

# The econometrics of inequality and poverty measurement

## *Lecture 9: The Pitfalls of International Comparisons: Inequality and Poverty in Europe*

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### Contents

<b>1</b>	<b>Introduction</b>	<b>3</b>
<b>2</b>	<b>Poverty in Europe</b>	<b>3</b>
2.1	A European policy . . . . .	4
2.2	Stylised facts . . . . .	4
2.3	Comparing France and the UK in 1988 . . . . .	6
2.4	The impact of equivalence scales . . . . .	8
<b>3</b>	<b>Relative or absolute poverty</b>	<b>9</b>
3.1	Stylised facts . . . . .	9
3.2	Controversies in France . . . . .	10
3.3	Subjective poverty lines . . . . .	12
<b>4</b>	<b>Income distribution for the EU</b>	<b>13</b>
4.1	Conceptual problems of measurement . . . . .	14
4.1.1	Currency conversion . . . . .	14
4.1.2	Differences in prices . . . . .	15
4.1.3	Sample survey versus national account . . . . .	15
4.1.4	Equivalence scales again . . . . .	17
4.2	Income distribution in Europe . . . . .	17
4.3	Poverty in Europe . . . . .	19
4.4	Comparing Europe and the USA . . . . .	21
4.5	Pen world tables . . . . .	22
4.6	World Wealth and Income Data base . . . . .	22

<b>5</b>	<b>The dynamics of poverty in Europe</b>	<b>24</b>
5.1	The three I's of poverty . . . . .	24
5.2	Two approaches for poverty dynamics . . . . .	27
5.3	Smoothed income poverty . . . . .	28
5.4	Poverty dynamics in Europe . . . . .	29
<b>6</b>	<b>The evolution of the access to data bases</b>	<b>34</b>
6.1	France . . . . .	34
6.2	Europe . . . . .	35
6.3	The case of the UK, Germany and the USA . . . . .	35
6.4	The World Bank and the developing countries . . . . .	36

# 1 Introduction

This lecture starts with analysing the book *Poverty in Europe* written by Atkinson (1998) following his Yrjö Jahnsson lecture of 1990. This book insists very much on the difficulties of international comparisons, limiting its analysis to Europe. The situation is reexamined in the more recent paper of Brandolini (2007) which can be seen as a continuation of the work of Atkinson. Up to now in these lectures, we have considered survey data on income, corresponding to a particular country, taking examples in France and in the UK. Whenever we want to do international comparisons, we are confronted to a whole range of empirical problems which are due to the differences of practice between the national statistical agencies. It is important to clear out these differences because empirical conclusions can be inverted depending on the type of conventions adopted.

In between these two landmarks, Eurostat, the European statistical agency launched the European panel (ECHP) which lasted eight years, from 1994 to 2001, which was replaced in 2003-2004 by the EU-SILC on living conditions and which insists that national statistical agencies use common procedures and methods. Using the ECHP, we propose in the last sections of this chapter to study poverty dynamics within the European Union. We conclude this chapter by a tour d'horizon concerning the access to public data.

## 2 Poverty in Europe

Both references quoted in the introduction are dealing with the measurement of poverty and inequality in Europe. Does it make sense to talk about poverty in rich countries? When we know for instance the situation in some African countries? The poverty line in Europe, defined as half the mean country income is certainly far above the mean income of most countries in the rest of the world.

There are at least three reasons for being concerned about poverty in Europe.

1. First of all, Europe is not a homogenous area. Poverty in Denmark is certainly very different from poverty in Portugal or in the new east European members. We have the book Leroux and Livet (2009) which is a collection of papers discussing poverty in rich countries.
2. Poverty in Europe is related to the concept of social exclusion. What is the minimum income in order to be able to be an active member of society. There are people who have no job, people while still having a job have not enough money to have a decent dwelling or any dwelling at all.
3. Poverty is the target of several economic policies, national or even European. Governments need knowing fact and figures in order to target their policy.

## 2.1 A European policy

Up to now, the building of the European Union was mainly centered on the realization of a common free market. However, the European commission started to be concerned about the measurement of poverty with a first report in 1981. Eurostat started to produce good survey data. The Lisbon European council of 2000 marked a change of perspective in the European policy, stating the strategic goals of a greater social cohesion in Europe and of the eradication of poverty. This strategy led to the adoption in 2001 of the Laeken social indicators including income inequality indices and poverty. These indicators are meant to compare the social performance of each European member.

## 2.2 Stylised facts

Atkinson (1998) relates empirical investigations which were led under the authority of the European Commission in its programme against poverty. The basic definition of poverty in the EU was

**Definition 1** *In the EU, is considered as a poor any person with an income lower than 50% of the mean income per inhabitant of the country where that person lives.*

First, this is a relative definition of poverty. The poverty is defined by reference to the mean income. The mean income is computed for each inhabitant, so some kind of equivalence scale has to be used. The mean income per inhabitant corresponds to the notion of standard of living. Secondly, this a national definition, because it is relative to the mean income of the country where the person lives. There is no global poverty line for Europe.

