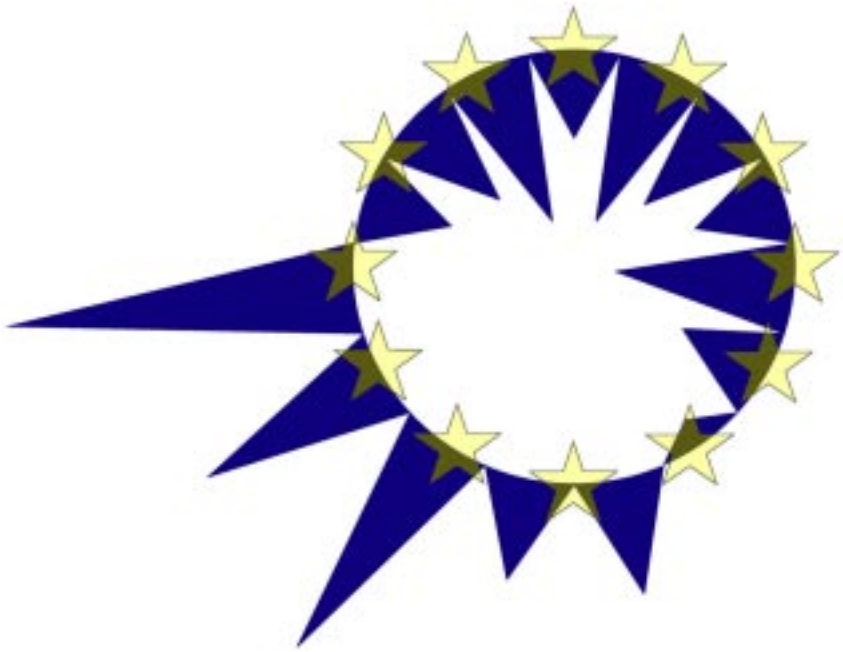
EUROMOD

WORKING PAPER SERIES



EUROMOD Working Paper No. EM8/01

INDICATORS OF SOCIAL EXCLUSION IN EUROMOD

Fotis Papadopoulos and Panos Tsakloglou

June 2001

Indicators of social exclusion in EUROMOD

EUROMOD Working Paper EM8/01

Fotis PAPADOPOULOS
Athens University of Economics and Business
and
Panos TSAKLOGLOU
Athens University of Economics and Business, IZA and IMOP

Athens University of Economics and Business
June 2001

1. Introduction

During the 1990s in a number of developed countries and international organisations, particularly in the EU, there has been a shift in emphasis from "poverty" to "social exclusion", a term first introduced in the 1970s by French social scientists. Although, broadly interpreted, the term implies the "inability of an individual to participate in the basic political, economic and social functionings of the society in which she/he lives", in practice it has been given several interpretations by social scientists and policy makers alike such as "exclusion from the labour market", "acute poverty and material deprivation", "inability to exercise basic social rights", etc.[1] Until now, there exists little agreement about the proper operationalisation of the concept of "social exclusion". As Atkinson (1998) points out, at least part of the concept's popularity, especially among policy makers, should be attributed to its vagueness.

The development of indicators for the measurement of social exclusion does not lie in the heart of the EUROMOD project. Undoubtedly, though, almost all the policies that will be simulated using EUROMOD are likely to affect to some extent persons or population groups facing particularly high risks in terms of certain aspects of social exclusion. The present paper aims to suggest a methodology for identifying these members of the population using the EUROMOD database. The next section provides a brief outline of the some of the main views about meaning of "social exclusion", while section 3 is devoted to the operationalisation of a number of indicators of social exclusion in the framework of EUROMOD, section 4 provides an example and section 5 concludes the paper.

2. The concept of social exclusion

Earlier views on the distinction between the concepts of "social exclusion" and "poverty" tended to stress two points.[2] Firstly, that "poverty" is unidimensional since it is concerned exclusively with lack of material resources (mainly income), whereas "social exclusion" is multidimensional since it is related to a broad range of aspects of deprivation. Secondly that "poverty" is a static concept, whereas "social exclusion" is a dynamic concept. Both points are controversial. Many social scientists argue that poverty is a multidimensional phenomenon and several of them have incorporated aspects of multiple deprivation in their analyses – even though a considerable proportion among them (mostly, but not exclusively, economists) just pay lip services to the multidimensional character of poverty and perform their analyses solely in terms of income.[3] Moreover, numerous empirical investigations of aspects of poverty dynamics can be found in the literature.[4] Among the many views expressed on the meaning of "social exclusion" in recent years, below we summarise three characteristic ones.

---

1. For a comprehensive survey of the various uses use of the concept of "social exclusion" in a number of European countries and contexts, see Mayes et al (2001) and, especially the chapter by Berghman and Vleminx (2001).
2. See Berghman (1995) and the references cited there.
3. The pioneering work that highlighted these aspects of poverty is probably that of Townsend (1979). For an interesting operationalisation of these concepts by economists, see Desai and Shah (1988).
4. See, for example, Jenkins (2000) and the references cited there.

According to Room (1995), who has been very influential in the conceptualisation of the term in the EU, social exclusion is characterised by five key factors:

- It is multidimensional, in the sense that it is not only about income, but also about a wide range of indicators of living standards.
- It is dynamic, in the sense that analysing social exclusion means understanding a process and identifying the factors which can trigger entry into or exit from it.
- It has a neighbourhood dimension, in the sense that multiple deprivation is caused not only by lack of personal resources but also by insufficient or unsatisfactory community resources.
- It is relational, in the sense that it implies inadequate social participation, lack of social integration and lack of power.
- It implies a major discontinuity in relationships with the rest of society.

