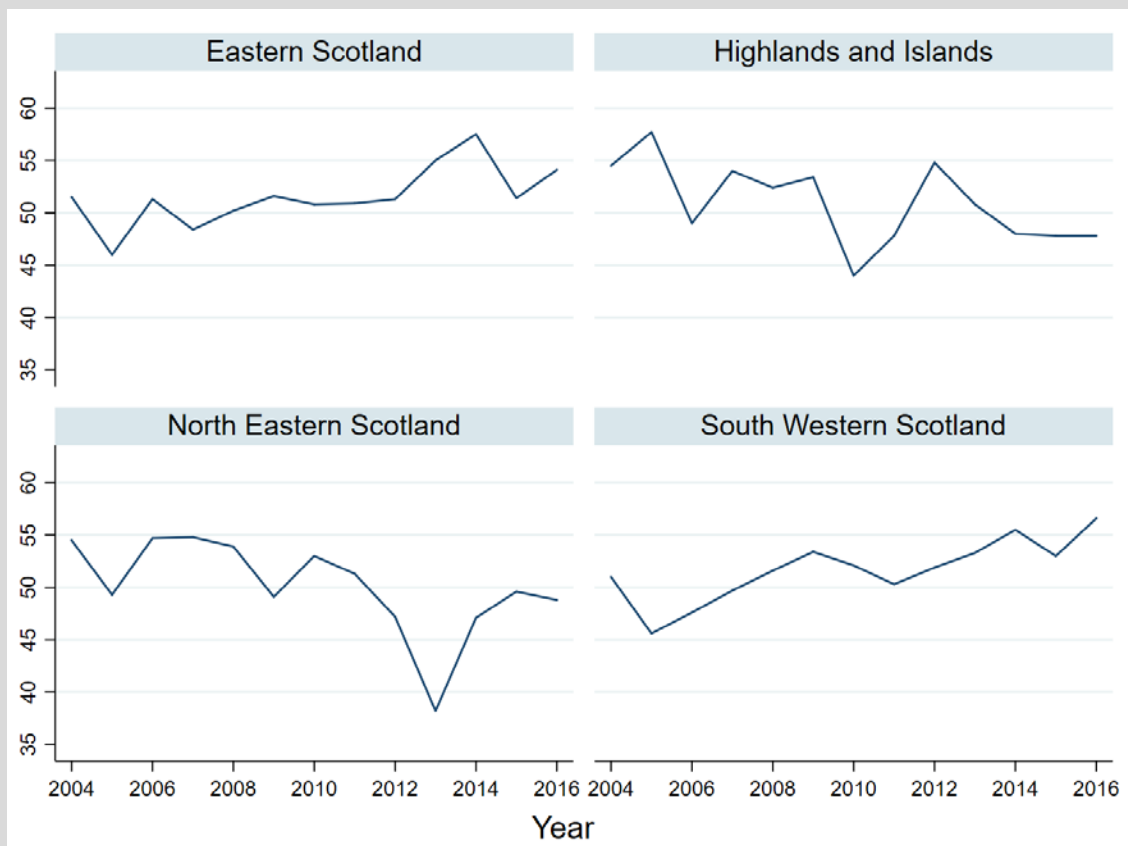
The indicators of the Education dimension show opposing trends following the Great Recession. On the one side, the Formal Education and Training Rate has not changed between 2008 and 2012. The higher value in 2016 suggests an increase in the enrolment in education and training. However, Box 2 highlights that this increase was not uniform in all Scottish NUTS 2 regions⁸.

The Skills Mismatch Rate, on the other side, evidences a large decrease between 2008 and 2012. Unfortunately, the score of 2016 suggest that the imbalances between skills supply and skills demand persist. Box 3 attempts to disentangle the causes of this mismatch.

Box 2: Regional trends in the Formal Education and Training Rate

Figure 5 presents the evolution between 2004 and 2016 of the Formal Education and Training Rate across Scottish NUTS 2 regions. Although the evolution is to some extent quite volatile, this figure evidences opposing trends across regions. In 2004, the formal education and training rates are quite similar across regions. In Eastern and South Western Scotland the enrolment rate in formal education or training increases thereafter. More precisely, the rate rises from about 50% in 2004 to about 55% in 2016. On the other side, in Highland and Islands as well as in North Eastern Scotland the trend over time is decreasing. In these regions, the Formal Education and Training Rate decreased from about 55% to less than 50%. Considering the already relatively low values of this indicator (see next section for an international comparison), the evolution in these two latter regions should be analysed in more detail.