Using that definition, there were 36.8 million poor in the 12 European countries in 1975. This number went up to 44 million in 1985. Finally, using consumption instead of income, that number was changed into 50 million of poor in 1985 to reach the Eurostat number of 57 million in 1993.

These numbers played an important role for mobilising policy. They also play a role for policy execution, in order to measure the impact of public policy on the level of poverty. They play exactly the same role as the unemployment rates do for labour market policies.

Atkinson (1998) reports the following Table 1 which gives the number and percentage of poor in 1988 for the 12 countries of the European Union at that time. These numbers indicates that poor countries, where the percentage of poor is the greatest are southern countries: Portugal, Italy, Greece and Spain. However, when we consider the absolute number of poor, they are located in the largest countries which are France, Germany, Italy et the UK.

If we try to get more recent figures on the Eurostat web site, we find first that the definition of the poverty line has changed slightly. It is now set at the 60 % of national median equivalized disposable income. It is often expressed in purchasing power standards (PPS), which means that it is adjusted to take into account different price levels across the different countries (cost of living across countries). In 2012, there are 28 states in the EU. The average rate of poverty is at 17.0% and is called a risk-of-poverty. This rate is computed after social transfers. In five

Table 1: Poverty in Europe  
(1988 figures from Atkinson 1998)

Country	Number of people (in millions)	Per cent
Portugal	2.5	25.5
Italy	12.1	21.1
Greece	1.8	18.7
Spain	6.5	16.9
Ireland	0.5	15.7
United Kingdom	8.4	14.8
France	8.2	14.7
Luxembourg	0.041	11.1
West Germany	6.6	10.9
Belgium	0.7	7.4
Netherlands	0.7	4.8
Denmark	0.2	3.9
Total	49.0	15.0

Member States, namely Greece (23.1 %), Romania (22.6 %), Spain (22.2 %), Bulgaria (21.2 %) and Croatia (20.5 %), one fifth or more of the population was viewed as being at-risk-of-poverty. The lowest proportions of persons at-risk-of-poverty were observed in the Netherlands (10.1 %) and the Czech Republic (9.6 %).

The figures reported in Table 2 indicate that large changes have occurred between 1988 and 2012. First of all, if the average poverty rate has increased, its range is narrower, and that for both ends. Which means that severe poverty has decreased in Portugal (25.5% to 17.9%) but has largely increased in the best ranked countries (Denmark, the Netherlands), the rate of poverty being multiplied by a factor of more than 2. During that period, the EU enlarged, welcoming former eastern countries. Those countries mainly joined the bottom of the ranking, but are around Portugal, Spain and Italy. But there are the exceptions of Hungary, Slovenia, Slovakia and the Czech Republic which are at the top of the ranking. The rate of poverty remained the same in France. But due to structural policies or to the financial crisis it rose strongly in Germany, The UK and Belgium.

Table 2: Poverty in Europe  
(2012 figures from Eurostat)

Country	Number of people (in thousands)	Per cent
Greece	2,536	23.1
	Romania	4,824
Spain	10,276	22.2
	Bulgaria	1,559
	Croatia	865
Italy	11,810	19.4
	Latvia	388
	Lithuania	559
Portugal	1,887	17.9
	Estonia	233
	Poland	6,478
Germany	13,030	16.1
United Kingdom	10,028	16.0
Ireland	722	15.7
Belgium	1,667	15.3
	Malta	62
Luxembourg	78	15.1
	Cyprus	127
Austria	1,201	14.4
France	8,707	14.1
Sweden	1,372	14.1
	Hungary	1,379
	Slovenia	271
	Slovakia	716
Finland	704	13.2
Denmark	731	13.1
Netherlands	1,678	10.1
	Czech Republic	990
European Union (28 countries)	84,877	16.9
Euro area (18 countries)	56,092	17.0
Euro area (17 countries)	55,705	17.0

Recent members of the European members are right justified in the first column in order to see the main evolution with Table 1.

### 2.3 Comparing France and the UK in 1988

The figures reported in Table 1 were much criticized, especially by UK politicians who claimed that poverty was nothing but another measurement for inequality. There are clearly problems of

measurement that we shall discuss now. In order to shed light on this discussion, it is useful to remember the dominance curves displayed at the end of Chapter 7.

We took that 1988 example in order to stress how statistical conventions can render international comparisons difficult. The situation is now slightly different because Eurostat has tried to promote common practices and provides rather homogenous data sets with the ECHP and the more recent EU-SILK. Let us go back to the former situation.

- French INSEE made a national study in 1989 using tax declaration and household budget surveys. Survey data come from *Enquête sur le Budget des Familles*. It reported a poverty rate of 9.6% instead of 14.7%.
- The British department of social security (DSS) produced annual regular studies between 1991 and 1996 based on the FES (*Family Expenditure Survey*). It reported a poverty rate of 4.1% instead of 14.8%.

