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Editors:

J.S. Svensson

J.G.J. Wassink

B. van Buggenhout

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More information about the JURIX foundation and its activities can be obtained by contacting the JURIX secretariat:

Mr. C.N.J. de Vey Mestdagh  
University of Groningen, Faculty of Law  
Oude Kijk in 't Jatstraat 26  
P.O. Box 716  
9700 AS Groningen  
Tel: +31 50 3635790/5433  
Fax: +31 50 3635603  
Email: [sesam@rechten.rug.nl](mailto:sesam@rechten.rug.nl)



# ADEQUACY OF UNEMPLOYMENT SCHEMES: AN APPLICATION OF MICROSIMULATION IN COMPARATIVE ANALYSIS

Lieve De Lathouwer

## Summary

*Departing from the observation that social security systems in different countries generate sharply different welfare outcomes, the question arises to what extent systems as such offer an explanation for better coverage of the poverty risk. In this article the micro-simulation technique is presented as an additional instrument in the field of comparative research. The micro-simulation technique offers the possibility of assessing the redistributive potential of different social security schemes, controlling for the socio-economic context. Institutional factors are thus separated from other factors which determine welfare outcomes. In this way a better understanding can be obtained of the redistributive criteria and mechanism operating within various systems.*

## 1. Purpose

In international comparative research, one important approach is the study of the effectiveness of social security systems and their impact on welfare outcomes in terms of poverty and income distribution of households.

So far comparative empirical studies are *primarily of a descriptive nature*. [Deleeck, Van den Bosch and De Lathouwer, 1992]; [Smeeding, O'Higgins and Rainwater, 1990]; [Mitchell, 1991]; [Jäntti and Danziger, 1992].

However, less is known about the *factors which determine* the differences in welfare outcomes. Why are social security schemes in some countries more effective, in terms of guaranteeing a minimum income, than in others ?

Departing from the observation that some social security schemes generate better results than others this article investigates *the degree to which social security schemes as such provide an explanation for a better coverage of the poverty risk, and which distribution mechanisms cause this*. It is difficult to derive an answer to this question from comparative poverty research, for the very reason that welfare outcomes are the result of the social security system and of the economic and social context, both of which are unique to each country.

To find the determining factors one must devise methods which allow to *analyse and distinguish* the various spheres of influence.

In this article the *microsimulation technique* is presented as an instrument for a *comparative system analysis*. The focus is in particular on the study of the potential distributional impact of different institutional arrangements. Microsimulation models allow to simulate, on a representative sample, various social protection systems, while controlling for socio-economic and demographic context variables. Institutional factors are thus separated from other factors which determine welfare outcomes.

These issues are approached by means of a *case study for two very distinct systems, the Belgian and Dutch unemployment schemes*. Departing from the observation that the Dutch unemployment scheme is more effective in the Dutch context than the Belgian scheme in Belgium, the question arises as to whether the Dutch unemployment scheme as such is better able to ensure a guaranteed minimum income and which distribution mechanisms are applied.

The empirical findings result from the microsimulation model for Social Security (MISISZ), developed by the Centre for Social Policy. MISISZ is a static microsimulation model, which enables one to simulate policy alternatives in the field of

social security and taxation on Belgian samples [Cantillon, Lambert and Verbist, 1993].<sup>1</sup>

The case-study presented here must be seen in the broader context of the research activities undertaken by the Centre of Social Policy. In 1986 the Centre enlarged its field of study towards comparative analysis of welfare outcomes [Deleeck, Van den Bosch and De Lathouwer, 1992]. Starting from descriptive empirical welfare outcomes the impact of distinct social security systems, or parts of it, is studied. By simulating various policies in one socio demographic economic setting and vice versa one gets a better understanding of potential implications of distinct policies and distinct population profiles for welfare outcomes in different countries.

