

Monitoring flexicurity policies in the EU with dedicated composite indicators

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Monitoring flexicurity policies in the EU with dedicated composite indicators¹

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Abstract

The notion of *flexicurity* promotes the idea of compensation of labour market deregulation (= flexibilization) with advantages in employment and social security. To monitor effects of flexicurity policies in Europe, flexicurity indices are constructed from (a) scores of the strictness of employment protection legislation provided by the OECD, (b) qualitative juridical data on social security benefits (unemployment insurance, public pensions, etc.), and (c) data on the dynamics of employment types (permanent, temporary, full-time, part-time, self-employed, etc.). The empirical investigation shows that, contrary to political promises and theoretical opinions, the current deregulation of European labour markets is not compensated with improvements in social security.

Keywords: Flexicurity, employment security, social security, employment protection legislation, statistical indices.

JEL Classification: C43 — Index Numbers and Aggregation, C51 — Model Construction and Estimation, J21 — Labor Force and Employment, Size, and Structure, J26 — Retirement; Retirement Policies, J65 — Unemployment Insurance; Severance Pay; Plant Closings, J83 — Workers' Rights, J88 — Public Policy.

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1 Introduction: Economical and social background

Measure what is measurable, and make measurable what is not so.

Galileo (1564–1642)

The general employment insecurity has significantly increased in Europe during the last 20 years. In addition to unemployment, the number of atypically employed, like part-time, fixed-term, or self-employed, has disproportionately grown since the 1980s (EuroStat 2003). The atypical employment is not only less secure but also provides less carrier prospects and training chances (OECD 2002, p. 156–159). Besides, it often disqualifies workers from social benefits, since the eligibility of atypically employed is substantially lower than that of permanently employed (OECD 2002, p. 131). The growth of atypical employment can be explained by several factors.

1. **Globalization.** Investments under globalization are easily made worldwide, industries and services move from one country to another, making permanent employment restrictive for efficient economic performance. The collapse of the Socialist Block gave way to unconstrained capitalism. The market economy became total, imposing economic priorities over social ones.

To improve the competitiveness of firms in the background of exporting industries to countries with cheap labour, European employers required the liberalization of national economies; for the deregulation of labour markets see Esping-Andersen and Regini (2000). Some governments yielded their pressure and the employment protection legislation (EPL) became more relaxed, resulting in a number of negative effects on labour markets and social structures (OECD 1999, section 2).

2. **Rapid technological changes.** Expanding information technologies are often implemented within relatively short-time projects. Some projects are realized by small temporary teams with a limited longevity and even by single individuals. These particularities and dynamics are transmitted to all branches which use information technologies and depend on their updates. Thus, the share of temporary employment in the total employment in France, Italy, Netherlands, and Spain doubled or tripled during 1985–2000, attaining in Spain 35% (OECD 2002, p. 133). The annual growth of self-employment in the non-agricultural sector in the OECD countries in 1990–1998 was 1.7%, whereas that of civilian employment 1% (OECD 2000, p. 159).
3. **Long-term unemployment.** During the 1990s the long-term unemployment in the OECD countries has become a more serious problem than before. In 1990 the unemployed for 6–12 months and for more than 12 months constituted respectively 44.6 and 30.9% of all unemployed. In 1998 these figures attained 48.6 and 33.4% (OECD 2002, p. 322). This means that the average duration of unemployment together with the *share* of long-term unemployment in the total unemployment has increased. This structural change indicates at an unusual social process. Its consequence is that the

workers having experienced a long-time unemployment “are more likely to be offered shorter contracts than other workers” (OECD 2002, p. 156).

4. **Immigration.** As stated by the OECD (2001, p. 171), “While admissions of new permanent foreign workers are currently very few in number, especially in the European OECD countries, the temporary employment of foreigners appear to be becoming more widespread. . . . The temporary employment of foreign workers introduces flexibility into the labour market.” Moreover, foreigners are overrepresented among long-term unemployed (OECD 2001, p. 181–182) whose chances to get a ‘normal’ permanent job are relatively low (OECD 2002, p. 156).
5. **High welfare.** Finally, high earnings and accumulated welfare in some European countries enabled a fraction of the population to turn to part-time jobs. For instance, the demand for part-time employment by full-time employed in the Netherlands is twice as large than vice versa. For women this ratio is even higher and surpasses 3 : 1 (OECD 1999, p. 33).

The growth of atypical employment (= other than permanent full-time) and intensive labour market transitions (Schmid and Gazier 2002) result in a new social situation which should be adequately reflected in the public policy. In most of the post-war Europe, employment relations were regulated by rather constraining employment protection legislation and by collective agreements between employers and trade unions. The actual contradiction between the flexibilization pursued by employers and strict labour market regulation defended by trade unions makes topical the discussion on flexibilization and employment protection legislation with regard to economical performance and unemployment.

The advantages and disadvantages of labour market regulation/flexibility versus employment were investigated by numerous scholars; for a review focusing on European welfare states as defined by Esping-Andersen (1990) see Esping-Andersen (2000a–b). As concluded by Esping-Andersen (2000b, p. 99), ‘the link between labour market regulation and employment is hard to pin down’. The same empirical evidence, that unemployment is practically independent of the strictness of employment protection legislation, was reported by the OECD (1999, pp. 47–132). There were even cases when the same legislative changes caused different effects. For instance, the impact of almost equal deregulation measures on the use of fixed-term contracts ‘was sharply different’ in Germany and Spain (OECD, 1999, p. 71).

At the same time, a good labour market performance under little regulation was inherent in the ‘Anglo-Saxon model’, that is, USA, Canada, United Kingdom, and Australia (Esping-Andersen 2000a). The deregulation of labour market in the Netherlands, which had a different kind of economy, coincided with the ‘Dutch miracle’ of the 1990s (Visser and Hemerijck 1997, Gorter 2000, van Oorschot 2000). A similar Danish practice in the background of ‘Eurosclerosis’ (Esping-Andersen 2000a, p. 67) was successful as well (Björklund 2000, Braun 2001, Madsen 2004). All of these convinced some scholars and politicians of the harmlessness and even usefulness of labour market deregulation. It was believed that employment flexibility improved competitiveness of firms and thereby stimulated production, which in turn stimulated labour markets.

The claims for flexibilization met a hard resistance, especially in countries with old traditions of struggle for labour rights. Wilthagen and Tros (2004, p. 179) reported with a reference to Korver (2001) that the *Green Paper: Partnership for a New Organisation of Work* of the European Commission (1997) ‘which promoted the idea of social partnership and balancing flexibility and security’ got a very negative response from French and German trade unions, because ‘the idea of partnership represents a threat to the independence of unions and a denail of the importance of worker’s rights and positions, notably at the enterprise level’. The ILO published a report, concluding that ‘the flexibilization of the labour market has led to a significant erosion of worker’s rights in fundamentally important areas which concern their employment and income security and (relative) stability of their working and living conditions’ (Ozaki 1999, p. 116).

To handle the growing flexibility of employment relations with lower job security and decreasing eligibility to social benefits, the notion of *flexicurity* has been introduced. Wilthagen and Tros (2004) ascribe its conception to a member of the Dutch Scientific Council of Government Policy, Professor Hans Adriaansens, and the Dutch Minister of Social Affairs, Ad Melkert (Labour Party). In the autumn of 1995 Adriaansens launched this catchy word in speeches and interviews, having defined it as a shift from job security towards employment security. He suggested to compensate the decreasing job security due to fewer permanent jobs and easier dismissals by improving employment opportunities and social security.

For instance, a relaxation of the employment protection legislation was supposed to be counterbalanced by providing improvements to temporary and part-time workers, supporting life-long professional training which facilitates changes of jobs, more favorable regulation of working time, and additional social benefits. In December 1995 Ad Melkert presented a memorandum *Flexibility and Security*, on the relaxation of the employment protection legislation of permanent workers, provided that temporary workers got regular employment status, without however adopting the concept of flexicurity as such. By the end of 1997 the Dutch parliament accepted flexibility/security proposals and shaped them into laws which came in force in 1999.

The OECD (2004, p. 97–98) ascribes the flexicurity to Denmark with its traditionally weak employment protection, highly developed social security, and easiness to find a job, see also Madsen (2004). Regardless of the priority in inventing the word *flexicurity*, both countries were recognized “good-practice examples” (Braun 2001, van Oorschot 2001) and inspired the international flexicurity debate. Although some authors still consider flexicurity a specific Dutch/Danish phenomenon (Gorter 2000), the idea spread all over Europe in a few years; for a selection of recent international contributions see Jepsen and Klammer (2004). At the Lisbon summit of 2000 the EU had already referred to this concept (Vielle and Walthery 2003, p. 2; Keller and Seifert 2004, p. 227).

Since the concept is rather new, there is neither an established definition of flexicurity, nor means for its quantitative characterization. This study attempts to operationally define flexicurity, reflecting viewpoints of neoliberals and trade unions. The flexicurity indices for 16 European countries for the years 1990–2003 are derived from (a) scores of employment protection legislation provided by the OECD (1999, pp. 52–53 and 2004, pp. 61–125), (b)

qualitative juridical data on five social security benefits (unemployment insurance, public pensions, sick leave, maternity/parental leave, and paid holidays) available from the OECD (2002, p. 144–150) and European Commission (2004), and (c) data on the dynamics of employment types (permanent, temporary, full-time, part-time, self-employed, etc.) available from EuroStat (2004). The factual rather than purely legislative situation is reflected by taking into account the variable size of employment groups with different eligibility to social security benefits.

The results are not encouraging. Contrary to theoretical opinions and political promises, the current deregulation of European labour markets is not adequately compensated by improvements in social security. After the flexicurity advantages/disadvantages have been accounted proportionally to the size of the affected groups, the factual trends turn out to be negative even from the viewpoint of neoliberals, to say nothing of trade unions. The reciprocity between the advantages/disadvantages is illusory, because gains are smaller than losses and winners are fewer than losers. Thus the study warns against promoting flexicurity policies with no operational control and empirical feedback. To surmount the negative trends, some improvements of flexicurity policies are suggested to meet the requirements of trade unions.

2 Flexicurity policies as flexibility versus security trade-offs

The comprehensive 758-page report on flexicurity (Klammer and Tillmann 2001, p. 16) refers to the definition of Wilthagen (2001, p. 1). The definition remained actual and was used three years later by Wilthagen and Tros (2004, p. 169). The only modification is the substitution of the word ‘deliberate’ for the former ‘coordinated’:

Definition 1 *[Flexicurity is] a policy strategy that attempts, synchronically and in a deliberate way, to enhance the flexibility of labour markets, work organization and labour relations on the one hand, and to enhance security — employment security and social security — notably for weak groups in and outside the labour market on the other hand.*

Wilthagen and Tros (2004, p. 170) emphasize that flexicurity is not ‘simply social protection for flexible work forces as Klammer and Tillmann (2001), Ferrera et al (2001) and many others tend to analyze it’. According to Wilthagen and Tros (2004, p. 167), flexicurity policies aim at increasing the competitiveness of European economies by their further liberalization:

... The mission of the EU as formulated in Lisbon in 2000 clearly reflects the ambition of enhancing both flexibility and security as the aims ‘to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth’...

Therefore, ‘enhancing security’ is not the primary goal. It is rather a means to attain a compromise between employers, who seek for the deregulation of labour markets, and employees, who wish to protect their rights. It explicitly manifests itself in the description of flexicurity as a flexibility versus security trade-off; see Visser and Hemerijck (1997, p. 44) and Wilthagen and Tros (2004, p. 171). Let us consider notions *Flexibility* and *Security* in some detail to better understand which trade is proposed.

Flexibility versus security The *Flexibility* stands for a multivariate aggregate which, according to the OECD (1989, p. 13–20), includes:

1. *External numerical flexibility* (*employment flexibility* by Standing 1999, p. 101–114; *numerical flexibility* by Regini 2000, p. 16, *external quantitative flexibility* by Vielle and Walthery 2003, p.8) defined as the employer’s ability to adjust the number of employees to current needs. In other words, it is the ease of ‘hiring and firing’ which manifests itself in the mobility of workers between employers (external job turnover).
2. *Internal numerical flexibility* (*work process* or *functional flexibility* by Standing 1999, p. 114–116; *temporal flexibility* by Regini 2000, p. 17, *internal quantitative flexibility* by Vielle and Walthery 2003, p.8) which is the employer’s ability to modify the number and distribution of working hours with no change of the number of employees. It appears in shiftworking, seasonal changes in the demand for labour, weekend/holiday working, overtime and variable hours, see also Keller and Seifert (2004, p. 228).
3. *Functional flexibility* (*job structure flexibility* by Standing 1999, p. 117–124; *internal-functional flexibility* by Keller and Seifert 2004, p. 228, *internal qualitative flexibility* by Vielle and Walthery 2003, p. 8), that is, the employers’ ability to move their employees from one task or department to another, or to change the content of their work. It is reflected by the mobility of workers within enterprises (internal labour turnover), see also Regini (2000, p. 16).
4. *Wage flexibility* (*flexible* or *variable pay* by Wilthagen and Tros 2004, p. 171), which enables employers to alter wages in response to changing labour market or competitive conditions. Typically, employers seek for applying individual performance-linked rewarding systems additionally to (or instead of) usual collective agreements independent of individual performance, see also Regini (2000, p. 16–17, 19–21).
5. *Externalization flexibility* (*external functional flexibility* by Keller and Seifert 2004, p. 228; one of constituents of *job structure flexibility* by Standing 1999, p. 123; *external qualitative flexibility* by Vielle and Walthery 2003, p.8), that is, the employers’ ability to order some works from external workers or firms without employment contracts but with commercial contracts in such forms as distance working, teleworking, virtual organizations, and *entreployees*, that is, self-entrepreneurial activities, see Pongratz and Voß (2003).