Following Atkinson (1998), social exclusion is characterised by three main elements:

- Relativity: it implies exclusion from a particular society at a particular time. In other words, unlike poverty, we cannot talk about "absolute" and "relative" social exclusion.
- Agency: it lies beyond the narrow responsibility of the individual concerned.
- Dynamics: it has serious dynamic implications, in the sense that people are excluded not just because of their current situation, but also because they have little prospect for the future.

In his 1998 IARIW Conference plenary lecture, Sen (1998) argued that social exclusion is wider than poverty. Unlike poverty it is better defined in the space of capabilities rather than the space of commodities (or income) and can be viewed both as a state and as a process leading to deprivation. Further, according to Sen, its quantification calls for discriminant treatment in areas such as unemployment, lack of access to health care, lack of educational opportunities, absence of social safety nets, credit market exclusion, lack of facilities for disabled persons, marketing limitations, political exclusion and cultural exclusion.

3. Operationalisation

Undoubtedly, the data requirements for the operationalisation of the three approaches outlined above – especially Sen's – are daunting and, almost certainly, the information required for their full implementation does not exist in any data set currently available. As noted earlier, EUROMOD is not a project primarily concerned with the measurement of social exclusion. What can be done using EUROMOD's database, either directly or indirectly, is the identification of population members that are likely to face high risk of deprivation (or exclusion) in particular fields. Since the information contained in EUROMOD's database is cross-sectional, we can only examine deprivation/exclusion as a state (in other words, we cannot examine dynamic aspects of exclusion). As such, we decided to focus on lack of sufficient resources in three areas: Disposable Income, Living Conditions and Necessities of Life. Further, since many social scientists and policy makers seem to consider exclusion from the labour market as the main avenue leading to social exclusion, we will also focus on the operationalisation of aspects of exclusion form the Labour Market.

The data needed for the identification of persons at high risk of deprivation in terms of disposable income (income poverty) are available in the EUROMOD database. The income information available in the EUROMOD database includes only monetary incomes – i.e., it does not contain information on incomes in-kind from either private or public sources – and, hence, may be regarded as a not entirely satisfactory of approximation of the concept of "command over resources". Nevertheless, poverty estimates derived from distributions of disposable monetary income are plentiful in the literature, especially in EU-supported studies.[5] In line with the current practice of the EU, in the framework of EUROMOD, the poverty line will be set at 60% of the median equivalent income per capita, using the "modified" OECD equivalence scales [Hagenaars et al (1994)].

Information on Living Conditions, Necessities of Life and, to a considerable extent, precarious Labour Market conditions is not available in the EUROMOD database. Therefore, for the purposes of the construction of indicators of deprivation/exclusion in these fields the information of the EUROMOD database will be combined with information from other data sources, common for all EU member-states. The source of the latter information is the European Community Household Panel (ECHP). More specifically, information from the third wave of the ECHP, which is used here, was collected in 1996 and covers all EU countries apart from Sweden.[6] The remaining of this section outlines approaches for combining the information of the EUROMOD database with that of the ECHP, in order to construct indicators of deprivation/exclusion in the fields of Living Conditions, Necessities of Life and, precarious Labour Market conditions.

3.1. Risk of exclusion in the field of Living Conditions

In the field of Living Conditions the ECHP contains information regarding the availability of certain household amenities, the existence of particular problem in the accommodation and the enforced lack of a number of durable goods. More specifically, the information on household amenities refers to the existence of the following amenities in the dwelling:[7]

- A separate kitchen
- A bath or shower
- An indoor flushing toilet
- Hot running water
- Central heating or electric storage heaters
- A place to sit outside (e.g. terrace or garden)

Likewise, the self-reported ECHP information on problems with a household's accommodation refers to the following problems:[8]

- Shortage of space
- Noise from neighbours or outside
- Too dark, not enough light
- Lack of adequate heating facilities
- Leaky roof

5. See, for example, O'Higgins and Jenkins (1990), ISSAS (1990), Hagenaars et al (1994).
6. Details of the methodology used for the collection of information in the ECHP can be found in Eurostat (1996). For issues related to the quality of the information collected, see Eurostat (1999).
7. The wording of the relevant question in the ECHP is: "Does the dwelling have the following amenities?"
8. The wording of the relevant question in the ECHP is: "Do you have any of the following problems with your accommodation?"

- Damp walls, floors, foundation etc.
- Rot in window frames or floors
- Pollution, grime or other environmental problems caused by traffic or industry
- Vandalism or crime in the area

The information on enforced lack of durable goods concerns the following items:[9]

- Car or van (available for private use)
- Colour TV
- Video recorder
- Micro wave
- Dishwasher
- Telephone
- Second home (e.g. for vacation)

The above amenities/problems/durables are not equally important in all countries. For example, possessing a dishwasher may be very common in country A, but less common in country B. Therefore, in order to aggregate the available information into a single "welfare indicator" in the field of Living Conditions, for every item under consideration we assigned to each household living in a particular country having access to a particular housing amenity or lack of problem or durable good, a weight equal to the proportion of the country's households living in dwellings not lacking the corresponding amenity or not reporting the relevant problem or not reporting enforced lack of the particular durable good. As a result, for instance, if a particular durable good is very rare (common) in one country, a household with such a durable good is assigned a low (high) welfare weight. Then, the weights of each household are added and the resulting sum is divided by the sum of the average "welfare scores" for each item for the entire population (that is, the sum of the proportions of the population not lacking particular housing amenities or not reporting particular housing problems or having particular items). In algebraic terms, the formula for the calculation of each household's "welfare indicator", u_j, is[10]:

$$u_j = \frac{\sum_{i=1}^{I} w_i X_{ij}}{\sum_{i=1}^{I} w_i}$$

where I is the total number of amenities/(lack of) problems/durables for which information is available (22 items), w_i is the proportion of the country's households living in accommodation with amenity i, or without reporting problems with item i, or not reporting enforced lack of durable good i and X_{ij} a variable that takes the value of 1 (0) if household j is (is not) equipped with amenity i or does not (does) report problems with item i or does not (does) report enforced lack of durable good i. For each household the "welfare indicator", u_j, takes values between 0 (complete deprivation) and 1 (no deprivation).