Both approaches made use of the same type of data as those recommended by the EU which itself produced poverty estimates. In Table 1, France and the UK look very similar, using estimates performed by the EU. However, the respective national investigations produced very different results, even if they are based on an apparently identical definition of the poverty line.

The French and the British studies consider income while Table 1 considers spending. The EU reports a poverty rate around 14.8% for the two countries, while France reports a poverty rate of 9.6% and the UK a mere 4.1%. We are first far from the EU estimates and secondly, these two figures report a radical difference between France and the UK. We can understand now why British politician criticized so much these European figures.

Atkinson in his book shows the route one has to follow in order to go from the figures produced by national studies to those produced by Eurostat.

1. A poverty line is determined a fraction of a central tendency indicator: the mean or the median. The two are identical if the distribution is symmetric which is not in general the case for the income distribution. Then the median is lower than the mean. Asymmetry in the distribution is very different in France and in the UK. The French took the median while the British took the mean. The EU took the mean (at that time).
2. To compute the mean, we can use different weights because we have samples. We can choose an equal weight for every household like in France or a weight equal to the size of the household like in the UK. The results are not so different, but they vary in opposite direction for the two countries.
3. Which type of equivalence scale should we use? The old OECD scale takes 1, 0.7, 0.5. France used it while the EU used the new OECD scale. The UK made use of a more complicated scale, taking into account the age of the children. This is the McClements scale.
4. Finally, we can take income before or after housing costs. In the UK, this cost can vary a lot because of variable interest rates. Consequently, housing spending does not result from

Table 3: Poverty rates and measurement units

Definition	France	UK
National poverty rates	9.6	4.1
Mean versus median	13.5	9.2
Individual versus household	12.5	10.3
DSS scale versus OECD scale	11.9	8.6
After housing versus before housing	13.0	13.6

a decision taken by the household, but from the evolution of financial markets. For a good part, housing spending are exogenous to the household decisions.

We see that measurement decisions have a large impact on the political decision which was to define poverty as being below 50% of a target income.

- France: 50% of the median, weighting households as 1, OECD equivalence scales, income before housing. With these choices, France poverty is twice that of the UK
- Adopting for both countries the UK choices: 50% of the mean, counting people instead of households, DSS equivalence scale, income after housing costs leads to similar poverty rates for the two countries.

## 2.4 The impact of equivalence scales

Most of survey data concern households, that have however different compositions. How to take into account those different sizes and mainly to translate household welfare into individual welfare. Equivalence scales operate the transition between household income and the income of an equivalent adult by dividing the household income by a function of the size of the household. If  $x_i$  is the household income, the income of the equivalent adult is obtained by dividing  $x_i$  by a number  $m_i$

$$\tilde{x}_i = \frac{x_i}{m_i}$$

where  $m_i$  can be computed in different ways. We can take  $m_i = n_i$  where  $n_i$  is the total number of individuals in the household. But in general, a smaller weight is given to children. The OECD scale gives 1 to the head, 0.7 to the other adults and 0.5 for all the children. A simpler formula was proposed in the literature:

$$m_i = n_i^\alpha$$

where  $\alpha < 1$ . This parameter measure the elasticity of  $m_i$  with respect to the size of the household. The different scales which were detailed in Chapter 8 corresponded to values between 0.3 and 0.7. Selecting a value for  $\alpha$  monitors the allocation of costs inside a household. If fixed costs are important, we can take a small  $\alpha$ . In the reverse case, the relative weight of an extra individual in the household will be greater, justifying a greater  $\alpha$ .



Considering again the comparison between France and the UK, Atkinson shows that when varying  $\alpha$ , one can reverse the ranking between the two countries. With  $\alpha < 0.55$ , there are more poverty in the UK. With  $\alpha > 0.55$ , there is more poverty in France. This is because when varying  $\alpha$ , the composition of the poor population is modified. When  $\alpha = 0$ , most of the poor are in small households. When  $\alpha$  is large, most of the poor are located in large families.

Changing definitions might have a large effect on poverty measurement, and in particular on the causes of poverty. Two groups are concerned

- The elderly
- Large families

Targeting policy is thus different according to the definition of the poverty line.

### **3 Relative or absolute poverty**

Choosing between a relative or an absolute poverty line is a delicate debate. We must define what we mean by poverty and by being a poor. Of course being deprived of basic needs such as food and housing is one definition of poverty. But, we must also try to have a dynamic definition of poverty. If the economy is growing but with increasing inequalities, a fraction of the population will be excluded from the benefits of economic growth. Is it fair, unfair? The UK situation was well described by the dominance analysis of Chapter 7. In 1996, the Government tried to recover from the past situation concerning the least favoured part of the population. It managed to reach that goal compared to the situation in 1992. But there are still individuals who are left behind, when we compare the situation in 1996 to that of 1979.

#### **3.1 Stylised facts**

We have seen the definition of a relative poverty line in term of a fraction of the average. An absolute poverty line corresponds to the amount of income necessary to buy a given basket of goods. The price of this basket is re-evaluated each year. This is a standard of living approach.