## **2. Advantages and limits of microsimulation in social policy : some methodological considerations**

Microsimulation may be of *additional value* for social policy analysis for three reasons. *Firstly*, the use of the microsimulation technique offers the possibility of assessing the redistributive potential of different social security schemes, controlling for the socio-economic context. In this way a better understanding can be obtained of the redistributive criteria and mechanism operating within various systems. The application of microsimulation in comparative research adds a new instrument to the range of the more traditional methods (cross-national comparisons on empirical data-sets, standard simulations, evidence from administrative data and comparative analysis of law and national social policies) [Hauser, 1993]. It offers new perspectives, new modes of cooperation at a cross-national level and also new demands on the comparability and availability of data [Atkinson, Bourguignon, Chiappori, 1988]; [Sutherland 1993]. *Secondly*, the results of the simulations can provide a contribution to the controversial debate concerning the desirability of greater convergence between the European systems. Bearing in mind considerations of effectiveness the central question is whether the existing schemes fulfil the existing needs best. In other words: Is the best guarantee for effective (and affordable) social protection provided by the national states' own schemes or not ? [Deleeck, 1992]. *Thirdly* this approach provides a source for reflection on the level of the national policies. It can inspire the ongoing discussions on social policy reform, almost in every country on the agenda now. In particular for the debate on the Belgian unemployment scheme, lessons can be drawn on the potential income implications of the redistributive mechanisms of the Dutch unemployment schemes. Especially the question of whether the duration of benefit entitlement in the Belgian scheme should be restricted and what would be the implications of doing so, is at the centre [OECD, 1992].

On the other hand microsimulation has its *limits*. On a more *conceptual level*, the results of microsimulation models can *never be taken as predicting real consequences of alternative policy models*, though micro-models are working on representative empirical databases. The reason for this is that, in judging changes of policy, microsimulation models would ideally have to take into account very diverse effects [Haveman, 1980]; [Mot, 1991]; [Atkinson and Sutherland, 1988]; [Hancock and Sutherland, 1992]. First we note effects of policy changes for the *economic efficiency* of the social security system. Changes in the social security system affect macro economic parameters and generate behavioural responses at the micro level, which are usually not included in the simulation model. Behavioural responses with respect to the labour market, saving attitudes or household formation are often not taken into account because there is an almost complete lack of empirically validated theories about behaviour of micro-units. Macro economic effects are usually also not built in because micro- and macro-models do not link up adequately in this respect [Social and Cultural Planning Office, 1990]. Secondly, effects relating to *implementation efficiency* are noted (for instance when a shift occurs from insurance to social assistance or vice versa), with consequences for the relationship between the potential beneficiary and the

administration and consequently also for the process of assigning and (non) take-up of benefits. Finally policy changes have implications for the legitimacy and the political robustness of the system (for instance through changes in the method of financing) and consequently for the *political effectiveness*. The existing literature indicates that there is as yet no micro-model where the effects distinguished above are taken into account in a reliable way.

In particular when simulating 'foreign' social security systems, these limits might be revealed more sharply as one is 'lifting out' an existing system from its particular social, institutional and political context and simulating it on a population profile, which is itself partly product of the existing institutional arrangements. Illustrative is the problem of the "communicating vessels". In social protection systems interaction exists between fiscal policy, family benefits and replacement transfers and between transfer schemes (unemployment versus disability schemes).

Hence microsimulation models remain 'scientific constructions' or, as Atkinson, Bourguignon and Chiappori put it, a simulation model is: "... arithmetic rather than economics, but in our view it provides a valuable means of summarising the quantitative significance of the first-round effects of variations in taxes and benefits' [Atkinson, Bourguignon, Chiappori, 1988, p. 345].

On a more **operational** level, microsimulation models are often limited by the *availability of data and the size of the samples* on which they are runned. Especially when modelling distinct social protection systems, one is soon confronted with the discrepancy between the details of legal rules and the availability of the required data. The existing data-sets are often not constructed in function of these simulationmodels, rather vice versa. Some variables might be lacking in the dataset because of inherent institutional differences between the countries. A variable which is essential in one social security system, might not be relevant in another system and thus will be lacking in the data-base. Therefore modelling of various policy models can only be done in its broad structures, not in every detail. The experiences with MISISZ learns that, in communicating the simulation results of existing 'foreign' systems, the policymakers are often particularly interested in those 'details', rather than in global distributive changes. This reflects the inevitable tension between the rationality of policymaking and the possibilities and limits of microsimulation models, see also Svensson [1993].

### 3. The main principles of the Dutch and the Belgian unemployment schemes

Within the limits of this paper it is not possible to give a complete description of the Belgian and the Dutch unemployment schemes<sup>2</sup>. The main underlying principles in the benefit structure of both systems can be summarized as follows:

Contrary to all other countries, *the Belgian scheme* consists solely out of an unemployment 'insurance' scheme. However the insurance principle is operating very weakly. Entitlement conditions are employment related but can also be build up by study. The benefits are hardly wage-related, due to the small difference between the minimum and maximum benefit levels. The duration of entitlement is unlimited and not related to an employment record (and thus contributions). Long-term unemployed cohabiters can be suspended (under specific conditions) when they exceed twice the average (local) unemployment duration. The benefit level is low and strongly family-related (assumed need).