In the next step we select a particular cut-off point in the distribution of the above welfare indicator and define as households at high risk of exclusion in the field of Living Conditions those households that fall below this threshold. For the purposes of our analysis, we selected

9. The wording of the relevant question in the ECHP is: "For each item below, please indicate whether or not your household possesses it. It does not matter whether the item is owned, rented or otherwise provided for your use. If you do not have an item, please indicate whether you would like to have it but cannot afford".

10. See Tsakloglou and Papadopoulos (2001).

a cut-off point equal to 80% of the median of the distribution of the above welfare indicator. Table 1 reports the proportion of the households classified as being at high risk of exclusion in the field of Living Conditions using the above approach in all EU member-states apart from Sweden, using the information of the third wave of the ECHP.[11]

Since in 10 of the 15 countries the data set used in the EUROMOD database comes from the ECHP, it could be argued that for the purposes of the operationalisation of the relevant indicator of exclusion in these countries, we could simply identify the households falling below this threshold as being "at high risk of exclusion in the field of Living Conditions". Instead and in order to reduce the impact of stochastic or idiosyncratic elements (and/or cross-country distortions), we recommend an alternative approach for all 14 countries for which information is available. More specifically, in the first step we identify a set of variables common in the ECHP and the EUROMOD database that can be thought of as reasonable determinants of a household's probability of falling below the aforementioned cut-off threshold. Then, we estimate the corresponding logit model using the ECHP data. In the third stage we apply the estimated coefficients on the variables of the EUROMOD database and derive for each household a "deprivation score". We identify as "households at high risk of exclusion in the field of Living Conditions" in country A the x% of households with the highest deprivation scores, where the x% is the proportion reported in Table 1.

Table 1. Proportion of households classified as deprived in the field of Living Conditions (cut-off point: 80% of the national median – ECHP, 3rd wave)

Country	**Proportion**
Austria	**7.1**
Belgium	**8.7**
Denmark	**4.1**
Finland	**5.3**
France	**7.8**
Germany	**6.2**
Greece	**10.4**
Ireland	**9.9**
Italy	**8.6**
Luxembourg	**5.0**
Netherlands	**4.8**
Portugal	**21.5**
Spain	**7.6**
United Kingdom	**5.3**

11. Even though there is a negative correlation between the deprivation scores reported in Table 1 and the average living standards of the corresponding countries, it should be kept in mind that these scores are purely relative, in the sense that they have been derived using national cut-off points.

3.2. Risk of exclusion in the field of Necessities of Life

In the field of Necessities of Life, in the framework of the ECHP, the participating households were asked about their ability to afford the following items (if they wanted to):[12]

- Keep their homes adequately warm
- Pay for a week's annual holiday away from home
- Replace a worn-our furniture
- Buy new, rather than second-hand, clothes
- Eat meat, chicken or fish every second day
- Have friends or family for a drink or meal at least once a month

The methodology recommended for the construction of an indicator of exclusion in the field of Necessities of Life – Current Life-Style deprivation, in the terminology of Whelan et al (forthcoming) – is similar to that outlined above for the construction of an indicator of exclusion in the field of Living Conditions. We first construct country-specific welfare indicators for each household based on the proportion of the country's households that replied positively to each of the above questions. Then, we select a cut-off point equal to 60% of the national median.[13] Table 2 reports the proportion of the households classified as being at high risk of exclusion in the field of Necessities of Life using this approach on the data of the third wave of the ECHP.[14]

In the next stage, we identify a set of variables common in the ECHP and the EUROMOD database that can be thought of as reasonable determinants of a household's probability of falling below this cut-off threshold and estimate a logit model using the ECHP data. Finally, we apply the estimated coefficients on the variables of the EUROMOD database and derive for each household a "deprivation score". In each country, the x% of the household with the highest deprivation scores – where x% is the proportion reported in Table 2 – are identified as "households at high risk of exclusion in the field of Necessities of Life".

12. The wording of the relevant question in the ECHP is: "There are some things many people cannot afford even if they would like them. Can I just check whether your household can afford these, if you want them?".
13. Naturally, the cut-off points used in such studies are quite arbitrary. Initially, for reasons of symmetry with the cut-off point selected in the field of Living Conditions, we considered a cut-off point equal to 80% of the median welfare score in the field of Necessities of Life. However, using this threshold in some countries, such as Portugal, over 40% of the households were classified as being at high risk of exclusion. Since we consider "exclusion" to be a rather strong term, we decided to adopt a lower threshold that would enable us to identify those at a more severe risk of exclusion in the filed of Necessities of Life in the member-states of the EU.
14. As noted in an earlier footnote, since the distributions and the cut-off points used for the derivation of the estimates reported in Table 2 are country-specific, they should not be interpreted as (inverse) proxies of the countries' living standards. Moreover, national idiosyncrasies and/or translation of the relevant question in the national questionnaire may influence these estimates. For example, in Greece around 18% of the households replied negatively to the questions, even though some of them belonged to the top decile of the distribution of equivalent income.

