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The Great Recession and the Working Conditions of Youth: A Descriptive Analysis of the European Labour Market

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Third Release of the KOF Youth Labour Market Index[†]

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Contents

1   Introduction

The objective of this report is twofold. First, it represents an accompanying user manual to the third release of the KOF Youth Labour Market Index (hereafter abbreviated KOF YLMI). Second, the report uses index-based tables and graphs to analyse the evolution of the working conditions that young people faced in Europe after the beginning of the Great Recession in 2008. The KOF YLMI — developed by the KOF research division Education Systems in 2014 — offers a multidimensional approach for the comparison of the youth labour market situation across countries and over time. Besides applying widely used indicators such as the youth unemployment rate, the KOF YLMI also considers the working conditions, the provided education, and the ease to entry into the labour market for youth in a specific country. The media attention and the political recognition received by the two previous releases encouraged us to maintain and improve the index and the associated web tool[1].

The main improvement to the third release of the KOF YLMI is the addition of new data from 2014 to the set of indicators composing the index. Due to larger datasets provided by our repositories[2] and ameliorations in the aggregation's procedures, we also increased the data coverage of years prior to 2014. Altogether this increased the data coverage by about 8%. The detailed descriptions of data sources and availability are reported in Section 2. This section also reviews the indicators' definitions and why they are included in the index.

From a methodological point of view, the only relevant modification is the shift of some upper bounds used to standardize the indicators' values. The dramatic evolution of some indicators has forced us to shift the bounds that are used to standardize values into scores. One prime example is the share of youth working involuntarily part-time, whose median value has more than doubled between 2008-2014. Without a modification to the upper bound, the values of all countries overtaking the original upper bound would be assigned the lowest possible score, and no further distinctions would be possible. The shift of the upper bounds is described in Section 3. These modifications to the bounds are not only applied to the data added from 2014, but retroactively applied to all values in the index from 1991-2013.

This report, besides keeping track of changes in data availability and calculation methods, aims to show the potential of the KOF YLMI in analysing the youth labour market situation. In this regard, Section 4 offers both a general overview of the index's evolution during the period 2008-2014, as well as case studies of selected countries. The attention here is mainly concentrated on the working conditions that youth face on the labour market. Working conditions, together with the indicators describing the activity state, are the components that were most strongly affected by the 2008 Great Recession. In particular, we highlight the heterogeneity that characterizes the working conditions in the countries impacted most by the crisis.

Section 5 concludes and briefly suggests future areas of work.

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[1] Free access on the interactive web application at `http://www.kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-youth-labour-market-index.html`

[2] Main data provider are the International Labour Organization (ILO), the Organisation for Economic Co-operation and Development (OECD) and Eurostat.

2   Indicators of the KOF Youth Labour Market Index

This section refreshes the definitions of each indicator in the index and describes their data sources. The indicators' calculation procedure has essentially remained the same as in the two previous versions, so besides mentioning the mathematical formula, we focus on describing the data sources used for the third release.

Table 1 summarises the main information about data source, time and geographical coverage. The main data repositories of the KOF YLMI are Eurostat, the OECD and the ILO. Beyond these, some values are provided by national statistical offices. The majority of the indicators starts in 1991. Some of them cover all of the considered countries, while a large part mainly describe European countries. Even though the index aims to describe the youth labour market situation around the world, accurate comparisons can mostly only be done between European countries, due to data availability. Detailed descriptions of data sources, time coverage, number of covered countries and extraction methods can be found in Table A in the Appendix.

Each sub-section is concerned with reviewing an indicator's definition and data source. Detailed explanations in regards to the indicators' selection criteria and the reason for a twelve-indicator system can be found in Renold et al. (2014).

Table 1: Summary of data availability

Indicator	Source	Time coverage	Max no. of countries
Unemployment Rate	ILO[a]	1991 - 2014	up to 178
Relaxed Unemployment Rate	Eurostat[b]	2005 - 2014	up to 33
NEET Rate	ILO & Eurostat	1998 - 2014	up to 110
Temporary Worker Rate	Eurostat	1992 - 2014	up to 33
Involuntary Part-Time Workers Rate	OECD[c] & SFSO[d]	1991 - 2014	up to 41
Atypical Working Hours Rate	Eurostat	1992 - 2014	up to 33
In Work at Risk of Poverty Rate	Eurostat	2003 - 2014	up tp 34
Vulnerable Employment Rate	ILO	1991 - 2014	up to 161
Formal Education and Training Rate	Eurostat & SFSO	1996 - 2014	up to 33
Skills Mismatch Rate	ILO & Eurostat	1992 - 2014	up to 59
Relative Unemployment Ratio	ILO	1991 - 2014	up to 178
Long-Term Unemployment Rate	ILO, OECD & Eurostat	1991 - 2014	up to 86

[a] International Labour Organisation
[b] Eurostat is the statistical office of the European Union
[c] Organisation for Economic Co-operation and Development
[d] Swiss Federal Statistical Office

2.1   Activity State

The *Activity State* category is composed of three indicators: *Unemployment Rate*, *Relaxed Unemployment Rate* and *NEET Rate*. These three indicators focus on different parts of the youth population, quantifying the participation of youth into the labour market. The *Unemployment Rate* concentrates on the unemployed in the narrow sense. The *Relaxed Unemployment Rate* enlarges this view by considering the so-called discouraged people. Finally, the *NEET Rate* focuses on youth that are inactive (i.e. neither employed nor unemployed) for reasons other than education.

2.1.1   Unemployment Rate

The *Unemployment Rate* is the most common indicator that describes the market's unused disposable labour supply in a given country. The advantages that lead to a wide use of this indicator in youth labour market evaluations are the simplicity of its definition and its large dissemination. The definition adopted in the KOF Youth Labour Market Index is the following:

$$\textbf{Unemployment Rate} = \frac{\text{Unemployed}}{\text{Labour force}} * 100$$

where the denominator is calculated as:

$$\textbf{Labour Force} = \text{Employed} + \text{Unemployed}$$

The data for this indicator cover all 178 countries considered in the index for the time period 1991-2014. The repository is the 9th edition of the Key Indicators of the Labour Market (KILM), a compilation of labour statistics provided by the ILO.

2.1.2   Relaxed Unemployment Rate

The youth unemployment rate does not always fully describe the real unused of labour supply. For example, people can be out of the labour force because they are not actively seeking work. There are also motivations for people to put off looking for a job, such as the ability to profit from unemployment benefits or because a young person just lacks motivation and gives up actively look for a job. The *Relaxed Unemployment Rate* accounts for these phenomena. Similarly to Elder (2009) and Puerto et al. (2011) it is calculated as follows:

$$\textbf{Relaxed Unemployment Rate} = \frac{Unemployed + Discouraged\ workers}{Labour\ force} * 100$$

Note that the data source of this indicator did not changed in respect to the previous releases. For the year 2014, the dataset provided by Eurostat contains values for 31 countries.

2.1.3   Rate of Young People Neither in Employment nor in Education and Training (NEET Rate)

The *NEET Rate* is the last indicator contained in the category *Activity State*. This indicator attempts to quantify the phenomenon of youth inactivity. In particular, it throws light on the share of youth that are neither part of the labour force — i.e. neither employed nor unemployed — nor are acquiring new skills through education or training. As the OECD (2010) points out, this indicator shows how much of the population can be potentially mobilised to get a job.

According to Elder (2015), there is no international definition of the *NEET Rate*. Both the ILO and Eurostat consider it to be *the percentage of the population of a given age group and sex*

who is not employed and not involved in further education or training. The definition adopted in the KOF YLMI (see formula below) is perfectly in line with the definition of Eurostat and the ILO.

$$\textbf{NEET Rate} = \frac{Youth\ Neither\ in\ Employment\ nor\ in\ Education\ and\ Training}{Young\ Population} * 100$$

Note that, differently than the two precedent indicators, the denominator here encompasses the whole young population and not just the labour force.

The repositories are, as in the case of the second release, both Eurostat and KILM-data provided by the ILO. In contrast to the previous edition, the 9th edition of the KILM also reports *NEET Rate* values for the years 2013 and 2014. This dataset represents the main source for our dataset. However, as already performed in the second release of the KOF YLMI, we additionally use Eurostat to extend the time series of many European countries back to the year 2000. Comparability is assured by the use of the same definitions. The combination of these two datasets allow us to cover up to 106 countries for a total of 693 point observations.

2.2   Working Conditions

Through the *Activity State* category, the KOF YLMI attempts to quantify the share of unemployed or inactive people. With *Working Conditions*, we now focus on the portion of youth that are employed and in particular on the conditions that these people find on the labour market. This category is composed of five indicators. Please refer to Renold et al. (2014) for accurate explanations about the selection criteria of the indicators and the possible methodological limitations.