In the UK, we draw the following graphic. We define the poverty line as 50% of the average income in 1979. Then a standard of living approach implies that we correct this figure only for consumer prices, while the relative approach implies that we also follow the evolution of incomes. Since real incomes per head increased a lot between 1979 and 1993, this makes a big difference. We have a rather constant line of poverty in one case, while the relative definition provides a sharp increasing in the poverty rate (after housing costs). In Italy, this is just the reverse for the same period. With an relative definition, poverty rate slightly increased (from 8.3 to 10.2), while with an absolute line there was a sharp decline from 8.3 to 3.4).

However, we must note the difference between the standard of living approach which maintains constant the poverty line in term of purchasing power and the approach which defines an absolute level, using for instance the minimum number of calories necessary to survive or defines the composition of a reference basket of goods.

The first studies concerning poverty at the end of the nineteenth century or the ones reported in chapter 6 of Duclos and Araar (2006) are mainly concerned about determining a basket of goods  $x^*$  so that the poverty line  $z$  is

$$z = p \cdot x^*.$$

The poverty line is re-evaluated according to  $p$ , so that it can be different in town and in rural areas. For international comparisons, we could decide to keep the same basket of goods, but to convert it on the basis of purchasing power parities.

The composition of the initial basket of goods has to be modified too. In the US, non-food requirements were introduced by dividing  $z$  by the share of food in average household budgets. Moreover, some goods of the basket might be no longer available. Or for getting a job, a cellular phone seems to be necessary nowadays on top of a decent clothing. So in the long term a fixed bundle of goods and services seems untenable for defining a poverty line.

A relative poverty line considers poverty in terms of deprivation to a certain minimum right to resources. A minimum income is a prerequisite for participation in a certain society, to be fully a citizen. 50% of the average has the virtue of transparency and simplicity.

## 3.2 Controversies in France

A Report to the Parliament entitled *SUIVI DE L'OBJECTIF DE BAISSSE D'UN TIERS DE LA PAUVRETE EN CINQ ANS*, published in October 2011 led to large of controversias in newspapers. I will try to shed some light on those controversias, starting from the report itself. The Government had promised to reach to objective that poverty should be reduced by one third in five years. That started in 2007. Which kind of criteria was used to measure a poverty rate?

*un indicateur central - le taux de pauvreté ancré dans le temps - qui privilégie une approche absolue de la pauvreté en se référant au seuil de pauvreté à 60% du revenu médian en 2006. Ce seuil est revalorisé chaque année pour tenir compte de l'inflation; il permet de mesurer les évolutions de la population vivant sous le seuil de pauvreté, indépendamment des variations année après année du revenu médian de la population.*

So the criteria which is chosen is close to an absolute rate of poverty, when the EU recommends a relative rate of poverty. We know that the evolution of the two measures can be very different.

*Les évolutions des indicateurs du tableau de bord montrent en 2009 une quasi stabilité du taux de pauvreté ancré dans le temps à 11,8%, alors que la tendance était à la baisse depuis 2007, et une augmentation du taux de pauvreté relatif au seuil de 60% du revenu médian (954 euros en 2009) qui s'établit à 13,5% de la population française métropolitaine. Le profil des personnes pauvres s'est toutefois peu modifié sur la période récente : le taux de pauvreté relatif (calculé au seuil à 60%) reste plus élevé pour les familles monoparentales, les personnes isolées, les familles nombreuses et les personnes immigrées alors que le risque de pauvreté décroît de façon générale avec l'âge.*

Le taux de pauvreté monétaire ancré dans le temps s'établit en 2009 à 11,8%; le nombre de personnes en dessous du seuil de pauvreté ancré dans le temps a baissé de 5% depuis 2007.

Selon cette définition, la proportion de personnes pauvres dans la population est passée de 13,1% en 2006 à 11,8% en 2009, soit un niveau équivalent à celui de 2008 (11,6%). 7,1 millions de personnes vivent en 2009 sous le seuil de pauvreté ancré en 2006 contre 7,5 millions en 2007, soit une baisse de 5,3% en deux ans.

Now these figures are going to be used to make international comparison. The absolute rate is taken for France, but not for the other countries. The note attached to Table 4, which is extracted from the report, shows that coexists a large variety of definitions.

Table 4: Évolution du taux de pauvreté en 2008-2009 et 2007-2009

	2000	2005	2006	2007	2008	2009
Allemagne (1)	10,4	14,8	13,8	14,2	14,5	ND
Espagne (1)	NA	14,9	15,2	15,6	15,5	16,7
États-Unis (2)	11,3	12,6	12,3	12,5	13,2	14,3
France	13,6	13,1	13,1	13,4	13,0	13,5
Royaume-Uni (3)	18,5	17,1	18,1	18,4	18,0	17,6
Italie (4)	11,0	11,1	11,1	11,1	11,3	10,8