The notion of *Security* also includes several issues. For instance, Standing (1999, p. 52) enumerates seven types of security. They are not all relevant to the flexicurity debate, like *labour market security* through state-guaranteed full employment in socialist countries. Within the debate Vielle and Walthery (2003, p. 18–19), following Dupeyroux and Ruellan (1998), focus the attention at compensatory functions of securities in case of unemployment, illness, advancing age, maternity, invalidity, as well as exceptional medical or family burdens (decommodification in the sense of Esping-Andersen (1990)). More specifically, Wilthagen, Tros and van Lieshout (2003, p. 4) restrict consideration to the following four types of security:

1. *Job security (employment security)* by Standing (1999, p. 52), ‘the certainty of retaining a specific job with a specific employer’. It is guaranteed by the protection of employees against dismissals and against significant changes of working conditions. This is the main subject of the employment protection legislation.
2. *Employment/employability security (job security)* by Standing (1999, p. 52), the ‘certainty of remaining at work (not necessarily with the same employer)’. It means the availability of jobs for dismissed and unemployed, corresponding to their qualification and previous working conditions. The employability of job seekers can be improved by life-long professional training which can be offered both by employers and by training programs within active labour market policies; see Keller and Seifert (2004, p. 235). Tros (2004, p. 5) also mentions *entreploees*, organization of firm-firm job pools, and facilities for work-work transitions.
3. *Income (social) security*, the ‘income protection in the event that paid work ceases’. Standing considers it more generally as protection of income through minimum wage machinery, wage indexation, comprehensive social security, including progressive taxation, provisions for old age (post-employment security by Keller and Seifert 2004, p. 236–238), etc.
4. *Combination security* (not considered by other authors cited), ‘the certainty of being able to combine paid work with other social responsibilities and obligations. This last form of security cannot be traced back to the other forms of security.’ Tros (2004, p. 5) explains it further as a work-life balance, work-family balance, early flexible part-time retirement, flexible working hours, and leave facilities.

Thus, a flexicurity policy is imagined as an increase in the four types of *Flexibility* compensated by improvements in five types of *Security*.

3 Problems in tracing flexicurity policies with matrices

Matrices like in Table 1 are often suggested ‘as a heuristic tool to trace flexicurity policies as specific trade-offs’ (Wilthagen and Tros 2004, p. 171). Table 1 is taken from Tros’

Table 1: The matrix aimed at tracing flexibility versus security trade-offs with a flexicurity policy for older workers as given by Tros (2004)

Flexibility types	Security types			
	Job security	Employment security	Income security	Combination security
External numerical		Firm-firm job pools Facilities work-work transitions Older <i>entreprenees</i>	Retirement arrangements	
Internal numerical	Part-time work Flexible retirement Part-time <i>entreprenees</i>		Flexible retirement	Part-time retirement Flexible age (pre)pension Flexible working hours Leave-facilities
Functional	Education/training Adaptation in working hours/tasks	Education/training Seniority/bridge jobs Job-rotation Age-aware career and job structures		

Table 2: The Dutch Law on Flexibility and Security (extraction) from January 1, 1999, as given by Wilthagen and Tros (2004), which cannot be inscribed into Table 1

Flexibility	Security
<ul style="list-style-type: none"> • Adjustment of the regulation of fixed-term employment contracts: after 3 consecutive contracts or when the total length of consecutive contracts totals 3 years or more, a permanent contract exists (previously this applied to fixed-term contracts that had been extended once). • The obligation of temporary work agencies (TWA) to be in possession of a permit has been withdrawn. The maximum term for this type of employment (formerly 6 months) is abolished as well. • The notice period is in principle 1 month and 4 months at maximum (used to be 6 months). 	<ul style="list-style-type: none"> • Introduction of so-called presumptions of law which strengthen the position of atypical workers (regarding the existence of an employment contract and the number of working hours agreed in that contract); the existence of an employment contract is more easily presumed. • A minimum entitlement to three hours' pay for on-call workers each time they are called in to work. • Regulation of the risk of non-payment of wages in the event of there being no work for an on-call worker: the period over which employers may claim that they need not pay wages for hours not worked has been reduced to six months. • A worker's contract with a TWA is considered a regular employment contract; only in the first 26 weeks are the agency and the agency worker allowed a certain degree of freedom with respect to starting and ending the employment relationship. • Special dismissal protection has been introduced for employees engaged in trade union activities.

(2004) paper on flexicurity policies for old-aged workers. The cells of the table show policy measures relevant to the intersecting types of flexibility and security. Some measures are multi-relevant, like *entreplooyees*, appearing at several row/column intersections. Such tables well illustrate the compound structure of *Flexibility* and *Security* but at a closer look fail to describe flexicurity trade-offs.

No fit of actual policy measures to the table cells One bottle-neck is that Table 1 provides no space for locating deregulation-only measures or purely security innovations. In particular, the Dutch Law on Flexibility and Security summarized in Table 2 cannot be inscribed into Table 1. Indeed, the Dutch Law consists of a number of items, each contributing either to flexibility, *or* to security. The cells of Table 1, on the contrary, combine certain types of flexibility *and* security simultaneously. Therefore, no item of the Dutch Law fits to any cell of the table.

Aiming at classification rather than at compensation issues Besides, Table 1 is aimed at *classifying* policy measures into flexibility/security types instead of *measuring* their contribution to flexibility/security required for tracing trade-offs. For instance, trading boats for cars requires an exchange rate expressed in some units, even if conditional, and the same is required for tracing flexibility/security trade-offs. In a sense, Table 1 only suggests which types of boats are exchanged for which types of cars with no further specificity. Moreover, the simultaneous classification into flexibility *and* security types makes policy measures ambiguous (in favor of flexibility or rather security?) which, concealing the compensation issues, creates an illusion of a ‘deliberate’ solution.

For instance, consider *Firm-firm job pools* at the intersection of row *External numerical flexibility* and column *Employment security*. If it is a flexibility measure to ‘softly’ dismiss workers (it stands in the row *External numerical flexibility*!) then the equivalent social compensation should be specified. If it is a security measure against easy dismissals (it stands in the column *Employment security*!) then it is too weak because it provides poorer career opportunities than retaining the same job. If it is thought to combine both flexibility and security in a ‘deliberate’ rate then it is too vague to be taken seriously.

The column *Income security* is even less clear. What can *Retirement arrangements* in the row *External numerical flexibility* mean? That a dismissed worker will retire? And additionally will get a pension equivalent to the wage? What can *Flexible retirement* in the row *Internal numerical flexibility* mean? That a non-benevolent part-timer gets additionally a compensatory part-time retirement? In which rate then?

Insufficient dimensionality The third reason why the matrix in Table 1 is little appropriate for tracing flexicurity trade-offs is its insufficient 2D-dimensionality to represent all the information required. It only provides the information on (a) what the measure, (b) its *simultaneous relevance* to one type of *Flexibility* and to one type of *Security*, without estimating the effective contributions to *Flexibility* and/or *Security*. The relevance and

contributions to several flexibility/security types, which is typical in actuality, cannot be reflected. To surmount this shortage, one has to describe a policy measure by a 9-dimensional vector

$$\text{Policy measure} \leftrightarrow \underbrace{(\Delta x_1, \dots, \Delta x_5)}_{\substack{\text{increments} \\ \text{in 5 types of} \\ \text{flexibility} \\ = \text{vector } \Delta X}} \underbrace{(\Delta y_1, \dots, \Delta y_4)}_{\substack{\text{increments} \\ \text{in 4 types of} \\ \text{security} \\ = \text{vector } \Delta Y}} .$$

For example, deregulation-only and security-only measures are described by 9-dimensional vectors $(\Delta x_1, \dots, \Delta x_5, 0, \dots, 0)$ and $(0, \dots, 0, \Delta y_1, \dots, \Delta y_4)$, respectively, and a policy measure which enhances the first type of flexibility is represented by vector $(\Delta x_1, 0, \dots, 0)$.

If quantifying contributions to the nine flexibility/security types is difficult then at least the verbal 9-dimensional format should be respected: (a) What the policy measure, (b) Which *contributions* to the five flexibility types, and (c) Which *contributions* to the four security types.

Double functionality of factors and reduction of their number Let us see, whether the dimensionality of flexicurity policies is indeed that high, or can be lowered down. Note that the security factors, except *Income (social) security*, are the flexibility factors regarded from the security viewpoint and ‘securitively’ labelled.

Job security is just the inverse of the *External numerical flexibility*. It decreases proportionally to the growth of *External numerical flexibility*, and vice versa. Therefore, considering *Job security* within *Security* instead of *Flexibility* means accounting debts for credits. It should be accounted once, and actually within the increasing *Flexibility*.

Employment security is closely interrelated with *Internal numerical* and *Functional flexibility*. Variable tasks, training, and using variable hours are attributes of internal numerical and functional flexibility. Employees are compelled to meet the increasing requirements of employers under the increasing risk of unemployment. At the same time, these measures are presented as employment security measures, because without these measures the employer will more likely look for new personnel, which means an increasing risk of dismissals. Thus, the *Employment security* in the given form is but the inverse of two kinds of *Flexibility*.

The *Combination security* is a ‘positively-minded’ reformulation of negative consequences of three types of flexibility (*External numerical*, *Internal numerical*, and *Externalization*). For instance, *entreploees*, flexible working hours, part-time work, and early retirement are all on the flexibility agenda. Having been reformulated as combination security measures, they look as consolations for non-benevolently self-employed, flexible-hours workers, part-timers, or early retired. Indeed, every cloud has a silver lining.

For the *Wage flexibility*, there is no security measure even for consolation.

In sum, the *Security* against *Flexibility* looks thin rather than full-valued. It has little sense to oppose all types of security to flexibility, because the latter implies most of the former. With minor reservations, the **real room for tracing trade-offs contains five flexibility sub-indices against one security index *Income (social) security***.

Roughly speaking, the situation is reduced to money compensations to workers who suffer from flexibilization. It is exactly the axis of bargaining between employers and trade unions which struggle for guaranteed jobs and stable wages instead of accepting inequivalent social security benefits.

4 Monitoring flexicurity policies in a vector space

Restrict attention to two main factors of flexicurity, *Strictness of employment protection legislation (EPL)* and *Social (income) security* represented quantitatively. Recall that the flexicurity debate originates from claims to relax the EPL which constrains the external numerical flexibility. Consequently, the *Strictness of EPL* can be regarded as an indicator of the *External numerical flexibility* which plays the key role in the debate. As for the latter factor, its prime importance is explained in the last paragraph of the previous section.

Thus our consideration is reduced to one *Flexibility* and one *Security* dimension. Recall that in a two-commodity space, a trade-off is an indifference curve along which a decrease in one commodity is compensated by an increase in another commodity. Our case is shown in Figure 1. The frontal horizontal axis *Strictness of EPL* displays the strictness of employment protection legislation measured in some conditional %. The strictness grows from left to right, implying flexibility at the left hand and rigidity at the right hand:

$$\text{Flexibility} = 100\% - \text{Strictness of EPL} .$$

The second axis *Security* shows the aggregated employment and social security also measured in some conditional %. States of the society are depicted by points (vectors) in the two-dimensional plane *Flexibility–Security*.

To speak of a trade-off, one has to assume a social preference. A preference is usually represented by a utility function which takes greater values at more preferable points and remains constant at equivalent points joined into *indifference curves* (= trade-offs). The indifference curves are but points of the same height on the utility hill; see Figure 1. A flexicurity policy is imagined as a motion along one of such indifference curves towards a higher flexibility, while the loss in the employment protection being compensated by a gain in the social security.

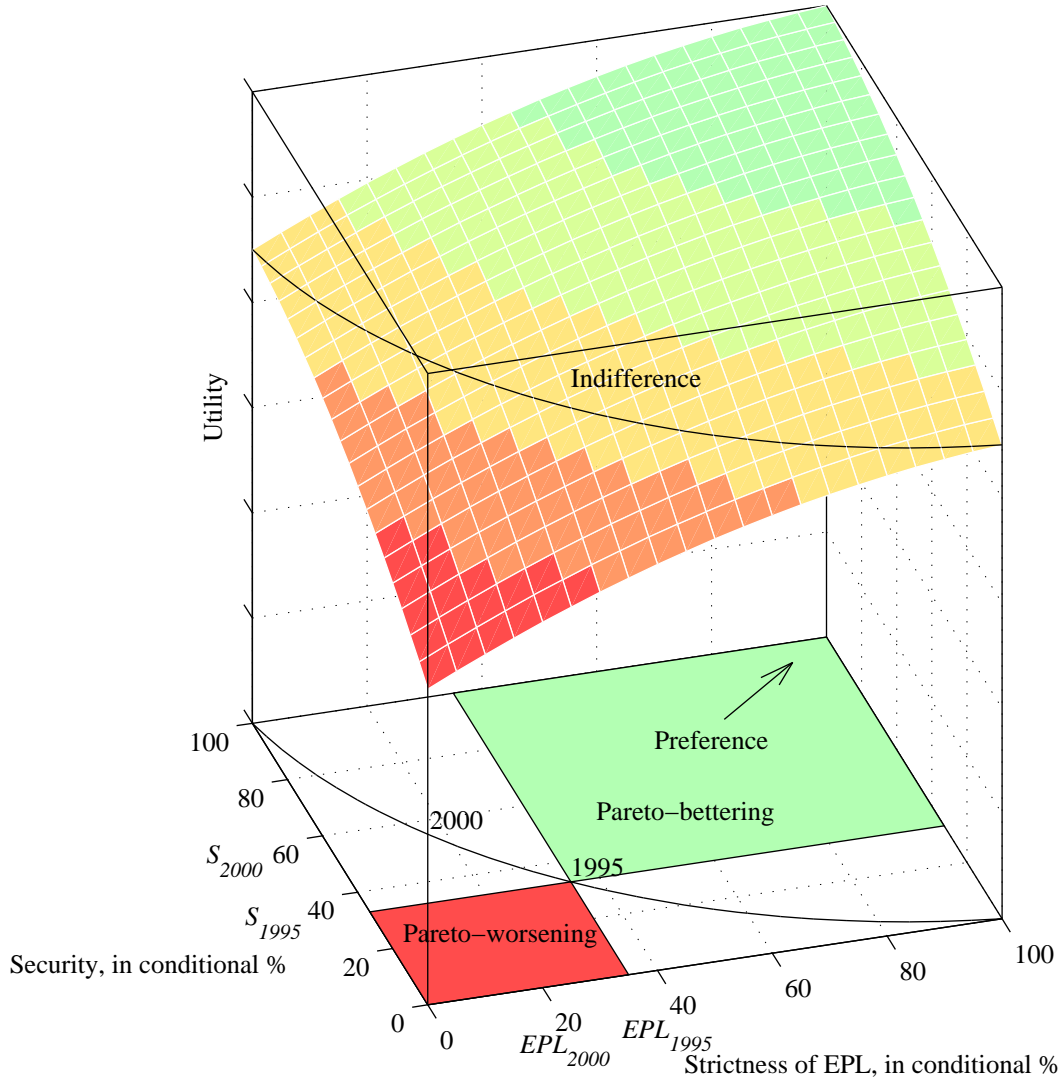
Suppose that the Netherlands in 1995 are characterized by a flexibility-security vector

$$1995 \leftrightarrow (EPL_{1995}, S_{1995}) .$$

If the Dutch Law'99 in Table 2 decreases the *Strictness of EPL* by ΔEPL and increases *Security* by ΔS , then the state in 2000 corresponds to vector

$$2000 \leftrightarrow (EPL_{1995} - \underbrace{\Delta EPL}_{\substack{\text{decrement} \\ \text{in the} \\ \text{strictness} \\ \text{of EPL} \\ \text{due to the} \\ \text{Dutch Law'99}}}, S_{1995} + \underbrace{\Delta S}_{\substack{\text{increment} \\ \text{in social} \\ \text{security} \\ \text{due to the} \\ \text{Dutch Law'99}}}) = (EPL_{2000}, S_{2000}) .$$

