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DISABILITY POLICIES: REFORM STRATEGIES IN A COMPARATIVE PERSPECTIVE

René Böheim
Thomas Leoni

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Disability policies: Reform strategies in a comparative perspective
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ABSTRACT

We analyze different disability policy strategies using policy scores developed by the OECD for the period 1990 to 2007. Applying model-based and hierarchical agglomerative clustering, we investigate the existence of distinct country clusters, characterized by particular policy combinations. In spite of common trends in policy re-orientation, our results indicate that the reforms of the last two decades led to more, not less, heterogeneity between country groups in terms of sickness and disability policy. A set of Northern and Continental European countries emerges as a distinct cluster characterized by its particular combination of strong employment-oriented policies and comparatively high protection levels. A qualitative review of policy changes in the most recent years suggests that the gap between these countries and the rest might have further increased. We embed our empirical analysis in a theoretical framework to identify the objectives and the main components of a comprehensive disability policy strategy. The objectives of such a strategy can be subsumed under three headings, representing strategy pillars: prevention and treatment; protection and insurance; and activation and re-integration. Not all these dimensions are covered equally well by the OECD policy scores and will have to be further investigated.

René Böheim
Johannes Kepler University
Linz, Austria
rene.boeheim@jku.at

Thomas Leoni
Austrian Institute of Economic Research
1030 Vienna - Austria, Arsenal, Objekt 20
Thomas.Leoni@wifo.ac.at

1. Introduction

The protection and integration of disabled person into the labor market is a key issue for social protection systems in advanced industrialized countries. The last decades saw intense reforms of disability policies in the majority of OECD countries, with the aim to support workers with health impairments, to ensure adequate labor supply, and to guarantee the long-term financial sustainability of social insurance systems.

The OECD has been investigating and documenting changes in sickness and disability policies, and noticed a certain degree of policy convergence across countries. This convergence consisted in a shift of the policies' focus from passive income maintenance to employment incentives and re-integration policies (OECD 2003, 2010; Prinz and Thompson 2009; Scharle et al. 2015). Other studies highlight substantial cross-country heterogeneity in policy design and reform strategies (Milligan and Wise 2011; Burkhauser et al. 2014; Vossen and van Gestel 2015).

We revisit the question of policy convergence, expanding on previous work by the OECD based on indicator scores to classify disability policies, with the aim to contribute to the understanding of disability policy settings and reform trajectories.[1] We use the scores for the period 1990 to 2007 and investigate clusters of countries, based on their disability policy strategies and their evolution over time. To achieve this objective, we apply both hierarchical agglomerative clustering, which had already been used by the OECD (2010, ch. 3), and model-based clustering, which provides more robust and statistically grounded results.

Our results indicate that, in spite of a common trend, the reforms led to more diversity across OECD countries over time. The substantial reforms resulted in the emergence of a separate policy cluster, formed by Northern and Continental European countries, which is characterized by a particular combination of strong employment-orientated policies and comparatively high protection levels. Although virtually all countries strengthened the activation and labor market integration components of their systems, some countries, among them the United States, implemented only minor changes in this area. Qualitative evidence on

[1] For a discussion of the relevance of social policy convergence, see for example Schmitt and Starke (2011).

the reforms since 2007 indicates that the gap between these countries and the cluster formed by countries with a high reform profile and intensive integration efforts has increased further.

We embed our empirical analysis in a theoretical framework which identifies the objectives and the main components of a comprehensive disability policy strategy. This analytical grid, which is presented in the next section (Section 2), serves to identify those aspects of disability policy which are not (fully) covered in the OECD scores — and therefore require further research to evaluated their efficacy in supporting the policies' aims.

2. An analytical framework of disability policy

Traditionally, social policy has been associated primarily with protective and redistributive functions, what Barr (2001) called the "piggy bank" and "Robin Hood" dimensions of the welfare state. In recent years, new functions, with a focus on the prevention of social risks and on supporting employment through activation, have been assigned to social policy (Bonoli 2012; Morel et al. 2012). With respect to sickness and disability, we can identify three separate policy objectives: promoting and improving the health status of the workforce to prevent health impairments; activating and re-integrating in employment those with health problems; providing benefits and other protective measures to cushion income and welfare losses due to sickness and disability.

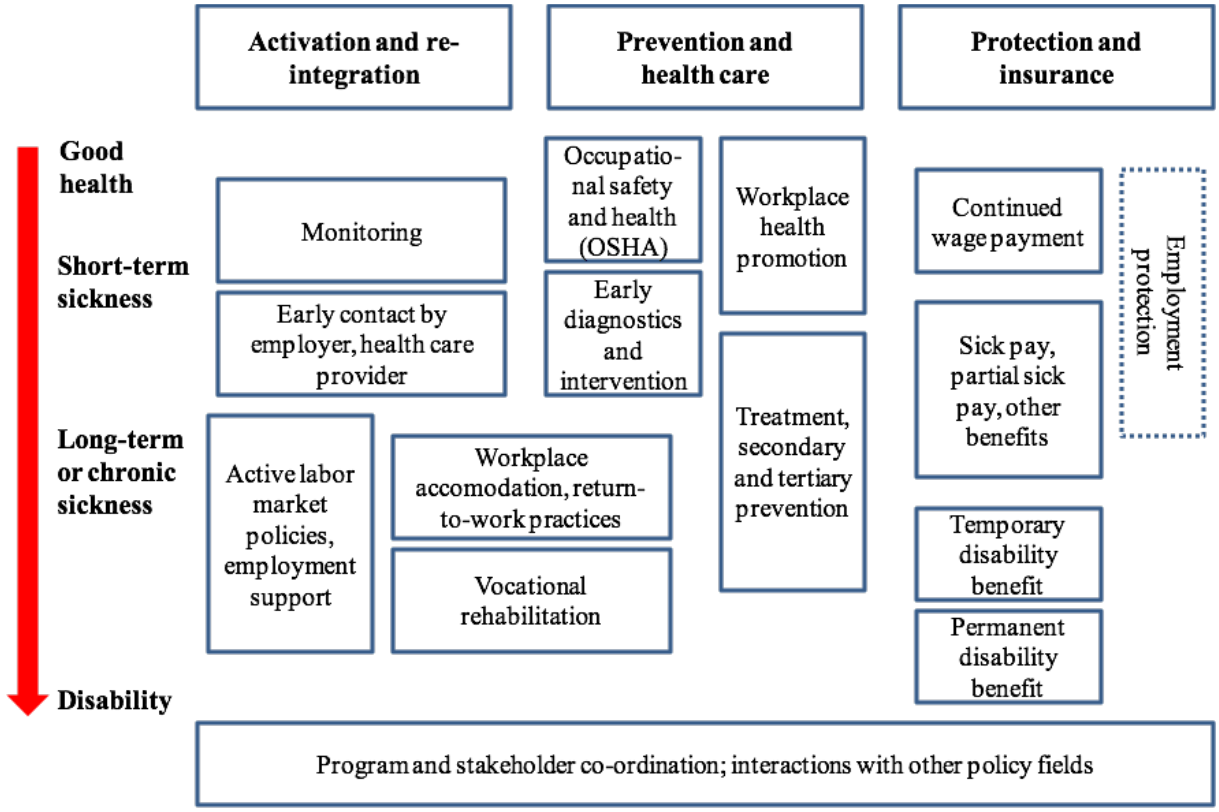
Figure 1 proposes a stylized visualization of a strategy to prevent disability and to support workers with health impairments to stay in employment. This overview is structured as a matrix where the main policy objectives are on the horizontal axis. The policy objectives are summarized under the three headings prevention and treatment; activation and re-integration; and protection and insurance. The vertical axis represents a person's health status, ranging from good health to (full) disability. This axis can also be thought of as a timeline which represents phases of a health trajectory.

This framework acknowledges that disability is not a state which is determined solely by health but rather by the interaction between an individual's health, workplace conditions, the welfare system, and the labor market situation. According to Burkhauser et al. (2014), disability can be viewed as "the product of an interactive process between an individual's health conditions and the social and physical environment" (p. 23). A comprehensive

disability strategy thus has to rely on multiple pillars for successfully addressing the policy's aims. Depending on their health situation, workers need to be provided with a balanced mix of prevention, benefits, incentives, and support. Program and stakeholder coordination as well as the interaction with other policy fields are crucial aspects of any strategy, regardless of which components are put in place and how they are designed.