Note : ND pour non disponible. (1) En Allemagne et en Espagne, le calcul inclut dans les revenus les loyers imputés. (2) Aux États-Unis, le calcul du taux de pauvreté ne porte pas sur l'ensemble du revenu (il n'inclut par exemple pas certaines prestations comme l'EITC) et il s'agit d'un taux de pauvreté absolu et pas relatif (le seuil de pauvreté est indexé sur un indice de prix). Le taux de pauvreté relatif n'aurait pas autant augmenté du fait de la baisse concomitante du revenu médian en 2009 et en 2008 (3) En Grande Bretagne, la période d'enquête couverte est d'avril à avril (financial year) ; les données sont relatives à la période avril 2009-avril 2010 sont affectées à l'année 2009 pour la comparaison. (4) En Italie, la définition repose sur une approche par la consommation et non par les revenus. Les données pour 2000 n'étant pas disponibles, ce sont celles pour 2002 qui sont reprises pour ce tableau (\*) Il s'agit alternativement de l'évolution du revenu réel médian ou de la consommation réelle médiane. Pour les États-Unis, il s'agit du revenu médian des ménages, non ajusté de la taille des ménages. Pour l'Italie, il s'agit de la valeur réelle de la consommation médiane.

### 3.3 Subjective poverty lines

People have in mind an idea about a poverty line. They can reveal this information in surveys. For instance this question was used in the US

*What is the smallest amount of money a family of four needs each week to get along in this community?*

The paper by Hourriez and Olier (1997) report a similar question for France in the *Enquête sur le Budget des Familles*. There is a vast literature dealing with the subjective approach which is known as the “Leyden Approach” around the work of Bernard van Praag at the University of Leyden in the Netherlands.

Using this approach Van den Bosch et al. (1993) present a comparison of poverty in seven European countries or regions. They note that absolute poverty lines have an elasticity of zero with respect to average real income, while for relative poverty lines this elasticity is by definition equal to one. In the subjective method they use, this elasticity is endogenously determined, so that subjective standards are a priori neither relative nor absolute (see Hagenaars and van Praag (1985)).

The subjective method takes account of the fact that poverty is a socially constructed category, and is not something that can be determined by an outside observer without regard to the circumstances and values in the surrounding society.

In this study respondents are asked to evaluate their own situation, on which they may be considered the best experts.

The Subjective Poverty Line (SPL) is based on survey responses to the Minimum Income Question (MIQ), which reads: “*What is the minimum amount of income that your family, in your circumstances, needs to be able to make ends meet?*” The answer to this question,  $Y_{min}$ , depends on a number of characteristics of the household, of which current household income  $y$  and household size  $N$  are the ones considered most relevant in the present context.

$$\log(y_{min}) = a + b_1 \log(y) + b_2 \log(N).$$

To find the poverty line, we have to find the point where this equation intersects with the line  $y = y_{min}$ . If the respondent has an income lower than his answer, that means that he cannot make ends meet, while for higher incomes, the reverse is true. At the point where  $y = y_{min}$ , the household is just able to make the ends meet. So we can determine the subjective poverty line using a fixed point argument as:

$$\log(y * N) = \frac{a + b_2 \log(N)}{1 - b_1}.$$

The subjective poverty lines can be regarded as being rooted in the everyday experiences of households trying to make ends meet, without necessarily representing a social or political consensus on the poverty line (which, anyway, may not exist).

Compared to a relative poverty line using the old OECD equivalence scale, survey data and 50% of the mean, we get a much higher value with the subjective line, except in the Netherlands

Table 5: Percentage of households in poverty by two standards in a number of European countries and regions

		SPL-standard	EC-standard
Belgium	1985	24.9	6.1
	1988	20.7	5.7
Netherlands	1985	8.6	7.1
	1986	15.9	7.2
Luxembourg	1985	23.2	7.6
	1986	12.5	7.6
Lorraine	1985	29.1	11.2
	1986	26.5	10.8
Ireland	1987	31.6	17.2
	1989	39.6	17.3
Catalonia	1988	37.3	15.1
Greece	1988	42.0	19.9

(the effect of a protestant culture?). The ranking is thus not the same. But there are three distinct groups, whatever the method: Northern countries with a low poverty rate, southern countries and Ireland while Lorraine in in between.

**(abstract)** *Their results indicate that the subjective poverty lines are plausible in a comparative context, although the levels of the subjective standards are rather generous. The estimated equivalence scales are much flatter than the one recommended by the OECD. The extent of poverty is much greater in the "peripheral" EC-countries than in the "central" ones. Though similar factors are found to be associated with poverty in all countries, there are also important differences in the characteristics of the poor across countries. The impact of social security transfers on poverty appears to be much smaller in the southern countries Greece and Catalonia, than in the Benelux and Lorraine .*

## 4 Income distribution for the EU

In his book, Atkinson has considered a different poverty line for each country. More precisely, the poverty line is determined as 50% of the mean income inside each country. This is a logical choice if anti-poverty policies are led by states. But the EU is seen more and more as a global entity with a desired convergence between the member countries. Atkinson suggested that the following formula could be used for computing an alternative poverty line

$$\tilde{z}_i = \tilde{z}_{EU}^\theta \tilde{z}_i^{1-\theta}$$

where  $\theta$  is a weighting parameter between 0 and 1 that has to be chosen a priori. Brandolini (2007) decided to have a global approach to inequality and poverty in Europe. The aim of her approach is to reach a new estimate of the income distribution in the enlarged EU as a whole.