Figure 1: A flexicurity policy along a tradeoff ‘Flexibility versus security’



If the flexicurity policy is implemented correctly then vector 2000 lies in the indifference curve through 1995 as in Figure 1. If vector 2000 lied in the red Pareto-worsening domain (more flexibility under no improvement in security) then it would mean that a deregulation-only policy takes place.

5 Chart of flexicurity policies for European countries

To monitor flexicurity policies in a vector space we use composite indicators of social security (Annex 1–2) and of strictness of EPL; the latter being based on the ones constructed by the OECD (1999, 2004) for permanently and temporarily employed; see Annex 3.

Figure 2 displays dynamical trajectories of European countries in the plane *Flexibility–Security*. The simplest flexicurity utility function $u = (\text{Strictness of EPL} + \text{Security})/2$ is

shown by diagonal indifference lines.

The *flexicure* countries with a high flexibility and a high security are located in the top-left corner (Denmark and Finland). The *inflexicure* countries with a low flexibility (= high *Strictness of EPL*) and a high index of *Security* are located in the top-right corner of the chart (Sweden and the Netherlands). The only outlier in the left-bottom corner with high flexibility and low social security indicator is the *flex-insecure* United Kingdom. The bottom-right corner is occupied by *inflex-insecure* countries with a strict employment protection legislation and relatively little advanced social security (Spain, Portugal, and Czech Republic).

The pursuing a flexicurity policy means the direction of a country's trajectory towards the 'North-West'. It is inherent in Denmark in the 1990s and the Netherlands in the late 1990s, when the flexicurity debate was initiated. Since the exact slope of indifference curves is not known, it is unclear whether the flexibility-security compensation was 'deliberate', but at least a flexicurity development cannot be denied.

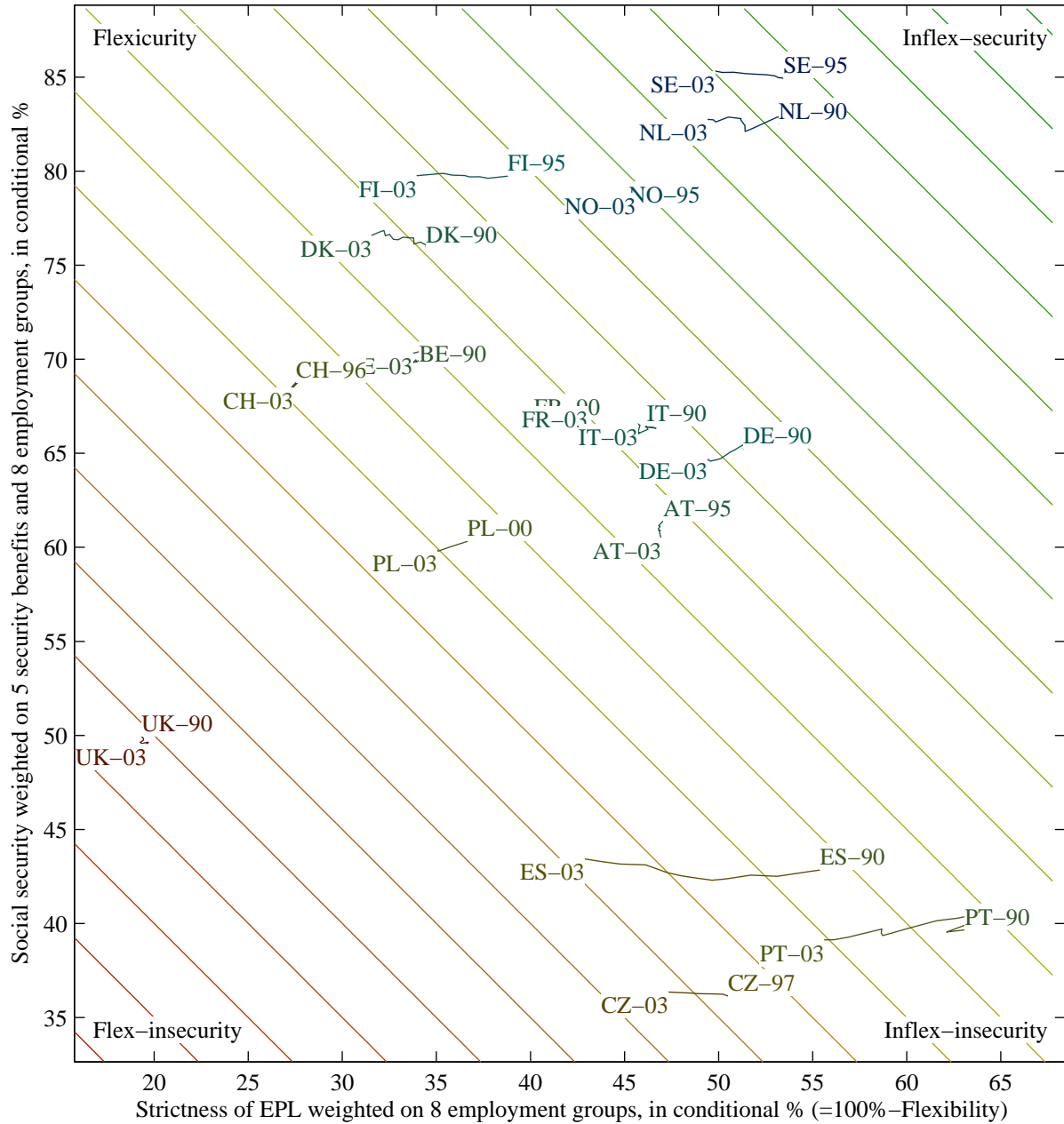
All directions between 'West' and 'South' correspond to Pareto-worsening for all imaginable social utility functions (no improvement in both factors—no compensation comes in question). Since, with the only short-time exceptions for Denmark and Netherlands, all trajectories are directed towards 'South', 'South-West', or 'West', the **deregulation-only policies are unambiguously prevailing, whereas the much promoted flexicurity is practically invisible.**

No increase in the *Security* index is observed in all the countries with the only exception for the Netherlands in the late 1990s. It does not necessarily imply that there are no improvements in national social security systems all over Europe. The explanation is that an increase in flexible employment disqualifies workers from social benefits. Recall that the indices *Flexibility* and *Security* are weighted, reflecting the average factual situation in the country. Flexibilization lowers down the *average* employment status and, also *on the average*, disqualifies workers from social benefits, thereby lowering down the factual security. Consequently, even a developing social security system can fail in increasing the *Security* index if the flexibilization is followed with a delay and if eligibility conditions are fitted to outdated norms.

The impact of flexibilization on the factual state of security is observed in Germany, where a relaxation of EPL since 1991 caused a reduction of the share of normal employment $71 \searrow 62\%$; see Table 8 and coupled Figure 5. Since fewer employed got qualified for high security benefits, the factual security decreased by 1%. Thus an increase in *Flexibility* was aggravated by an implicit decrease in *Security*, by the principle 'who does not swim drowns'. (A similar relaxation of EPL in Spain did not cause structural changes in employment as in Germany, because the share of normally employed in Spain was already as low as 50% and did not decrease further; for exact data and their derivatives see country tables and figures in Tangian (2004b) which are not replicated here).

Some countries develop their social security systems but manage only to 'run in place' against the counter-flow of flexibilization. For instance, the improvement in Portugal's social

Figure 2: Flexibility-Security trajectories in the background of diagonal flexicurity isolines



security since 1992 was annihilated by a reduction of the share of normal employment from 65% to 56%, and the *Security* index remained unchanged; see Tangian (2004b). Thus, security measures intended to compensate a growing flexibilization can suffice only to retain the existing security level but not to pursue a flexicurity policy. **To be a real balance weight for flexibilization, the security system must be itself flexible and double-generous with increasing compensatory capacities and relaxing eligibility conditions.**

6 Trade-unionist view at flexicurity

According to the viewpoint so long discussed, the relaxation of the EPL required by employers can be equivalently compensated by better social security benefits to workers. Flexicurity is thereby a particular manifestation of social compromise, discussed since Rousseau's (1762) *Social Contract*.

From the viewpoint of trade unions, first of all French and German, flexibilization of employment relations can be hardly compensated by social security benefits, and giving up labour rights for social advantages is not appropriate. Even if each particular compromise seems more or less fair, their succession can lead away from the social status quo and the employees can finally get nothing or very little for their pains. It can run as in the known tale about a man who goes to the market with a horse, exchanges it for a cow, then the cow for a sheep, and so on until he finds himself with nothing but a needle which he loses on the way home.

Who is interested in flexicurity? Since changes in the EPL are required by employers, the compromise tends to meet their interests first, although Wilthagen and Tros (2004) argue for 'win-win strategies' (p. 173) in 'positive sum games' (p. 179). However, trade unions argue that even if prosperous enterprises offer additional benefits to workers, the general profit distribution is unlikely to be fair, taking into account the increasing income difference between workers and owners with top managers.

A flexicurity trade-off is a chain of compromises, meaning that flexibility and security are opposed to each other. Since a relaxation of the employment protection legislation requires a compensation, flexibilization is implicitly recognized as being 'socially bad' (otherwise what is the compensation for?). Therefore, the question emerges: If flexibilization is 'socially bad', why not abolish it? Why not move along the same indifference curve in the opposite direction, towards a stricter employment protection legislation accompanied by a reduction of social security? At least, it could release considerable social security funds with no loss in the social utility.

Since this possibility is not discussed, there should be some motivation exclusively for flexibilization. Since a flexicurity policy along a trade-off results in no increment in social utility, the motivation is beyond the social preference. In other words, someone 'beyond the society' wins from flexibilization while the society itself gets no advantages. Therefore, the understanding of flexicurity as a trade-off cannot be a 'win-win strategy'. At best it

is a ‘win—no-win-no-loss’ policy with a ‘positive sum’ but not for the society, and not for workers.

Obviously, **every** step towards a higher flexibility **always** meets interests of employers regardless of the state of social security. Business gets rid of restrictions, managers improve performance by rotating personnel, and firms gain higher profits. All expenses are recovered by the state which arranges everything: paves the way for a favorable public opinion, accepts new laws, and provides compensations to workers in the form of additional social security benefits. One can argue that employers, having got advantages, gain higher profits, pay more taxes, and thereby refill governmental funds. It is however unlikely that all the additional tax-returns will be channelled to social security but not to other purposes and that firms’ share in this financial loop will be modest enough to be socially fair. Therefore, such a flexibilization scenario leads not only to a liberalization of the economy but also turns out to be a long-running indirect governmental donation to firms. Since the state budget originates from taxpayers, the employees are the ones contributing to the donation.

Which are the doubts? Trade unions put in question the main argument of adherents of flexicurity as a trade-off, that higher social **guarantees** can compensate a **higher risk** to loose a job. The train of thought which disproves the argument is as follows. Assume that an increase in the risk to loose a job can be compensated by a sufficiently high increase in guaranteed social benefits, that is, in income and status. Then one arrives inductively step-by-step to the extreme case, when the growing risk to loose the job turns into certainty, while the social compensation remains adequate. It means that for (almost) every employee the loss of his/her employment can be adequately compensated by social security in income and status. Then very few individuals will be motivated to work, and the resulting low production will not cover high expenditures for social security. This economical contradiction shows that every relaxation of EPL can be compensated by social security benefits only partially but never completely.

Even if it were possible to more or less adequately compensate a relaxation in the strictness of EPL with social security advantages, entrusting the workers’ welfare to the welfare-giver, the state, would be too risky. Indeed, every political change or economic recession may result in easily realizable social cuts (as now in Germany). Employment protection, on the contrary, guarantees jobs and, consequently, a stable income even during recessions and political crises (Bewley 1999).

The next point is that non-benevolently changing jobs destroys career prospects. Since past achievements play a little role, each time one must begin from the start and establish oneself anew. Since the acquired experience can be insufficient, it is often necessary to learn new skills and to accommodate to the new environment. Besides, one can be obliged to move from one place to another which complicates the family life. All of these can be psychologically difficult, time-consuming, and little successful, especially at an older age.