The analytical grid also highlights that sickness absences and disability have to be understood as one common area for policy. Empirical studies document the strong correlation between prolonged sickness absences and subsequent disability (e. g., Wallman et al. 2009), but in most countries sickness absences and disability are still separate policy areas. They are typically governed by different insurance systems with separate funding, managed by different agencies and stakeholders, and are addressed by disconnected policies.

Figure 1: Components of a strategy to prevent and sickness/disability and to support employment.



Source: Authors.

3. Disability policies and their reforms in the OECD

3.1 Data

In our analysis of disability policies and their reforms, we rely on data provided by the OECD who developed a set of indicators to classify disability policies. The OECD classifies disability policies on the basis of two policy indicators, each of them consisting of ten sub-dimensions. The first indicator provides an overall assessment of policy features related to the benefit system, i.e., the *compensation dimension*, whereas the second captures the intensity of measures for activation and employment integration, i.e., *the integration dimension* (OECD, 2010).[2] Each of the 20 sub-components is measured according to a predefined scale which ranges from zero to five points.

The compensation dimension includes aspects such as the coverage and level of disability benefits, the minimum degree of incapacity needed for benefit and full benefit entitlement, the type of medical and vocational assessment, as well as information on sickness benefits. The integration dimension considers, among others, the complexity and consistency of benefits and support systems, the degree of employer obligations towards their employees, the timing and extent of vocational rehabilitation, and the existence of work incentives for beneficiaries. Both indicators have a maximum of 50 points. A higher score on the compensation indicator means greater generosity, whereas an increase in the integration dimension signals a more active and employment-oriented approach.

A comparison of the indicators and our analytical framework in Figure 1 shows that the indicators cover the majority of components of a comprehensive disability policy strategy. The compensation dimension includes detailed information on the benefit design and contains a link between sickness and disability, including sickness monitoring. With the exception of employment protection legislation in case of sickness, all salient aspects of the insurance and protection pillar are thus taken into account in the score index.

[2] See Table B1 and Table B2in the Appendix. Further details are available in OECD (2010), box 3.1 on page 85.

With respect to the activation and re-integration pillar of disability policy, the OECD scores are however slightly less exhaustive. Specific policies to support employment and integration, such as the existence of case management, of workplace accommodation or of return-to-work practices, are covered only indirectly by the scores. Whereas work incentives for disability benefit recipients are included in one indicator (Y10), partial sick-leave schemes, which have proven to be an option to increase activation and labor market attachment for workers who receive sickness benefits (Markussen, Mykletun and Røed 2012; Viikari-Juntura et al. 2012), are not part of the OECD indicator set.

Of the three policy pillars that we identify in our analytical framework, the prevention and treatment dimension is covered least by the indicators. Policy fields such as occupational safety and health regulations and workplace health promotion remain unaddressed or are addressed only indirectly. The same is true for the role of medical professionals, and the health system in general.

Overall, the indicators developed by the OECD are comprehensive and well-suited to provide a detailed picture of policy differences and developments across countries and over time. However, the index does not account for all facets of disability policy. This opens up scope for future research and it also cautions us not to equate a lack of change in policy scores with an overall lack of reform activity.

3.2 Methods

In order to classify OECD countries based on their disability policies, we use two different clustering approaches. Cluster analysis is based on the idea that observations can be grouped by their distance from each other. Ideally, the clusters should exhibit high internal homogeneity, i.e., groups should contain similar observations, as well as high external heterogeneity, i.e., observations which are dissimilar should be in different groups (Danforth 2014). One widely used method to identify these clusters is agglomerative hierarchical clustering. This is an iterative process whereby the sample is first divided into singletons and in subsequent stages singletons or groups are merged into clusters. This merging is based on some distance criterion, for example, the shortest distance between groups. Agglomerative hierarchical clustering can be represented graphically in form of a dendrogram. This method

permits to separate observations into clusters without predetermining the number of clusters beforehand. The disadvantage of this approach is that it is largely heuristic and therefore not suited for strong inferences.

In contrast, model-based clustering is well-grounded in probability theory and statistically rigorous in the identification of clusters which permits the use of information-based model selection tools. In this approach, the problems of determining the number of clusters and of choosing an appropriate clustering method is recast as a statistical problem of model choice (Fraley and Raftery 2002). The central assumption of a model-based cluster analysis is that the observations are generated by a finite mixture of probability distributions where each component distribution represents a different group or cluster (Danforth 2014). Clusters can then be defined as groups of objects that belong to the same probability distribution. In addition, agglomerative hierarchical clustering tends to suggest a larger number of tentative clusters than model-based clustering, which is typically more conservative in the identification of groups being based on statistical tests of differences between the observations.

Following recent examples in the literature (Beblavy et al. 2013; Danforth 2014), we employ both approaches to provide a broader picture of tentative clusters. When we estimate agglomerative hierarchical clusters, we use Ward's method, which is based on the sum of squared errors, and the Euclidean metric as measures of distance between clusters. In Ward's approach, two clusters (observations) are merged into the same cluster, if this particular merger increases the sum of squared errors the least among all possible mergers. This is the clustering technique most frequently used in the social sciences. It is well suited to settings where we expect somewhat equally sized clusters and the dataset does not include outliers. Although it is not possible to evaluate the validity of clusters with a statistical test, bootstrap resampling techniques can be used to estimate the probability that the clusters are supported by the data. To gauge the reliability of our hierarchical clustering results, we calculate approximately unbiased (AU) p-values for each section of the dendrograms that we display.

These p-values are computed using a multi-scale bootstrap resampling routine which was developed by Suzuki and Shimodaira (2006)[3].

With respect to model-based clustering, we follow the approach proposed by Fraley and Raftery (1998, 2002) and set the maximum number of clusters at 9 and choose a finite mixture model. After performing hierarchical agglomeration to approximately maximize the likelihood of classification for each model, we apply the expectation-maximization (EM) algorithm for each model and each number of clusters. We then select the optimal model and number of clusters based on a comparison of Bayesian information criteria.

We apply both clustering approaches to data for 1990 (the first year in the OECD database) and 2007 (the last year). The OECD data comprise 23 countries for which information is available for both 1990 and 2007.[4] This balanced panel represents the main target of our analyses. In addition, we will investigate the full OECD dataset for 2007, which comprises 28 countries. In this way, we aim to identify meaningful groupings as well as reform trajectories and strategy changes of single countries over time. Before carrying out the cluster analyzes, we provide descriptive evidence of policy changes over time.

[3] This approach is more frequently used in the natural sciences than in the social sciences. See, for instance, Wang et al. (2011).

[4] For France, Italy, and Mexico, no policy indicators are available for 1990 and we use those from 1985.