2.2.1   Temporary Worker Rate

The first working condition we look at is the duration of the contracts. This is addressed by the indicator *Temporary Worker Rate*, which relates the share of youth with a temporary contract to the total youth employed. In order to not penalise working relations such as apprenticeships, which usually have a temporary duration of at least two years, we restrict our attention to short-term temporary contracts. The *Temporary Worker Rate* is calculated by dividing the share of employees who have contracts shorter than 18 months by the total number of employees:

$$\textbf{Temporary Worker Rate} = \frac{Employees\ with\ a\ contract\ < 18\ months}{Total\ number\ of\ employees} * 100$$

As in the two previous releases of the index, the data source of this indicator is Eurostat. Thanks to an optimisation in the data aggregation procedure, the dataset now covers 33 countries for the time period 1992-2014. This is one more country than in the second release, when observations only started in 1995.

2.2.2   Involuntary Part-Time Workers Rate

Beside the duration of the contract, the number of hours worked is also a relevant dimension in describing the working conditions. People — in particular youth — can face problems in finding full-time employment. It must be said, nonetheless, that having a part-time job should not be *per se* considered negatively. As pointed out by Sandor (2011), part-time jobs allow for higher participation — of women, in particular — in the labour force, enable employers to better adjust their resources to the cyclical evolution of the market and, from the perspective of the employees, can be a measure to achieve an optimal work-life balance. When the condition of working part-time is not a choice but reflects an undesired situation, it takes on a negative connotation. The KOF YLMI only takes into consideration the situation of involuntary part-time, and defines the *Involuntary Part-Time Workers Rate* in the following way:

$$\textbf{Involuntary Part-Time Workers Rate} = \frac{Involuntary\ part\ time\ employment}{Total\ employment} * 100$$

OECD is the data source of this indicator. As already discussed in the second release of the KOF YLMI (see Pusterla, 2015), in 2015 the OECD retroactively revised the definition of involuntary part-time by shifting from a fixed threshold of 35 hours per week to the national definitions of part-time. Finally, the Swiss Federal Statistical Office provides compatible values to the one of the OECD for 2014. The inclusion of Swiss data is in line with the second release. Data availability for 2014 is assured for in a total of 40 countries, the same amount as in 2013.

2.2.3   Atypical Working Hours Rate

This indicator quantifies the extent to which youth are exposed to atypical work schedules. Eurostat (2009) considers "atypical" work as in the evening, at night, shift, on Saturday or on Sunday. As explained in Renold et al. (2014), the KOF YLMI restricts the attention to people working shift, at night or on Sunday. The *Atypical Working Hours Rate* represents the average of these three conditions. It can be calculated in the following way:

$$\textbf{A.W.H. Rate} = \left(\frac{Working\ on\ Sunday}{Tot.\ employees} + \frac{Working\ at\ night}{Tot.\ employees} + \frac{Working\ shift}{Tot.\ employees} \right) * \frac{1}{3} * 100$$

The repositories for this indicator are the four different tables provided by Eurostat[3]. In contrast to the second release, the dataset is enlarged by 33 values for 2014.

2.2.4   In Work at Risk of Poverty Rate

The fourth component describing the *Working Conditions* considers how many people have a job that does not ensure them a decent quality of life. A variety of definitions exist which

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[3]See Table A in the Appendix for details.

provide different descriptions and quantifications of quality of life. In the KOF YLMI, we use the Eurostat (2013a) definition of workers who are "in-work-at-risk-of-poverty" to signify those who do not have jobs ensuring them decent quality of life. "In-work-at-risk-of-poverty" refers to all persons earning less than 60% of the national median equalised disposable income. The indicator *In Work at Risk of Poverty Rate* can be calculated as:

$$\textbf{In Work at Risk of Poverty Rate} = \frac{In\ work\ at\ risk\ of\ poverty\ employees}{Total\ number\ of\ employees} * 100$$

We continue to use Eurostat as data source in the third release of the KOF YLMI. Eurostat integrated the time series for youth — table *yth_incl_130*, which was the source in the two precedent releases — into the table for adult — *ilc_iw01*. The detailed description of this table can be found in the Appendix. The methodological procedure behind this indicator remains however unaffected[4].

This dataset contains values for 33 countries in 2014. Furthermore, the time series were extended until year 2003 in the case of some countries. Values previously started in 2004.

2.2.5 Vulnerable Employment Rate

The *Vulnerable Employment Rate* is the last indicator used to describe *Working Conditions*. This indicator attempts to quantify the share of young workers that are less protected by labour agreements and as a result more exposed to the risks of economic cycles. According to Elder (2009), vulnerable employment represents own-account workers and those contributing to a family business. The rate can be calculated by considering the share of workers in either of these two states out of total employment. More formally, the *Vulnerable Employment Rate* included in the KOF YLMI is calculated as:

$$\textbf{Vulnerable Employment Rate} = \frac{Own\ account\ workers\ +\ Unpaid\ family\ workers}{Total\ employment} * 100$$

The data source for this indicator is the 9th Edition of the KILM provided by the ILO. For 2014, the dataset contain values for 37 countries.

2.3 Education

After having quantified unemployment and inactivity in the dimension *Activity State*, and after having described the conditions that young workers face, we now focus on the share of youth involved in the education process. The third category of the KOF YLMI is *Education*. This category contains two indicators, namely *Formal Education and Training Rate* and *Skills Mismatch Rate*. The former describes the involvement of youth in the acquisition of further education

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[4]Table *yth_incl_130* was already before a subset of table *ilc_iw01*.

or training, while the latter estimates the extent to which the skills acquired through formal education and training are in demand on the labour market.

2.3.1   Formal Education and Training Rate

Education offers to youth the possibility to increase their knowledge and skills, which improve the chances of finding a good job. The literature often distinguishes between three types of education: formal, non-formal and informal education. According to Eurostat (2013b), formal education is provided by formal institutions, such as schools, colleges and universities, while non-formal education may not take place in formal institutions but still represent educational content, e.g. general culture, life skills, or adult literacy. Lastly, informal education corresponds to self-learning activities. Since non-formal education differs greatly across countries and because informal education does not comply with any defined standards, the KOF YLMI restricts its attention to only formal education. In addition to the youth involved in formal education, we also take into consideration those in training programs. This is attributed to the clear structure offered by this educational path.

The rate of people in formal education and training is calculated as follows:

$$\textbf{Formal Education and Training Rate} = \frac{Youth\ in\ formal\ edu.\ or\ training}{Young\ Population} * 100$$

Repository of this indicator is once more Eurostat. In the KOF YLMI third release, the values of 33 countries for the year 2014 are added to the time series starting in 2004. Since 2015, Eurostat stopped publishing the data from 2003, arguing that the picture for all EU countries is only available from 2004 on. The values of 2003 are still obtainable upon direct request. Lastly, note that some national statistics offices started differentiating between formal and non-formal education before 2003, but these values are not reported by Eurostat. This is the case for Switzerland, for which we are able to include data since 1996. All these additions have the purpose of extending data availability as much as possible.

2.3.2   Skills Mismatch Rate

The indicator *Skills Mismatch Rate* aims to capture the discrepancies between the skills provided by the labour force and the ones demanded by the economy. However, skill mismatch is a multidimensional concept and a direct measurement of these imbalances does not exist. A valuable proxy is an index of dissimilarity, like the one developed by the ILO (2013). This measure uses the idea that the mismatch is low when the share of unemployed with a given education level corresponds to the share of employed with the same education level among the working population. *Skills Mismatch Rate* can be calculated according to the following formula:

$$\textbf{Skills Mismatch Rate} = \frac{1}{2} * \sum_{k=1}^{3} \left| \left(\frac{Employed\ with\ edu.\ k}{Total\ employment} - \frac{Unemployed\ with\ edu.\ k}{Total\ unemployment} \right) \right|$$

where k is the ISCED level of education (primary or less; secondary; tertiary).

In this release we would like to draw attention to some drawbacks of this measurement. First, this indicator relies on the subdivision of education profiles according to the ISCED classification. However, the comparability of this classification across countries is not always accurate. Second, the index of dissimilarity is a crude measure of the concept of mismatch. The optimal way to measure skills mismatch should be assessing mismatch directly, i.e. by asking employees regarding the use of their skills at the workplace. Data availability unfortunately restricts us to using the above measurement.

The data source for the *Skills Mismatch Rate* in the previous two releases of the index was the ILO. However, in the 9th release of the KILM, the ILO do not provide data for skills mismatch any more. The ILO will include this indicator in the *youthSTAT* collection in the future. Since these data have not been published yet, we follow the strategy adopted in the second release of the KOF YLMI (see Pusterla, 2015) and self-calculate the *Skills Mismatch Rate* according to Eurostat data. Through this procedure we are able to add values for 33 countries in 2014.

2.4   Transition Smoothness

Transition Smoothness is the last dimension of the KOF YLMI. This category characterizes the difficulties of youth in the transition path from education to the labour market. This dimension, that partially relate to the *Activity State* category, emphasize the dynamic component of the transition process. The indicators *Relative Unemployment Ratio* and *Long-Term Unemployment Rate* compose to this category.