Finally, it is often emphasized that the flexicurity as a trade-off is advantageous for social beneficiaries. For employees it turns out that the already incomplete social security compen-

sation for their labour rights is further reduced in favor of ‘weaker groups’ (otherwise, where to take resources from? In fact, all money paid to anybody is subtracted from somebody). Moreover, the compensation for employees in the form of social security looks as a charity rather than as a reward for their contribution to the national economy. This ethical nuance damages the civil image of employees, equalizing them to non-employed.

Trade-unionist understanding of the role of flexicurity The specificity of the trade-unionist viewpoint at flexicurity is reflected by the alternative definition below. It is just the one criticized by Wilthagen and Tros (2004, p. 170):

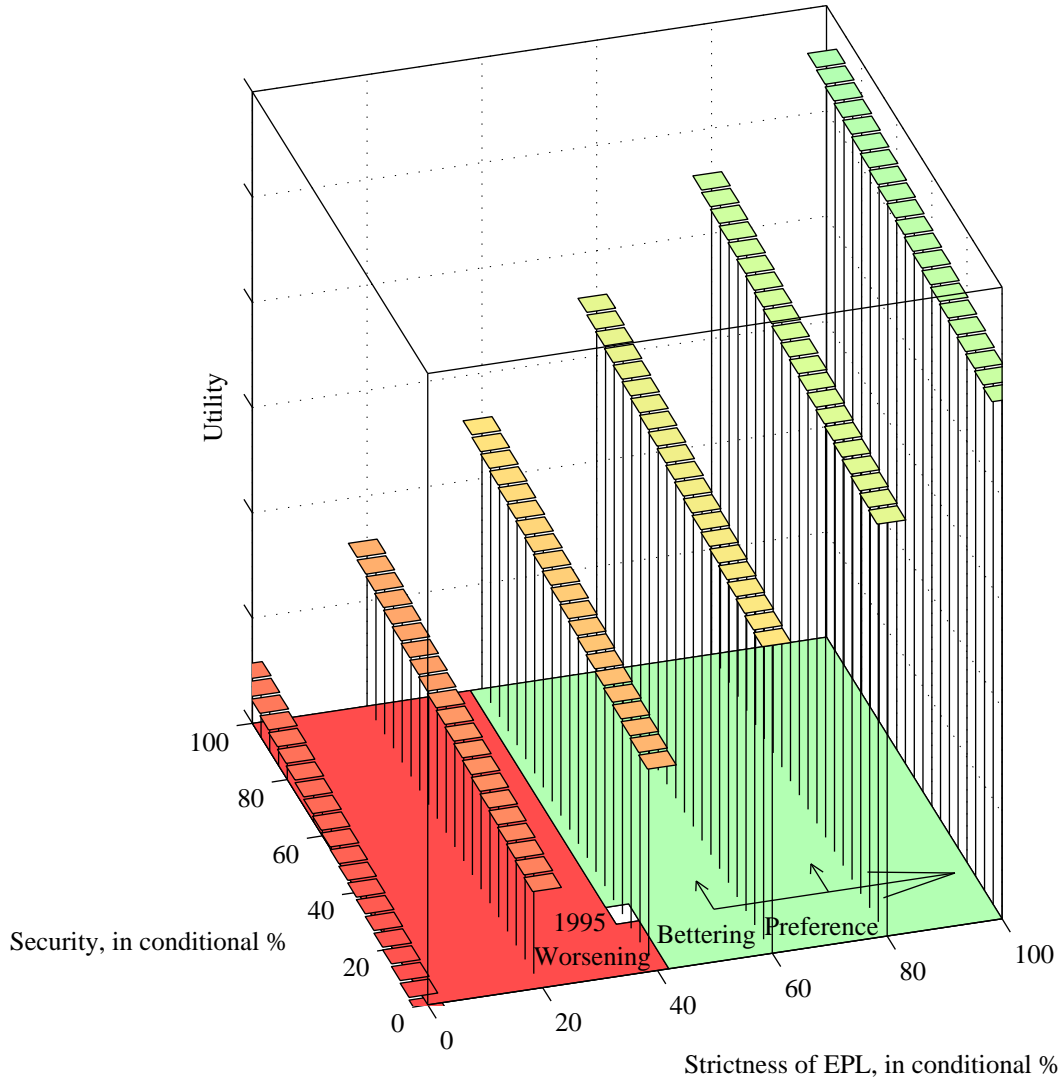
Definition 2 (trade-unionist) [*Flexicurity is*] *social protection for flexible work forces, understood as ‘an alternative to pure flexibilization’ (Keller and Seifert 2004, p. 226), and ‘to a deregulation-only policy’ (Klammer 2004, p. 283); see also WSI (2000).*

Thus, the main distinction of the trade-unionist understanding of flexicurity is that it should protect employees’ positions in the globalization-driven processes, as opposed to neoliberal suggestions to meet employer’s requirements under new economical conditions. In other words, trade-unions consider flexicurity an instrument of labour movement with a reference to the status-quo, whereas neoliberals narrow it down to a form of bargaining with relativized values (Cf. with Wilthagen and Tros’ (2004, p. 170) ‘weaker groups in and outside the labour market . . . [where] . . . the classifications ‘stronger’ or ‘weaker’ only have a relative meaning here and cannot be defined in advance’).

Trade-unionist social utility function Since trade unions see little possibilities to compensate flexibilization of employment relations with improved social security benefits, the preference of trade unions is determined primarily by the strictness of EPL, and the second factor, security, is considered *ceteris paribus*, if only the first factor remains invariable. It means that for every given strictness of EPL the preference grows from 0% to 100%-security level; and every such a run is superior to any run which starts from a lower strictness level of EPL; see Figure 3. The preference can be imagined as a staircase with floors being the EPL strictness levels and each flight of stairs being the full-range ascent along the social security scale.

This type of preference is called *lexicographic* by analogy with a lexicon which words are ordered alphabetically by the first letter (here, the strictness of EPL), and those with the same first letter are ordered alphabetically by the second letter (the security level), and so on. The lexicographic preference has no indifference curves, because indifference levels are single points. It means that a shortage of a high-priority factor cannot be compensated by any surplus of lower-priority factors. Finally, no lexicographic preference on a plane can be represented by a utility function, because the number of ‘flights of stairs’ is non-countable as the number of points in the first axis (Tangian 1991, p. 49–50). To overcome this representation inconvenience, one can disregard the continuity of the first scale (here, of the strictness of EPL) and to calibrate it by reducing to several levels as in Figure 3. Such a

Figure 3: Lexicographic preference of trade unions with no trade-offs



calibrated lexicographic preference is representable by a utility function, but the calibration levels should be sufficiently dense, otherwise the utility will be little sensitive to variations in the EPL.

The interrelation of the neoliberal and trade-unionist definitions can be illustrated with Figure 1 by superimposing both preferences. The only commonality is the ‘self-evident’ Pareto-preference which stands for bettering one factor with no worsening of others. In Figure 1, the Pareto-bettering domain for the year 2000 is shown by a green rectangle. The Pareto-worsening domain with both less strict EPL and lower security is depicted by a red rectangle.

From the viewpoint of trade unions, there is not much room for a flexicurity policy. In Figure 1, the corresponding flexicurity trajectory should ascend along the vertical edge of the Pareto-bettering domain. Deviations towards a lower flexibility (into the domain) are undesirable for employers, and deviations towards a higher flexibility (out of the domain)

are undesirable for trade unions.

Chart of trade-unionist flexicurity According to the trade-unionist concept of flexicurity, the focus should be made at improving the employment and social security of flexible workers without giving up the rights of regular workers. As follows from the previous analysis, it is not the case, and we could immediately stop here. Nevertheless, let us have a look what happens at the market of flexible labour forces, abstracting from its interactions with the market of regular employment; see Figure 4.

The vertical indifference isolines relate to the first-priority component (EPL) in the trade-unionist lexicographic preference, showing that up-downward changes of security are not important. Any deviation of policy trajectory to the left is unfavorable for trade unions, and an upward increment is appreciated if only the horizontal increment is negligible.

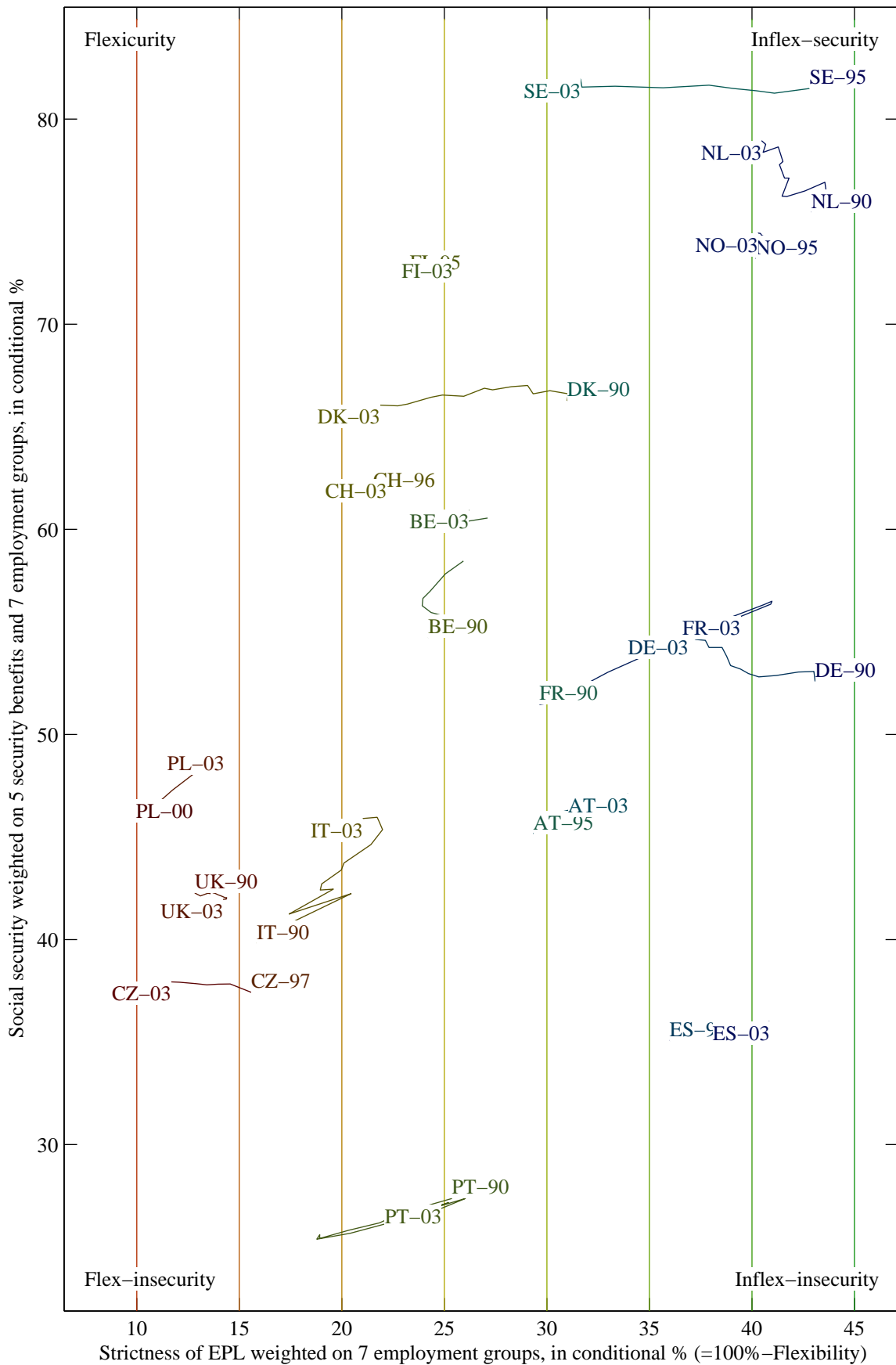
There are clear manifestations of flexicurity policies during the control period 1990–2003. The decisive indicator *Strictness of EPL* increased in France (29.6 ↗ 39.4%), Italy (15.9 ↗ 21.0%), Spain (36.0 ↗ 40.9%), Austria (29.3 ↗ 34.0%), Poland (10.0 ↗ 14.3%), and Belgium (24.2 ↗ 26.2%); see Tangian (2004b). The general security of flexible employed has improved in some of these countries as well, like Italy (39.8 ↗ 45.9%), Belgium (54.7 ↗ 61.0%), France (51.5 ↗ 55.7%), Poland (45.7 ↗ 49.1%), and Austria (45.2 ↗ 47.1%); see Tangian (2004b). The progress in Poland is especially remarkable, because it occurred within only four years 2000–2003 of availability of Poland’s statistical data to the EU.

However, in many cases this increase is not due to a better employment and social protection of flexibly employed. To a great extent it is due to the increasing share of permanently part-time employed. More and more young people and women sign part-time contracts, thereby reducing the share of normal employment (Austria, France, Belgium, Poland). Another factor is the decreasing share of self-employed since they close their business and become employees (France, Austria, Belgium). Thereby the share of better employment/socially protected within flexibly employed increases and their average employment and social security status grows.

The greatest degression in social utility due to a decrease in the decisive indicator *Strictness of EPL* (again, we speak exclusively of flexibly employed!) is inherent in Sweden (42.8 ↘ 31.6%), Denmark (31.0 ↘ 21.9%), Germany (43.1 ↘ 36.9%), Czech Republic (15.6 ↘ 11.7%), the Netherlands (42.9 ↘ 40.5%), and Portugal (25.4 ↘ 24.9%); see Tangian (2004b). As for compensation of these degradations by security measures, there is no sense to discuss it as long as the trade-unionist lexicographic utility is considered.