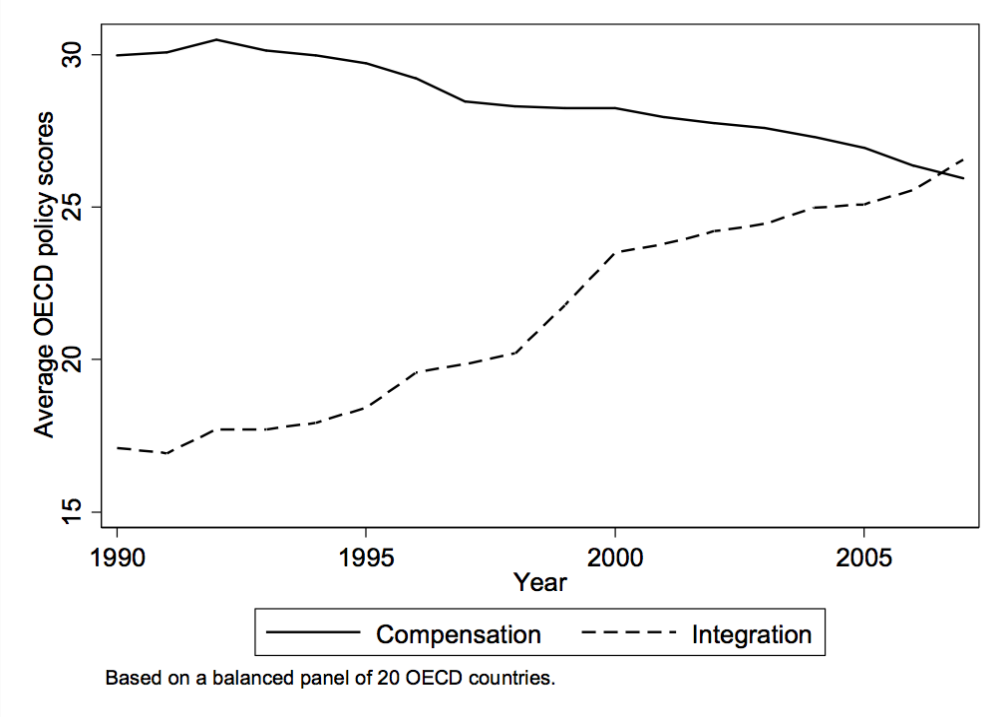
4. Empirical results

4.1 Overall trends and developments

In general, the reforms carried out by OECD countries since the early 1990s can be grouped along four major strands (OECD 2010; Kautto and Bach-Othman 2010): reforms which tightened benefits and increased their employment-orientation; reforms which expanded employment integration measures for persons with health impairments; reforms which increased the involvement of employers and medical professionals; and reforms that improved the institutional set-up to improve the match-efficiency between services and the disabled. Some countries also introduced changes to create stronger links in the management and prevention of sickness and disability. For example, in the Netherlands and in Switzerland, disability benefit applications are now assessed with respect to steps taken during the antecedent sickness periods.

Figure 2 shows how the two disability policy dimensions captured by the OECD indicators developed over time. We observe a marked increase in the integration component over this period and a moderate, but steady decrease in the compensation component. The decrease in the compensation dimension (-4.1 points on average between 1990 and 2007) was not as strong as the increase in the integration dimension (+9.4 points). Table 1 indicates that the change in orientation, with a shift from the compensation to the integration dimension, was supported by corresponding changes in almost all sub-components of the two policy indicators.

Figure 2: OECD countries strengthened „integration“ and reduced „compensation“ measures.



Source: OECD; authors' calculations. Note: Yearly average index for 20 OECD countries with full yearly information on scores for the period 1990 to 2007.

Among the compensation indicators, the only indicator which on average increased was population coverage (X1). This finding is in line with other indicators for welfare state generosity and reflects that several countries, in particular Southern European countries, extended the coverage of their social protection systems in recent decades. (This happened in spite of overall retrenchment trends, see, for instance, Nullmeier and Kaufmann 2010). Of the remaining compensation indicators, those that declined most refer to medical assessment criteria (X5) and sickness absence certification (X10). Medical assessment became stricter in a number of countries, notably in Austria, Italy, Germany, Finland, and the Netherlands. Sickness absence certifications were also placed under stricter regulation, including monitoring, risk profiling, and sanctions in some countries. The Netherlands and Denmark are prominent examples for major reforms in this area. The compensation indicators for the

medical assessment criteria (X6) and the vocational assessment criteria (X7) document other marked changes.

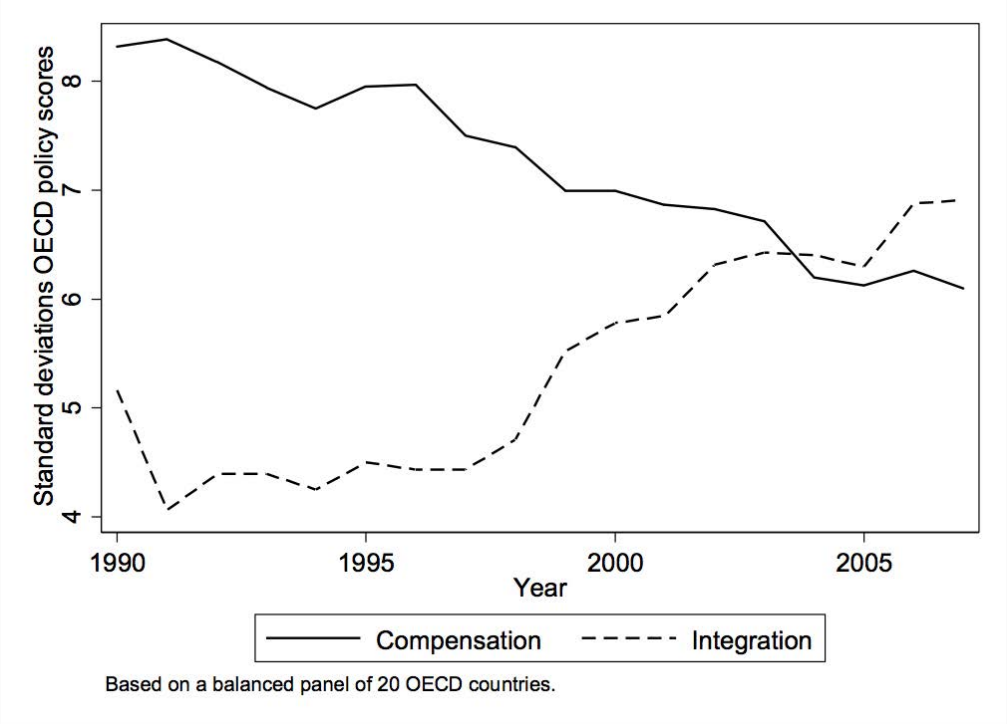
Table 1: Change in indicator sub-components, 1990 to 2007.

Indicator	**ø change**	**Indicator**	**ø change**
Compensation	-4,1	*Integration*	9,4
Population coverage (X1)	0,3	Consistency (Y1)	0,7
Minimum disability (X2)	-0,2	Complexity (Y2)	1,3
Full benefit disability (X3)	-0,3	Employer obligations (Y3)	1,7
Maximum benefit (X4)	-0,2	Supported employment (Y4)	1,5
Benefit permanence (X5)	-1,0	Subsidised employment (Y5)	0,7
Medical criteria (X6)	-0,7	Sheltered employment (Y6)	0,6
Vocational criteria (X7)	-0,7	Rehab comprehensiveness (Y7)	0,5
Sickness benefit level (X8)	-0,1	Rehab timing (Y8)	0,9
Sickness benefit duration (X9)	-0,1	Benefit suspension optiion(Y9)	0,9
Sickness monitoring (X10)	-1,1	Work incentives (Y10)	0,6

Source: OECD; authors' calculations.

Taken together, the changes indicate that countries decreased the compensation dimension of their disability policy (and thus the generosity of the social protection pillar of their disability policy strategy) primarily by tightening the inflow into benefit programs. The benefit levels, which are covered by the compensation indicators for disability benefits (X3 and X4), as well as sickness benefits (X8 and X9), indicate that only comparatively small reforms were implemented. The evolution of the policy scores indicates convergence across countries in compensation policies and divergence in integration policies. This is visible in Figure 3 where we plot the standard deviations of the policy scores over time.

Figure 3: Convergence in "compensation" and divergence in „integration"



Source: OECD; authors' calculations. Note: Yearly average index for 20 OECD countries with full yearly information on scores for the period 1990 to 2007.

Among the integration dimensions of disability policy, the strongest reforms touched employer obligations (Y3), where the average score increased by 1.7 points, from 1.25 to almost 3 points on average. Only four out of all 23 countries did not undertake any reform of their disability policies in this dimension. In most cases, the change was however minor. The strongest changes can be observed for the Netherlands, the United Kingdom, and Sweden, where this integration dimension increased by 3 points.