2.4.1   Relative Unemployment Ratio

Relative Unemployment Ratio relates the unemployment rate of youth with that of adults. This indicator shows whether or not unemployment spells are more specific to young people. The ratio is calculated in the following way:

$$\textbf{Relative Unemployment Ratio} = \frac{Young\ unemployment\ rate\ (age\ 15\ to\ 24)}{Adult\ unemployment\ rate\ (age\ 25\ and\ older)}$$

A high value resulting from this indicator suggests a relatively low ability of youth to transition. In contrast, a value close to 1 would imply that the situation for youth is not worse than that for adults. Hypothetically, this value could even be smaller than 1, suggesting a lower unemployment rate for youth than adults. However, this has not yet been observed in reality.

The ILO collects data for this indicator from almost all countries around the word. The third release of the KOF YLMI relies on the 9th edition of the KILM. This dataset provides values for all 178 countries considered for the time period 1991-2014.

2.4.2   Incidence of Long-Term Unemployment Rate

The last indicator that composes the KOF YLMI is the *Incidence of Long-Term Unemployment Rate.* This measure relates the number of youth that are unemployed for more than one year to the total number of unemployed youth. The *Incidence of Long-Term Unemployment Rate* is in the category *Transition Smoothness* since it describes whether unemployment is a short-term phenomenon or rather the consequence of an unfavourable match between labour supply and demand. The rate can by calculated as follows:

$$\textbf{Incidence of Long-Term Unemployment} = \frac{Unemployed\ longer\ than\ one\ year}{Total\ unemployment} * 100$$

In the second release of the index, the absence of 2013 values in the KILM pushed us to look directly at Eurostat and the OECD for comparable values. Meanwhile, the ILO has proposed a new version of the KILM, which includes values for the *Long-Term Unemployment Rate* till 2014. As with the second release, the historical values contained in the KILM yield an almost identical picture to the values from Eurostat and the OECD. Therefore, we decide to keep all three data sources (the ILO, the OECD and Eurostat) for the third release of the KOF YLMI. This strategy, besides being consistent with the second release, further allows for an increase in the number of countries covered from 53 to 86. Data comparability with past values is still guaranteed.

3 Calculation Method: Revision of the Upper Bounds

After having refreshed the definitions of the indicators and revised the data availability, this section turns to the calculation methods. As explained in Renold et al. (2014), there are essentially two steps that lead to the calculation of the index. The first step consists of standardising the indicators' values into scores. This stage requires the definition of upper and lower bounds. Once the standardised scores are determined, the second step consists of aggregating the twelve indicators into a single value. This is performed on the basis of theoretically pre-defined weights. The second step, in particular the assessment of the validity of the pre-defined weights, is planned for the near future[5]. The first step, i.e. checking the defined lower and upper bounds, has to be conducted after each index update, once new data are available. Recall that the reason for having fixed bounds is to ensure comparability over time and to allow us, in case of graphical representation of the KOF YLMI, to better visualize the differences across countries. Indeed, fixed bounds enable the distribution of values of each indicator to range from one to seven. Equation 1 recalls the formula adopted for the standardisation of the scores for the indicators contained in the index:

$$score_{nit} = 6 * \left(\frac{\text{indicator}_{nit} - \text{fixed min}_n}{\text{fixed max}_n - \text{fixed min}_n} \right) + 1 \tag{1}$$

where n indicates the indicator number, i the chosen country and t the specified year.

The only exception in this regard is the indicator *Formal Education and Training Rate.* Since high values are preferable, it is calculated according to the following formula:

$$score_{nit} = -6 * \left(\frac{\text{indicator}_{nit} - \text{fixed min}_n}{\text{fixed max}_n - \text{fixed min}_n} \right) + 7 \tag{2}$$

As written above, the inclusion of new data — either by extending time series or by the enlarging the set of countries — can generate situations in which the initially defined bounds are no longer adequate. This circumstance was already mention in the first release of the KOF YLMI[6]. From a practical point of view, values outside the bounds generate two possible problems. First, the presence of values above a certain upper bound would indicate a score of 1 for the corresponding countries[7]. The distinction between which situations are worse will therefore be impossible. In contrast, values below the lower bound would receive a score of 7[8] and again, no distinctions between best performers will be possible. Second, if a lower bound or a upper bound is far away from the lowest or highest value, respectively, then this would imply that part of the score-distribution is not used. For instance, an upward shift of the lower bound

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[5]The KOF research division Education System aims to investigate this aspect through a factor analysis.

[6]See subsection 4.2.1 in Renold et al. (2014).

[7]With the only exception being *Formal Education and Training Rate.* For this indicator countries with values above the upper bound of 80% receive the score of 7.

[8]The exception is *Formal Education and Training Rate*, which would receive a value of 1.

will allow for better differentiation between countries having extremely high values. The larger the distance between the lowest and highest observations and their respective corresponding bounds is, the higher the motivation for a shift of bounds.

During the second release of the KOF YLMI we decided to leave the bounds unchanged even though a few values surpassed the bounds. For the third release, the inclusion of the 2014 values imposes us to adjust the bounds of some indicators. A prime example in this regard is the increasing deterioration of the *Involuntary Part-Time Worker Rate*. Figure 1 shows the evolution of the distribution over time. The horizontal red line indicates the upper bound that, until the second release, was fixed at 15%. The box-plot indicates the distribution of values for the countries which have data availability for each year. By looking at this graph, one can easily observe that for the time period 1991 to 2006 almost all values are below the upper bound. Since 2007, the values of a few countries start to clearly overtake the threshold of 15%, while the median values actually decrease. Finally, starting in 2009, we can observe a constant increase of both the median value and the number of countries having a share of involuntary part-time employees larger than 15%. The overtaking of the upper bound, without intervention, would imply that many countries would receive a score of 1 for this indicator. This would be the case for both a country reporting a rate of 16% and for a country with a value of 24% (an incidence rate one-and-a-half time larger). In this case, shifting the upper bound from 15% to 30% is the appropriate solution.
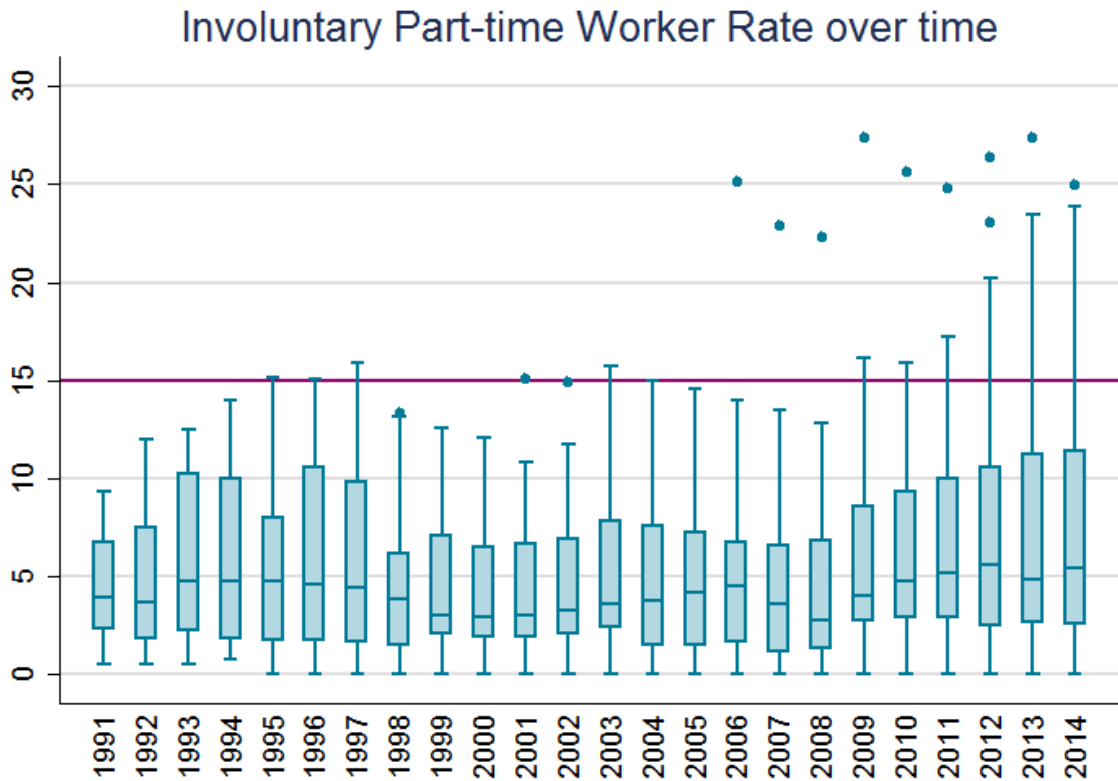

Figure 1: Evolution of the distribution of the Involuntary Part-Time Worker Rate

Categories and indicators	Lower Bounds	Upper Bounds	
		1st & 2nd release	3rd release
Activity State			
Unemployment Rate	0	70	70
Relaxed Unemployment Rate	0	70	**85**
NEET Rate	0	40	40
Working Conditions			
Temporary Worker Rate	0	60	60
Involuntary Part-Time Worker Rate	0	15	**30**
Atypical Working Hours Rate	0	30	**35**
In Work at Risk of Poverty Rate	0	30	**35**
Vulnerable Employment Rate	0	40	40
Education			
Formal Education and Training Rate	30	80	80
Skills Mismatch Rate	0	40	40
Transition Smoothness			
Relative Unemployment Ratio	0	10	10
Incidence of Long-Term Unemployment Rate	0	60	**70**

Table 2: Review and modifications (in bold) of lower and upper bounds used in the KOF YLMI

As with the *Involuntary Part-Time Worker Rate* other indicators show evidence of overrunning their upper bound thresholds. Table 2 reports the lower and upper bounds of the twelve indicators and the modifications to the upper bounds of five indicators in the third release. For example, the upper bound of the *Relaxed Unemployment Rate* increases from 70 to 85%. As already mentioned, the upper bound of *Involuntary Part-Time Worker Rate* moves from 15 to 30% while the upper bounds of both *Atypical Working Hours Rate* and *In Work at Risk of Poverty Rate* shift from 30 to 35%. Finally, the upper bound of the *Incidence of Long-term Unemployment Rate* increases from 60 to 70%. Note that all these modifications apply to the whole time period considered in the KOF YLMI and not only for the values recently added.