Table 2. Proportion of households classified as deprived in the field of Necessities of Life (cut-off point: 60% of the national median – ECHP, 3rd wave)

Country	**Proportion**
Austria	12.8
Belgium	12.5
Denmark	7.4
Finland	14.0
France	15.2
Germany	11.6
Greece	36.4
Ireland	13.3
Italy	15.4
Luxembourg	7.8
Netherlands	11.3
Portugal	17.7
Spain	16.4
United Kingdom	18.4

3.3. Risk of Labour Market exclusion

As noted earlier, several policy makers and academics in Europe seem to interpret "social exclusion" as, more or less, "exclusion from the labour market". For this reason, in the framework of EUROMOD, we will try to operationalise this aspect of exclusion. The simplest possible way is to look at those currently unemployed and examine how the policies simulated using EUROMOD might affect them. However, it is likely that a number of those currently unemployed might be so for a short period of time only, while others who are currently employed might have an unusually bad employment history and, thus be at high risk of exclusion from the Labour Market. Moreover, in all EU member-states there is a considerable number of working-age persons who, for several reasons, do not participate in the labour force but would have wished to do so. For our purposes, we will proceed using a methodology similar to that used for the identification of households at high risk of exclusion in the fields of Living Conditions and Necessities of Life. Naturally, this time the unit of analysis should be the individual rather than the household. We will work separately for those who participate in the labour market and for those who do not.

Regarding the labour market participants, apart from those currently unemployed, we need to identify those who are precariously employed. The ECHP provides a substantial amount of information on the labour market experiences of those who are currently employed. Using this information, we classify as "precariously employed" those who are presently employed and:

- During the last five years had either at least two unemployment spells or at least one unemployment spell longer than one year

and, in addition,

- Feel "extremely" or "very" insecure in their current employment[15]

Among the working age non-participants in the labour market (excluding the retired and those who are still in education), we classified as "constrained workers" those who are inactive and would have liked to have a job but are not seeking employment because of housework or looking after children or looking after other persons.

The proportions of those unemployed and "precariously employed" among the labour force participants in the 3rd wave of the ECHP are reported in the first two columns of Table 3. The shares of the "constrained workers" among the working age inactive persons (excluding the retired and those who are still in education) are reported in the last column.[16] Undoubtedly, the first two of the above groups of group (unemployed and "precariously employed") are those who are likely to face the most serious risk of social exclusion due to exclusion from the labour market. Nonetheless, it can be also argued that the third group ("constrained workers") also faces a type of labour market exclusion that may increase the risk of social exclusion in the longer term.

Table 3. Proportions of individuals in groups at risk of exclusion from the labour market (ECHP, 3rd wave)

Country	Unemployed[1]	Precariously Employed[1]	Constrained Workers[2]
Austria	4.4	1.2	67.4
Belgium	11.6	3.3	53.9
Denmark	6.0	4.3	34.0
Finland	17.1	9.1	59.0
France	11.0	1.5	39.9
Germany	6.0	2.5	81.4
Greece	10.7	4.6	76.9
Ireland	10.8	5.0	77.6
Italy	13.3	4.0	74.5
Luxembourg	3.6	0.5	89.8
Netherlands	6.1	1.8	39.6
Portugal	5.2	3.0	44.1
Spain	22.1	8.4	70.6
United Kingdom	7.5	4.2	54.4

1. The reference sample consists of all active population members aged 16+.
2. The reference sample consists of all inactive population members aged 16-65, excluding those still in education or in retirement.

For the purposes of the operationalisation of indicators of high risk of exclusion from the Labour Market in EUROMOD, we adopted a methodology similar to those outlined above in the cases of indicators of exclusion in the fields of Living Conditions and Necessities of Life. Initially, we selected a set of variables common in the ECHP and the EUROMOD database

15. These are the two lowest categories in a 1 to 6 categorisation of replies to the question: "How satisfied are you with your present job or business in terms of job security?"
16. In all EU countries the overwhelming majority of the "constrained workers" are females. The proportions range from 93.7% (UK) to 100% (Greece and Portugal).

that we considered as possible determinants of the probability of an individual to belong to the group of "unemployed" or "precariously employed". Then, we estimated a logit model using these regressors on the ECHP data. In the final stage, we isolated the labour market participants in the EUROMOD database and applied the estimated coefficients on the corresponding variables, thus deriving a "probability score". In each country, the x% of the labour market participants with the highest scores – where x% is the sum of the proportions reported in the first two columns of Table 3 – are identified as "persons at high risk of exclusion from the Labour Market". Likewise, a similar methodology was also adopted in order to identify persons at high risk of inclusion in the group of "constrained workers" among the inactive population members aged 16-64 who were neither retired nor in education.

4. An example

In this section an example of the methodology outlined above is presented, using data for Greece. The Greek data set in the EUROMOD database has been derived from the ECHP. Estimates similar to those reported below for Greece were derived for all ECHP countries, but are not presented here for reasons of space limitations. However, several tables provide summary evidence for all ECHP countries.

We start by looking at the households at high risk of exclusion in the filed of Living Conditions. After several experimentations, we selected the following regressors for the logit model: shares of children (persons aged up to 16), older persons (aged over 64) and unemployed persons in the household, employment status, educational level and sex of the reference person, household type, region of residence and equivalent disposable income. The corresponding groups for the categorical variables are reported in Table 4.[17] Information for these variables exists in both the ECHP and the EUROMOD database.

The most controversial of these variables is undoubtedly the last one (equivalent disposable income). As expected, in all countries equivalent disposable income turned out to be negatively and highly statistically significantly related to the probability of falling below the selected deprivation thresholds. However, in the framework of our methodology, the consequence of including equivalent income among the explanatory variables might be that the households that will be classified as being at high risk of exclusion will be primarily those with low incomes – thus, potentially, causing some damage to the multi-dimensionality aspect of social exclusion that we intend to capture. For this reason we estimated the model both with and without equivalent income among the independent variables. The corresponding estimates for Greece are reported in the first and the second column of Table 4.

17. The reference group (omitted category) consists of childless couples (both below 65), with no unemployed persons, whose reference person is male, employee in the tertiary sector, who completed only lower secondary education or less. In order to avoid misspecification, in the estimated equations for each country we included only the variables that turned out to be statistically significant (or, in the case of categorical variables, if the relevant dummy variables were jointly significant).