The degressions are also often caused by transitions between employment categories rather than by institutional changes. In Sweden the share of best-protected permanently part-time employed decreased 18.3 ↘ 14.1%, and in Denmark 19.5 ↘ 17.3%. In Czech Republic the share of well-protected permanent part-timers decreased not much (3.1 ↘ 2.3%) but the share of self-employed, who are not protected by labour laws, increased (10.7 ↗ 15.3%); see Tangian (2004b). Thus the average employment status within flexibly employed decreased and the average employment protection of flexibly employed decreased respectively.

Figure 4: Flexibility-Security nexus for flexibly employed only (trade-unionist perspective) in the background of trade unions' vertical flexicurity isolines of first priority



The changes in the indices for flexibly employed should not be misinterpreted. A great deal of changes are caused by transitions between employment categories. The indicators only reflect changes within flexibly employed, disregarding normally employed. Therefore, an eye should be kept on the dynamics of employment categories. For instance, if the strictness of EPL for flexibly employed increases but of all employed decreases then, most likely, the share of normally employed feeds the share of flexibly employed with a higher employment status.

In actuality, however, the price of certain advantages for flexibly employed is incomparable with disadvantages for regularly employed. The latter are so significant that the general average trend is essentially negative. This disproportion in flexicurity advantages/disadvantages is unambiguously illustrated in Figure 2 which reflects the factual situation of all workers in general. This means that **relatively few flexibly employed gain little from significant losses of much more numerous normally employed.**

Thus, during the last decade the situation of flexibly employed in certain European countries has visibly improved. It would be a trade unions' victory, if the situation improved *ceteris paribus*, not having been aggravated by other factors. It is not necessary to emphasize that a growth in indices of flexibly employed due to transitions from regular employment does not make trade unions very happy.

Inconsistency between neoliberal and trade-unionist viewpoints at flexicurity

The conception of flexicurity as proposed by neoliberals is shaped to their vision of values. It suggests a compensation which looks quite fair: one commodity (labour rights) is exchanged for another commodity (social security), and the only question is the substitution rate which should be negotiated.

The misleading trick is that on the neoliberals' playing field, to which they invite, everything can be bought and sold by default (which is not always true!). However, this apparent natural prerequisite (inherent in usual trade union negotiation practice with no political requirements) leaves trade unions with no chance to win. The choice is only between bad and worst. In a sense, it is suggested that workers' social health (= the right to remain at work) be exchanged for a treatment (= social care in the form of advanced social security benefits). In other words, give me your hand, and get a prosthesis instead. However: Can a prosthesis, whatever its value, substitute a healthy hand?

To have a real chance, trade unions need their own playing field where they are hosts rather than guests, or at least a neutral one. The key problem is that social preferences of neoliberals and trade unions are more than just different, they differ in the **type of preference**. The former have a hill-shaped utility with gradual ascents/descents in every direction. Trade-unions have a stair-like utility with gradual ascents/descents only along the 'flight of stairs' but with leaps in all other directions. What is suggested as a subject for 'deliberate' bargaining—determining the slope of social trade-off—is questionable for trade unions whose preference has no indifference curves which might have a slope.

It corresponds well to the remark of Wilthagen and Tros' (2004, p. 169): 'some recent

studies are pessimistic that appropriate trade-offs can be found between flexibility and security'. Furthermore, they even more specifically point out the problem of the very existence of trade-offs: 'If these levels . . . do not exist, negotiations and trade-offs are hard to envisage, because there is 'no more/or less' situation' (Op.cit, p.181).

7 Three proposals: How to unify values and to balance forces

Thus, the critical component of flexicurity is the *Utility function* which incorporates social values and implies trade-offs. In defining such a function one has to ask questions: Do higher industrial productivity, higher competitiveness, and other economic criteria constitute the goal of human development? Why economic performance is put beyond social fairness and social justice? Is it moral to trade the social health against higher productivity and consumption? In other words, is it really more important to be economically rich rather than to be socially healthy?

Flexicurity as trade-off under utility function *Labour market performance* The flexicurity trade-offs can be level curves of the function of unemployment rate in variables 'flexibility' and 'security'. Such a function can be empirically estimated by fitting the regression (hyper)plane to European survey data provided flexibility and security factors being represented by numerical indices. The casual relation 'flexibility-security→unemployment' can be considered with a delay of one year. A trade-off with respect to such a function can convince trade unions, providing a basis for bargaining.

Similarly, flexicurity trade-offs can be determined from the index of macroeconomic performance (weighted sum of indicators of unemployment, GDP growth, inflation, increase in public debt, and resistance to economic shocks) estimated as a function in five flexibility and four security variables.

Flexicurity as *Social insurance* for flexibly employed If the idea of the second component of flexicurity, *Flexibility*, is clearly linked to a relaxation of EPL, the idea of the third flexicurity component, *Security*, remains quite vague. A solution could be as follows.

Since all types of flexibility are projected on the one-dimensional money-compensation bargaining axis, the role of social security becomes similar to that of health insurance or life insurance, which rates depend only on risk and sum of compensation. The employer contributions to social security (\sim rates) can be double-progressive, depending both on wage (\sim the insurance compensation) and flexibility of the contract (\sim risk of unemployment). Flexibly employed can be additionally 'insured' similarly to the additional health insurance for the medical expenses not recognized by the state.

This way the social security system receives contributions, corresponding to the social risk of insured. The employers are less rigidly constrained then under the employment

protection legislation. Flexibly employed enjoy equal or even more generous social benefits than permanently employed (due to the additional insurance for flexibly employed). Finally, society maintains a consensus by equilibrating the supply and demand for all degrees of employment flexibility.

Multi-national trade unions opposed to multi-national companies At the political level, there is a visible disequilibrium of interested sides. National trade unions can hardly negotiate with multi-national companies which can move jobs to countries with cheap labour and flexible employment relations. Solidarity and unions of national organizations are not sufficient. A solution could be multi-national trade unions with the same international status and operating in the same economic space as multi-national corporations.

8 Conclusions

1. **Operational definitions of liberal and trade-unionist concepts of flexicurity** are suggested. They imply dedicated **indicators** for monitoring and improving flexicurity policies with respect to factual rather than juridical situation in the EU member states.

The indicators are based on statistical data on (a) the size of eight employment groups in 16 European countries in 1990-2003, (b) scores of the employment protection legislation available from the OECD, and (c) five security rank-based indicators obtained from juridical data available from the European Commission.

2. **(Empirical observations)** The first quantitative analysis shows that the practical implementation of flexicurity is far behind its theory. Minor advantages for flexibly employed turn into great disadvantages for regularly employed with a negative general balance.

The concept of flexicurity may not be holding up to its political promises and theoretical declarations.

3. **(Practical implications)** Operationalizing the notion of flexicurity and keeping it under instrumental control with empirical feedback can contribute to finding acceptable political solutions.

A possible flexicurity regulation of labour market in the form of flexicurity insurance is proposed. Achieving a world-wide social consent requires a parity multi-national status of corporations and trade unions.

Annex 1: Rank-based composite indicators

The juridical data on social security in Europe available from the OECD (2002, pp.146–148) and European Commission (2004) are exclusively qualitative (descriptive). It makes the OECD (2003) guide-lines for developing composite indicators of country performance irrelevant. The model described below is based on methods for practically constructing utility functions (Tangian 2002, 2004a) and, more specifically, on the author’s experience in designing an indicator of working conditions for European countries from the *Third European Survey of Working Conditions 2000* by European Foundation (2001); see Tangian (2004d).

Why composite indicators are weighted sums of variables A *composite indicator* in the general form is a formula with n entries (for first-level indicators), in other words, a function f in n variables which to each set of input values x_1, \dots, x_n puts into correspondence the indicator value $y = f(x_1, \dots, x_n)$. Usually a composite indicator is not expected to abruptly change its *behavior*, meaning the differentiability of f . Then its Taylor expansion in a neighborhood of some reference point (x_1^0, \dots, x_n^0) gives the *first-order approximation* of f :

$$\begin{aligned}
 f(x_1, \dots, x_n) &\approx \underbrace{f(x_1^0, \dots, x_n^0)}_{\text{Function value at } (x_1^0, \dots, x_n^0)} + \sum_{i=1}^n \underbrace{\frac{\partial f(x_1^0, \dots, x_n^0)}{\partial x_i}}_{\text{Partial derivative of } f \text{ at } (x_1^0, \dots, x_n^0)} \underbrace{(x_1 - x_1^0)}_{\text{Argument increment}} \\
 &= \underbrace{f(x_1^0, \dots, x_n^0) - \sum_{i=1}^n \frac{\partial f(x_1^0, \dots, x_n^0)}{\partial x_i} x_i^0}_{\text{Constant } C} + \underbrace{\sum_{i=1}^n \frac{\partial f(x_1^0, \dots, x_n^0)}{\partial x_i} x_i}_{\text{Weighted sum of variables } \sum_{i=1}^n a_i^0 x_i} \quad (1)
 \end{aligned}$$

Since composite indicators are primarily used for comparisons and tracing relative progress, the constant C in (1) is omitted. The remaining weighted sum of variables is, consequently, the general composite indicator to within its first-order approximation.

Apparent problems with rank-based composite indicators The OECD (2003) guide-lines for constructing composite indicators assume that the input first-level indicators are metrical (= measured in a cardinal scale). Ordinal first-level indicators (= expressed in ranks) create certain problems discussed by the OECD (1999, p. 115) in the context of composite indicator for the strictness of employment protection legislation:

One limitation of a summary indicator based on ranking is that a given country’s strictness score could either rise or fall over time, even though its employment protection practice were completely unchanged, for the simple reason that other countries changed their policies. Even more fundamentally, it would be invalid to compare rank-based score for the late 1980s, which was based on an analysis of 16 European countries, with a rank-based score for the late 1990s based on a sample

of 27 countries. Quite independently of any changes in EPL, the maximum rank score has nearly doubled.

By these reasons the OECD (1999) replaced originally ordinal data by metrical expert estimates. The method survived (OECD 2004), although the OECD itself acknowledges that ‘the scoring algorithm is somewhat arbitrary’ (OECD 1999, p. 115).

Thus, the first OECD’s concern is that rank-based indicators can make a country’s score dependent on changes in other countries. It is similar to what occurs in tournaments when one’s rating is altered by wins/losses of competitors. This phenomenon, known in the theory of choice as the *dependence of irrelevant alternatives*, is not always critical; for the historical discussion see Black (1958, pp. 156–238) and McLean and Urken (1994, Introduction). In any case, the ranking method can be modified as follows.

Method of Total Ranks To be specific, consider Denmark (DK) and Netherlands (NL) with regard to the duration of unemployment insurance in 1994–2004. In 1994 the duration of Danish insurance was 30 months, and in the Netherlands it was 6–54 months, depending on the length of service and age (Schmid and Reissert 1996, p. 239–241). In 2004 Denmark extended the duration unconditionally to 48 months (European Commission 2004). Although the duration of Dutch insurance remained unchanged, the Netherlands fall in the two successive rankings:

Rank	1994		2004	
	Country	Insurance duration	Country	Insurance duration
1	NL	6–54 months, conditioned	DK	48 months, unconditioned
2	DK	30 months, unconditioned	NL	6–54 months, conditioned

Now rank all the pairs *Country/Year*. For this purpose consider Denmark in 1994 and Denmark in 2004 as two different objects (as they actually are) and the Netherlands in 1994 and in 2004 as two copies of the same object. Hence, the total ranking is

Rank	Country	Year	Insurance duration
1	DK	2004	48 months, unconditioned
2	NL	1994	6–54 months, conditioned
2	NL	2004	6–54 months, conditioned
3	DK	1994	30 months, unconditioned

which implies the constant rank of the Netherlands and changing ranks of Denmark:

Rank	1994		2004	
	Country	Insurance duration	Country	Insurance duration
1			DK	48 months, unconditioned
2	NL	6–54 months, conditioned	NL	6–54 months, conditioned
3	DK	30 months, unconditioned		

Thus ranks can be made independent of ‘irrelevant alternatives’.

Accuracy of a rank-based composite indicator The second, ‘more fundamental’, OECD’s concern is that the first-level indicators based on ranks are invalid when the number of countries changes (e.g. the top rank of 27 countries almost doubles the top rank of 16 countries). This problem can be resolved by proportionally reducing all the ranks to the standard scale 0–1. The rigorous normalizing rules as well as the estimation of error from substituting ordinal ranks for cardinal scores are given below.

Consider ranks as manifestations of continuous evaluations which are not observed directly. Consequently, if one defines an indicator as a weighted sum of partial scores and disposes but partial ranks, it is natural to substitute the ranks for the scores.

This idea goes back to the justification of Borda’s (1733–1799) method of marks by Laplace (1749–1827); for the modern account see Black (1958), Tangian (1991), and McLane and Urken (1994). Recall that Borda proposed to evaluate candidates to the members of the Royal Academy of Sciences in Paris by the sum of their ranks in the ballot schedules. Laplace assumed that these ranks were manifestations of some n latent metrical estimates (scores) uniformly distributed in the segment $[0; 1]$. He showed that the ratio of expectations of the scores was as that of their ranks

$$\mu_1 : \mu_2 : \dots : \mu_n = 1 : 2 : \dots : n .$$

By the Central Limit Theorem (the first version is attributed to Moivre (1667–1754); see Kendall and Stuart 1958, Korn and Korn 1968) a sum of a large number of metrical scores is well approximated by the sum of their expectations, or ranks. Laplace concluded that in a large statistical model scores could be replaced by ranks with a negligible error.

This way of thought can be implemented already for a few metrical estimates (scores) under a controllable accuracy of approximation. The next theorem suggests a normalizing rule for the input ranks (differing from the standardization of metrical input) and estimates the errors of the composite indicator which result from ‘ordinal rounding’ of its continuous entries.