## 4.1 Conceptual problems of measurement

We have households  $j$  in countries  $k$ , that have various sources of income  $i$  (earnings, financial incomes, land incomes). The total income of an household is given by the formula

$$y_{jk} = \frac{\sum_i c_{ijk} x_{ijk}}{e_k p_{jk} m_k(h_{jk})}$$

where

- $m$  is an equivalence scale, specific for each country
- $h_{jk}$  specific characteristics of a household
- $e_k$  a conversion rate for currency
- $p_{jk}$  price index
- $c_{ijk}$  a correcting factor because of the various data sources (macro, micro).

In national studies some of these items do not exist and the income of household  $j$  is given by:

$$y_j = \frac{\sum_i x_{ij}}{m(h_j)}$$

In usual studies concerning world income comparison, the basic point for comparison is the per capita gross national income computed in some international currency, mostly the dollar. This is the case for the Pen World Tables from the University of Pennsylvania, available on the Web at <http://pwt.econ.upenn.edu>. Here, we have to solve for various questions.

### 4.1.1 Currency conversion

Foreign rate of exchange not useful because depends on too many financial factors. It does not reflect the price structures that consumers are facing. Another approach based on PPP. They are based on the prices a fixed bundle of goods and provide in the conversion rate from a national currency to an artificial common currency. This is followed by EUROSTAT with the Purchasing Power Standard (PPS). There exist also the international dollar.

This solution is not exempt of problems. There are various sources just because several international agencies have their own sources. Brandolini has used the EUROSTAT PPS. But she could have used those of the World Bank or the OECD.

There are different methods, because there are different methods for aggregating individual prices using different types of weights.

Finally, we can compute PPP for GDP or PPP for household consumption HFCE. In 2000, using one or the other would make the real income of Finland or Poland 8 to 12% lower while making real income of Germany or Luxembourg 6 to 11% higher. GDP PPP reduces international differences, while HFCE PPP make them larger.

### **4.1.2 Differences in prices**

Essentially, the price of housing is not the same everywhere and that can make a big difference. When comparing EU to the USA, Brandolini has tested a variant using a different price index per US state because one dollar in Mississippi is 1.30 dollar in Massachusetts. For that reason, the poverty threshold can be adjusted.

### **4.1.3 Sample survey versus national account**

We have various sources of information, survey and national account. There is a tendency to merge the two sources. They do not measure the same thing. There is GNI (gross national income) and HGDI (household gross disposable income). On average HGDI is only 64% of GNI. Household surveys are closer to the HGDI. International studies such as those produced by the FMI or the World Bank mostly use the GNI per capita which comes from national accounts. They give a picture of world inequality, inequality between countries. But this picture is different from that would be obtained if considering the world income distribution, which would give a more inegalitarian distribution. In Table 6, we have ranked European countries according to their GNI per capita, which includes the whole economy activity and not only the household incomes. When using the survey data, the UK and Germany which have quite similar GNI keep the same rank. However the difference which is positive between France and the UK becomes negative when considering survey data. Macro data and survey data cannot be mixed easily.

Table 6: Annual income in EU countries around 2000 in PPS

Country	GNI	HGDI	HNDI	ECHP-LIS
Luxembourg	38 889	-	-	15 957
Netherlands	25 506	13 263	12 460	10 284
Denmark	24 819	11 790	10 951	11 233
Austria	24 778	16 393	15 618	10 685
Belgium	23 979	14 800	14 047	11 172
Sweden	23 701	11 817	11 408	10 156
France	23 125	14 939	14 433	10 507
Finland	22 725	12 195	11 268	9 882
Italy	22 600	15 671	14 721	8 064
UK	22 521	15 251	14 542	11 894
Germany	22 277	15 423	14 412	11 071
Ireland	21 807	-	16 783	8 784
Spain	18 390	12 410	11 711	7 927
Portugal	15 757	11 362	10 594	6 477
Greece	14 749	11 028	10 342	6 835
Slovenia	13 905	9 061	8 402	5 551
Czech Republic	11 316	6 595	6 258	4 331
Hungary	9 156	5 768	-	3 318
Poland	8 579	6 228	6 064	3 438
Estonia	7 916	5 103	4 775	3 145
Slovak republic	7 546	4 464	4 317	2 511
Lithuania	7 530	5 213	4 947	-
Latvia	7 090	4 588	4 277	-

GNI: Gross national income (per capita); HGDI: Household gross disposable income; HNDI: Household net disposable income; ECHP-LIS: Total net household income (TNHI). ECHP is the European Panel, LIS is the Luxembourg Income Study which is used for the countries which are outside the ECHP. Presumably the left three columns are per capita while the last column is adjusted using the new OECD scale. Source: Brandolini (2007).