The advantage of the modifications is to better adjust the distribution of scores between 1 and 7. However, the figures based on this third release are no longer fully comparable with the figures in previous versions. Even though the patterns described in the figure are the same, the distribution of the scores on the scale ranging from 1 to 7 might be deformed. Since the new upper bounds apply for the whole time period, we would like to make users of the web-application[9] aware that the comparison of graphs exported from previous releases may not coincide with the one currently available. In our opinion, however, the advantages of shifting the upper bounds exceed this inconvenience.

Finally, note that three out of the five modifications made to upper bounds regard indicators in the category *Working Conditions*. These modifications are the consequence of the increase in extreme values registered for these indicators in the last years. The alarming evolution of the *Working Conditions'* indicators during the last years, together with a more general analysis of the trends between 2008 and 2014, are the focus of the next section.

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[9]Available at `http://www.kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-youth-labour-market-index.html`

4 How did the Great Recession Affect the Working Conditions of Youth?

The previous section put the attention on the index calculation methods, and in particular on fixing the upper bounds. With the third release of the KOF YLMI five upper bounds are shifted, essentially due to overcoming reason. Of these five upper bounds, three belong to the category *Working Conditions*, namely *Involuntary Part-time Worker Rate*, *Atypical Working Hours Rate*, and *In Work at Risk of Poverty Rate*. The other two belong to the categories *Activity State* respectively *Transition Smoothness*. The fact that three indicators concern the *Working Conditions* is noteworthy. During the last few years — in particular since the beginning of the Great Recession in 2008 — we have seen a dramatic increase of youth unemployment rates in many European countries. Other indicators, such as the *NEET Rate* or the *Long-Term Unemployment Rate*, provide further evidence of the unfavourable situation. The necessity of shifting the upper bounds of the three indicators previously mentioned stresses the need to look at the *Working Conditions* and their evolution over time.

This section starts with a general overview of the evolution of the KOF YLMI and its categories over the last few years. Afterwards, we provide a more detailed analysis of certain countries with particular attention on the *Working Conditions*.

4.1 General Overview

Table 3 reports the evolution of the KOF YLMI over the period 2008-2014 for all countries in the index that have values for at least nine indicators. In addition to the aggregate index values, this table also provides information about the scores of the four categories and their evolution over the considered time period.

Our intuition about the worsening of the *Working Conditions* is confirmed by the last row in Table 3. Indeed, the average scores suggest that the larger deterioration occurred in the categories *Activity State*, of which the average score fall from 5.48 in 2008 to 4.91 in 2014, and in the *Working Conditions*, which decreased from 5.22 to 4.84. The average score in the category *Transition Smoothness* decreased to a lesser extent: from 5.12 to 4.91. Finally, the category *Education* increased over the period 2008-2014, moving from the average score of 4.34 to 4.59.

A closer look at the evolution of the four categories at the country-level reveals further differences. In the *Transition Smoothness* category, the countries achieving high values in 2008 maintain an almost stable evolution until 2014. In contrast, countries that already have low values at the beginning of the considered time period show even less smooth transitions by 2014. The patterns for *Education* are more difficult to disentangle. The average increase in this category is driven by many countries exhibiting substantial increases, both at the upper at the lower end of the distribution. However, the amelioration in *Education* is not observable in all countries. Some countries, in particular Lithuania and Luxembourg, experiencing massive declines. These opposing trends in *Education* are noteworthy.

By looking at the category *Activity State*, it becomes clear that not only in average wors-

Country	KOF YLM Index			Change		Activity State			Working Conditions			Education			Transition Smoothness		
	2014	2008	Rank			2014	2008	Direction*	2014	2008	Direction*	2014	2008	Direction*	2014	2008	Direction*
Denmark	5.74	5.68	1	▲	2	5.89	6.25	↘	5.45	5.65	→	5.67	4.89	↑	5.96	5.93	→
Switzerland	5.70	5.72	2	▼	1	6.03	6.20	→	5.76	5.62	→	5.55	5.48	→	5.47	5.60	→
Austria	5.51	5.30	3	▲	9	5.94	6.05	→	5.73	5.77	→	4.58	3.74	↑	5.79	5.63	→
Germany	5.47	5.35	4	▲	5	6.22	5.96	→	5.51	5.49	→	4.61	4.62	→	5.55	5.34	→
Netherlands	5.44	5.64†	5	▼	1	5.91	6.40	↘	5.16	5.68	↘	5.02	4.63	↗	5.68	5.84	→
Norway	5.41	5.13	6	▲	8	6.12	6.24	→	5.29	5.01	↗	4.32	3.64	↑	5.89	5.63	→
Iceland	5.31	5.35†	7	▲	3	6.00	6.27	→	4.81	5.00	→	4.51	4.50	→	5.92	5.62	↗
Estonia	5.24	5.45	8	▼	2	5.37	5.75	↘	5.50	6.07	↘	5.12	4.78	↗	4.98	5.18	→
Lithuania	5.15†	5.70†	9	▼	7	5.44	5.75	↘	5.74	6.11	↘	4.00	5.20	↓	5.40	5.75	↘
Latvia	5.14	5.31	10	▲	1	5.17	5.48	↘	5.68	5.90	→	4.35	4.01	↗	5.34	5.83	↘
Finland	5.09	5.12	11	▲	4	5.15	5.58	↘	4.51	4.63	→	4.77	4.35	↗	5.92	5.90	→
Czech Republic	5.06	4.99	12	▲	7	5.72	6.13	↘	5.18	5.50	↘	4.50	3.42	↑↑	4.84	4.90	→
Slovenia	5.02	5.41	13	▼	6	5.22	6.00	↘	4.14	4.57	↘	6.07	5.83	→	4.67	5.26	↘
Poland	4.93	5.36	14	▼	6	4.99	5.50	↘	4.45	4.67	→	5.25	5.94	↘	5.04	5.32	↘
Luxembourg	4.90	5.18†	15	▼	2	4.96	5.78	↘	5.25	5.43	→	3.90	4.78	↓	5.50	4.75	↑
France	4.86	5.05	16	▲	1	5.06	5.45	↘	4.90	5.04	→	4.56	4.62	→	4.93	5.10	→
Hungary	4.81	4.96	17	▲	3	5.07	5.24	→	5.49	5.64	→	4.10	4.23	→	4.60	4.75	→
United Kingdom	4.79	4.95††	18	▲	3	5.42	5.52	→	5.10	5.85	↘	3.92	3.31	↑	4.73	5.14	↘
Belgium	4.75	4.92	19	▲	3	5.07	5.51	↘	5.32	5.39	→	4.07	3.86	↗	4.54	4.93	↘
Turkey	4.74†	4.41†	20	▲	12	4.60	3.94	↑	4.66	4.78	→	4.03	3.63	↗	5.66	5.30	↗
Malta	4.65	4.82	21	▲	3	5.82	5.94	→	5.42	5.90	↘	2.37	2.40	→	4.98	5.06	→
Cyprus	4.58	5.50†	22	▼	17	3.99	6.00	↓↓	4.66	5.67	↓	4.79	4.80	→	4.88	5.53	↘
Ireland	4.57	5.03	23	▼	5	4.93	5.52	↘	4.77	5.73	↓	4.01	3.44	↑	4.58	5.41	↓
Portugal	4.52	5.07	24	▼	8	4.18	5.56	↓	4.31	4.73	↘	5.03	4.84	→	4.57	5.17	↘
Sweden	4.50	4.46	25	▲	5	5.18	5.34	→	3.68	3.86	→	3.47	3.24	↗	5.66	5.40	→
Romania	4.49	4.42	26	▲	5	4.58	5.25	↘	3.78	4.22	↘	5.50	4.34	↑↑	4.09	3.88	↗
Bulgaria	4.48	4.65	27	▲	2	4.32	5.12	↓	5.46	5.70	→	3.98	3.22	↑	4.16	4.55	↘
Slovakia	4.45	4.67	28	=	0	4.74	5.38	↘	4.67	5.30	↘	4.47	3.77	↑	3.91	4.24	↘
Croatia	4.10	4.75†	29	▼	4	3.13	4.93	↓↓	4.72	4.88	→	4.66	5.04	↘	3.91	4.13	↘
Greece	3.96	4.91	30	▼	7	3.20	5.23	↓↓	3.64	4.62	↓	5.23	5.35	→	3.76	4.45	↓
Macedonia	3.95†	3.67††	31	▲	2	2.83	2.27	↑	4.21	4.52	↘	5.22	4.34	↑	3.52	3.54	→
Spain	3.80	4.68	32	▼	5	3.05	4.86	↓↓	3.19	4.47	↓↓	4.45	3.61	↑	4.48	5.77	↓
Italy	3.79	4.70	33	▼	7	2.86	4.36	↓↓	3.72	4.78	↓	5.37	5.43	→	3.22	4.26	↓
Average	4.82	5.04				4.91	5.48	↘	4.84	5.22	↘	4.59	4.34	↗	4.91	5.12	→