Theorem 1 (Accuracy of a rank-based composite indicator)

Let given countries be independently ranked with respect to social security partial criteria $k = 1, \dots, 5$, giving R_k ranks for criterion k , that is, R_k is the lowest rank for criterion k . For each criterion, the ranks are ordinal manifestations of unknown continuous scores x_1, \dots, x_{R_k} which are random variables uniformly distributed in the segment $[0; 1]$ (default statistical assumption). Consider an indicator (a sum of variables with weights a_k) both for continuous scores and ranks:

$$I^{continuous} = \sum_k a_k x_{r_k} \iff I^{rank-based} = \sum_k a_k \frac{r_k}{R_k + 1}, \quad \sum_k a_k = 1, \quad a_k \geq 0, \quad (2)$$

where x_{r_k} is the r_k th score from the bottom for criterion k . Then the error due to the ‘ordinal rounding’

$$\Delta = I^{continuous} - I^{rank-based}$$

has expectation and variance, respectively,

$$\begin{aligned}\mu = \mathbb{E} \Delta &= 0 \\ \sigma^2 = \mathbb{V} \Delta &= \sum_k a_k^2 \frac{r_k(R_k - r_k + 1)}{(R_k + 1)^2(R_k + 2)} \quad \left(\leq \frac{1}{4} \sum_k \frac{a_k^2}{R_k + 2} \right) .\end{aligned}\quad (3)$$

PROOF. Fix the k th criterion. As shown by Kendall and Moran (1963), the r_k th ordered score x_{r_k} is beta-distributed with the expectation and variance

$$\mathbb{E}x_{r_k} = \frac{r_k}{R_k + 1}, \quad \mathbb{V}x_{r_k} = \frac{r_k(R_k - r_k + 1)}{(R_k + 1)^2(R_k + 2)} .$$

Hence, taking into account that I is constant regardless of values x_{r_k}

$$\mu = \mathbb{E} \Delta = \mathbb{E} I - \mathbb{E} \tilde{I} = \sum_k a_k \frac{r_k}{R_k + 1} - \sum_k a_k \mathbb{E} x_{r_k} = 0 .$$

By the independence of estimation with respect to different criteria, the variance of the sum of scores is equal to the sum of their variances. We obtain

$$\begin{aligned}\sigma^2 &= \mathbb{V} \Delta \\ &= \mathbb{V} I + \mathbb{V} \tilde{I} \quad \mathbb{V} I = 0 \text{ since } I \text{ is constant} \\ &= \sum_k a_k^2 \frac{r_k(R_k - r_k + 1)}{(R_k + 1)^2(R_k + 2)} \quad \text{Identity} \\ &= \sum_k a_k^2 \frac{\overbrace{0.25 - \left(0.5 - \frac{r_k}{R_k + 1}\right)^2}^{\leq 0.25}}{R_k + 2} .\end{aligned}\quad \blacksquare$$

We conclude:

1. The concern about the difficulties in using ranks in constructing indicators is overemphasized.
2. In certain cases (for instance, while tracing country development), the Method of Total Ranks overcomes the dependence on irrelevant alternatives inherent in common ranks.
3. Rank method can be adapted (a) to compare variable number of options, (b) to allow several options with the same rank, (c) to optimize statistical properties of rank-based composite indicators.

Annex 2: Composite indicator of *Social security*

Incoming subfactors for the indicator *Social security* The main function of social security is to compensate income losses in case of unemployment, illness, etc. We consider the following five benefits:

1. Unemployment insurance (OECD 2002, p. 144–150)
2. Participation in a public pension scheme (OECD 2002, p. 144–150)
3. Paid sick leave (OECD 2002, p. 144–150)
4. Paid maternity leave (OECD 2002, p. 144–150)
5. Paid holidays (OECD 2002, p. 144–150)²

The eligibility to social security benefits differ for different employment groups, which should be taken into account. For example, normally employed can be strongly secured and the atypically employed can be weakly secured. If the first group is large and the second is small then the social security of the society is quite high. However, if the first group is small and the second is large then, under the same juridical regulation, the social security level should be considered low. Therefore, the factual rather than intended social security in a country should be described by the weighted average *Social security* of the groups with the weights being proportional to their size.

Within the flexicurity debate, Klammer and Tillmann (2001, p. 514) and Hoffmann and Walwei (2000) provide a classification of types of employment with respect to four dichotomic indicators: (a) permanent/fixed-term, (b) full-time/part-time, (c) employed/self-employed, and (d) in agriculture/not in agriculture. For self-employed the discrimination between ‘permanent’ and ‘fixed-term’ is not relevant, and from $2^4 = 16$ employment groups it remains the following eight:

1. Permanently full-time employed
2. Permanently part-time employed
3. Fixed-term full-time employed
4. Fixed-term part-time employed³

²Entitlement to paid holidays is usually not considered within the flexicurity debate. It is not quite logical. Securities are aimed at compensating income losses and exceptional medical and family burdens, including vacations. Therefore, no entitlement to paid holidays discriminates those flexibly employed who work few hours, under short-time contracts, or self-employed, which should be taken into account.

³Fixed-term part-timers with low income are sometimes singled out into the group of *Mini-job-holders*; see Keller and Seifert (2004, p. 240). We do not consider mini-jobs here, because they are ill-socially-secured, not sufficiently reflected in the available statistics, and because it is impossible to consider all minor forms of employment relations. One has to stop somewhere, not descending to tips for hotel porters. The natural criterion of significant jobs is the tax liability which cuts mini-jobs off.

5. Full-time self-employed in agriculture
6. Full-time self-employed not in agriculture
7. Part-time self-employed in agriculture
8. Part-time self-employed not in agriculture.

Thus we obtain 8 employment groups in each of 16 countries, totally 128 groups. The authors cited consider no labour market outsiders as suggested by Wilthagen and Tros (2004). Respectively, we do not consider them here, also because flexicurity deals with the flexibility of *employment* relations.

Weights of social benefits The five social security benefits are considered with equal weights $a_k = \frac{1}{5}$ (as equally important). The equal weights are justified by the following reason. Each individual has his/her own weight ratio for social security benefits. For instance, a young women with a small child may pay the prime attention to *Sick leave*, a middle-aged man to *Unemployment insurance*, and an older worker to *Pensions*. Therefore, assigning a higher weight to *Unemployment insurance* we favor the middle-aged man and discriminate both the young woman and the older worker.

Generally speaking, higher weights of certain benefits are advantageous for those who are most interested in them and disadvantageous for those who are not. Thereby unequal benefit weights result in a factual inequality of individuals. Therefore, the problem of weighting social security benefits is closely linked to the one of weighting individuals. Since individual weights are usually assumed equal (= one voter one vote), regardless of education, experience, or intelligence, the benefit weights should be assumed equal as well. Any deviation from equal weights is a source of debate, and to avoid it, equal weights are accepted whenever possible.

In statistics it is also a tradition to accept the equal distribution (weights) by default, unless no other information is available; such an assumption satisfies the principle of maximal likelihood; see Kendall and Moran (1963). One can expect that even if in actuality the weights are unequal, the deviations from equal weights statistically annihilate each other so that the equally-weighted composite indicator provides a reasonable approximation.

Computation of the indicator *Social security* Consider the first security benefit *Unemployment insurance* ($k = 1$). Table 3 contains the national rules as given by OECD (2002, p. 146–148) and updated from European Commission (2004) by Martin Kimmich. In comparison to Schmid and Reissert (1996, pp. 239–241) Judith Aust found no significant changes during 1994–2003.

The second section of Table 3 contains ranking of the 128 pairs *Group/Country* (also performed by Martin Kimmich). Let us trace the ranking procedure step-by-step. Assign rank 1 to the best pair(s) *Country/Group* with respect to the rules listed. Then assign rank 2 to the next-best pair(s) *Country/Group*, and so on. If certain pairs have been overlooked then they are inserted between the ones already ranked with an intermediate fractional

rank like 1.5. These fractional ranks are converted by computer to integer-valued ranks in parentheses. ‘NAN’ (Not A Number) stands for missed data. As usual in empirical studies, they are replaced by mean values, in this case by the rounded middle rank. Since there are 12 ranks (the maximal rank R_1 is given in the table caption), the NaN is replaced by 7.

Other benefits *Pensions*, *Sick leave*, *Maternity leave*, and *Paid holidays* ($k = 2, \dots, 5$) are processed in the same way with similar Tables 4–7. Thereby, each *Country/Group* (m, n) is evaluated with respect to benefit k , getting rank $1 \leq r_{mnk} \leq R_k$, where R_k is the maximal rank attained with respect the k th benefit. To respect the rule ‘the more the better’ invert ranks r_{mnk} to $R_k + 1 - r_{mnk}$. The ranks are normalized to the range 0–1 by taking $\frac{R_k+1-r_{mnk}}{R_k+1} = 1 - \frac{r_{mnk}}{R_k+1}$. The resulting equidistant grades which provide the most accurate statistical approximation (see Annex 1).

The score of *Social security* I_{mn} of every *Country/Group* (m, n) is computed by the Annex formula (2) with equal weights $a_k = \frac{1}{5}$. The *social security* level I_{mt} in a country m in year t is the weighted mean of that of its employment groups with the weights b_{mnt} being proportional to their size in the given year:

$$I_{mn} = \frac{1}{5} \cdot \sum_{k=1}^5 \left(1 - \frac{r_{mnk}}{R_k + 1}\right) \quad I_{mt} = \sum_{n=1}^8 b_{mnt} I_{mn} . \quad (4)$$

The computation results for Germany ($m = 1$) in 1990–2003 are shown in Table 8 coupled with Figure 5.

For example, the group of permanently full-time employed ($n = 1$) in Germany ($m = 1 = \text{DE}$) has partial ranks with respect to the five partial criteria $r_{\text{DE}1k} = 5, 4, 1, 1, 4$. The maximal ranks are $R_k = 12, 9, 15, 8, 7$. Substitute these values into (4), apply the transformation $1 - I$, and obtain the summary score

$$1 - I_{\text{DE}1} = \frac{1}{5} \cdot \left(\underbrace{1 - \frac{5}{13}}_{=61.5\%} + \underbrace{1 - \frac{4}{10}}_{=60.0\%} + \underbrace{1 - \frac{1}{16}}_{93.8\%} + \underbrace{1 - \frac{1}{8}}_{=88.9\%} + \underbrace{1 - \frac{4}{8}}_{=50.0\%} \right) = \underbrace{0.708}_{=70.8\%}$$

which is shown in the bottom-left section of Table 8. The composition of summary scores from partial scores for the sample year 2003 is displayed in the bottom section of Table 8.

The top number of each cell is the size of the employment group n in year t , given in % to total employment in the given year (= the weight b_{mnt}). In Figure 5 it is the length of the corresponding color rectangle. The bottom number of the cell is the *Security level* I_{mn} for the group shown by the color rectangle’s height. The horizontal color layers show the contribution of five benefits as given in the bottom section of Table 8. The black background is the *Security deficit*, that is, the remainder to attain the 100%-security.

The German yearly security levels I_{mt} are shown in the next to last column of Table 8. In Figure 5 it is the share of colored area in the framing rectangle of the year. For instance, the level of security in Germany in 2003 is obtained from the 2003 row of Table 8:

$$S_{\text{DE}2003} = 0.619 \cdot 0.708 + 0.175 \cdot 0.688 + \dots + 0.012 \cdot 0.175 = 0.647 = 64.7\%.$$

Table 3: Ranking (1–12) groups of employees with respect to social security benefit *Unemployment insurance*. Source: own estimation based on OECD (2002), p. 146–148 and MISSOC (2004)

	General conditions		Employment type							
	Statutory right	Conditions	Permanent full-time	Permanent part-time	Fixed-term full-time	Fixed-term part-time	Full-time self-employed in agriculture	Full-time self-employed not in agriculture	Part-time self-employed in agriculture	Part-time self-employed not in agriculture
Germany	yes	12 months in last 3 years or 6 months if a seasonal worker	2(5)	2(5)	2.5(6)	2.5(6)	6(12)	6(12)	6(12)	6(12)
Austria	yes	52 weeks in past 24 months and earnings > 309 EUR	2(5)	2.5(6)	3(8)	3(8)	6(12)	2(5)	6(12)	2.5(6)
Belgium	yes	312 days in past 18 months for < 36 years old and more days for older age groups	3(8)	4(10)	3(8)	4(10)	6(12)	6(12)	6(12)	6(12)
Switzerland	yes	6 months in past 2 years; 12 months for repeat claim	1.5(3)	1.5(3)	1.75(4)	1.75(4)	NaN(7)	NaN(7)	NaN(7)	NaN(7)
Czech Republic	yes	12 months in past 3 years	2(5)	2(5)	2.75(7)	2.75(7)	NaN(7)	NaN(7)	NaN(7)	NaN(7)
Danemark	voluntary participation	52 weeks in past 3 years; 34 weeks for part-timers	2(5)	2(5)	2.75(7)	2.75(7)	2.5(6)	2.5(6)	2.5(6)	2.5(6)
Spain	yes	360 days in past 6 years	2(5)	2(5)	2.5(6)	2.5(6)	6(12)	6(12)	6(12)	6(12)
Finland	yes	43 weeks in past 24 months and > 18 hours per week	1.75(4)	4(10)	2(5)	4(10)	1.75(4)	1.75(4)	4(10)	4(10)

Table 3: Ranking (1–12) groups of employees with respect to social security benefit *Unemployment insurance*. Source: own estimation based on OECD (2002), p. 146–148 and MISSOC (2004) (continued)