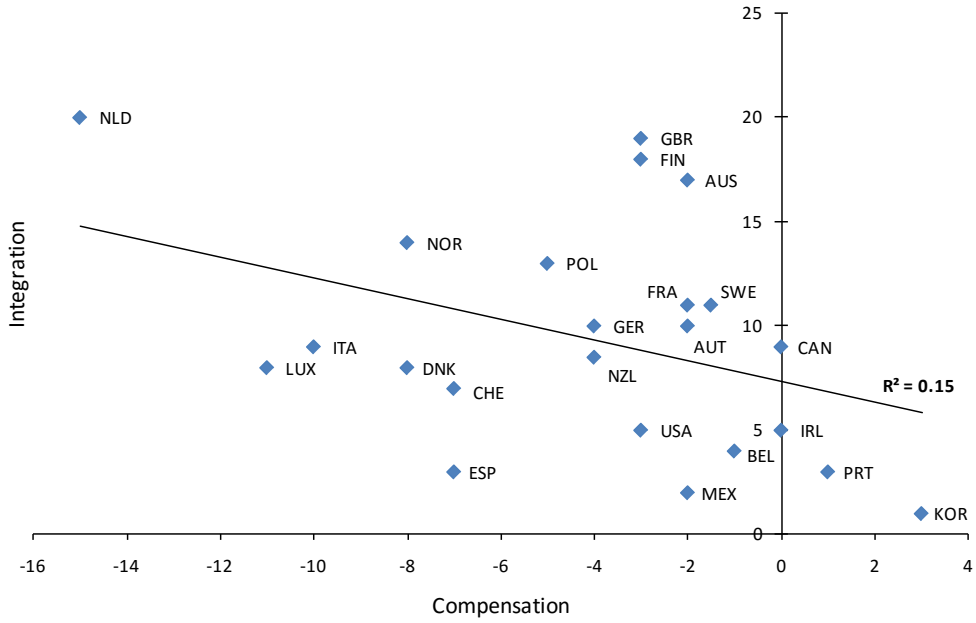
Programs and benefit complexity (Y2) were also significantly reformed. Co-ordination of all—or, at least, most of— the programs and benefits was achieved in all Scandinavian countries (particularly in Norway), as well as in Australia, and in the United Kingdom.

Other sub-components of integration policy which increased strongly document the introduction of supported employment programs (Y4), the timing of vocational rehabilitation

(Y8), and the option for disability benefit suspension (Y9). Together with measures extending other forms of employment programs and work incentives for disability benefits recipients, these reforms share the goal to increase the labor market attachment of workers with health impairments.

Figure 4 plots individual countries' changes in the two aggregate dimensions. Almost all countries reduced the compensation dimension. The only exceptions are Ireland and Canada, where no changes for compensation components are recorded, and Korea and Portugal, which implemented (very minor) changes that increased compensation. All countries strengthened the integration component of their disability policies, albeit in some countries (Korea, Mexico, Portugal, Spain, Belgium, Ireland, and the United States) the reforms changed the scores only very lightly.

Figure 4: Changes in OECD disability policy scores, 1990 to 2007.



Source: OECD; authors' calculations.

Looking at the overall reform intensity, we find that the Netherlands are the country which underwent by far the largest changes in disability policy (scores).[5] High reform intensity can also be observed in most Northern European countries, in the United Kingdom and Australia, as well as in Italy, Poland, Germany, Switzerland, and Luxembourg. The United States can be singled out as one of the countries where the policy indicators changed very little, followed by Belgium, Ireland, Portugal, Korea, and Mexico. As we pointed out in Section 3.1, a lack of change in policy scores is not necessarily equal to a complete absence of reforms, because some aspects of disability policy are not fully captured by the index scores.

In the next steps, we aim to reduce the complexity represented by the manifold combinations in disability policy and to extract from these data clusters of countries with similar policies and policy trajectories.

4.2 Model-based clustering

Table 2 presents the central results from our model-based clustering analyzes for the balanced panel of countries of the years 1990 and 2007. In the second and third columns (fifth and sixth columns for 2007), we display country classifications based on separate calculations for the two main policy dimensions (i.e., aggregate compensation and integration indicators with their respective sub-components). Our main results are displayed in the first and fourth columns and describe a classification based on the full data for all 20 sub-dimensions.

In 1990, we detect only two, strongly identified, clusters. The first cluster consists of the Anglo-Saxon countries in the OECD plus Korea, and the other cluster consists of all European countries without the United Kingdom and Ireland, plus Mexico. These clusters are robustly identified and all countries are classified with a low uncertainty level (< 0.001). The exactly same clusters emerge when only the compensation dimension alone is used. When we use the integration dimensions separately to identify clusters, we detect four different clusters, which indicate greater heterogeneity across countries. The structure of the clusters is however more fragile when we use only the integration than when we consider only the compensation

[5] See also Table A1 in the Appendix.

dimension or both dimensions together. This can be verified with the uncertainty levels which are displayed in Table 2. To sum up, in 1990 we can distinguish two clusters: One consisting of Anglo-Saxon countries, characterized by low compensation and low integration levels, and one with the remaining OECD countries, with higher compensation and more diverse integration policies.[6]

By 2007, the number of clusters according to the comprehensive classification based on both policy dimensions increased to three. The Anglo-Saxon countries are joined by South Korea and still form a distinct cluster. Ireland has shifted to a new cluster and is grouped together with a number of Continental European countries and Mexico. The third cluster is formed by the Scandinavian countries plus Finland, Germany, Switzerland, and the Netherlands. Austria is also part of this cluster, but the reliability of its classification is lower than for the other members of the cluster. Using Esping-Andersen's (1990) terminology, this is a cluster that is dominated by Social-democratic (Nordic) and Conservative (Continental) European welfare states. This group of countries (cluster 2 in Table 2) has by some length the highest scores on the integration sub-component as well as the highest scores on the majority of compensation indicators (see Table A3 in the Appendix). The Anglo-Saxon countries (cluster 1) have on average the lowest scores in most indicators of the compensation dimension. The remaining (Southern, Eastern and Continental) European countries, together with Mexico, have compensation indicators that are between the first two clusters.

In terms of the integration dimension, the means of the indicators reveal a similar pattern, however, with a reversed position between the Anglo-Saxon cluster and the "residual" European cluster. Broadly speaking, in 2007 we can thus speak of one cluster, formed by countries with high integration and high compensation scores; one where countries with intermediate integration and low compensation levels cluster; and one cluster which is formed by countries with intermediate compensation and low integration levels.

[6] Details on cluster means for the policy dimensions and single sub-components can be found in Table A2 in the Appendix.

Table A4 in the Appendix compares the clustering results for 2007 from the balanced panel (i.e., the output as in Table 2) with the classification that emerges when we apply the same methodology to the full OECD sample for 2007, which contains 28 instead of 23 countries.[7] In this larger sample, Austria is still part of the Northern European cluster, but the reliability of this classification has dropped below conventional statistical significance levels. With respect to the remaining countries, the specification with the full sample shows a high level of consistency with the smaller sample. All countries which are part of the smaller sample are classified in the same clusters in the version based on the full sample. Japan is added to the Anglo-Saxon cluster, whereas the other four additional countries are all classified in the third cluster.[8]

These findings correspond to calculations by the OECD based on agglomerative hierarchical clustering. OECD (2010) identifies the same three main clusters as well as some sub-groups within these. As our results indicate, however, these three groups emerge from the reform processes and were not identifiable at the beginning of our observation period. In the next step, we augment this picture with more nuanced information on single countries and country groups.

[7] The full sample additionally includes information on Hungary, Czech Republic, Slovakia, Greece, and Japan.
[8] Analogously to the clustering based on all 20 sub-components, clustering on the 10 compensation indicators return exactly the same country ordering when we use either the small or the large 2007 sample (with the inclusion of the additional five countries in the second cluster). With respect to the integration dimension alone, there are some re-classifications if we use the larger sample. These re-classifications, however, concern countries whose memberships in clusters are characterized by comparatively high levels of uncertainty.

Table 2: Model-based clustering results.

		1990			2007		
		ALL	COMP	INTEG	ALL	COMP	INTEG
# of clusters		2	2	4	3	2	3
# of obs		23	23	23	23	23	23
Country clusters	1	AUS CAN GBR IRL KOR NZL USA	AUS CAN GBR IRL KOR NZL USA	CAN USA	AUS CAN GBR KOR NZL♦ USA	AUS CAN GBR KOR	CAN USA
	2	AUT BEL CHE DNK ESP FIN FRA GER ITA LUX MEX NLD NOR POL PRT SWE	AUT BEL CHE DNK ESP FIN FRA♦ GER ITA LUX MEX♦ NLD NOR POL PRT SWE	AUS AUT♦ CHE ESP FIN FRA• GBR IRL◊ KOR LUX NLD NZL◊ POL◊ PRT	AUT◊ CHE DNK FIN GER NLD NOR SWE	AUT BEL CHE DNK ESP FIN FRA GER IRL ITA LUX MEX NLD NOR NZL POL PRT SWE USA	AUS♦ AUT♦ CHE◊ DNK FIN GBR GER NLD NOR SWE
	3			BEL° DNK GER NOR SWE	BEL♦ ESP FRA IRL♦ ITA LUX♦ MEX POL PRT		BEL° ESP♦ FRA♦ ITA IRL KOR LUX◊ MEX NZL♦ POL PRT
	4			ITA MEX◊			

Note: Uncertainties for all classifications listed above are less than 0.001 unless otherwise indicated (♦ < 0.01, ◊ < 0.05, • < 0.1, ° ≥ 0.1).