Figure 5: Evolution of the Formal Education and Training Rate by regions



⁸ Nomenclature of Territorial Units for Statistics (NUTS). The NUTS are geographical divisions of the UK, split into three levels. They provide a basis for data analysis and aggregation across the UK.

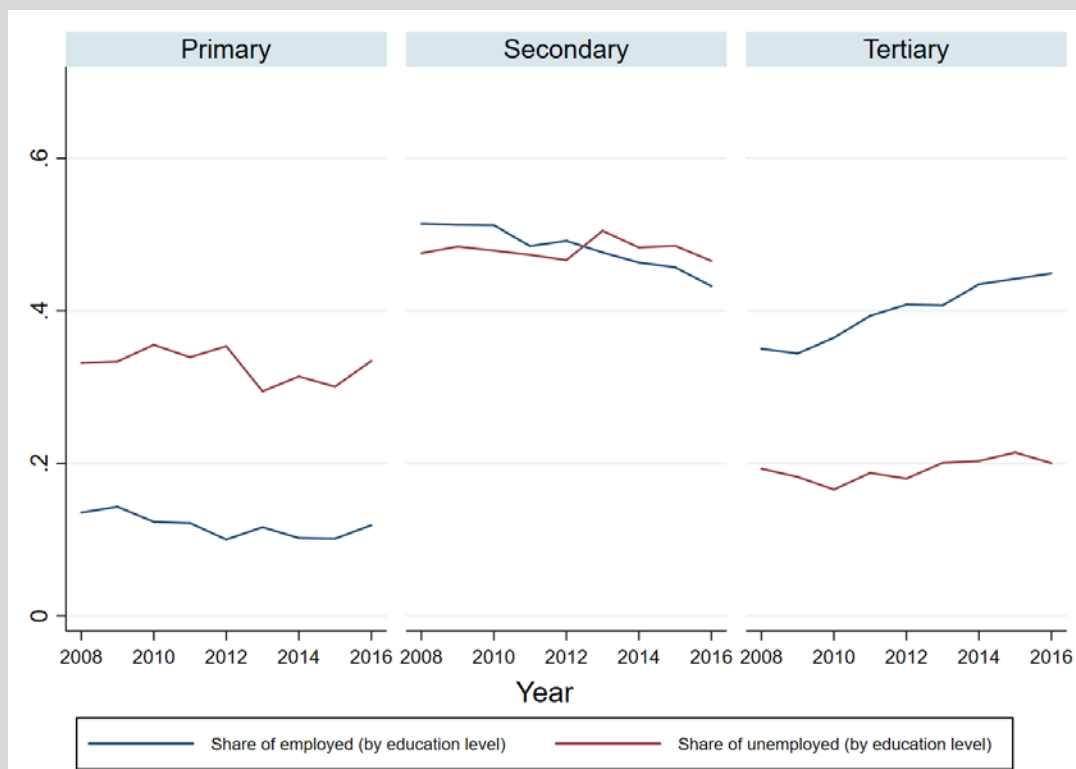
Transition Smoothness

The indicators composing the Transition Smoothness dimension show opposing trends between 2008 and 2016. On the one side, the score of the Relative Unemployment Ratio improves over time, suggesting that youth were, compared to adults, proportionally less exposed to unemployment spells from the aftermath of the Great Recession. On the other side, the score of the Incidence of Long-term Unemployment Rate sharply drops between 2008 and 2012. Being unemployed for more than one year was disproportionately more likely four years after the start of the crisis. The score in 2016 suggests that some improvement since 2012 has occurred. However, the situation of long-term unemployment had worsened by 2016 compared 2008.