Table 4. Logit model estimates of the probability of falling below the deprivation threshold (80% of the median) in the field of Living Conditions (Greece - ECHP, 3rd wave)

Constant term	-1.3394	**	-2.5188	**
Equivalent income	-0.0000094	**		
Population share of children in the HH				
Population share of persons aged 65+ in the HH				
Population share of unemployed persons in the HH	1.3489	**	1.6690	**
Employment status of the reference person				
Self-employed (in agriculture)				
Self-employed (non agriculture)				
Unemployed				
Retired				
House worker				
Other				
Level of education of the reference person				
Tertiary	-0.5782	**	-1.3219	**
Second stage of secondary level	-0.7059	**	-1.0786	**
Sex of the reference person				
Female				
Household Type				
One person aged 65+	0.6181	**	0.9095	**
One person aged 30-64	1.0939	**	0.9956	**
One person aged 30-	1.7705	**	1.9279	**
Single parent household	0.3066		0.3656	
Couple – at least one person aged 65+	0.1812		0.4395	
Couple with one child aged 16-	0.2541		0.2003	
Couple with two children aged 16-	-0.0705		0.0365	
Couple with three or more children aged 16-	0.7381	**	0.8997	*
Couple with at least one child aged 16+	-0.0072		0.0068	
Other	0.5409	*	0.7069	**
Region				
Voreia Ellada	-0.0851		0.1537	
Kentriki Ellada	0.1331		0.3315	**
Nisia Aigaiou, Kriti	0.7046	**	0.8574	**

* Statistically significant at the 5% level
** Statistically significant at the 1% level

How well do these models "predict" the households that fall below the relevant deprivation thresholds? A first attempt to provide an answer to this question is shown in Table 5. The second and third columns of the table report the proportions of the households that fall below the selected deprivation thresholds in the field of Living Conditions and are predicted to

belong to the top x% of the households facing risk of exclusion in the field of Living Conditions (x% is reported in the first column of the table) using the estimates of the first (with income) or the second (without income) model. As anticipated, since equivalent income turned out to be highly statistically significant in all ECHP countries, the second model performs less well than the first (marginally so in the cases of Austria and Greece). On average, about one third of the deprived households belong to the top x% of the households facing risk of exclusion in the field of Living Conditions, when the first model is used; the proportion is slightly lower when equivalent income is not included among the independent variables.

Table 5. Predicted and actual risk of exclusion in the fields of Living Conditions and Necessities of Life (ECHP, 3rd wave)

	Proportion of households at risk of exclusion in the filed of:					
	Living Conditions (cut-off point: 80% of the national median)			**Necessities of Life (cut-off point: 60% of the national median)**		
Country	**Actual**	**"Predicted" correctly (with income)**	**"Predicted" correctly (without income)**	**Actual**	**"Predicted" correctly (with income)**	**"Predicted" correctly (without income)**
Austria	**7.1**	**2.0**	**2.0**	**12.8**	**5.5**	**4.8**
Belgium	**8.7**	**2.8**	**2.6**	12.5	**5.4**	**4.4**
Denmark	**4.1**	**1.4**	**1.3**	7.4	**2.3**	**2.0**
Finland	**5.3**	**1.6**	**1.4**	14.0	**6.0**	**5.6**
France	**7.8**	**2.1**	**2.0**	15.2	**6.9**	**5.2**
Germany	**6.2**	**1.8**	**1.4**	11.6	**5.2**	**4.6**
Greece	**10.4**	**3.3**	**3.3**	36.4	**24.9**	**22.6**
Ireland	**9.9**	**3.8**	**3.0**	13.3	**6.3**	**5.8**
Italy	**8.6**	**2.5**	**2.3**	15.4	**5.4**	**5.0**
Luxembourg	**5.0**	**1.4**	**0.8**	7.8	**3.0**	**1.8**
Netherlands	**4.8**	**1.3**	**1.2**	11.3	**5.6**	**3.5**
Portugal	**21.5**	**10.0**	**8.8**	17.7	**8.5**	**7.6**
Spain	**7.6**	**1.9**	**1.8**	16.4	**7.6**	**6.8**
United Kingdom	**5.3**	**1.3**	**1.2**	**18.4**	**10.7**	**11.5**

Nonetheless, if we turn to the distribution of households at high risk of exclusion in the field of Living Conditions across deciles of equivalent income in Table 6, the picture is very different. The distribution of households predicted as being at high risk of exclusion using the second model resembles far more the actual distribution of such households than the distribution of households predicted as being at high risk of exclusion using the first model. For example, using the methodology outlined in section 3, 45.5% of the Greek households considered to be at high risk of exclusion in the field of Living Conditions belong to the bottom fifth of the income distribution. The corresponding "predicted" proportions using the first and the second model are 73.0% and 43.1%, respectively. This is a pattern that we observed in all ECHP countries. On the basis of this evidence, one would anticipate that the (negative) correlation between the "welfare scores" and the predicted "deprivation scores" of the households would be stronger when the predictions were derived from the second than the first model. It turns out that this is not the case. The evidence reported in the first two columns of Table 7 demonstrates, that the Spearman rank correlation coefficients between the actual "welfare scores" and the predicted "deprivation scores" using these models are (in absolute terms) always substantially higher when the predictions are derived from models where equivalent income is included in the set of regressors.