4.3 Hierarchical agglomerative clustering

Figure 3 and Figure 4 provide additional insights, visualizing the results from agglomerative hierarchical clustering in form of dendrograms. In the dendrograms, the y-axis marks the distance, based on all 20 sub-components of the indices, at which the countries and clusters merge. The red numbers on each cluster edge are approximately unbiased (AU) p-values. The red rectangles highlight clusters which are supported by the data at least at a 90% statistical significance level (AU p-values ≤ 0.1). The dendrograms for 1990 and 2007 indicate patterns that correspond to the results from the model-based clustering.

The Anglo-Saxon countries (with the exception of Ireland) show a high degree of similarity both at the beginning and at the end of our observation period. The Scandinavian countries are consistently classified as a comparatively homogenous group. In 1990, these countries were somewhat similar to the European countries, which, by 2007, is no longer true. The dendrogram suggests stronger policy heterogeneity in European countries by 2007. In 2007, the cluster of Scandinavian countries is joined by Finland and Germany and merges only at much greater distance with the remaining European countries.

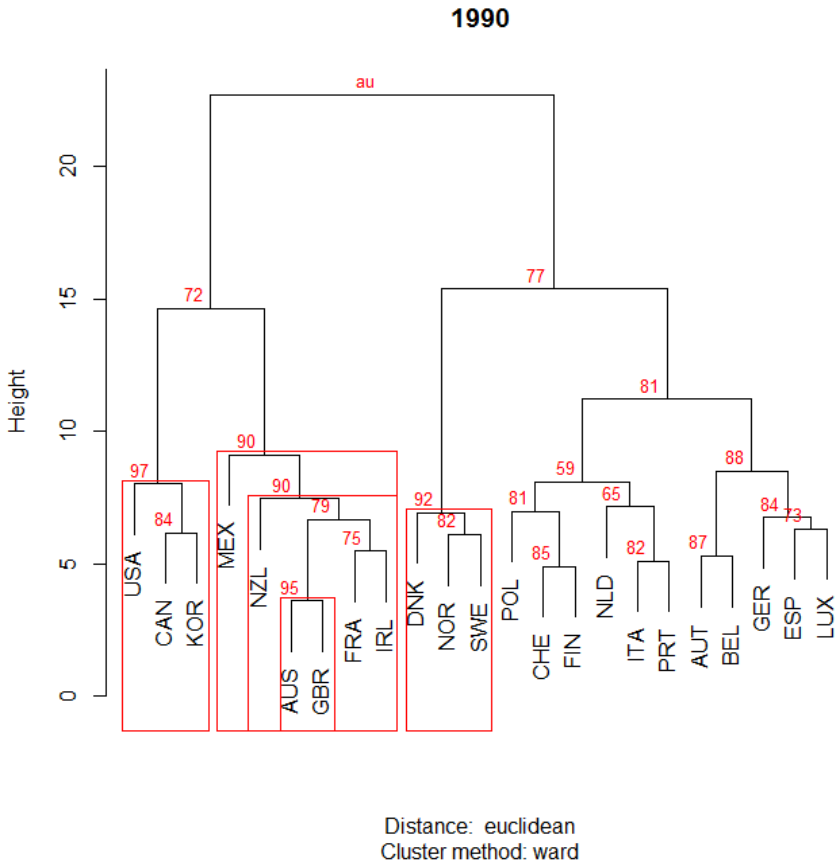
The agglomerative clustering highlights similarities between single countries. As we can see in all versions of the dendrogram, for instance, Australia and the United Kingdom reveal a high degree of similarity. The same can be said for the three Scandinavian countries as well as for United States, Canada, and Korea. In addition, in 1990, we find high similarity levels among sub-sets of Continental European countries, such as Italy and Portugal or Austria and Belgium.

Switzerland, Finland, Germany, and the Netherlands are the countries which experience the strongest re-classification over time. By 2007, Germany is clustered with Finland and has become part of the Scandinavian cluster. Switzerland constitutes a pair with the Netherlands. In opposition to the model-based results, the hierarchical clustering however locates Switzerland and the Netherlands closer to the Continental, Southern, and Eastern European countries than to the Nordic ones.

These findings change slightly when we look at the dendrogram for the full set of countries available for 2007.[9] In this version, we find the strongest correspondence between the hierarchical agglomerative and the model-based clustering results. (Compare the right half of Table A4 with Figure A1 in the Appendix.) To the right of the dendrogram in Figure A1, we see those countries with high compensation and high integration policy levels. The Netherlands and Switzerland are part of a cluster together with the Nordic countries plus Germany. Austria is not included in this group but is rather part of the large cluster that comprises the remaining European countries (plus Mexico). The Anglo-Saxon countries form the third, distinctive group together with the Asian OECD member states (Japan and Korea).

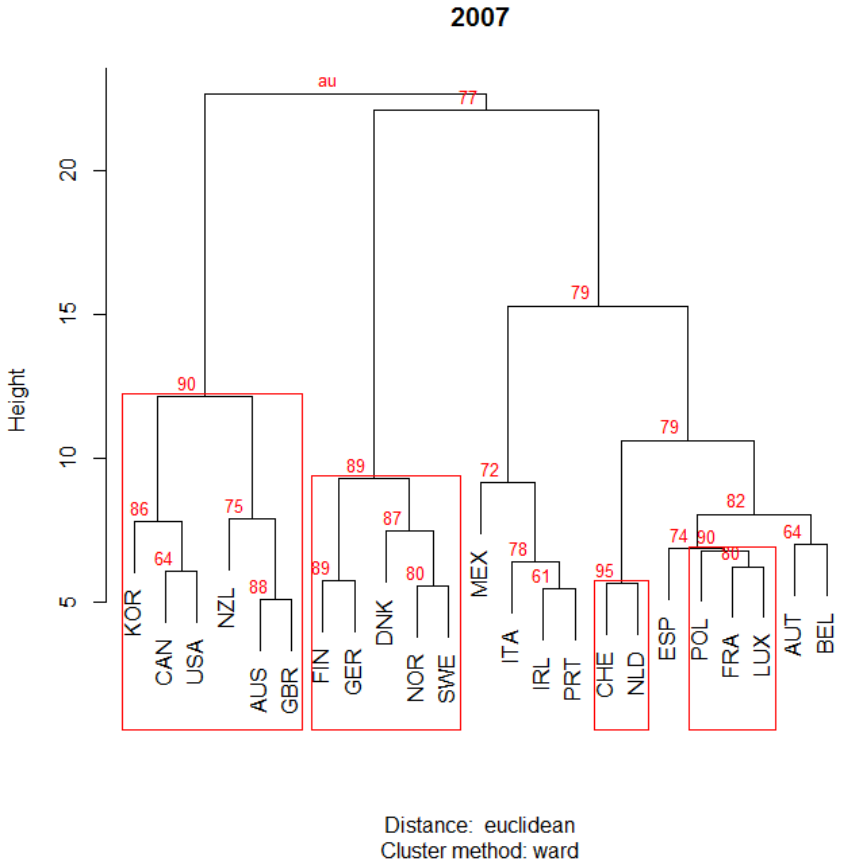
[9] The introduction of five additional countries leads to a re-classification of Poland in a cluster with Greece. In this enlarged sample, we also find high homogeneity between the Czech Republic and Slovakia.

Figure 5: Clustering of OECD countries on the basis of OECD policy scores, 1990.



Note: Authors' calculations based on disability policy country scores covering 20 dimensions, OECD (2003; 2010). Hierarchical cluster analysis: Dendrogram using ward linkage. Red numbers on cluster edges are approximately unbiased (AU) p-values. Red rectangles highlight clusters which are statistically significant at AU p-values ≤ 0.1.