Box 3: Disentangling Skills Mismatch

Figure 6 reports the evolution of the Skills Mismatch components in Scotland between 2008 and 2016. More precisely, the blue line reports the shares of employment by educational attainment, for example the share of employees with primary education among all employees. Correspondingly, the red line shows the shares in unemployment. Primary education corresponds to ISECD levels 1-2, secondary education to ISECD levels 3-4, while tertiary to ISECD levels 5-8. The shares of employed respectively unemployed by education level are reported, together with the absolute values, in Table 4 and Table 5, respectively. The Skills Mismatch Rate measures the difference between the share of employed and the share of unemployed across these three groups. If the blue and red line are close to one another, then the mismatch is low. When the red line is above the blue line, this means that unemployed are over-represented in this education group. There is hence on the labour market an over-supply of workers with this education attainment. Conversely, if the red line lies below the blue line there is evidence of over-demand on the labour market.

Figure 6: Evolution of the Skills Mismatch components



Notes: In every year, the share of employed respectively unemployed across educational levels sum up to 100%.

In the case of Scotland, Figure 6 suggests that there is over-supply on the market of primary educated workers. This pattern has only slightly reduced over the considered period. The group of workers with a secondary education shows the best match. With this regard, the graph shows across the years 2012-2013 a slight shift from over-demand to over-supply of workers with secondary education. Finally, the sub-graph on the right-hand side evidences a clear over-demand of workers with tertiary education. During the considered time, the gap between the demand and the supply of workers with this level of education increased. This implies that potentially the Scottish labour market might be able to absorb a larger number of workers with tertiary education. This is particularly relevant in the perspective of decreasing Formal Education and Training Rate in two regions, as already illustrated by Box 2.

Table 4: Employment by education attainment

Year	Employed ISCED 1-2		Employed ISCED 3-4		Employed ISCED 5-8		Employed TOT	
	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)
2008	83,221	13,5%	315,823	51,4%	215,159	35,0%	614,203	100%
2009	86,396	14,3%	309,548	51,3%	207,781	34,4%	603,724	100%
2010	72,526	12,3%	301,111	51,2%	214,326	36,5%	587,963	100%
2011	70,907	12,2%	282,684	48,5%	229,288	39,3%	582,878	100%
2012	59,156	10,0%	291,051	49,2%	241,555	40,8%	591,762	100%
2013	69,839	11,6%	286,457	47,7%	244,802	40,7%	601,097	100%
2014	61,879	10,2%	281,100	46,3%	263,802	43,5%	606,780	100%
2015	64,562	10,1%	291,817	45,7%	282,077	44,2%	638,456	100%
2016	73,648	11,9%	267,858	43,2%	278,181	44,9%	619,687	100%