The *Dutch schemes* represent a three-stage protection, trying to combine various principles of equity. Short-term unemployment is protected in a first stage according to the insurance principle, with strong wage-related benefits and with the duration of benefits depending on employment record. In a second stage a minimum flat benefit is guaranteed for a limited period. Finally a means-tested assistance scheme is operating, with however high minimum benefit levels.

Briefly the Belgian scheme can thus be characterised by its **generous scope** (in particular concerning benefit duration) but on the other hand **low benefit levels** are guaranteed. Contrary the Dutch scheme is more restrictive in its coverage, but guarantees **higher benefits**, as well for wage-related benefits as for minimum benefits.

#### 4. The simulation model and the results

The microsimulation model MISISZ makes it possible to simulate *the Dutch and the Belgian unemployment scheme* both for the Belgian benefit-entitled unemployed and to compare the cost and social effectiveness of both schemes.

Two scenarios were simulated<sup>3</sup>:

In a **first scenario** the Dutch unemployment scheme is simulated in its entire benefit structure (insurance and assistance). *Three variants* are distinguished by changing the level of minimum protection: variant A with minimum benefits at the level of the *Belgian (nett) minimum wage*, variant B with minimum benefits linked to *Dutch (nett) minimum wages* and finally minimum benefits for a *constant rate of financing* (variant C) <sup>4</sup>.

In a **second scenario** the present Belgian system is maintained for those who are unemployed for as long as two years. After these benefits are exhausted a social assistance scheme comes into operation, based on the actual *Belgian social assistance level*. At this point only one aspect of the logic of the Dutch system is simulated, namely income protection for a limited duration under unemployment insurance, without altering wage-related- or minimum benefits and whilst retaining the present (low) level in the Belgian social assistance scheme.

Table 1 compares the different minimum benefit levels in the various scenarios and variants.

**Table 1:** Level of the minimum (nett) benefits for the unemployed in the simulations according to family situation, 1 July 1992, in BF per month (corrected for PPP) (1)

household situation (2)	Current system	Scenario 1			Scenario 2
		Variant A(5)	Variant B(6)	Variant C	
family/couples (3)	27.404	32.223	35.485	37.970	24.971
one-parent family	27.404	29.000	31.937	34.170	24.971
singles	19.604	22.556	24.840	26.580	18.729
cohabiters (3)	11.804(4)	19.333(*)	21.290(*)	22.780(*)	12.486
schoolleavers	10.764(*)	19.333(*)	21.290(*)	22.780(*)	12.486

- Scenario 1, Variant A: Dutch benefit structure, Belgian minimum wages
- Scenario 1, Variant B: Dutch benefit structure, Dutch minimum wages
- Scenario 1, Variant C: Dutch benefit structure, constant cost-price
- Scenario 2: Belgian benefit structure for short-term unemployed, long-unemployed benefits according to Belgian social assistance scheme.

(1) PPP(purchasing power standard),source:Eurostat,1991 (most recent available year), 1 guilder=19.42 BF, exchange rate on july 1992:1 guilder=18.27 BF;net Dutch social minimum for couple (incl.vacation):1827,3 guilders a month

(2) For families with children child allowances are not included. They play however a significant role in guaranteeing a minimum income. These allowances are higher in Belgium than in the Netherlands and in addition progression along the number of children is steeper. This leads to a diminution of the differences between families with (many) children. These amounts neither take into account housing allowances. By doing so, the Dutch amounts are under-estimated.

- (3) The category 'cohabiters' versus 'couples' is treated differently in the various systems. In Belgium the category 'cohabiters' applies also to (married) partners, without persons at charge. Breadwinners (with persons at charge) ressort under the category 'family'. In the Netherlands married women ressort under the categorie 'couples', but after means-test. The minima of this category can be reduced by a 'homesharer deduction' (e.g. for independant children living at home, on 1.7.92 this deduction amounts to 182 guilders a month or about 3500 bf/ppp).
- (4) after 18 months of unemployment; higher minima apply in the first and second period.
- (5) Belgian minimum wage, exclusive (double) holiday allowances; minimum wage level without seniority conditions; brut level:38.857 BF/month (brut level with seniority conditions:39.940 BF/month), net minimum wage was calculated for one earner without children, without holiday allowance.
- (6) Dutch social minima, inclusive holiday allowances, according to WAM, (on comparison: brut minimum wage level:2163,2 + 'overhevelingstoelag' 235,6 guilders=2398,8 guilders/a month (=46.585 BF/PPP))
- (\* amounts which vary with age: in the Belgian system: from the age of 18 (school leavers are assumed to be cohabiters; higher amounts apply for single persons or heads of families); in variant A: from the age of 21; in variant B: from 23 years onwards (younger age groups receive smaller benefits).