Table 6. Distribution of households at risk of exclusion in the field of Living Conditions (actual and predicted with and without equivalent income among the independent variables - Greece - ECHP, 3rd wave)

Decile	Actual	Predicted	
		With equivalent income	Without equivalent income
1 (bottom)	28.0	49.7	25.1
2	17.5	23.3	18.0
3	10.8	12.8	13.6
4	11.0	9.2	11.9
5	10.0	2.9	8.3
6	8.3	0.8	6.4
7	4.7	1.0	5.7
8	4.9		5.7
9	3.5	0.2	3.6
10 (top)	1.2		1.7

Table 7. Spearman rank correlation coefficients between actual welfare scores and predicted probabilities of deprivation in the fields of Living Conditions and Necessities of Life

	Living Conditions		Necessities of Life	
Country	**Prediction with income**	**Prediction without income**	**Prediction with income**	**Prediction without income**
Austria	**0.277**	**0.243**	**0.443**	**0.335**
Belgium	**0.387**	**0.288**	**0.483**	**0.405**
Denmark	**0.346**	**0.317**	**0.371**	**0.296**
Finland	**0.403**	**0.378**	**0.457**	**0.377**
France	**0.342**	**0.255**	**0.567**	**0.402**
Germany	**0.399**	**0.280**	**0.453**	**0.330**
Greece	**0.371**	**0.300**	**0.650**	**0.535**
Ireland	**0.416**	**0.353**	**0.539**	**0.465**
Italy	**0.309**	**0.292**	**0.500**	**0.462**
Luxembourg	**0.246**	**0.186**	**0.345**	**0.241**
Netherlands	**0.244**	**0.226**	**0.511**	**0.411**
Portugal	**0.431**	**0.355**	**0.628**	**0.500**
Spain	**0.341**	**0.286**	**0.612**	**0.506**
United Kingdom	**0.387**	**0.321**	**0.612**	**0.473**

All numbers are negative and statistically significant at the 1% level.

As noted earlier, the methodology for the identification of households at high risk of exclusion in the field of Necessities of Life is very similar to that used for the identification of households at high risk of exclusion in the field of Living Conditions. In fact, the set of independent variables is the same. The estimated coefficients of the logit models for Greece are reported in Table 8 (with and without equivalent income among the regressors). Once again, the coefficient of equivalent income is negative and statistically significant. Further, as shown in the last two columns of Table 5, the proportions of households that fall below the selected deprivation thresholds in the field of Necessities of Life and are predicted to belong to the top x% of the households facing risk of exclusion in the field of Necessities of Life (x% is reported in the third column of the table) are higher in all ECHP countries (apart from the UK) when we use the estimates of the first (with income) rather than the second (without income) model. On average, a little less than half of the households classified as deprived belong to the top x% of the households facing risk of exclusion in the field of Necessities of Life when the first model is used. The corresponding proportion is around 40% when the predictions are derived from equations that do not include equivalent income among the explanatory variables.

Table 8. Logit model estimates of the probability of falling below the deprivation threshold (60% of the median) in the field of Necessities of Life (Greece - ECHP, 3rd wave)

Constant term	1.6839	**	-0.5742	**
Equivalent income	-0.000015	**		
Population share of children in the HH			0.9899	**
Population share of persons aged 65+ in the HH			0.4788	*
Population share of unemployed persons in the HH			0.7300	*
Employment status of the reference person				
Self-employed (in agriculture)	0.0532		0.3425	**
Self-employed (non agriculture)	-0.2032		-0.1932	
Unemployed	0.8913	**	1.1517	**
Retired	0.3517	**	0.4936	**
House worker	0.0596		0.1587	
Other	0.4476		0.5041	**
Level of education of the reference person				
Tertiary	1.2094	**	-2.1416	**
Second stage of secondary level	0.6987	**	-1.1648	**
Sex of the reference person				
Female			0.2061	*
Household Type				
One person aged 65+	0.7587	**	0.5484	*
One person aged 30-64	1.0060	**	0.6473	**
One person aged 30-	-0.0065		0.3097	
Single parent household	0.3895	*	0.2045	
Couple – at least one person aged 65+	0.2299		0.1986	
Couple with one child aged 16-	-0.3720		-0.4466	*
Couple with two children aged 16-	-0.6791	**	-0.7730	*
Couple with three or more children aged 16-	-0.4281		-0.4338	
Couple with at least one child aged 16+	-0.1570		-0.0585	
Other	-0.4155	**	-0.3023	
Region				
Voreia Ellada	-0.4565	**		
Kentriki Ellada	-0.4932	**		
Nisia Aigaiou, Kriti	-0.2917	*		

* Statistically significant at the 5% level
** Statistically significant at the 1% level

As in the case of households at high risk of exclusion in the field of Living Conditions, the evidence of Table 9 reveals that the actual distribution of households at high risk of exclusion in the field of Necessities of Life across income deciles in Greece resembles more to the

distribution of households that are predicted to be at high risk of exclusion in the field of Necessities of Life when equivalent income is not included in the regressors than when it does – although the corresponding differences are not as pronounced as those reported in Table 6. Once again, though, the figures reported in the last two columns of Table 7 reveal that in all ECHP countries the Spearman rank correlation coefficients between the actual "welfare scores" and the predicted "deprivation scores" in the field of Necessities of Life using these models are (in absolute terms) considerably higher when the predictions are derived from models that include equivalent income among the explanatory variables.

Even though the picture is not always clear, on the basis of the above evidence, we would advocate the inclusion of equivalent income in the models that will be used for the identification of households at high risk of exclusion in the fields of Living Conditions and Necessities of Life in EUROMOD. It should be noted, though, that unlike the simulations performed here, the means of the distributions of equivalent income in the ECHP and the EUROMOD data base are not likely to be identical, thus introducing a bias in the predictions. For this reason it may be necessary, before proceeding to the estimation of the logit models using the ECHP data, to set the mean of each country's equivalent income equal to the corresponding figure of the EUROMOD data base by an equiproportionate change in the equivalent income of all households in the ECHP data set.[18]

Table 9. Distribution of households at risk of exclusion in the field of Living Conditions (actual and predicted with and without equivalent income among the independent variables - Greece - ECHP, 3rd wave)