Table 5: Unemployment by education attainment

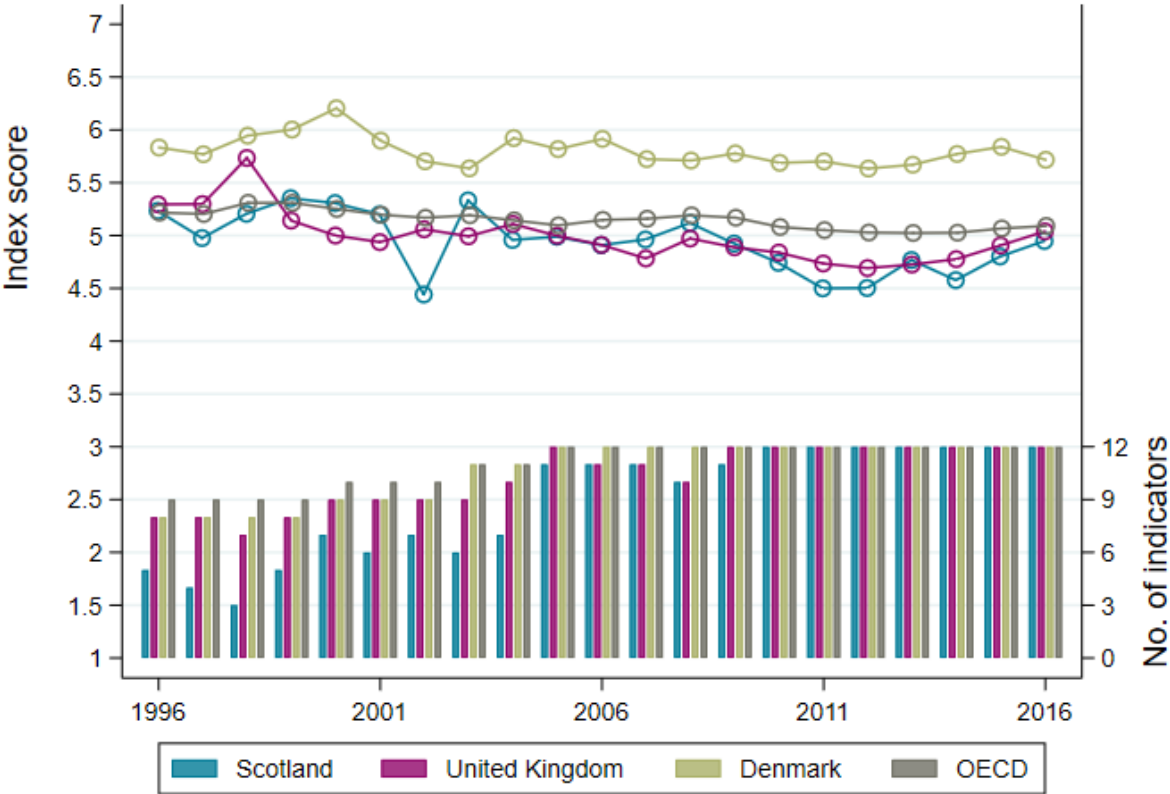
Year	Unemployed ISCED 1-2		Unemployed ISCED 3-4		Unemployed ISCED 5-8		Unemployed TOT	
	(no.)	(%)	(no.)	(%)	(no.)	(%)	(no.)	(%)
2008	22,266	33.2%	31,933	47.5%	12,959	19.3%	67,158	100%
2009	29,247	33.4%	42,468	48.4%	15,973	18.2%	87,688	100%
2010	39,331	35.5%	52,999	47.9%	18,316	16.6%	110,647	100%
2011	39,110	33.9%	54,591	47.3%	21,613	18.7%	115,314	100%
2012	41,148	35.4%	54,258	46.6%	20,929	18.0%	116,335	100%
2013	29,226	29.4%	50,148	50.5%	19,934	20.1%	99,308	100%
2014	26,429	31.4%	40,688	48.3%	17,110	20.3%	84,227	100%
2015	24,051	30.0%	38,852	48.5%	17,154	21.4%	80,057	100%
2016	19,798	33.4%	27,565	46.5%	11,859	20.0%	59,223	100%

4 Comparison of Scotland with the UK, Denmark and the OECD

To contextualise Scotland’s situation on the youth labour market, this section presents an international comparison with some selected countries and groups of countries. We contrast the results of the KOF YLMI for Scotland with the values of the United Kingdom to understand how Scotland differs from the national labour market. Denmark represents a comparison to the top-performing youth labour market in 2016. Finally, the OECD values allow benchmarking against a broad set of countries with a comparable development state. The analysis starts by observing the evolution of the KOF YLMI at the aggregate level and is then broken down into the balance across the twelve indicators in 2016.

Figure 7 presents the evolution of the KOF YLMI in Scotland, the United Kingdom, Denmark and the OECD average between 1996 and 2016. The bar diagram in the bottom part of the figure (right y-axis) reports the number of available indicator for each country in each year. The line chart in the top part of the figure (left y-axis) reports the KOF YLMI score achieved by the countries in every year.