	General conditions		Employment type							
	Statutory right	Conditions	Permanent full-time	Permanent part-time	Fixed-term full-time	Fixed-term part-time	Full-time self-employed in agriculture	Full-time self-employed not in agriculture	Part-time self-employed in agriculture	Part-time self-employed not in agriculture
France	yes	4 months in past 18 months	1(1)	1(1)	1.25(2)	1.25(2)	6(12)	6(12)	6(12)	6(12)
Italy	yes	52 weeks in past 2 years	2(5)	2(5)	3(8)	3(8)	6(12)	6(12)	6(12)	6(12)
Netherlands	yes	26 weeks in last	1.5(3)	1.5(3)	1.75(4)	1.75(4)	6(12)	6(12)	6(12)	6(12)
Norway	yes	39 weeks income past year > 125% of basis; or mean income past 3 years > 100% of basis	2.5(6)	3(8)	2.5(6)	3(8)	6(12)	6(12)	6(12)	6(12)
Poland	yes, if earnings > minimum wage	365 days in past 18 months	2(5)	3.5(9)	3(8)	3.5(9)	NaN(7)	NaN(7)	NaN(7)	NaN(7)
Portugal	yes	540 days in past 24 months	3.5(9)	4.5(11)	4.5(11)	4.5(11)	6(12)	6(12)	6(12)	6(12)
Sweden	yes	6 months in past 12 months	1.5(3)	1.5(3)	1.5(3)	1.5(3)	2.5(6)	2.5(6)	2.5(6)	2.5(6)
United Kingdom	yes	some employment in past 2 years and contributions paid > some multiple of threshold	3(8)	3.5(9)	3(8)	3.5(9)	6(12)	6(12)	6(12)	6(12)

Table 4: Ranking (1–9) groups of employees with respect to social security benefit *Pension*. Source: own estimation based on OECD (2002), p. 146–148 and MISSOC (2004)

	General conditions		Employment type							
	Statutory right	Employment duration	Permanent full-time	Permanent part-time	Fixed-term full-time	Fixed-term part-time	Full-time self-employed in agriculture	Full-time self-employed not in agriculture	Part-time self-employed in agriculture	Part-time self-employed not in agriculture
Germany	yes	> 325 EUR and 60 months	2.5(4)	3(5)	3.5(6)	3.5(6)	3(5)	2.5(4)	4.5(8)	3(5)
Austria	yes	180-300 months with earnings > 309 EUR all	3(5)	3.5(6)	3(5)	3.5(6)	3(5)	3(5)	3.5(6)	3.5(6)
Belgium	yes	1 year	1(1)	1(1)	1(1)	1(1)	1.5(2)	1.5(2)	1.5(2)	1.5(2)
Switzerland	yes	not applicable	2(3)	2(3)	2.5(4)	2.5(4)	NaN(5)	NaN(5)	NaN(5)	NaN(5)
Czech Republic	yes	all	NaN(5)	NaN(5)	NaN(5)	NaN(5)	NaN(5)	NaN(5)	NaN(5)	NaN(5)
Danemark	yes	15 years	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)
Spain	yes	a month and minimum earnings	3(5)	3(5)	4(7)	4(7)	3(5)	3(5)	3(5)	3(5)
Finland	yes	all	1(1)	2(3)	1(1)	2(3)	1.5(2)	1.5(2)	2(3)	2(3)
France	yes	5 years	1(1)	1(1)	1(1)	1(1)	2(3)	2(3)	2(3)	2(3)
Italy	yes	all	2.5(4)	3(5)	3.5(6)	3.5(6)	2.5(4)	2.5(4)	3(5)	3(5)
Netherlands	yes	all	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)
Norway	yes	all	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)
Poland	yes	it varies	NaN(5)	NaN(5)	NaN(5)	NaN(5)	NaN(5)	NaN(5)	NaN(5)	NaN(5)
Portugal	yes	15 years with >120 days	3(5)	5(9)	4(7)	5(9)	3(5)	3(5)	5(9)	5(9)
Sweden	yes	all	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)
United Kingdom	yes	earnings > threshold	2(3)	2.5(4)	2(3)	2.5(4)	2(3)	2(3)	2.5(4)	2.5(4)

Table 5: Ranking (1–15) groups of employees with respect to social security benefit *Sick leave*. Source: own estimation based on OECD (2002), p. 146–148 and MISSOC (2004)

	General conditions		Employment type							
	Statutory right	Employment duration	Permanent full-time	Permanent part-time	Fixed-term full-time	Fixed-term part-time	Full-time self-employed in agriculture	Full-time self-employed not in agriculture	Part-time self-employed in agriculture	Part-time self-employed not in agriculture
Germany	yes	all	1(1)	1(1)	1(1)	1(1)	6(15)	6(15)	6(15)	6(15)
Austria	yes (not for on-call workers)	monthly earnings > 309 EUR	1.5(2)	3.5(9)	1.5(2)	3.5(9)	6(15)	3.5(9)	6(15)	3.5(9)
Belgium	yes	3 months	2(4)	2(4)	2.5(5)	2.5(5)	3.5(9)	3.5(9)	3.5(9)	3.5(9)
Switzerland	voluntary participation	3 months	2(4)	2(4)	2.5(5)	2.5(5)	NaN(8)	NaN(8)	NaN(8)	NaN(8)
Czech Republic	no	not applicable	6(15)	6(15)	6(15)	6(15)	NaN(8)	NaN(8)	NaN(8)	NaN(8)
Danemark	yes	> 72 hours in past 8 weeks	1(1)	3.5(9)	1(1)	3.5(9)	3.75(10)	3.75(10)	3.75(10)	3.75(10)
Spain	yes	180 days in past 5 years	4(11)	4.5(13)	5(14)	5(14)	4(11)	4(11)	4.5(13)	4.5(13)
Finland	yes	all	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)
France	yes	800 hours in past 12 months	3(7)	4(11)	3.5(9)	4(11)	6(15)	5(14)	6(15)	5(14)
Italy	yes	all	1(1)	1(1)	1(1)	1(1)	6(15)	6(15)	6(15)	6(15)
Netherlands	yes	all	1(1)	1(1)	1(1)	1(1)	6(15)	6(15)	6(15)	6(15)
Norway	yes	14 days	1.5(2)	1.5(2)	1.5(2)	1.5(2)	2(4)	2(4)	2(4)	2(4)
Poland	yes	30 days	1.75(3)	1.75(3)	1.75(3)	1.75(3)	NaN(8)	NaN(8)	NaN(8)	NaN(8)
Portugal	yes	6 months	3.5(9)	3.5(9)	3.75(10)	3.75(10)	4(11)	4(11)	4.25(12)	4.25(12)
Sweden	yes	all	1(1)	1(1)	1(1)	1(1)	1.5(2)	1.5(2)	1.5(2)	1.5(2)
United Kingdom	yes	3 months and earnings > 500 EUR	2.5(5)	4(11)	2.75(6)	4(11)	3(7)	3(7)	3.25(8)	3.25(8)

Table 6: Ranking (1–8) groups of employees with respect to social security benefit *Paid maternity leave*. Source: own estimation based on OECD (2002), p. 146–148 and MISSOC (2004)

	General conditions			Employment type							
	Statutory right	Contribution period	Beyond contract	Permanent full-time	Permanent part-time	Fixed-term full-time	Fixed-term part-time	Full-time self-employed in agriculture	Full-time self-employed not in agriculture	Part-time self-employed in agriculture	Part-time self-employed not in agriculture
Germany	yes	all	yes	1(1)	1(1)	1(1)	1(1)	6(8)	6(8)	6(8)	6(8)
Austria	yes	monthly earnings > 309 EUR	yes	1(1)	3(4)	1(1)	3(4)	5.5(7)	3(4)	5.5(7)	3(4)
Belgium	yes	all	yes (at benefit level)	1(1)	1(1)	1(1)	1(1)	3(4)	3(4)	3(4)	3(4)
Switzerland	yes	all	yes	1(1)	1(1)	1(1)	1(1)	NaN(5)	NaN(5)	NaN(5)	NaN(5)
Czech Republic	no	not applicable	yes	6(8)	6(8)	6(8)	6(8)	NaN(5)	NaN(5)	NaN(5)	NaN(5)
Danemark	yes	> 120 hours in past 13 weeks	yes	1.5(2)	3(4)	1.5(2)	3(4)	1.5(2)	1.5(2)	1.5(2)	1.5(2)
Spain	yes	180 days in past 5 years	no	3(4)	3.5(5)	3.5(5)	3.5(5)	3(4)	3(4)	3.5(5)	3.5(5)
Finland	yes	all	yes (by the state)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)
France	yes	200 hours per quarter in past 6 months or 800 hours in past year	yes	1.75(3)	3(4)	3(4)	3(4)	1(1)	NaN(5)	1(1)	NaN(5)
Italy	yes	all	no	1(1)	1(1)	1(1)	1(1)	1.5(2)	1.5(2)	1.5(2)	1.5(2)
Netherlands	yes	all	no	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)
Norway	yes	all	yes	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)
Poland	yes	6 months	no	3(4)	3(4)	3.5(5)	3.5(5)	NaN(5)	NaN(5)	NaN(5)	NaN(5)
Portugal	yes	6 months	yes	3(4)	3(4)	3.5(5)	3.5(5)	6(8)	6(8)	6(8)	6(8)
Sweden	yes	all	yes	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)	1(1)
United Kingdom	yes	26 weeks and earnings > 500 EUR	yes	3(4)	4(6)	3.5(5)	4(6)	1(1)	1(1)	1(1)	1(1)

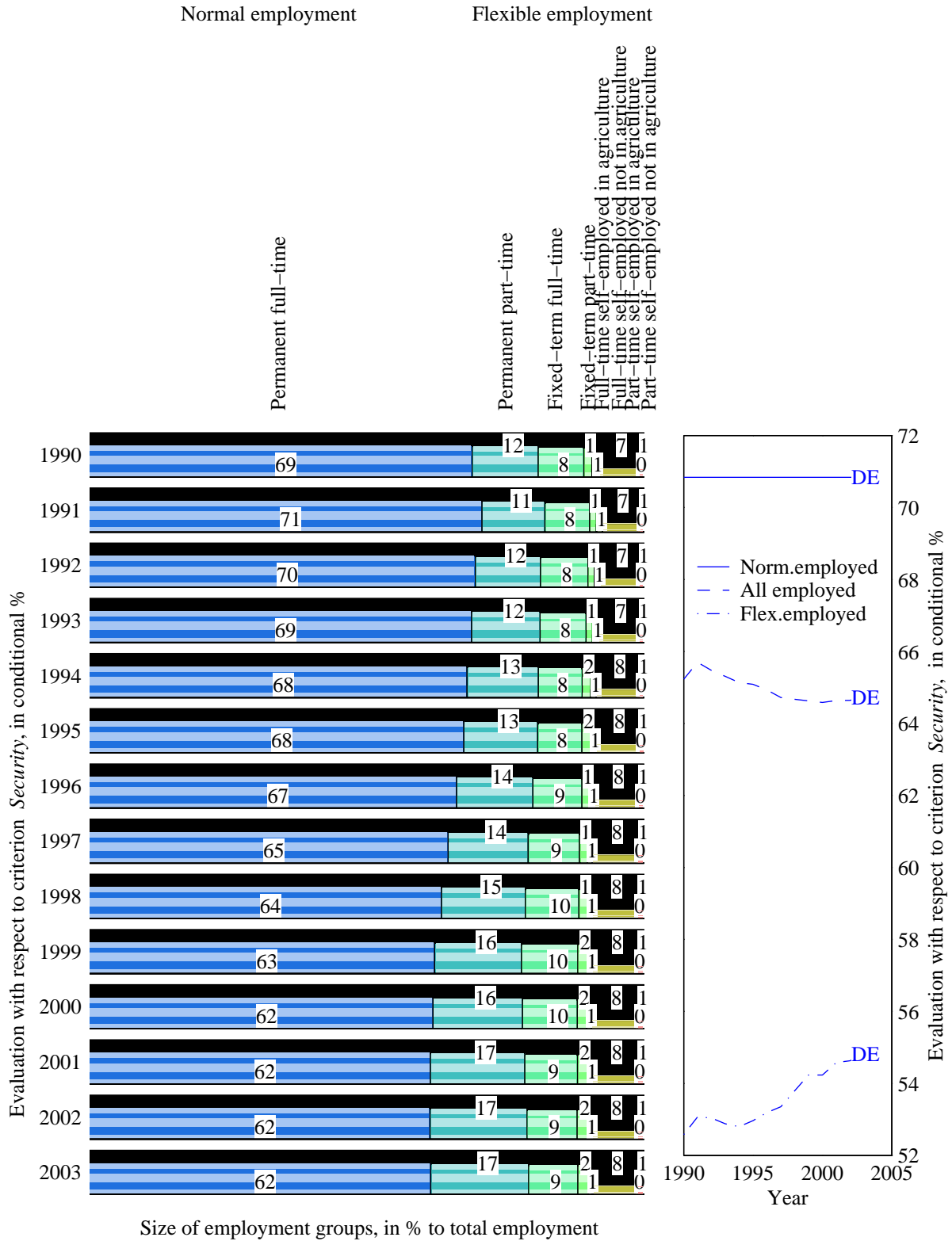
Table 7: Ranking (1–7) groups of employees with respect to social security benefit *Paid holidays*. Source: own estimation based on OECD (2002), p. 146–148 and MISSOC (2004)