Figure 6: Clustering of OECD countries on the basis of OECD policy scores, 2007.



Note: Authors' calculations based on disability policy country scores covering 20 dimensions, OECD (2003; 2010). Hierarchical cluster analysis: Dendrogram using ward linkage. Red numbers on cluster edges are approximately unbiased (AU) p-values. Red rectangles highlight clusters which are statistically significant at AU p-values ≤ 0.1.

5. Developments since 2007

A qualitative review of disability policy changes that were implemented in OECD countries after 2007 indicates that the trends that we observe for the period 1990 to 2007 did not come to a halt in recent years. Governments continued to reduce inactivity and benefit reliance, while strengthening prevention and support for (re-)integration of workers with health problems. At the same time, reform activity continued to be distributed very unevenly across countries.

5.1 Increased monitoring and early intervention

A continuing strand of reforms consists of efforts to improve disability prevention through monitoring and early intervention during sickness absence. Austria, for instance, introduced a new Labor and Health bill in 2011 which established an informational and consulting service to identify and support workers with a heightened risk for disability (*fit2work*). In analogy to Germany, which established a similar system in 2004 (*Betriebliches Eingliederungsmanagement*), workers who accumulate more than six weeks of sickness absence within one year are identified as having an increased risk. The Austrian system is however less binding than the German one, where the law mandates employers to contact their sick employees and to be responsible for re-integration efforts.

Switzerland increased its focus on rehabilitation with additional reforms in 2008 and 2013, which encouraged the use of vocational rehabilitation (OECD 2014). Particularly strong reform efforts were undertaken in Sweden, which carried out major legislative changes in 2008 (Burkhauser et al. 2014). Sweden strengthened the incentives and improved the opportunities for individuals with disabilities to work. The principal reform component is the establishment of a new timeline for the provision of rehabilitation services, with additional work capacity assessments during sickness. In particular, after six months of receiving sickness benefits, a benefit recipient's work capacity is tested in relation to the regular labor market as a whole (OECD 2013). If a person is found to have remaining work capacity, she comes under responsibility of the public employment services and must accept adequate job offers or loses her benefit entitlement. In Denmark, the government very recently adapted the

sickness benefit scheme. In 2014, the timeline for the assessment of sickness benefit extension was shortened to 22 weeks (previously it was 52 weeks). In 2015 further reforms were implemented, including measures to improve the case management of workers with complex health problems and to strengthen the involvement of employers (Ministry of Economic Affairs 2015).

5.2 Continued efforts to improve gate-keeping and reduce number of beneficiaries

In general, measures to improve early intervention continued to be accompanied by reforms to impose stricter gate-keeping and higher thresholds for benefit application. In Denmark, the 2003 reform increased the level of disability or work incapacity which was required for benefit receipt and became, after a transitional period, applicable to all workers after 2010. Sweden introduced time limits for its sickness benefits: Until July 2008, there was no formal time restriction on the length of sickness absence in the sickness insurance, this was first reduced to 2.5 years and is currently 1 year (although extensions might be applicable). More importantly, however, strict guidelines for sickness absence were introduced in 2008 which were rapidly implemented by Swedish doctors (*Försäkringskassan* 2014; *Skaner et al.* 2011). These guidelines contain general recommendations for sickness absence certification and provide doctors with reference values for the length and extent of sickness absence for different diagnoses.

Norway developed an on-line tool that makes it possible for physicians to compare their sickness certification practice against all other physicians, supporting them when assessing future patients (OECD 2015). In 2011, it also passed an extensive pension reform that restricted access to disability benefits as a form of retirement. The United Kingdom introduced a new and stricter work capability assessment in 2008 and tightened the requirements for beneficiaries to engage in work-related activity (Burkhauser et al. 2014). In Austria, the access to disability benefits (which correspond to a benefit for health-related early retirement) was stopped for persons younger than 50 years of age and replaced by a benefit to rehabilitation programs in 2014.

Several countries intensified their efforts to increase the utilization of graded (i.e. partial) sick leave models. In Finland, the option to graded sick-leave, which had been

introduced in 2007 with a restriction to long absences (> 60 days), was extended to shorter absences (> 14 days) in 2010 (Kausto et al. 2012). In Norway, graded sick-leave was pushed as one component of comprehensive tripartite agreements signed by the government and the employer and employee organizations to foster an inclusive working life (*IW agreements*).

Although efforts to reduce the number of persons on sickness and disability benefits continue to focus primarily on the inflow of new applicants, some attempts have been made to reduce also the stock of beneficiaries. Sweden, for instance, introduced pilot programs to provide disability recipients with incentives to return to work. As pointed out by Burkhauser et al. (2014), however, these measures were not very successful. The United Kingdom carried out a large-scale reassessment of the work capacity of its invalidity benefit claimants. This attempt reassessed in its initial phase a large number of claimants as fit to work. However, due to appeals, there is a large backlog of claims that await assessment which resulted in political controversy and, ultimately, led to very few reactivations (Gaffney 2015).

These examples indicate that recent reforms continued to strengthen activation and re-integration of workers with health impairments, while at the same time they kept protection levels constant or reduced them further. Although we cannot compute complete scores for all observed countries, the available evidence leads us to expect that after 2007 the average OECD integration indicator prolonged its upward and the compensation indicator its downward trend. Behind these average trends, heterogeneity across countries continues to be large and has most likely been increasing. The most decided reform steps that we can observe in recent years took place in the same set of countries which already did most to change their management of sickness and disability in the previous period.

We found little evidence that countries with low reform activity between 1990 and 2007 introduced major changes to their sickness and disability policies in the last years. These countries typically lack a consistent strategy to combine prevention with activation and protection, as well as the institutional set-up which is required to provide an adequate mix of policies and services, incentives and support. Significant need for reform has been identified, among others, in Canada (OECD 2010), Belgium (OECD 2015), and the United States (Autor 2010; Liebman and Smalligan 2013).

Although further in-depth research on policy changes is needed, the available evidence corroborates the findings from the previous sections. In spite of a broad, common trend towards integration, the reform process seems to have led to a higher degree of diversity across groups of advanced industrialized countries with respect to their sickness and disability systems.

6. Summary and conclusions

We used score indicators developed by the OECD for the period 1990 to 2007 to investigate differences in disability policies across countries and their evolution over time. Overall, we observe a considerable amount of reform activity in sickness disability policies across countries in the 1990s and 2000s. A clear and well-documented trend emerges from these reforms, with an intensification of activation and integration policies and (moderate) reduction of protection and compensation. Changes in the level of employer responsibility and incentives for employer involvement as well as measures for program/benefit simplification were, on average, particularly strong. In addition, numerous countries introduced larger programs and/or stronger incentives for workers with health impairments to remain employed. With respect to the compensation dimension, countries tried primarily to reduce the inflow into disability benefits implementing stricter gate-keeping and monitoring. In some instances, a strong interlocking of the sickness and disability systems was achieved.

Behind these average developments, we find significant diversity in disability policies. According to the OECD's scores, the Netherlands introduced by far the most extensive changes to their disability policy. Northern European countries as well as other European countries (United Kingdom, Italy, Poland, Germany, Switzerland) and Australia recorded also far-reaching reforms. Reform activity, as measured by the scores, was much more limited in other countries, such as Belgium, Portugal, Canada, and the United States. In spite of these differences in reform activity as well as in initial conditions, it is possible to single out clusters of countries with similar policies. In its comparative analysis, the OECD (2010) had identified three main country groups, which had strong overlaps with the welfare regime taxonomy associated with the "Liberal", the "Corporatist", and the "Socialdemocratic" worlds of welfare described by Esping-Andersen (1990).

In our clustering analysis, we reach similar conclusions. Using model-based clustering techniques, which rely more on statistical inference than hierarchical aggregation clustering, we find however that the number of distinct country clusters in terms of sickness and disability policy increased over time. The group of Nordic and Continental European countries was not identifiable as a separate cluster in 1990. In spite of common trends in policy re-orientation, the changes of the last two decades thus sharpened the distinction between country groups. Whereas convergence took place in the compensation dimension, intense reform activity by a sub-set of countries led to divergence in the integration dimension. Qualitative evidence on the reforms which were carried out since 2007 suggests that in recent years the heterogeneity between clusters might have further increased, as countries with high reform activity in the previous period made additional efforts to adapt their sickness and disability systems.