#### 4.1.4 Equivalence scales again

For international poverty comparisons, per capita is used. It ignores simply the economy of scale in the household. UK has a tendency to use the McClements scale, while EUROSTAT recommends using the new OECD scale. The effect of the MacClements equivalence scale is detailed in Anyaegbu (2010) from which is drawn Table 7. The new OECD scale used presumably in the

Table 7: Equivalence scales: McClements versus OECD

Household members	McClements scale	New OECD scale
First adult	0.61	0.67
Spouse	0.39	0.33
Second adult	0.46	0.33
Third adult	0.42	0.33
Subsequent adults	0.36	0.33
Child aged 0-1 year	0.09	0.20
Child aged 2-4 year	0.18	0.20
Child aged 5-7 year	0.21	0.20
Child aged 8-10 year	0.23	0.20
Child aged 11-12 year	0.25	0.20
Child aged 13 year	0.27	0.20
Child aged 14 year	0.27	0.33
Child aged 15 year	0.27	0.33
Child aged 16-18 year	0.36	0.33

last column of Table 6 allows international comparisons. But researchers from eastern Europe claims that the scale economy are less important in their countries than in Western Europe simply because the budget share of food is greater and housing cheaper. Housing is the great item where the scale economies are at work. So it would be nice to have a scale depending on the level of income.

## 4.2 Income distribution in Europe

There are nice data sources for the 15 countries of the EU in 2000. The European panel (EHP) was a common adventure in order to provide a unified and harmonized source of survey data for the 15 members. For the other countries, there is the Luxembourg Income Study (LIS) where harmonization is done ex-post.

Figure 1 present the income distribution for 21 out of 25 European countries in 2000. Four countries are ignored because we have no data either in the EHP or the LIS: Malta, Cyprus, Latvia, Lithuania.

We see on this graph that

- the country median (thick horizontal mark)
- the distance between the 20th and the 80th quantile (thick vertical bar)