	General conditions		Employment type							
	Statutory right	Contribution period	Permanent full-time	Permanent part-time	Fixed-term full-time	Fixed-term part-time	Full-time self-employed in agriculture	Full-time self-employed not in agriculture	Part-time self-employed in agriculture	Part-time self-employed not in agriculture
Germany	yes	6 months	3(4)	3(4)	3(4)	3(4)	6(7)	6(7)	6(7)	6(7)
Austria	yes	6 months	3(4)	3(4)	3(4)	3(4)	6(7)	6(7)	6(7)	6(7)
Belgium	yes	all	1(1)	1(1)	1(1)	1(1)	6(7)	6(7)	6(7)	6(7)
Switzerland	yes	pro rata	2(3)	3(4)	2(3)	3(4)	6(7)	6(7)	6(7)	6(7)
Czech Republic	yes		NaN(4)	NaN(4)	NaN(4)	NaN(4)	6(7)	6(7)	6(7)	6(7)
Danemark	yes	all	1(1)	1(1)	1(1)	1(1)	6(7)	6(7)	6(7)	6(7)
Spain	yes		NaN(4)	NaN(4)	NaN(4)	NaN(4)	6(7)	6(7)	6(7)	6(7)
Finland	yes	> 14 days or > 35 hours per month	1.5(2)	1.5(2)	1.5(2)	1.5(2)	6(7)	6(7)	6(7)	6(7)
France	yes	1 month	2(3)	2(3)	2(3)	2(3)	6(7)	6(7)	6(7)	6(7)
Italy	yes	all	1(1)	1(1)	1(1)	1(1)	6(7)	6(7)	6(7)	6(7)
Netherlands	yes	all	1(1)	1(1)	1(1)	1(1)	6(7)	6(7)	6(7)	6(7)
Norway	yes	all	1(1)	1(1)	1(1)	1(1)	6(7)	6(7)	6(7)	6(7)
Poland	yes	all	1(1)	1(1)	1(1)	1(1)	6(7)	6(7)	6(7)	6(7)
Portugal	yes	30 days	2(3)	2(3)	2(3)	2(3)	6(7)	6(7)	6(7)	6(7)
Sweden	yes	all	1(1)	1(1)	1(1)	1(1)	6(7)	6(7)	6(7)	6(7)
United Kingdom	yes	13 weeks	4(5)	4(5)	4(5)	4(5)	6(7)	6(7)	6(7)	6(7)
	(not for all sectors)	(currently under consideration to remove this restriction)								

Table 8: Employment types in Germany and their evaluation with respect to criterion *Security* (Source: EuroStat and own estimation)

Year	Employment group, in % to total employment / Its summary score with respect to criterion <i>Security</i> , in %								<i>Security</i> (weighted average of summary scores)	
	Normal	Flexible employment							For all em- ployed (liberal concept)	For flexibly em- ployed (trade- unionist concept)
	Perma- nent full-time	Perm- anent part- time	Fixed- term full-time	Fixed- term part- time	Full- time self-em- ployed in agri- culture	Full- time self-em- ployed not in agricul- ture	Part- time self-em- ployed in agri- culture	Part- time self-em- ployed not in agricul- ture		
%	%	%	%	%	%	%	%	%	%	
1990	69.3	11.8	8.1	1.4	1.3	7.0	0.1	0.9	65.2	52.6
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
1991	71.1	11.2	8.0	1.2	1.0	6.6	0.1	0.8	65.7	53.1
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
1992	69.9	11.7	8.5	1.1	1.0	6.9	0.1	0.8	65.5	53.0
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
1993	69.2	12.2	8.2	1.2	1.0	7.2	0.1	0.9	65.3	52.9
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
1994	68.4	12.7	7.8	1.5	1.0	7.6	0.1	0.9	65.1	52.8
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
1995	67.8	13.2	7.9	1.5	0.9	7.6	0.1	1.0	65.1	53.0
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
1996	66.5	13.6	8.8	1.3	0.9	7.9	0.1	1.0	64.9	53.2
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
1997	65.0	14.3	9.2	1.4	0.9	8.1	0.1	1.1	64.7	53.4
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
1998	63.8	15.0	9.5	1.5	0.8	8.0	0.1	1.2	64.7	53.8
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
1999	62.6	15.5	10.1	1.7	0.9	8.1	0.1	1.2	64.6	54.2
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
2000	62.3	16.0	9.8	1.7	0.8	8.2	0.1	1.2	64.6	54.2
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
2001	61.9	16.8	9.4	1.7	0.8	8.1	0.1	1.2	64.6	54.6
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
2002	61.8	17.3	9.0	1.8	0.8	8.1	0.1	1.2	64.6	54.6
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
2003	61.9	17.5	8.8	1.8	0.8	7.9	0.1	1.2	64.7	54.8
	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5		
Construction of summary score <i>Security</i> from partial scores for 2003, in %									Criterion weight	
Unempl.insur.	61.5	61.5	53.8	53.8	7.7	7.7	7.7	7.7	0.2	
Pension	60.0	50.0	40.0	40.0	50.0	60.0	20.0	50.0	0.2	
Sick leave	93.8	93.8	93.8	93.8	6.3	6.3	6.3	6.3	0.2	
Matern.leave	88.9	88.9	88.9	88.9	11.1	11.1	11.1	11.1	0.2	
Paid holidays	50.0	50.0	50.0	50.0	12.5	12.5	12.5	12.5	0.2	
Weighted sum	70.8	68.8	65.3	65.3	17.5	19.5	11.5	17.5	1.0	

Figure 5: Employment types in Germany and their evaluation with respect to criterion *Security* (Source: EuroStat and own estimation)



For a specific trade-unionist concept of flexicurity to be considered later, the last column of Table 8 contains a similar index but for flexibly employed only:

$$F_{mt} = \frac{1}{\sum_{n=2}^8 b_{mnt}} \cdot \sum_{n=2}^8 b_{mnt} I_{mn} .$$

For Germany in 2003 it is obtained from the 2003 row of Table 8 as follows:

$$S_{DE2003}^{flex} = \frac{S_{DE2003} - 0.619 \cdot 0.708}{1 - 0.619} = 0.548 = 54.8\%.$$

In Figure 5 it corresponds to the share of colored area in the reduced framing rectangle of the year with no first (permanent full-time) section.

The auxiliary graph in Figure 5 visualizes the *Security* yearly dynamics for normally, for all, and for flexibly employed (the first and two last columns of Table 8).

Accuracy of the composite indicator *Social security* Estimate *total errors* σ_{mt} of the *Security* indicator for country m in year t .

- Assume the independence of rankings with respect to social security benefits k . For every country m and employment group n obtain the *summary error* from (3):

$$\sigma_{mn} = \frac{1}{5} \sqrt{\sum_{k=1}^5 \frac{r_{mnk}(R_k - r_{mnk} + 1)}{(R_k + 1)^2(R_k + 2)}} , \quad (5)$$

where

- $\frac{1}{5}$ are equal weights of five social security benefits,
- r_{mnk} is the integer-valued rank of employment group n in country m with respect to security benefit k , as given in Table 3, and
- R_k is the maximal rank for benefit k .

- Since ranks of employment groups with respect to the *same* social security benefit k are dependent random variables, the standard error of the *Security* indicator of a country m in a given year t cannot be found from the sum of variances: $\sigma_{mt} \neq \sqrt{\sum_{n=1}^8 b_{mnt}^2 \sigma_{mn}^2}$. We use a less advantageous formula which includes correlation, namely the weighted sum of standard errors with weights being the relative size of employment groups b_{mnt} :

$$\sigma_{mt} = \begin{cases} \sum_{n=1}^8 b_{mnt} \sigma_{mn} & \text{(for all employed: liberal concept)} \\ \frac{1}{\sum_{n=2}^8 b_{mnt}} \cdot \sum_{n=2}^8 b_{mnt} \sigma_{mn} & \text{(for flexibly employed: trade-unionist concept)} . \end{cases} \quad (6)$$

The yearly total errors for country's *Security* indicator computed for all employed (= liberal concept) and for flexibly employed only (= trade-unionist concept) are shown in Tables 9–10. The last column of the tables provides the maximal total indicator error during the control period 1990–2003. Substitute summary errors (5) into (6) and obtain the errors for *Security* indicators of pairs *Country/year*.

Table 9: Total standard error σ_{mt} in estimating *Security* for all employed (liberal concept)

	σ_{mt} in % (liberal concept)														$\max_t \sigma_{mt}$
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	%
Germany	5.56	5.57	5.56	5.56	5.56	5.56	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.55	5.57
Austria						5.85	5.86	5.86	5.87	5.88	5.88	5.89	5.90	5.91	5.91
Belgium	4.89	4.88	4.88	4.88	4.88	4.88	4.88	4.88	4.88			4.86	4.86	4.86	4.89
Switzerland							5.71	5.72	5.71	5.72	5.72	5.72	5.72	5.72	5.72
Czech Republic								5.73	5.74	5.74	5.74	5.74	5.74	5.75	5.75
Danemark	5.02	5.02	5.01	5.02	5.00	5.00	5.00	5.01	5.01	5.00	5.00	4.99	4.99	5.00	5.02
Spain	6.20	6.20	6.19	6.19	6.19	6.19	6.19	6.20	6.21	6.22	6.23	6.23	6.23	6.24	6.24
Finland						4.82	4.82	4.82	4.83	4.83	4.83	4.83	4.83	4.83	4.83
France	5.46	5.47	5.47	5.47	5.48	5.48	5.48	5.48	5.49	5.49	5.50	5.50	5.50	5.49	5.50
Italy	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.02	5.03	5.03	5.03	5.03
Netherlands	4.27	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.28	4.29	4.28	4.28	4.28	4.29
Norway						4.62	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63	4.63
Poland											5.90	5.90	5.90	5.89	5.90
Portugal	5.96	5.95	6.00	6.00	5.98	5.97	5.95	5.94	5.94	5.95	5.96	5.94	5.93	5.93	6.00
Sweden						4.35	4.35	4.35	4.34	4.34	4.34	4.34	4.34	4.34	4.35
United Kingdom	6.11	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.13	6.13	6.14	6.14	6.14	6.13	6.14

Table 10: Total standard error σ_{mt} in estimating *Security* for flexibly employed only (trade-unionist concept)

	σ_{mt} in % (trade-unionist concept)														$\max_t \sigma_{mt}$
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	%
Germany	5.35	5.36	5.36	5.35	5.35	5.35	5.36	5.36	5.37	5.38	5.38	5.39	5.39	5.39	5.39
Austria						6.03	6.02	6.04	6.05	6.07	6.09	6.09	6.13	6.14	6.14
Belgium	5.05	5.03	5.02	5.02	5.02	5.01	5.00	4.99	4.98			4.94	4.94	4.93	5.05
Switzerland							5.84	5.83	5.83	5.83	5.83	5.83	5.82	5.83	5.84
Czech Republic								5.90	5.92	5.92	5.92	5.93	5.93	5.93	5.93
Danemark	5.34	5.33	5.33	5.33	5.32	5.32	5.33	5.33	5.34	5.33	5.34	5.35	5.35	5.35	5.35
Spain	5.89	5.91	5.91	5.90	5.91	5.92	5.92	5.93	5.93	5.94	5.95	5.95	5.96	5.96	5.96
Finland						4.87	4.87	4.87	4.88	4.89	4.89	4.89	4.89	4.90	4.90
France	5.35	5.36	5.36	5.39	5.39	5.41	5.42	5.43	5.44	5.45	5.47	5.47	5.46	5.44	5.47
Italy	4.93	4.93	4.94	4.93	4.94	4.94	4.94	4.94	4.94	4.95	4.95	4.95	4.96	4.95	4.96
Netherlands	4.23	4.24	4.25	4.24	4.24	4.24	4.25	4.25	4.26	4.26	4.27	4.26	4.27	4.27	4.27
Norway						4.56	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57	4.57
Poland											6.00	5.98	5.97	5.96	6.00
Portugal	5.33	5.28	5.23	5.21	5.18	5.19	5.18	5.19	5.27	5.28	5.32	5.28	5.31	5.30	5.33
Sweden						4.41	4.41	4.41	4.41	4.40	4.41	4.41	4.41	4.40	4.41
United Kingdom	5.75	5.77	5.79	5.80	5.80	5.81	5.82	5.83	5.84	5.85	5.86	5.86	5.85	5.84	5.86

Annex 3: Composite indicator of the *Strictness of EPL*

As already mentioned, we represent the *Flexibility* by the *Strictness of EPL*. OECD (1999, pp.52–53 and 2004, pp. 61–125) designed two indicators for permanently and temporary employed; see Table 11. To obtain yearly summary indicators of *Strictness of EPL* for a

Table 11: Summary indicators of the strictness of employment protection legislation. Source: own estimation based on OECD (1999) pp. 52–53, 66

	Permanent employment		Fixed-term employment		Collective dismissals
	Late 1980s	Late 1990s	Late 1980s	Late 1990s	Late 1990s
	Score 0–6	Score 0–6	Score 0–6	Score 0–6	Score 0–6
Germany	2.7	2.8	3.8	2.3	3.1
Austria	2.6	2.6	1.8	1.8	3.3
Belgium	1.5	1.5	4.6	2.8	4.1
Switzerland	1.2	1.2	0.9	0.9	3.9
Czech Republic	2.8	2.8	0.5	0.5	4.3
Danemark	1.6	1.6	2.6	0.9	3.1
Spain	3.9	2.6	3.5	3.5	3.1
Finland	2.7	2.1	1.9	1.9	2.4
France	2.3	2.3	3.1	3.6	2.1
Italy	2.8	2.8	5.4	3.8	4.1
Netherlands	3.1	3.1	2.4	1.2	2.8
Norway	2.4	2.4	3.5	2.8	2.8
Poland	2.2	2.2	1.0	1.0	3.9
Portugal	4.8	4.3	3.4	3.0	3.6
Sweden	2.8	2.8	4.1	1.6	4.5
United Kingdom	0.8	0.8	0.3	0.3	2.9

country do the following

- extrapolate the scores of a country’s employment group (permanent/temporary) from 1989 and 1999 (‘late 1980s’ and ‘late 1990s’) to 1990–2003 by linear regression
- compute the yearly *Strictness of EPL* for permanently, temporary, and self-employed with a constant score of *Collective dismissals* (available only for 1999) and weights $\frac{5}{6}, \frac{1}{6}$ suggested by the OECD (1999, p. 118):

$$\text{Strictness of EPL} = \begin{cases} \frac{5}{6} \cdot \text{Score of permanently employed} + \frac{1}{6} \cdot \text{Collective dismissals} & \text{for permanently employed} \\ \frac{5}{6} \cdot \text{Score of temporary employed} + \frac{1}{6} \cdot \text{Collective dismissals} & \text{for temporary employed} \\ 0 & \text{for self-employed} \end{cases}$$

- taking the weighted sum of the EPL indicators of three employment groups (permanently, temporarily, and self-employed) with the weights proportional to their size in the given year (to reflect the factual rather than intended situation, similarly as in the indicator of *Social security*).

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