A comparison of the above minimum benefit levels shows that the current Belgian minimum unemployment benefits are considerably lower than the Dutch minima in absolute terms (variant B). Linking the hypothetical minima to the Belgian minimum wages (variant A) in line with the Dutch benefit logic, raises the minimum benefit level considerably, but the minima remain lower than the Dutch ones because of the lower minimum wages in Belgium.

The Dutch minimum income guarantee is valid both for unemployment insurance and for social assistance (RWW). In Belgium minimum benefits under unemployment insurance are higher than under social assistance. Compared with the Netherlands this latter benefit level may be considered very low.

*The descriptive analysis leads to the general conclusion that the social allocation of unemployment benefits according to the Dutch system generates a **greater social effectiveness and efficiency** from the point of view of eliminating poverty and insecurity of subsistence. With a same input of resources less unemployed households would be poor under the Dutch benefit structure and a larger share of the transfers would help to close the poverty gap.*

*The entire Dutch benefit structure would generate higher benefits (as well wage-related as minimum benefits) for fewer unemployed (depending on the variant, 22 to 26% of those now entitled would be excluded from the system). The considerably smaller scope of the Dutch system is explained by the large proportion of long-term unemployed from multiple income households among the Belgian unemployed, chiefly married women. The latter would be less covered by the Dutch logic.*

The degree of improvement is sensitive to the variant (and thus level of minimum protection) and the poverty line applied<sup>5</sup>. When concentrating on *severer poverty* (measured by the more stringent ec-standard) the poverty problem is reduced. If the minima are raised the differences in effectiveness between the current system and the simulated system are more substantial.

When measuring with more *generous income standards* (here the broader csp-norm) the conclusion becomes less clear. The number of poor households is higher than at present, but the Dutch system would still entail a greater reduction of the total poverty gap (except in variant A). This is because more households are situated under the generous poverty line but their average income shortage is less.

The increase in effectiveness is explained by a *significant decrease of poverty among single income providers*. Multiple income families, in particular two-income providers, are threatened in their subsistence security, especially when measuring with generous poverty lines. For many two-income providers unemployment benefits are an important means of keeping the household income up to (higher) standards.

A selective system following the entire logic of the Dutch benefit scheme (in all respects) consequently leads to *smaller savings* than one might have expected. In

addition there is a significant shift in the *method of financing* the unemployment scheme (from social insurance to social assistance).

**Scenario 2** learns that, if the present system is maintained for unemployment lasting up to 2 years, transferring the longerterm unemployed to the current low level of social assistance benefits would lead to considerable cuts, while the available means would be used in a considerably more efficient way. Opposed to this, however, a very high social cost must be paid: a doubling of the poverty risk (measured by the stringent EC-norm). The severe means-test sharply reduces the scope (more than 30% of those entitled at present drop out of the system), while there is no guarantee of higher allowances. Consequently, a selective application of too small a budget, in view of the existing needs, leads to considerable ineffectiveness and increased poverty.

**Table 2:** Simulation results of the Belgian and the Dutch unemployment schemes: costprice, generosity, effectiveness and efficiency among Belgian unemployed households (EC- and CSP-standard)