Figure 7: Evolution over time of the KOF YLMI in Scotland, UK, Denmark and OECD



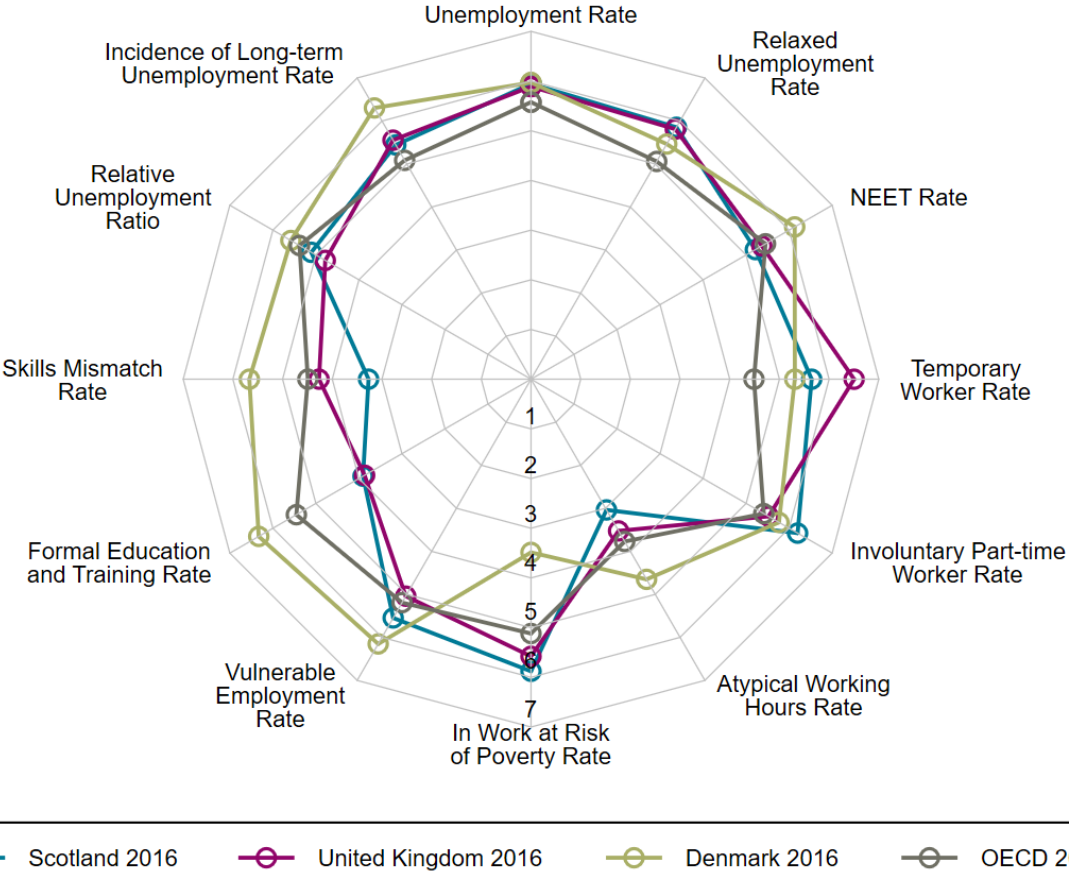
Notes: The line chart in top part of the figure (left y-axis) reports the KOF YLMI score achieved by the countries in every year. Scores ranges on a scale from 1 to 7, where higher scores suggest more desirable outcomes The bar diagram in the bottom of the figure (right y-axis) reports the number of available indicators that each country dispose in every year.

The results show that the KOF YLMI is similar in Scotland as in the UK overall. Both of these values are generally slightly below the OECD average and substantially below Denmark. Hence, the youth labour market situation in Scotland is only average in an international perspective.

In the time before the Great Recession, the KOF YLMI has decreased slightly Scotland. However, this development also occurs in the UK, Denmark and the OECD. Furthermore, it remains unclear whether this is due to the increasing number of available indicators in this time. As discussed above, the KOF YLMI for Scotland decreased substantially between 2008 and 2012. The corresponding UK score also decreased. But since the drop was less substantial, we conclude that the Great recession has affected the Scottish youth labour market more than the UK as a whole. The disparity becomes even stronger when compared to the OECD and Denmark, where the changes after 2008 are even less pronounced. However, looking at the recovery since 2012 tells a different story. The KOF YLMI for Scotland has increased and reached a similar level in 2016 than before the crisis. This recovery has been larger than in the UK and OECD. Therefore, both Scotland and the UK are only slightly lower than OECD average in 2016. However, the youth labour market situation in Denmark has also improved and is hence substantially better than in Scotland.

To disentangle the different components of the index, we also show the results obtained in every indicator separately. Figure 8 reports the spider web for Scotland, the United Kingdom, Denmark and OECD average in 2016. From this figure, we can observe that for some indicators the values suggest very similar situations, while in the case of others the differences are larger. In the next of the section, we take a closer look at each indicator.

Figure 8: Spider web for Scotland, UK, Denmark and OECD in 2016



Notes: The spider web reports the score of the twelve indicators composing the KOF YLMI. Scores ranges on a scale from 1 to 7, where higher scores suggest more desirable outcomes.

Activity State

The spider web suggests that the four considered territories have very close levels of youth unemployment rate. The score of Scotland is basically identical to the one of the United Kingdom and Denmark, and slightly higher than the OECD average.