† Only 11 indicators out of 12 available.
†† Only 10 indicators out of 12 available.
* The directions describe the changes in the categories' score in 2014 relative to 2008. The key of lecture is the following: ↑↑ score changes > +25%; ↑ score changes by +15% to +25%; ↗ score changes by > +5% to +15%; → score remains stable between +5% and −5%; ↘ score changes by > −5% to −15%; ↓ score changes by > −15% to −25%; ↓↓ score changes > −25%.

Table 3: Evolution of the KOF YLMI between 2008 and 2014

ened, but also the individual situations in almost all countries. Even countries with a high index score show a slight decrease in this dimension. Similar patterns are observable in the *Working Conditions* trends. The vast majority of countries exhibit a worsening of the *Working Conditions*. The only exceptions in this regard are Norway, which shows a significant increase, and Switzerland. Beside these two countries, very few other countries show an almost constant evolution in this dimension. Countries such as Cyprus, Ireland, Greece, Spain, and Italy exhibit marked decreases in their working conditions. This needs to be analysed accurately in order to understand the causes of these trends.

The adverse evolution over time of the *Working Conditions*' indicators for the countries previously mentioned is the focus of the next subsection. We further focus on Norway and Switzerland, the only two countries that were able to markedly improve the *Working Conditions* between 2008 and 2014[10]. Finally, we conclude by looking at the evolution of the KOF YLMI in Sweden and Portugal. These two countries, albeit presenting very similar index scores in 2014, show different trends and different structures of their youth labour markets. This last example highlights the relevance of the multidimensional approach offered by the KOF YLMI.

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[10]The score of Switzerland increased from 5.62 to 5.76, while the one for Norway by more than 5%, from 5.01 to 5.29.

4.2   Where does the Great Recession most Affect the Working Conditions?

Figure 2 presents the evolution of the indicators constituting the *Working Conditions* for Cyprus, Greece, Ireland, Italy and Spain between 2004 and 2014. This figure also reports the evolution of the EU28 for benchmarking reasons. The vertical dashed line represents the start of the Great Recession in September 2008.
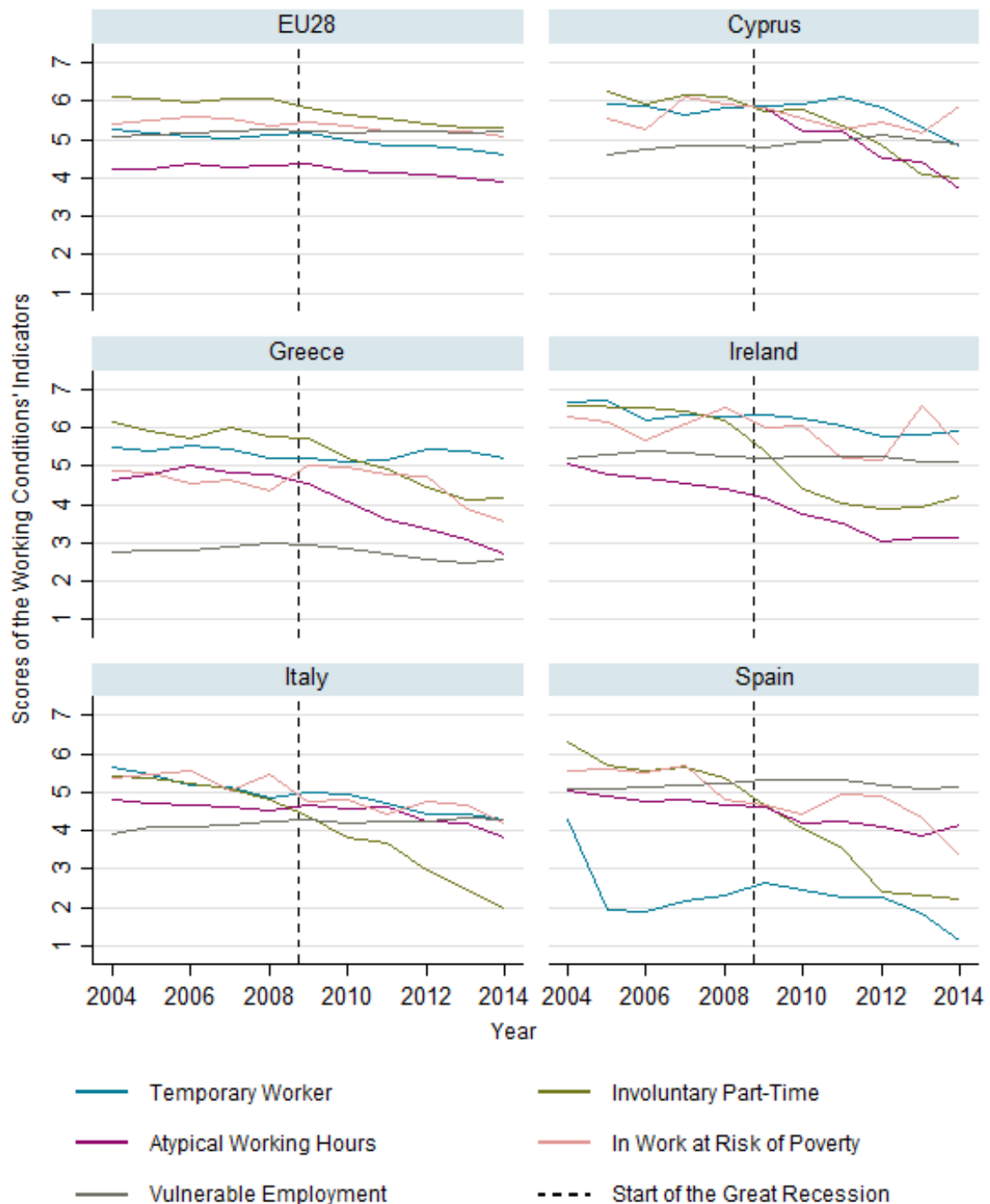

Figure 2: Evolution of the Working Conditions in Cyprus, Greece, Ireland, Italy, Spain, and in the EU28

By examining the first graph, which illustrates the EU28 values, one can easily observe that the decline starting in year 2008 was mainly driven by the indicators *Temporary Worker Rate*, *Involuntary Part-time Worker Rate*, and *Atypical Working Hours Rate*. The indicators *In Work at Risk of Poverty Rate* and *Vulnerable Employment Rate* show on the contrary a constant evolution.

As observable in Table 3, Cyprus' score regarding the *Working Conditions* decreased from 5.67 in 2008 to 4.66 in 2014. By looking at the graph for Cyprus, one can easily observe that the Great Recession had a particularly negative impact on both the *Involuntary Part-time Worker Rate* and the *Atypical Working Hours Rate*. The indicator *Vulnerable Employment Rate* does not seem to be particularly concerned. Finally, the indicators *Temporary Worker Rate* and *In Work at Risk of Poverty Rate* show opposite trends. The former increases until 2011 and then sharply declines, while the latter declines before showing signs of recovery.

As reported in Table 3, the score of the *Working Conditions* in Greece drop by about one point, from 4.62 in 2008 to 3.64 in 2014. Negative trends are particularly pronounced in respect of the *Involuntary Part-time Worker Rate* and the *Atypical Working Hours Rate*. The *Temporary Worker Rate* does not exhibit alarming trends for Greece, while the *In Work at Risk of Poverty Rate* provides evidence of a deterioration only after 2012. Finally, the low value of the *Vulnerable Employment Rate*, although a relative constant evolution over time, suggests that young Greeks are relatively less protected by labour agreements compared to other countries.

In Ireland the *Working Conditions* decreased as well by about one point over the period 2008-2014. In this country, the indicator *Atypical Working Hours Rate* shows the weakest evolution. Beside this, the graph about Ireland shows indications of a tremendous deterioration of the *Involuntary Part-Time Worker Rate* starting in 2008. The evolutions of the indicators *Temporary Worker Rate* and *Vulnerable Employment Rate* are relatively constant, while the trend *In Work at Risk of Poverty Rate* is more difficult to be interpreted since it exhibits an oscillating pattern.