	Current system	Scenario 1			Scenario 2
		Variant A	Variant B	Variant C	
Coverage	100	74.3	76.0	77.7	67.4
Average benefits	15.373	19.129	19.147	19.808	15.040
Costprice (in % of current costprice)	100	92.4	94.6	100	66
- insurance		64	63	65	49
- assistance		29	32	35	17
% poor households					
<i>EC-norm:</i>					
all households (*)	12.2	10.3	8.0	4.6	25.6
one income households	33.2	17.8	14.4	6.9	51.5
more income households(**)	4.9	7.6	5.7	3.8	16.5
<i>CSP-norm:</i>					
all households	34.3	42.8	42.5	38.8	52.4
one income households	77.2	76.2	75.2	68.8	85.1
more income households	19.3	31.1	31.1	28.3	41.0
Reduction poverty gap for households with unemployed					
<i>EC-norm</i>	92.4	94.1	95.7	97.1	80.5
<i>CSP-norm</i>	79.3	78.7	81.4	85.8	60.2
Share of transfers to needy households as far as poverty line					
<i>EC-norm</i>	39.9	44.0	43.7	41.9	52.7
<i>CSP-norm</i>	59.6	64.0	64.6	64.5	68.6

source: MISISZ (Micro Simulatie Model voor de Sociale Zekerheid), csp-sample 1985

Scenario 1, Variant A: Dutch benefit structure, Belgian minimum wages

Scenario 1, Variant B: Dutch benefit structure, Dutch minimum wages

Scenario 1, Variant C: Dutch benefit structure, constant input of transfers

Scenario 2: Current Belgian unemployment scheme for short-term unemployed up to 2 years, for long-term unemployed benefits according Belgian social assistance scheme.

(\*) Proportion of the householdcategories in the total population of entitled unemployed: singles (8,5%), one-parent (4,6%), one-income provider (12,2%), two-income providers (49,8%), inmates

(25%, of which 17% children living with their parents). In 1992 the household formation of the unemployed remained roughly the same.

(\*\*) the categorization into one- and more income households concerns initial categories; alterations in the relationship between these categories owing to greater selectivity in scope are not represented in this table. More income-households (households where unemployment benefit is cumulated with other income sources), under simulations including unemployed without allowances.

## 5. Summary and conclusions

Departing from the observation that social security systems in different countries generate sharply different welfare outcomes, the question arises to what extent *systems as such* offer an explanation for better coverage of the poverty risk. In this article the *micro-simulation technique* is presented as an additional instrument in the field of comparative research. The microsimulation technique offers the possibility of assessing the redistributive potential of different social security schemes, controlling for the socio-economic context. Institutional factors are thus separated from other factors which determine welfare outcomes. In this way a better understanding can be obtained of the redistributive criteria and mechanism operating within various systems. It must be emphasized that the results obtained by simulations of 'foreign' social protection systems provide only first-round effects, because they abstract from all kinds of behavioural effects and from the broader social context in which institutions are embedded.

The application of microsimulation in comparative research is illustrated by means of a *case-study of the Belgian and Dutch unemployment schemes*. The simulation exercise shows in a general sense that *systems do not necessarily relate best to the existing needs* from the point of view of social effectiveness and cost effects. The application of the integral Dutch benefit structure to Belgium yields better (first order) welfare outcomes for the same input of transfers than the Belgian system. The Dutch model leads to more effectiveness on condition that a relatively *high level of benefits*, and consequently also a relatively generous scope is guaranteed. Selectivity on the basis of the current low Belgian social assistance benefits lead to impermissibly high poverty risks for the unemployed.

Raising the allowances is only possible if there is *greater selectivity in scope*, given the available budget. Greater *selectivity* is generated by manipulating the *parameter of the duration of benefits* under the Belgian system.

The *debate in the Netherlands* indicates however that neither high minimum benefits (linked to minimum wages), nor the use of the means test as an instrument for greater selectivity are obvious options. High floor levels (in wage and allowance structures) lead to (a) economic inefficiency, namely a disruption of labour market allocation, both on the side of supply and on that of demand and (b) severe budgetary effects especially when very many people become dependent on the system while ever fewer people are working. In addition the automatic link between minimum wages and social benefits leads to a greater rigidity for policy making. The application of the means test raises problems concerning increased non-take-up, 'invisible' unemployment (also among women through the discouragement of the work of the partner) and the poverty trap. Besides this there is the problem of hidden unemployment in the disablement regulations.

The presented case-study learns that the application of microsimulation in comparative research is a new and additional instrument, providing a better insight on the distributional impact of social security but also generating new questions in the search for understanding the effectiveness of social protection systems. In this way microsimulation, combined with traditional instruments for comparative research, such as cross-national comparisons on empirical data-sets, standard simulations, evidence

from administrative data and analysis of national social policies, generates further knowledge on the impact of social security systems.