These results add to our understanding of strategies and reform activities in the field of sickness and disability policy. They also point to different avenues for future research. First, further research is needed to assess the policy changes which were implemented after 2007. This is particularly important for those European countries, such as Greece, Portugal, and Spain, which underwent large structural adjustment programs in the wake of the Great Recession and the Euro-zone debt crisis. In addition, not all aspects of a comprehensive strategy to tackle health problems and disability are equally well represented by the OECD indicators.

The analytical framework for a comprehensive disability strategy proposed in this paper rests on three pillars: prevention, protection, and activation. The OECD indicators lack coverage of policies which can be associated with the first of these three pillars (prevention), such as the strictness of occupational safety and health regulations. Even aspects of sickness and disability policies which are more closely related to protection and activation are not explicitly addressed in the scores either. Examples include measures such as graded sick-leave benefits, the existence and extent of employment protection in case of sickness, and measures to improve GP's sick-listing practices.

Second, the observed differences in reform intensity and the growing gap in employment-orientation raise the question of the determinants of reform adoption. Scharle et

al. (2015) highlight the role of different welfare regime institutions and of the political context as reform determinants. More research will however be needed, particularly since our results point in the direction of increasing differences between countries groups and country-specific differences within welfare regime types.

Finally, the diversity of strategies and reform pathways calls for the investigation of causal reform effects. The empirical evidence on outcomes associated with particular disability policies and reform steps is growing, but still limited. A review of the available findings would go beyond the scope of the present paper. There is some indication, however, that those countries which – according to the policy scores we investigate in this paper – introduced far-reaching reforms, particularly in the integration dimension, achieved tangible results. Sweden, for instance, was very successful in tackling its large numbers of sickness and disability recipients (OECD 2013). In Switzerland, the repeated reforms of the Swiss Disability Insurance Act have been associated with a decrease by 45% in the number of new disability benefit claimants (OECD 2014). The radical restructuring of sickness and disability policies implemented in the Netherlands, too, reversed the trend of rising disability receipt rates (Everhardt and de Jong 2011; van Sonsbeek and Koning 2013). These countries provide examples for the implementation of comprehensive strategies to address sickness and disability.

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Appendix

A. Additional Tables and Figures

Table A1: Reform intensity across OECD countries and policy dimensions, 1990 to 2007

Country	Compensation	Integration	Total
	Change in indicator score between 1990 and 2007		
Netherlands	-15	20	35
Great Britain	-3	19	22
Norway	-8	14	22
Finland	-3	18	21
Italy	-10	9	19
Luxembourg	-11	8	19
Australia	-2	17	19
Poland	-5	13	18
Denmark	-8	8	16
Germany	-4	10	14
Switzerland	-7	7	14
France	-2	11	13
Sweden	-1.5	11	12.5
New Zealand	-4	8.5	12.5
Austria	-2	10	12
Spain	-7	3	10
Canada	0	9	9
United States	-3	5	8
Belgium	-1	4	5
Ireland	0	5	5
Portugal	1	3	4
Korea	3	1	4
Mexico	-2	2	4
Total	-4.1	9.4	13.5

Note: Data for Mexico, Italy and France refer to 1985 instead of 1990.

Table A2: Cluster means for each measure (1990).

	Compensation										Integration									
	X1	X2	X3	X4	X5	X6	X7	X8	X9	X_{10}	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y_{10}
Clusters based on all indicators																				
	2.7	1.1	1.4	1.3	2.9	3.0	1.1	1.1	2.3	4.1	1.3	1.0	0.7	1.3	1.6	1.9	0.7	1.4	2.0	1.9
	3.1	3.3	2.7	3.4	4.0	2.8	3.5	3.3	3.8	4.1	2.6	1.8	1.4	0.3	2.3	1.9	2.1	1.9	1.2	1.7
Clustering based on indicators for the compensation dimension																				
	2.7	1.2	1.5	1.3	2.9	3.0	1.2	1.2	2.3	4.1										
	3.1	3.3	2.7	3.4	4.0	2.8	3.5	3.3	3.8	4.1										
Clusters based on indicators for the integration dimension																				
											0.5	0.0	1.0	1.0	1.0	2.0	1.0	1.5	5.0	2.5
											2.8	2.0	2.0	0.2	3.8	1.8	4.0	2.8	3.2	1.0
											2.3	1.6	1.1	0.7	1.9	2.2	1.2	1.4	0.5	1.9
											1.5	1.5	0.5	0.0	0.0	0.0	0.0	1.5	0.0	2.5

Source: OECD; authors' calculations. *Note:* The cluster numbers correspond to the clusters identified through model-based clustering and displayed in Table 2. For instance, cluster 1 in the version based on all indicators consists of the following countries: AUS, CAN, GBR, IRL, KOR, NZL and USA.

Table A3: Cluster means for each measure (2007).

	Compensation										**Integration**									
	X1	X2	X3	X4	X5	X6	X7	X8	X9	X_{10}	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y_{10}
Clusters based on all indicators																				
1	3.2	1.2	1.3	1.3	2.7	2.5	0.5	1.2	1.7	3.8	2.0	2.7	2.7	2.5	1.8	1.9	0.8	1.8	4.0	3.3
2	4.3	3.8	2.5	3.1	2.5	2.8	1.9	3.8	3.5	2.3	3.4	3.3	3.5	2.7	3.4	3.0	4.5	4.0	3.1	2.2
3	2.6	2.2	2.2	2.9	2.8	1.6	3.3	2.3	3.9	3.1	3.1	2.4	2.4	1.1	2.8	2.4	1.1	1.9	0.4	1.9
Clusters based on indicators for the compensation dimension																				
1	2.7	1.5	1.2	1.0	2.5	2.0	0.5	0.8	1.2	4.8										
2	3.4	2.7	2.3	2.9	2.7	2.3	2.4	2.9	3.6	2.6										
Clustersbased on indicators for the integration dimension																				
1											3.5	3.5	3.5	2.5	3.1	2.9	3.7	3.8	3.4	2.3
2											2.8	2.5	2.2	1.3	2.7	2.2	1.0	1.7	0.7	2.2
3											0.5	0.5	3.0	3.5	1.5	2.0	1.0	1.5	5.0	4.0

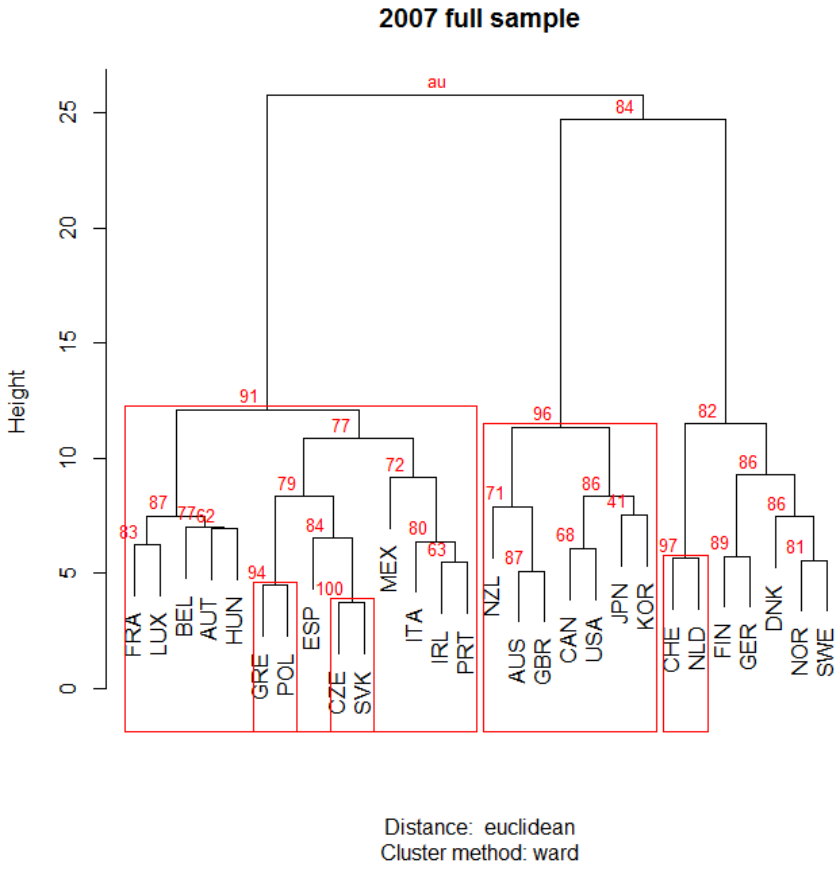
Source: OECD; authors' calculations. *Note:* The cluster numbers correspond to the clusters identified through model-based clustering and displayed in Table 2. For instance, cluster 1 in the version based on all indicators consists of the following countries: AUS, CAN, GBR, KOR, NZL and USA.