Decile	Actual	Predicted	
		With equivalent income	Without equivalent income
1 (bottom)	22.0	27.8	22.0
2	17.4	23.0	16.4
3	13.9	17.3	14.3
4	13.6	13.4	10.9
5	11.3	10.0	10.3
6	7.7	5.3	8.3
7	5.6	2.4	6.5
8	5.3	0.7	6.0
9	2.0		2.9
10 (top)	1.1		2.4

18. An alternative to the procedure outlined above for the identification of households at high risk of exclusion in the fields of Living Conditions or Necessities of Life (which we do not support), could be to estimate equations where the dependent variables would be the "welfare scores" of the households in these fields and, then, select the households with the lowest estimated x% welfare scores. Yet another alternative (which we do not support either) in order to avoid cross-country idiosyncratic differences could be to select for every country the households belonging to the bottom x% of the distribution of welfare scores (say, 20% - the same for every country), use one of the above alternatives for the identification of the bottom 20% of "welfare scores" in the EUROMOD database and, then, simply call them the "x% of households with the highest risk of exclusion in field A".

We turn now to the identification of person at high risk of exclusion from the Labour Market. As noted above, we will work separately for the unemployed and "precariously employed" on the one hand and the "constrained workers" on the other. Initially, we merged the groups of unemployed and "precariously employed" and estimated a logit model of the probability of belonging to this group using the ECHP data. This time the sample consists of labour market participants only. As explanatory variables we used the individual's age group, educational level, sex, marital status, region or residence and existence of children in the household. The corresponding estimates for Greece are reported in the first column of Table 10.

Table 10. Logit model estimates of the probability of belonging to a labour market risk group (Greece - ECHP, 3rd wave)

	Unemployed or Precariously Employed		Constrained Worker	
Constant term	-1.7575	**	0.9594	**
"Reservation Wage" (only for Constrained Workers)				
Age Group of the individual				
25>	1.1278	**	-0.8278	**
25-35	0.5261	**	-0.8247	**
45-55	-0.2011		-0.1225	
55-65	-0.3883	**	-0.4321	**
65<	-2.1060	**		
Level of education of the individual				
Tertiary	-0.6638	**		
Second stage of secondary level	-0.2823	**		
Marital Status				
Married	-0.6369	**	1.2733	**
Children in the household				
Yes			1.4001	**
Sex of the individual				
Female (male for Constrained Workers)	0.7473	**	-10.7056	**
Region				
Voreia Ellada			0.0259	
Kentriki Ellada			0.3225	
Nisia Aigaiou, Kriti			-0.6602	*

* Statistically significant at the 5% level
** Statistically significant at the 1% level

Using the estimates from this model we selected the x% of the labour market participants with the highest predicted risk of belonging to the group of unemployed or precariously employed and identified how many of them were indeed unemployed or precariously employed in all ECHP countries. The corresponding estimates are reported in the first two columns of Table

11. On average, around a third of those who actually belong to the group of unemployed or precariously employed turned out to belong to the top x% of the labour market participants with the highest predicted risk of belonging to the group. In some countries (Denmark, Austria, the Netherlands) the relevant proportion is substantially lower. For this reason we tried to separate the two groups (unemployed and precariously employed) and apply the above methodology to the precariously employed only. The resulting actual and "correctly predicted" shares among the employed are reported in the third and the fourth column of Table 11. This time the results for almost all countries are disappointing. On average, only one in eight of the "precariously employed" workers belong to the top x% of the employed labour market participants with the highest predicted risk of belonging to the group.[19]

Table 11. Predicted and actual risk of exclusion from the Labour Market (Greece - ECHP, 3rd wave)

Country	Unemployed or Precariously Employed[1]		Precariously Employed[2]		Constrained Workers[3]	
	Actual	"Predicted" correctly	Actual	"Predicted" correctly	Actual	"Predicted" correctly
Austria	5.6	0.7	1.2	0.3	67.4	**59.0**
Belgium	15.4	6.3	3.8	0.3	53.9	**44.1**
Denmark	10.3	1.6	4.6	0.6	34.0	**24.1**
Finland	27.0	12.3	11.1	2.2	59.0	**51.4**
France	12.9	3.8	1.7	0.2	39.9	**28.9**
Germany	8.6	1.4	2.7	0.0	81.4	**75.3**
Greece	15.4	5.9	5.1	0.4	76.9	**69.6**
Ireland	16.8	6.2	6.0	0.6	77.6	**73.8**
Italy	17.4	9.2	4.4	0.7	74.5	**67.4**
Luxembourg	4.2	0.5	*	*	89.8	**85.9**
Netherlands	8.2	1.4	1.9	0.1	39.6	**26.0**
Portugal	8.2	3.8	3.2	0.4	44.1	**32.0**
Spain	30.8	16.6	10.7	2.8	70.6	**64.7**
United Kingdom	12.7	3.2	4.6	0.6	54.4	**41.8**

1. The reference sample consists of all active population members aged 16+.
2. The reference sample consists of all employed population members aged 16+.
3. The reference sample consists of all inactive population members aged 16-64, excluding those still in education or in retirement.
* very few observations

Under these circumstances, it is not easy to make a clear recommendation. One alternative, which we prefer, would be to use the above methodology, despite its not very satisfactory

19. It should be noted that the predictions improved substantially when we included in the explanatory variables a number of variables (mostly related to the individual's attributes and labour market history) that are available in the ECHP but not in the EUROMOD data base.

predictions, in order to identify persons at high risk of exclusion from the Labour Market on the basis of their characteristics. If this approach is adopted, care should be taken for the fact that the unemployment rates derived from the ECHP and the EUROMOD data base may differ (due, for example, to different reference years). In this case, it may be advisable to adjust accordingly the share of those identified on the basis of their predicted risk of exclusion from the Labour Market (x%) in the EUROMOD data base. More specifically, it is recommended that if the shares of the unemployed and precariously employed among all the labour market participants in the ECHP are a% and b%, respectively, and the corresponding share of the unemployed in the EUROMOD data base is c%, the share of those who will be identified as being at high risk of exclusion from the Labour Market to be equal to c(1+b/a)% of the labour market participants in the EUROMOD data base.[20]