The *Working Conditions* in Italy deteriorate between 2008 and 2014 even more strongly than in Cyprus, Greece, and Ireland. The score of this category plunged from 4.78 to 3.72. At a first glance, the evolution of the indicator *Involuntary Part-Time Worker Rate* is the most impressive. The declining trend starts already in 2005 and is likely strengthened by the Great Recession. The situation described by this indicator in 2014 is alarming and suggests a large opportunity for intervention. The evolutions of the other indicators, albeit having relatively low scores, do not appear as grave as the *Involuntary Part-Time Worker Rate*.

Spain is the country in which the *Working Conditions* degraded the most over the period 2008-2014. As reported by Table 3, the score of this category decreased by more than 25%, from 4.47 to 3.19. Temporary contracts represent the most critical aspect in Spain. The indicator *Temporary Worker Rate*, although showing an already bad situation before the start of the Great Recession[11], suggests a persistent and disastrous situation. The *Involuntary Part-Time Worker Rate* is also particularly worrisome for Spain. The evolution of this indicator is very similar to that in Italy. Nevertheless, Spain shows signs of a stabilization in the *Involuntary Part-Time Worker Rate* score starting in 2012. In contrast, the indicators *Atypical Working Hours Rate*

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[11]Please note that the jump between 2004 and 2005 reported in Figure 2 is due to a break in time series.

and *Temporary Worker Rate* demonstrate negative trends since 2012.

Altogether, the countries described above highlight high levels of heterogeneity in their *Working Conditions*. Even though all five countries has been significantly hit by the crisis, the way in which they were affected differs. Further analyses should try to explain the causes for these country-specific trends.

## 4.3   Norway and Switzerland: Two Exceptions of Improved Working Conditions

Norway and Switzerland are, among all countries listed in Table 3, the only ones able to substantially increase the score of the category *Working Conditions* over the period 2008-2014. The *Working Conditions* in Norway increased by more than 5%, from 5.01 in 2008 to 5.29 in 2014, while Switzerland reports a more moderate increase, from 5.62 to 5.76. Figure 3 presents the detailed evolution of all indicators contained in the KOF YLMI for these two countries.

Starting with the category *Activity State*, one can observe a strong and stable situation represented by the three corresponding indicators for both countries. Regarding the *Working Conditions* the major changes over time are observable in respect to the indicator *In Work at Risk of Poverty Rate*. Both countries were capable of continuously improving their situation. Nonetheless, Switzerland shows a better absolute value than Norway. The higher score suggests that the share of Swiss youth having a job that does not pay enough to ensure a decent life is relatively low. With regard to the *Atypical Working Hours Rate*, both countries again show stable values, with Switzerland demonstrating a markedly high score. In contrast, Norway exhibits a better condition in the *Vulnerable Employment Rate*. In respect to the *Involuntary Part-Time Worker Rate*, both countries have improved their positions over the considered time period and achieved extremely high values in 2014. Lastly, Norway ameliorates in the area of temporary contracts, while Switzerland slightly worsened its position. However, these last two indicators show, in comparison with other countries, extraordinary high scores.

The largest differences between Norway and Switzerland are observable in the categories *Education* and *Transition Smoothness*. Switzerland, compared to Norway, achieves a clearly higher score in *Formal Education and Training Rate* and *Skills Mismatch Rate*. However, Norway shows encouraging positive developments in both indicators. Finally, regarding *Transition Smoothness*, it is worth noting that Switzerland offers a more balanced picture than Norway. The *Relative Unemployment Ratio* score is higher for Switzerland (although Norway shows heartening amelioration), while Norway indicates an outstanding position in the *Incidence of Long-Term Unemployment Rate*.

Summing up, the picture presented by Figure 3 stresses the strong positions of Switzerland and Norway in respect of the youth labour market situation. The evolution of certain indicators listed above — in particular *Atypical Working Hours Rate* in Norway and the *Incidence of Long-Term Unemployment Rate* in Switzerland — can offer input for specific policies in these two countries. Indeed, albeit generally good positions, both countries have room for improvements.
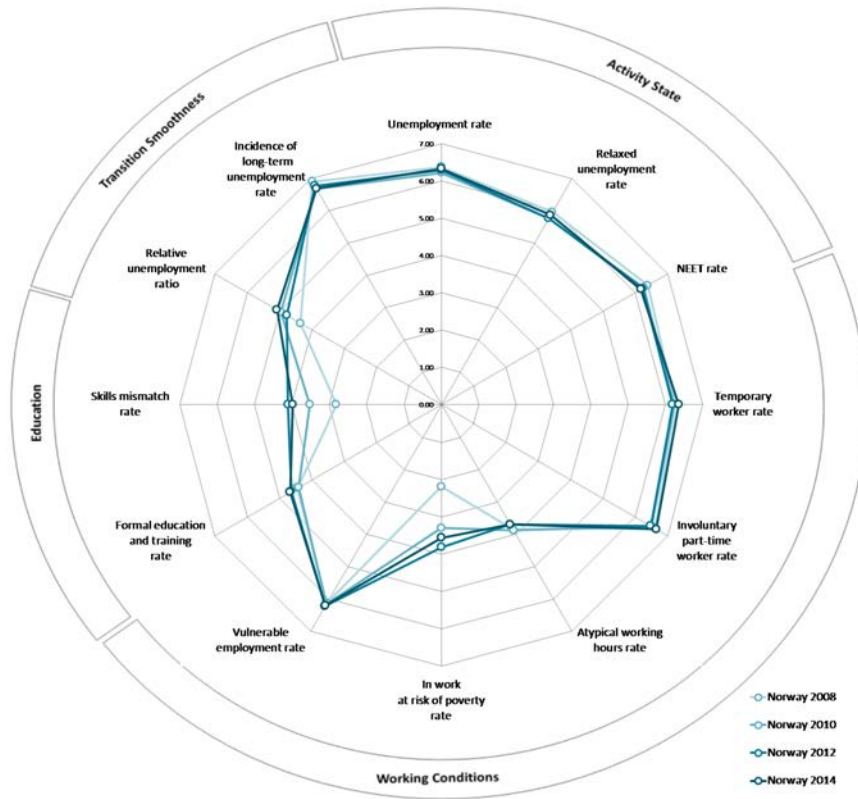
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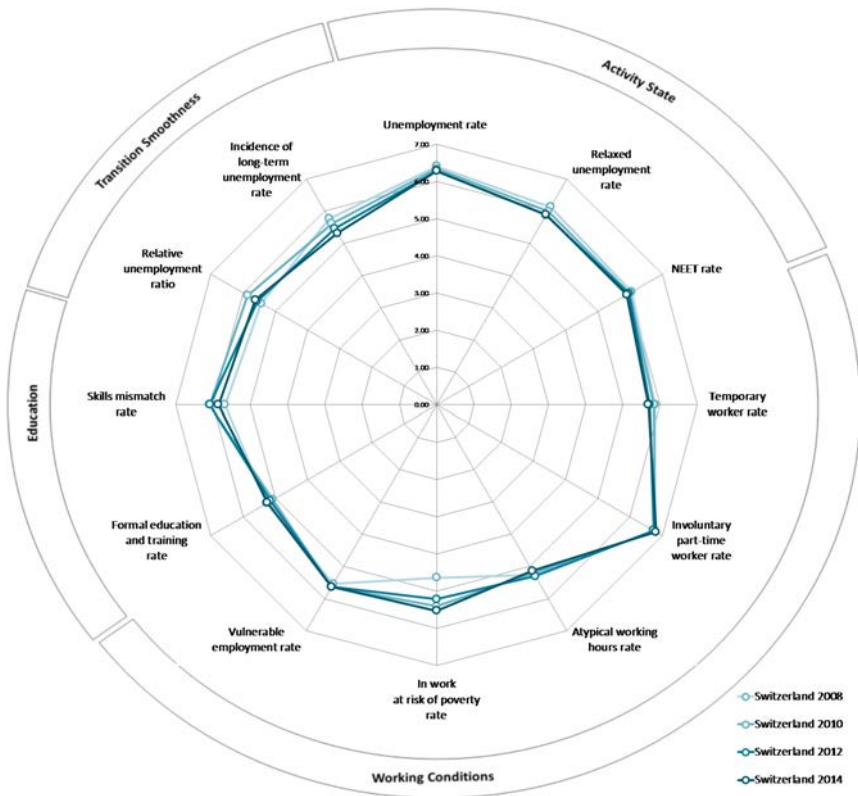
(b)

Figure 3: Spiderwebs of Norway (a) and Switzerland (b) in 2008, 2010, 2012 and 2014

4.4   Sweden and Portugal: Large Imbalances Persist

Sweden and Portugal both achieve very similar index values in 2014, see the first column of
Table 3. However, their values in 2008 differed more. Sweden achieved an index value of 4.46,
while Portugal performed better with a value of 5.07. Figure 4 reports their spiderwebs in 2008
with a two year interval until 2014. The analysis of these two countries is particularly adept to
highlighting the potentialities offered by the multidimensional approach of the KOF YLMI.