As we consider the broader concept of Relaxed Unemployment Rate, we observe larger differences. Scotland shows an almost identical situation to the one of the United Kingdom. However, both Scotland and the United Kingdom position clearly above OECD average. Their score is even higher than the one of Denmark, the country leader in the KOF YLMI.

Notwithstanding, the picture in case of the NEET Rate – the third and last indicator of the Activity State – is different. Scotland performs slightly below the United Kingdom, which presents a score close to the OECD average. The distance to the score of Denmark suggests that room for improvement exists with respect to this indicator.

Working Conditions

Differences between the four countries are notable in the field of Working Conditions, which encompasses five indicators. In the Temporary Worker Rate, the score of Scotland suggests a generally good situation. Nevertheless, the Scottish score is below the UK's. This suggests that temporary contracts are more diffused in Scotland than in the United Kingdom. Deepening analyses on the differences between Scotland and the United Kingdom should provide insights on the reasons for this difference. Anyway, it should be noted that the scores in the Temporary Worker Rate for both United Kingdom and Scotland are better than in Denmark and clearly above the OECD average.

Looking now at the Involuntary Part-time Worker Rate, we observe that the score for Scotland is higher than in the UK. Furthermore, Scotland scores above the OECD average and even Denmark. Working part-time but desiring to work more is hence clearly less problematic in Scotland than in the United Kingdom.

With respect to the Atypical Working Hours, Scotland has a score below the United Kingdom. Furthermore, the OECD average is even better and Denmark receives an even higher score. Hence, the score of Scotland is low, suggesting that young people there face un-social conditions with respect to the working hours.

The picture among these countries capsizes once we look at the subsequent indicator, the In-work At-risk of Poverty. For this indicator, the scores of Scotland and the United Kingdom are relatively close. Both score clearly higher than the OECD average, while this indicator represents Denmark's Achilles heel. The Vulnerable Employment Rate, the last indicator composing the Working Conditions dimension, suggests better situation in Scotland than across the United Kingdom and even higher than the OECD average. However, Denmark consolidates its leading position in this indicator.

Education

Concerning the Education dimension, we observe for both indicators – the Formal Education and Training Rate and the Skills Mismatch Rate – that Scotland performs relatively poorly. In particular, with respect to the Formal Education and Training Rate, Scotland scores similarly as the United Kingdom, but substantially lower than the OECD average or Denmark. An enrolment rate in formal education or training of approximately 54% is in Scotland and in the United Kingdom are clearly below than the average of the OECD members, which is about 67%.

By looking at the Skills Mismatch Rate – the other indicator in the Education dimension – we observe that the score of Scotland suggests a very poor situation. The United Kingdom scores substantially higher than the OECD average and Denmark outperforms Scotland even more. As discussed in Box 3, this has two reasons. On the one side, youth with primary education in the group of unemployed are over-represented relative to the proportion of primary-educated workers in total employment. On the other side, youth with tertiary education are under-represented within unemployed relative to their share in the total employed. The low score in the Scottish Skills Mismatch Rate captures these two opposed imbalances.

Transition Smoothness

Lastly, the Transition Smoothness dimension comprises the indicators Relative Unemployment Ratio and Incidence on Long-term Unemployment Rate. This dimension evidences fewer differences than the previous two dimensions. Nevertheless, worth of mention is the score in the Relative Unemployment Ratio for Scotland and the UK, which are below the OECD average. These indicate that the ratio between the unemployment rate of youth and the one of adults is proportionally higher than in other OECD countries, suggesting that the youth labour market is particularly affected. This pattern is less prominent in Scotland than in the United Kingdom, though.

Finally, with respect to the Incidence of Long-Term Unemployment Rate, the spider web suggests a relatively positive situation for Scotland. The indicator is similar as in the UK, both of which score above the OECD average. The high value of Denmark recalls however, that room of improvement exists with regard to this indicator as well.

5 Summary

This study describes the creation of the KOF Youth Labour Market Index (KOF YLMI) for Scotland. The KOF YLMI is a tool, which allows comparing the Scottish youth labour market with the situation in other countries. To build the KOF YLMI for Scotland, we first collect data, calculate scores for each indicator, validate the comparability of scores and finally calculate the index.