The last part of this section is devoted to the identification of "constrained workers"; that is labour market non-participants who would wish to participate in the labour market but, for various reasons, cannot do so. Although excluded from the labour market, many members of this group may not face a particularly high risk of social exclusion (at least in the short term). The methodology followed for the identification of the members of this group in the EUROMOD data base is similar to that outlined above for the unemployed and the precariously employed. The regressors used in the logit model are the same, with one addition. The addition is a proxy for their reservation wage, derived using a Mincerian equation.[21] The corresponding estimates for Greece are reported in the last column of Table 10, while the actual and "correctly predicted" shares of the "constrained workers" among the inactive population members aged 16-64 (excluding those still in education or in retirement) are reported in the last two columns of Table 11. In most cases, the actual and "predicted correctly" shares are quite close.

5. Conclusions

The paper outlined a methodology for incorporating indicators of social exclusion in the EUROMOD data base. Four such static indicators were examined covering the fields of Living Conditions, Necessities of Life and Labour Market. In all cases, it was suggested to extract the relevant information using a common data base (the ECHP) and then use matching techniques for transferring this information to the EUROMOD database. Simulations using the ECHP data showed that this operationalisation is likely to be more effective in the case of indicators of exclusion in the fields of Living Conditions and Necessities of Life than in the

20. An alternative would be to abandon the above methodology altogether and simply look at the impact of policies simulated using the EUROMOD tax-benefit model on the unemployed. Another alternative could be to select only those of the EUROMOD countries whose data sets have been derived from the ECHP, retain the additional information needed in order to classify somebody as "precariously employed" and examine the impact of the simulated policies, separately on the unemployed and the precariously employed for this sub-set of countries only.

21. It should be noted that in a number of countries the resulting variable (proxy for "reservation wage") was closely correlated with other variables included in the logit model (education, age) and was not included in the estimated equation for reasons of collinearity. Moreover, since the means of the distributions of hourly earnings in the ECHP and the EUROMOD data base may differ, if this approach is adopted, before proceeding to the estimation of the Mincerian equation using the ECHP data, the mean of each country's hourly wage rate should be set equal to the corresponding figure of the EUROMOD data base by an equiproportionate change in the hourly wage rates of all employees in the ECHP data set.

case of some indicators of exclusion from the Labour Market. Once these indicators are constructed they can be used in order to examine the impact (positive or negative) of the policies simulated using the EUROMOD tax-benefit model on those identified as being at high risk of exclusion in the relevant areas.

REFERENCES

Atkinson A.B. (1998) "Social exclusion, poverty and unemployment", in A.B. Atkinson and J. Hills (eds) *Exclusion, employment and opportunity*, CASE Paper No 4, Centre for Analysis of Social Exclusion, LSE, London.

Berghman, J. (1995) "Social exclusion in Europe: policy context and analytical framework", in G. Room (ed.) *Beyond the threshold: The measurement and analysis of social exclusion*, Policy Press, Bristol.

Berghman J. and Vleminx K. (2001) "Social exclusion and the Welfare State: An overview of conceptual issues and policy implications" in Mayes D, Berghman J and Salais R. (eds) *Social exclusion and European policy*, Edward Elgar, Cheltenham.

Desai M. and Shah S. (1988) "An econometric approach to the measurement of poverty", *Oxford Economic Papers* 40, pp. 505-522.

Eurostat (1996) *The European Community Household Panel (ECHP): Survey methodology and implementation*, Theme 3, Series E, Eurostat, Luxembourg.

Eurostat (1999) *ECHP data quality*, DOC.PAN 119/99, Eurostat, Luxembourg.

Hagenaars, A. J. M., de Vos, K. and Zaidi, M. A. (1994) Poverty statistics in the late 1980s: Research based on micro-data, Theme 3, Series C, Eurostat Luxembourg.

ISSAS (1990) *Poverty in figures: Europe in the early 1980s*, Theme 3, Series C, Eurostat, Luxembourg.

Jenkins S.P. (2000) "Modelling household income dynamics", *Journal of Population Economics* 13, pp. 529-567.

Mayes D, Berghman J and Salais R. (2001) *Social exclusion and European policy*, Edward Elgar, Cheltenham.

O'Higgins M. and Jenkins S.P. (1990) "Poverty in EC: Estimates for 1975, 1980 and 1985", in R. Teekens and B.M.S. van Praag (eds) *Analysing poverty in the European Community*, Eurostat News Special Edition, Luxembourg.

Room G. (1995) *Beyond the threshold: The measurement and analysis of social exclusion*, Policy Press, Bristol.

Sen A.K. (1998) "Social exclusion and economic measurement", paper presented at the 25th General Conference of the International Association for Research in Income and Wealth, Cambridge.

Townsend P. (1979) *Poverty in the United Kingdom: A survey of household resources and standards of living*, Penguin, Harmondsworth.

Tsakloglou and Papadopoulos (2001) "Poverty, material deprivation and multi-dimensional disadvantage during four life stages: Evidence from the ECHP", in C. Heady, M. Barnes, J. Millar, S. Middleton, Tsakloglou and F. Papadopoulos (eds) *Poverty and social exclusion in Europe*, Edward Elgar, Cheltenham

Whelan C.T., Layte R., Maitre B. and Nolan B. (forthcoming) "Income and deprivation approaches to the measurement of poverty in the European Union", in R. Muffels and P. Tsakloglou (eds) *Social exclusion in European Welfare States: An empirical study of labour market integration and social exclusion in panel perspective*, Edward Elgar, Cheltenham.