### Notes

1. Belgium is characterized by the absence of useful simulation models in the field of social security, as opposed to other countries. As part of the Presoc project (Project Prevoyance Social) the Centre for Social Policy started to investigate the possibility of setting up a microsimulation model for Belgium [Antonissen, 1989, 1990]. MISISZ - Micro Simulatie Model voor de Sociale Zekerheid- is a static microsimulation model which runs on large scale representative samples of the Centre of Social Policy (surveys of 1976, 1982, 1985, 1988 and 1992, around 6000 to 4000 households). MISISZ has recently become operational and is still being developed (for instance very recently with a fiscal module).
2. For a detailed juridical analysis of the unemployment schemes in the Netherlands [Pennings F., 1990]. For Belgium see The New Unemployment Act, November 1991 (the aim of 'The New Unemployment Act' was to rewrite the existing legislation in order to simplify, not to change the law), for a policy review [Alaluf and Dillemans, 1992]. For a synthetic comparison between the Belgian and the Dutch system [De Lathouwer, 1993].
3. In interpreting the results of the simulation one must take into account the following *options and abstractions*:  
*Firstly*, no adjustment is made in the Belgian tax system. In the simulations of wage-related benefits in scenario 1 (for the first unemployment period) we departed from a nett replacement rate of 70% (the brut-net traject could not be calculated with the simulationmodel as this module was not operational yet at the moment of analysis). The imputed individual nett replacement rate approximates however the net rates resulting from standardsimulations (on a yearly base the individual net replacement rate of wage related benefits under the dutch unemployment system but taxed according to the Belgian fiscal system would vary between 68% and 73% depending on the family situation and the income level; under the Dutch tax system this rate comprises about 75% to 78%) [De Lathouwer, 1993].  
*Secondly*, a number of hypotheses were employed concerning the duration of the employment record (especially significant for the prolongation of benefits under the unemployment insurance), owing to the lack of such data in the sample. Under scenario 1 a maximum hypothesis was assumed, that for everyone with past employment, the employment record required for eligibility under the Dutch model, is satisfied (i.e. the reference condition is supposed to be satisfied: one must have worked 12 weeks in the year preceding unemployment and the condition for entitlement to a prolonged benefit would also be satisfied: one must have received a minimum of 52 days of wages in at least three years during the five years preceding unemployment).  
*Thirdly*, possible "communicating vessels" between institutional arrangements were not taken into account. No adjustments were made into the child allowance system (with higher benefits than in the Netherlands, and an increased benefit for unemployed). No attention was paid to a possible switch between unemployment and disability schemes, such as to the more generous disability regulations in the Netherlands. No alteration was made to the current system of early retirement benefits (an advantageous system for certain categories of older unemployed persons).  
*Fourthly*, no account was taken of possible behavioural changes affecting the labour market (for instance, changes in labour market behaviour, hidden unemployment, ...), in saving patterns and in household formation. Possible implications for the implementation cost, the potential for non-take-up of (means tested) benefits and the consequences for the legitimacy of the system were abstracted from.  
*Finally*, the simulations are static in nature and do not take into account a potentially changing profile of needs under the influence of rising unemployment.

4. The difference in costprice due to a lower budget in variant A and B is assigned to a further raising of the level of minimum income guarantee (variant C), in order to get budget neutrality. Only when the latter condition is fulfilled the proper distributional potential of the Dutch system can be evaluated. The distributive impact is in this way controlled for differences in costprice. It is clear that other options can be taken in order to attain budget neutrality.
5. The **ec 50% norm** is a further development by O'Higgins and Jenkins of the poverty line which was employed in the first EC programme against poverty [O'Higgins and Jenkins, 1990]. It must be emphasized that this norm cannot (as yet) be regarded as the official EC poverty standard. The **csp-norm** defines the social subsistence level on the basis of two questions which are formulated in the questionnaire (the question relating to the household's income considered necessary ("What is the minimum amount of income that your household, in your circumstances, needs to make ends meet?") and the question relating to the subjective evaluation of income (with your current monthly income, everything included, can you get by: with great difficulty, with difficulty, with some difficulty, fairly easily, easily, very easily, for your household?). It yields a generous income level, with a comparatively flat equivalence scale. In 1992 the EC-poverty line for singles amount to 17.800 BF/month and for a couple (without children) 30.300 BF/month. The CSP-poverty line for singles is 26.600 BF/month and for a couple (without children) 39.300 BF/month. For a technical description and evaluation of various poverty standards see: [Deleeck, Van den Bosch and De Lathouwer, 1992], [Van den Bosch, 1993].

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