Table A4: Model-based clustering results for 2007, balance and full sample

		2007			2007 full sample		
		ALL	X	Y	ALL	X	Y
# of clusters		3	2	3	3	2	3
# of obs		23	23	23	28	28	28
Country clusters	1	AUS CAN GBR KOR NZL♦ USA	AUS CAN GBR KOR	CAN USA	AUS CAN GBR JPN KOR NZL♦ USA	AUS CAN GBR KOR	CAN USA
	2	AUT◊ CHE DNK FIN GER NLD NOR SWE	AUT BEL CHE DNK ESP FIN FRA GER IRL ITA LUX MEX NLD NOR NZL POL PRT SWE USA	AUS♦ AUT♦ CHE◊ DNK FIN GBR GER NLD NOR SWE	AUT• CHE♦ DNK FIN GER NLD NOR SWE	AUT BEL CHE CZE DNK ESP FIN FRA GER GRE HUN IRL ITA JPN LUX MEX NLD NOR NZL POL PRT SVK SWE USA	AUS AUT BEL CHE DNK FIN FRA GBR GER HUN JPN KOR LUX♦ MEX NLD NOR NZL SWE
	3	BEL♦ ESP FRA IRL♦ ITA LUX♦ MEX POL PRT		BEL° ESP♦ FRA♦ IRL ITA KOR LUX◊ MEX NZL♦ POL PRT	BEL♦ CZE ESP FRA GRE HUN◊ IRL♦ ITA LUX♦ MEX POL PRT SVK		CZE◊ ESP♦ GRE IRL♦ ITA POL◊ PRT♦ SVK

Note: Uncertainties for all classifications listed above are less than 0.001 unless otherwise indicated (♦ < 0.01, ◊ < 0.05, • < 0.1, ° ≥ 0.1).

Figure A1: Clustering of OECD countries on the basis of policy scores, 2007 full sample.



Note: Authors' calculations based on disability policy country scores covering 20 dimensions, OECD (2003; 2010). Hierarchical cluster analysis: Dendrogram using ward linkage. Red numbers on cluster edges are approximately unbiased (AU) p-values. Red rectangles highlight clusters which are statistically significant at AU p-values ≤ 0.1.

B. OECD scores

Table B1: OECD disability policy typology: classification of the compensation scores.

DIMENSION	*5 points*	*4 points*	*3 points*	*2 points*	*1 point*	*0 points*
X. Compensation						
X1. Population coverage	Total population (residents)	Some of those out of the labour force (*e.g.* congenital)	Labour force plus means-tested non-contrib. scheme	Labour force with voluntary self-insurance	Labour force	Employees
X2. Minimum required disability or work incapacity level	0-25%	26-40%	41-55%	56-70%	71-85%	86-100%
X3. Disability or work incapacity level for full benefit	< 50%	50-61%	62-73%	74-85%	86-99%	100%
X4. Maximum disability benefit payment level	RR > = 75%, reasonable minimum	RR > = 75%, minimum not specified	75 > RR > = 50%, reasonable minimum	75 > RR > = 50%, minimum not specified	RR < 50%, reasonable minimum	RR < 50%, minimum not specified
X5. Permanence of benefit payments	Strictly permanent	De facto permanent	Self-reported review only	Regulated review procedure	Strictly temporary, unless fully (= 100%) disabled	Strictly temporary in all cases
X6. Medical assessment criteria	Treating doctor exclusively	Treating doctor predominantly	Insurance doctor predominantly	Insurance doctor exclusively	Team of experts in the insurance	Insurance team and two-step procedure
X7. Vocational assessment criteria	Strict own or usual occupation assessment	Reference is made to one's previous earnings	Own-occupation assessment for partial benefits	Current labour market conditions are taken into account	All jobs available taken into account, leniently applied	All jobs available taken into account, strictly applied
X8. Sickness benefit payment level	RR = 100% also for long-term sickness absence	RR = 100% (short-term) > = 75% (long-term) sickness absence	RR > = 75% (short-term) > = 50% (long-term) sickness absence	75 > RR > = 50% for any type of sickness absence	RR > = 50% (short-term) < 50% (long-term) sickness absence	RR < 50% also for short-term sickness absence
X9. Sickness benefit payment duration	One year or more, short or no wage payment period	One year or more, significant wage payment period	Six-twelve months, short or no wage payment period	Six-twelve months, significant wage payment period	Less than six months, short or no wage payment period	Less than six months, significant wage payment period
X10. Sickness absence monitoring	Lenient sickness certificate requirements	Sickness certificate and occupational health service with risk prevention	Frequent sickness certificates	Strict follow-up steps with early intervention and risk profiling, but no sanctions	Strict controls of sickness certificate with own assessment of illness if necessary	Strict follow-up steps with early intervention and risk profiling, including sanctions

Source: OECD (2010), Annex 3.1. Note: RR = replacement rate.

Table B2: OECD disability policy typology: classification of the integration scores.

DIMENSION	*5 points*	*4 points*	*3 points*	*2 points*	*1 point*	*0 points*
Y. Integration						
Y1. Consistency across supports in coverage rules	All programmes accessible	Minor discrepancy, flexible mixture	Minor discrepancy, restricted mixture	Major discrepancy, flexible mixture	Major discrepancy, restricted mixture	Strong differences in eligibility
Y2. Complexity of the benefits and supports systems	Same agency for assessment for all programmes	One agency for integration, benefits co-ordinated	Same agency for benefits and vocational rehabilitation	One agency for integration, benefits not co-ordinated	Different agencies for most programmes	Different agencies for all kinds of assessments
Y3. Employer obligations for their employees and new hires	Major obligations towards employees and new applicants	Major obligations towards employees, less for applicants	Some obligations towards employees and new applicants	Some obligations towards employees, none for applicants	No obligations at all, but dismissal protection	No obligations of any kind
Y4. Supported employment programmes	Strong programme, permanent option	Strong programme, only time-limited	Intermediary, also permanent	Intermediary, only time-limited	Very limited programme	Not existent
Y5. Subsidised employment programmes	Strong and flexible programme, with a permanent option	Strong and flexible programme, but time-limited	Intermediary, either permanent or flexible	Intermediary, neither permanent nor flexible	Very limited programme	Not existent
Y6. Sheltered employment programmes	Strong focus, with significant transition rates	Strong focus, but largely permanent employment	Intermediary focus, with some "new" attempts	Intermediary focus, "traditional" programme	Very limited programme	Not existent
Y7. Comprehensiveness of vocational rehabilitation	Compulsory rehabilitation with large spending	Compulsory rehabilitation with low spending	Intermediary view, relatively large spending	Intermediary view, relatively low spending	Voluntary rehabilitation with large spending	Voluntary rehabilitation with low spending
Y8. Timing of vocational rehabilitation	In theory and practice any time (*e.g.* still at work)	In theory any time, in practice not really early	Early intervention increasingly encouraged	Generally *de facto* relatively late intervention	After long-term sickness or for disability recipients	Only for disability benefit recipients
Y9. Disability benefit suspension option	Two years or more	At least one but less than two years	More than three but less than 12 months	Up to three months	Some, but not for disability benefits	None
Y10. Work incentives for beneficiaries	Permanent in-work benefit provided	Benefit continued for a considerable (trial) period	Income beyond pre-disability level allowed	Income up to pre-disability level, also partial benefit	Income up to pre-disability level, no partial benefit	Some additional income allowed

Source: OECD (2010), Annex 3.1. Note: RR = replacement rate.