Sweden's *Activity State'* indicators show evidence of a small deterioration. However, after
2010 the situation for all three indicator ameliorates. Portugal also shows a decline in its
Unemployment Rate, *Relaxed Unemployment Rate* and *NEET Rate* scores at first. In contrast
to Sweden, the situation of these indicators after 2010 degrades further.

The indicators contained in the category *Working Conditions* show a more imbalanced pic-
ture. In Sweden, the issue of temporary contracts worsened between 2008 and 2010 and remained
stable afterwards. The *Involuntary Part-Time Worker Rate* also deteriorates at the beginning
of the crisis but by 2014 suggests a recovery. In contrast, the *In Work at Risk of Poverty Rate*
ameliorates first, but then plunges in 2014 to a value lower than in 2008. The remaining two
indicators, *Atypical Working Hours Rate* and *Vulnerable Employment Rate* exhibit a relative
constant situation. The imbalances across the indicators describing the working conditions in
Portugal are even larger than the ones of Sweden. For Portugal, the period 2008-2014 was
characterised by substantial drops in the scores of the indicators *Temporary Worker Rate*, *Invol-
untary Part-Time Worker Rate*, and *In Work at Risk of Poverty Rate*. Conversely, the indicators
Atypical Working Hours Rate and *Vulnerable Employment Rate* show that some improvements
have occurred. Overall, the opposing indicator trends in this category suggest that working
conditions in Portugal experienced substantial transformations during the crisis.

Sweden and Portugal further present imbalanced situations in respect to the two remaining
categories. In the field of *Education*, Portugal exhibits very high scores in the *Skills Mismatch
Rate*, while relatively low ones in *Formal Education and Training Rate*. It is worth highlighting
that these imbalances have been reduced over the considered time period. Sweden, on the
opposite, shows imbalances in the field of *Transition Smoothness*. The extremely high score of
the *Incidence of Long-Term Unemployment Rate* is compensated by a low score in the *Relative
Unemployment Ratio*, meaning that Swedish youth, compared to adults, are particularly exposed
to the unemployment phenomena.

In summary, the spiderwebs reported in Figure 4 suggest that both Sweden and Portugal
have been markedly affected by the Great Recession. However, the way in which their respective
labour markets reacted was different. Sweden was partially able to correct the imbalances in
the field of *Working Conditions*. Improvement is visible in the category *Transition Smoothness*,
while in respect to *Skills Mismatch Rate*, some work still need to be done. In Portugal, the
forces that characterize the youth labour market situation are more difficult to disentangle. In
particular, the contrasting trends in the field of *Working Conditions* represent a puzzle. In this
perspective, the KOF YLMI just offers initial insights. Qualitative and quantitative research
both at national and international level should provide for further discussion of the topic.
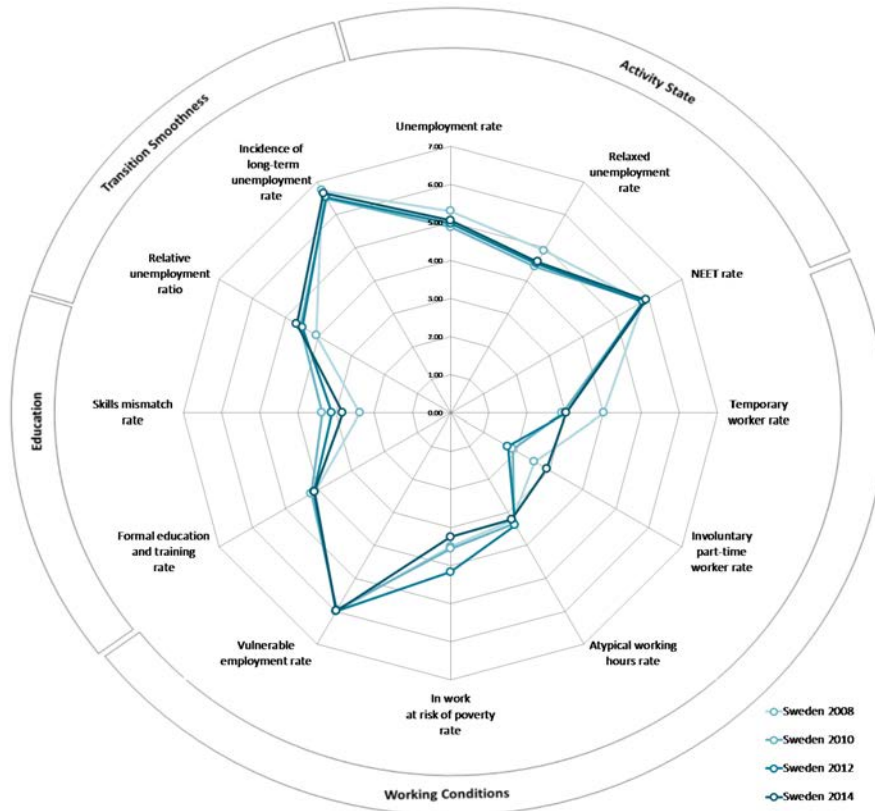
(a)
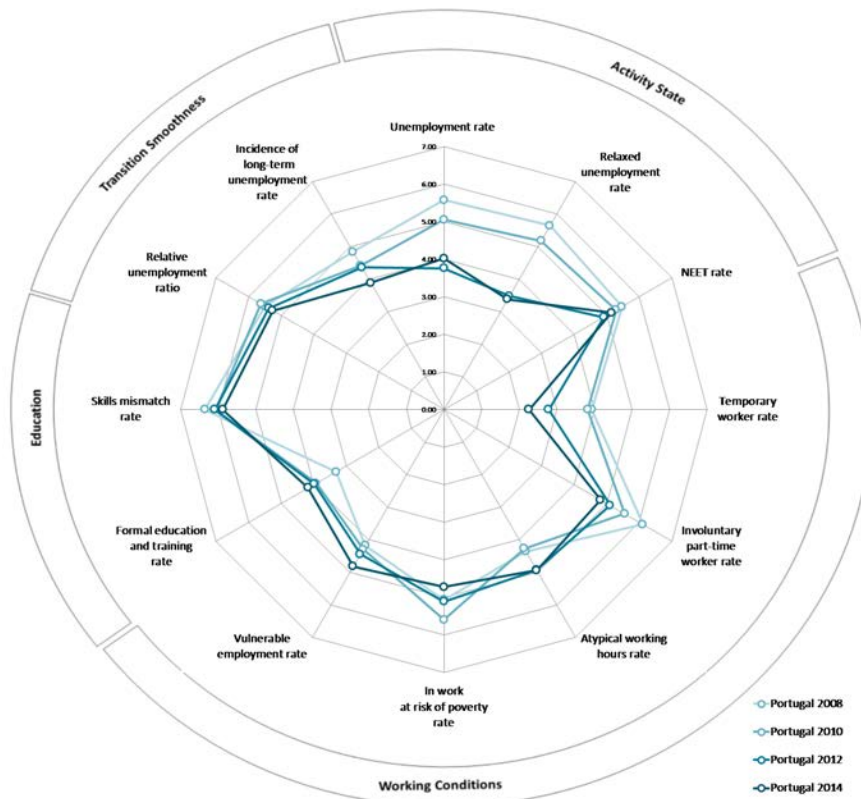
(b)

Figure 4: Spiderwebs of Sweden (a) and Portugal (b) in 2008, 2010, 2012 and 2014

5   Outlook

The third release of the KOF YLMI mainly focuses on the enlargement of available data to include the year 2014. Additionally, some modifications had to be made in regards to the verification of the upper bounds used in the standardisation of indicators' values into scores. In particular, the upper bound of the *Relaxed Unemployment Rate* was shifted from 70 to 85%, while the upper bound of the *Incidence of Long-Term Unemployment Rate* increased from 60 to 70%. The upper bound of both the *Atypical Working Hours Rate* and the *In Work at Risk of Poverty Rate* were shifted from 30 to 35% while the upper bound of the *Involuntary Par-Time Worker Rate* moved from 15 to 30%. Note that three of these five indicators belong to the category *Working Conditions*. The necessary shift of these three upper bounds can be interpreted as an alarm signal of a worsening trend in *Working Conditions* over recent years. Section 4 started to address this topic by analysing the situation in some extreme cases. Nevertheless, further analyses in the field of the *Working Conditions* are needed. In particular, the evolution of the *Working Conditions* in relation to changes in the other categories of the KOF YLMI can be very informative.

The next steps in the development of the KOF YLMI are (a) the continued and periodic update of new values, and (b) the enlargement of the data coverage to an even larger set of countries — in particular developing countries. Additionally, as new data will become available, the accuracy of lower and upper bounds should also receive attention in future releases. The KOF research division Education Systems also aims to investigate the accuracy of the theoretical weights used in the aggregation of twelve indicators into a single index value. A confirmatory factor analysis, for instance, could suggest the most adequate weighting scheme that maximizes the explained variance in the indicators' set. A research project in this direction is already ongoing.