Our results indicate that in an international perspective the youth labour market situation in Scotland is slightly below the OECD average. In this study, we first focus on the evolution over time of the twelve indicators composing the KOF YLMI for Scotland, and then we compare them at international level. Our analysis evidences that Scotland scores above the OECD average in seven out of twelve indicators. Furthermore, we highlight four possible areas that require more detailed attention. These can be summarised as i) targeting the increasing share of young people neither in employment, nor in education or training ii) understand the reason for the sharp increase in the share of youth that works on Sundays or shifts since 2010, iii) foster the enrolment in formal education and training, particularly in the Highlands, Islands and North Eastern Scotland, and iv) address the issue of increasing skills mismatch, which is mainly driven by an over-supply of primary educated workers and an over-demand of tertiary educated workers.

Annex

Literature

Pusterla, F. (2015). *How did the youth labour market situation evolve between 2012 and 2013? Second release of the KOF youth labour market index* (No. 67). KOF Studien.

Pusterla, F. (2016). *The Great Recession and the Working Conditions of Youth: A Descriptive Analysis of the European Labour Market. Third Release of the KOF Youth Labour Market Index* (No. 83). KOF Studien.

Pusterla, F. (2017). How Active are Youth? The Interplay between Education, Youth Unemployment, and Inactivity. *KOF Studies*, 97.

Renold, U., Bolli, T., Egg, M. E., & Pusterla, F. (2014). *On the multiple dimensions of youth labour markets: A guide to the KOF youth labour market index* (No. 51). KOF Studien.

Biographies of Authors

Ursula Renold, Dr

Renold is head of the research centre for comparative education systems at the Swiss Federal Institute of Technology (ETH) in Zurich. In addition, she is Chairman of the University Board of the University of Applied Sciences and Arts, Northwestern Switzerland. She was a Visiting Fellow at the Harvard Graduate School of Education between September 2012 and March 2013. Prior to this, Renold was Director General of the Federal Office for Professional Education and Technology (OPET) until June 2012. In this position, she headed Switzerland's competence centre for professional education, the universities of applied sciences and led program innovation starting in 2005. Before becoming Director General, she was head of OPET's Vocational Education and Training Division and Director of the Swiss Federal Institute of Vocational Education and Training (teacher education). During her career, Renold has launched numerous key initiatives that have had great impact on the Vocational and Professional Education and Training system in Switzerland. She holds an honorary Professorship in Professional Education at the University of Applied Labour Studies in Mannheim (Germany).

Thomas Bolli, Dr

Bolli is a postdoctoral researcher in the research centre for comparative education systems at the Swiss Federal Institute of Technology (ETH) in Zurich. Before starting this position in April of 2013, he was awarded a Swiss National Science Foundation grant to visit the University of Lancaster as a postdoctoral researcher. He wrote his PhD thesis on the production and measurement of knowledge capital in the research centre for innovation at the Swiss Federal Institute of Technology (ETH) in Zurich. Building on this, his research interests consist of the statistical analysis of knowledge, in particular applying micro-econometrics to questions regarding the economics of education, research and innovation.

Maria Esther Oswald-Egg

Oswald-Egg is a researcher and doctoral student in the research centre for comparative education systems at the Swiss Federal Institute of Technology (ETH) in Zurich. She did her bachelor studies in Economics at the University of St. Gall Switzerland and graduated in 2010. For the master studies in Economics she moved to Zurich, Switzerland, and graduated in 2013 from the University of Zurich. Her dissertation area is in education economics and labour economics. Thereby, she focuses on the relation between the youth labour market and vocational education and training.

Filippo Pusterla

Pusterla is a researcher and doctoral student in the centre for comparative education systems at the Swiss Federal Institute of Technology (ETH) in Zurich. He has a master's degree in economics from the University of Zurich. His research interests are economics of education and labour economics, with a particular focus on the youth labour market situation. In his PhD thesis, he analyses the complementarities between vocational and professional education and other production inputs, particularly digitalization.

Imprint

Editor

© 2018 KOF Swiss Economic Institute, ETH Zurich

Authors

Dr. Ursula Renold, Dr. Thomas Bolli,
Maria Esther Oswald-Egg and Filippo Pusterla

KOF

ETH Zurich
KOF Swiss Economic Institute
LEE G 116
Leonhardstrasse 21
8092 Zurich, Switzerland

Phone +41 44 632 42 39
Fax +41 44 632 12 18
www.kof.ethz.ch
kof@kof.ethz.ch