A further area of investigation is related to the indicator *Skills Mismatch Rate*. There are different possible measurements that capture the mismatch between the skills provided by the labour force and the skills demanded by the economy. Unfortunately, however, there is no internationally diffused definition at the moment.

Finally, we renew the invitation for user to access data and figures based on KOF YLMI through the web application freely available at `http://www.kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-youth-labour-market-index.html`. Our encouragement is to use this tool for analyses and comparisons between countries or group of countries. The KOF YLMI is a useful instrument that can help both researchers and policy makers to obtain initial insight into the situation that youth face on the labour market and how this evolves over time.

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A Data availability

Indicator	Sources	No. of countries covered in at least one year	No. of countries covered in year 2014	Years
Unemployment Rate	**ILO** - *KILM 9th Edition Table 10a: Youth unemployment (ILO estimates) [Youth unemployment rate; Countries: Select all, exclude Samoa; Income group: Select all; Year: 1991-2014; Sex: MF; Type of statistic: Select all]* Extracted on 08.03.2016	178	178	1991 - 2014
Relaxed Unemployment Rate	**Eurostat** - *Unemployment [lfsa_ugan; Age: 15-24; Citizen: Total; Geo: Select all; Sex: Total; Time: 1995-2014; Unit: Thousand]; Supplementary indicators to unemployment [lfsi_sup_a; Age: 15-24; Geo: Select all; INDIC_EM: NSEE_AV; Sex: Total; Time: 2005-2014; Unit: Thousand]; Population [lfsa_pganws; Age: 15-24; Citizen: Total; Geo: Select all; Sex: T; Time: 1995-2014; Unit: Thousand; WStatus: ACT]* Last update 26.04.2016	33	31	2005 - 2014
NEET Rate		106	37	1998 - 2014
	ILO - *KILM 9th Edition Table 10c: NEET Rates [Share of youth not in education, employment, or training; Countries: Select all, exclude Samoa; Income group: Select all; Year: 1998-2014; Age: 15-24; Repository: Select all; Type of source: Select all; Coverage: Select all; Geographical coverage: Select all]* Extracted on 24.11.2015	106	37	1998 - 2014

	Eurostat - *Young people neither in employment nor in education and training by sex and age (NEET rates) [NEET rate; Sex: Total; Age: 15-24; Year: 2000-2014; Unit: Percentage; WStatus: NEMP]* Last update 08.10.2015	33	33	2000 - 2014
Temporary Worker Rate	**Eurostat** - *Temporary employees by sex, age and duration of the work contract [lfsa_etgadc; Age: 15-24; Duration: Less than 1 month, From 1 to 3 months, From 4 to 6 months, From 7 to 12 months, From 13 to 18 months; Geo: Select all; Sex: T; Time: 1992-2014]* Aggregated values (1 to 18 months) obtained from Eurostat on 16.12.2015 after direct request; *Employment by sex, age and citizenship [lfsa_egan; Age: 15-24; Citizen: Total; Geo: Select all; Sex: T; Time: 1995-2014]* Values for the period 1992-1994 obtained from Eurostat on 14.03.2016 after direct request.	33	33	1992 - 2014
Involuntary Part-Time Workers Rate		40	40	1991 - 2014
	OECD - *Incidence of involuntary part time workers [Country: Select all; Time: 1991-2014; Sex: All persons; Age: 15-24; Employment status: Total Employment; Series: Share of involuntary part-timers in total employment]* Extracted on 31.08.2015	39	39	1991 - 2014

	Swiss Federal Statistical Office - *Involuntary part-time workers (INVPT) [Involuntary part-time workers are part-timers (working less than 30-usual hours per week) because they could not find a full-time job]*; Data obtained from the SFSO on 27.11.2015 after direct request. Note that the values for the years 2007-2010 and 2013-2014 have relatively low reliability. Please interpret those values with caution.	1	1	2004 - 2014
Atypical Working Hours Rate	**Eurostat** - *Employees working shifts as a percentage of the total of employees [lfsa_ewpshi; Age: 15-24; Geo: Select all; Sex: T; Time: 1992-2013], Employed persons working at nights as a percentage of the total employment [lfsa_ewpnig; Age: 15-24; Frequenc: Usually; Geo: Select all; Sex: T; Time: 1992-2013; WStatus: EMP], Employed persons working on Sundays as a percentage of the total employment [lfsa_ewpsun; Age: 15-24; Frequenc: Usually; Geo: Select all; Sex: T; Time: 1992-2014; WStatus: EMP]*, Last update 19.11.2015	33	33	1992 - 2014
In Work at Risk of Poverty Rate	**Eurostat** - *In-work at-risk-of-poverty rate by age and sex [ilc_iw01; Age: 15-24; Geo: Select all; Sex: T; Time: 2003-2014; WStatus: EMP]* Last update 29.06.2016	34	33	2003 - 2014

Vulnerable Employment Rate	**ILO** - *KILM 9th Edition Table 3: Status in Employment [Share of vulnerable employment in total employment; Countries: Select all, exclude American Samoa, Anguilla, Antigua and Barbuda, Aruba, British Virgin Islands, Cayman Islands, Cook Islands, Djibouti, Dominica, French Guiana, French Polynesia, Germany (Federal Republic of), Grenada, Guam, Isle of Man, Kosovo, Marshall Islands, Montserrat, Netherlands Antilles, New Caledonia, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, San Marino, Sao Tome and Principe, Tonga, Turks and Caicos Islands, Tuvalu, Vanuatu; Income group: Select all; Year: 1998-2014; Age: Select all; Repository: Select all; Type of source: Select all; Coverage: Select all; Geographical coverage: Select all]* Extracted on 01.12.2015	157	37	1991 - 2014
Formal Education and Training Rate		33	33	1996 - 2014
	Eurostat - *Participation in education and training [trng_lfs_09; Age: 15-24; Geo: Select all; Sex: T; Time: 2004-2014; TYP-TRAI: Formal education and training; Unit: PC]* Last update 08.10.2015. Values for 2003 obtained from Eurostat on 10.09.2015 after direct request.	33	33	2003 - 2014
	Swiss Federal Statistics Office - *Participation rate in formal education and training (last 4 weeks) [by sex and age (15-24), frequencies in percent]* Data available from the SFSO upon request	1	1	1996 - 2002

Skills Mismatch Rate		59	33	1992 - 2014
	ILO - *KILM 8th Edition Table 15a: Skills mismatch between labour supply and demand by educational attainment [Skills mismatch; Sex: MF; Year: 2000-2013; exclude: Samoa]* Extracted on 02.02.2015	59	0	2000 - 2013
	Eurostat - *Active population by sex, age and educational attainment level (1 000) [lfsa_agaed; Sex: Total; Age: From 15 to 24 years & from 25 to 29 years; Unit: Thousand; Time: 1992-2014]* Last update: 09.03.2016 - *Employment by sex, age and educational attainment level (1 000) [lfsa_egaed; Sex: Total; Age: From 15 to 24 years & from 25 to 29 years; Unit: Thousand; Time: 1992-2014]* Last update: 09.03.2016	33	33	1992 - 1999 2013 - 2014
Relative Unemployment Ratio	**ILO** - *KILM 9th Edition Table 10a: Youth unemployment (ILO estimates) [Ratio of youth unemployment rate to adult unemployment rate; Countries: Select all, exclude Samoa; Income group: Select all; Year: 1991-2014; Sex: MF; Type of statistic: Select all]* Extracted on 01.22.2015	178	178	1991 - 2014
Incidence of Long-Term Unemployment Rate		86	44	1991 - 2014

ILO - *KILM 9th Edition Table 11a: Long-term unemployment [Incidence of long-term unemployment; Countries: Select all, exclude French Polynesia; Income group: Select all; Year: 1991-2014; Sex: MF; Age group: Youth; Repository: Select all; Type of source: Select all; Coverage: Select all; Geographical coverage: Select all]* Extracted on 10.03.2016	87	43	1991 - 2014
OECD - *OECD.Stat [Unemployment by duration; Year: 1991-2013; Sex: All Person; Age: 15 to 24; Frequency: Annual ; Unit: Persons, thousands]* Extracted on 06.07.2015 - *OECD.Stat [Incidence of unemployment by duration; Year: 1991-2013; Sex: All Person; Age: 15 to 24 ; Unit: Percentage]* Extracted on 06.07.2015	12	0	1997-2013
Eurostat - *Long-term unemployment (12 months or more) as a percentage of the total unemployment, by sex, age and nationality (%) [lfsa_upgan; Age: From 15 to 24 years; Citizen: Total; Geo: Select all; Sex: Total: Time: 1995-2014; Unit: Percentage]* Last update 24.02.2016	1	1	1998-2014

Table 4: Detailed information about data sources, extraction methods, number of covered countries and time coverage