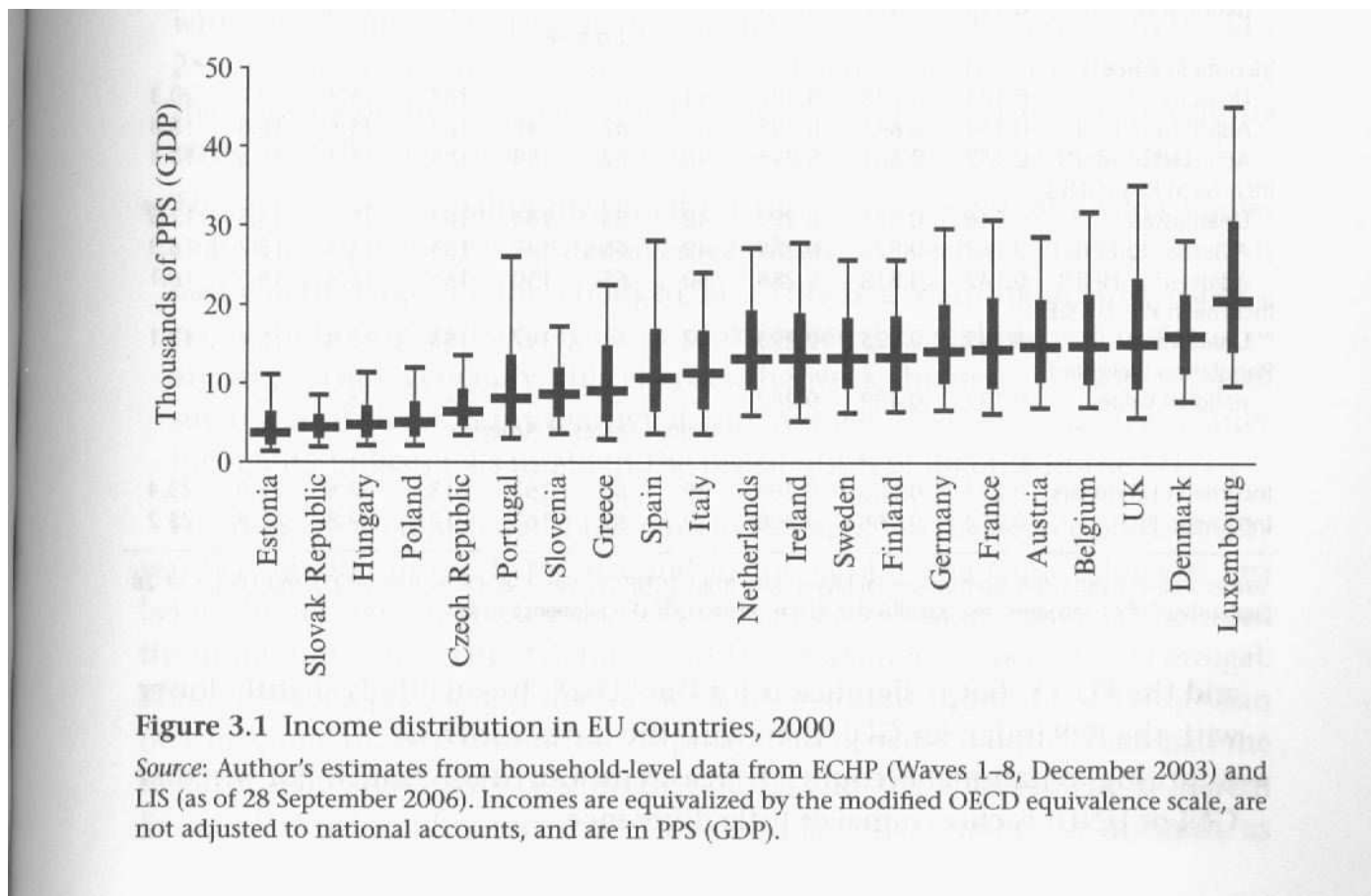


Figure 1: Income distribution in 21 EU countries

- the 5th and 95th percentiles (thin vertical bar)

There are several groups of countries

- The Eastern countries
- Portugal Slovenia and Greece (southern Europe)
- Spain and Italy
- Europe from Ireland to Belgium
- The contrasted cases of Denmark and the UK
- Luxembourg

Detailed Tables in Brandolini shed some more light on the influence of methodological choices. Large inequalities in Estonia, Portugal, the UK.

- Inequality is higher when measured in Euro instead of PPP.
- Inequality is highest when measured in per capita. It is lower with the modified OECD than with the old OECD.
- Inequality is higher when measured at a whole than when obtained by averaging national values weighted by their population.

### 4.3 Poverty in Europe

With national poverty lines, there are 68 M of poor in EU-25 in 2000 and a poverty rate of 15%, regardless of the boundaries of Europe. This rate was raised to 17% in 2012. Adopting  $\theta = 1$

Table 8: European poverty line for E25 in 2000

	$\theta = 0$	$\theta = 1$
$P_0$	0.15	0.23
$N_0$	68M	103M

raises the incidence of poverty as shown in Table 8.

A common poverty line increases the contrast between Est and West Europe. A common policy should reduce poverty. A common poverty line moves the location of the poor. None is left in Luxembourg. But in southern Europe, a large fraction of people are reclassified as poor, see Table 9. The geography of poverty also changes. More than half of the eastern Europe falls in poverty. A part of the population falls into poverty in southern Europe. The contrary happens to the rest of Europe. Poverty disappears in Luxembourg.

Table 9: Moving poverty location around 2000  
when varying the poverty line

Country	Poverty rate	EU-wide line	Geometric mean line
Slovak republic	13	79	37
Estonia	18	67	37
Hungary	11	68	33
Poland	16	62	38
Czech republic	8	52	21
Portugal	21	22	11
Slovenia	11	21	8
Greece	20	15	7
Spain	18	6	3
Italy	18	3	2
Netherlands	11	-3	-1
Sweden	8	-3	-2
Finland	11	-4	-2
Ireland	20	-4	-2
Germany	10	-5	-3
Denmark	10	-7	-4
Austria	12	-6	-4
France	16	-7	-4
UK	19	-7	-4
Belgium	13	-8	-5
Luxembourg	12	-12	-8

Source: Brandolini (2007), Figure 3.2, page 77. The figures represent the percentage of increase or decrease of the poverty rate when moving the poverty line. The initial poverty rate is given in the first column and comes from Eurostat web site. When the precise figure was not available, we took its nearest date available.

## 4.4 Comparing Europe and the USA

All the estimates given in the literature suggest that inequality is less important in Europe than in the US. This is also true for the E25. The difference could come from the PPP adjustment. This adjustment entail large variations in Europe, especially in the E25. When adjusting for PPP within the States of the USA, there is virtually no difference with the previous results. This indicates an integration which is accomplished in the USA while it is not yet in the EU.

In Table 10, we compare Gini coefficients between the US and Europe. Inequality is greater in the US. However, when we move the poverty line, varying  $\theta$  between 0 and 1, we get a contrasted picture. Let us now turn to poverty. With  $\theta = 0$ , we have national poverty lines for Europe and state by state poverty lines for the US. When  $\theta = 1$ , we have a common poverty line for the USA and a common poverty line for the EU. With  $\theta = 1$ , the poverty rate is the same in

Table 10: Gini and  $P_0$  per capita for the USA and for EU

	USA	EU-15	EU-25
Gini	0.399	0.324	0.357
$P_0, \theta = 0.0$	23.9	17.2	17.2
$P_0, \theta = 0.5$	24.0	17.7	19.8
$P_0, \theta = 1.0$	24.1	18.6	24.0

Source: Brandolini (2007), Table 3.3, page 75.

the USA and in the EU-25. But it is still lower in the EU-15. When varying  $\theta$ , the poverty rate does not vary very much in the US and in the EU-15. It varies a lot in the EU-25. So economic integration is comparable between the USA and EU-15 and poverty is lower in EU-15.

## 4.5 Pen world tables

available at <http://pwt.econ.upenn.edu>.

Alan Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.3, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, August 2009.

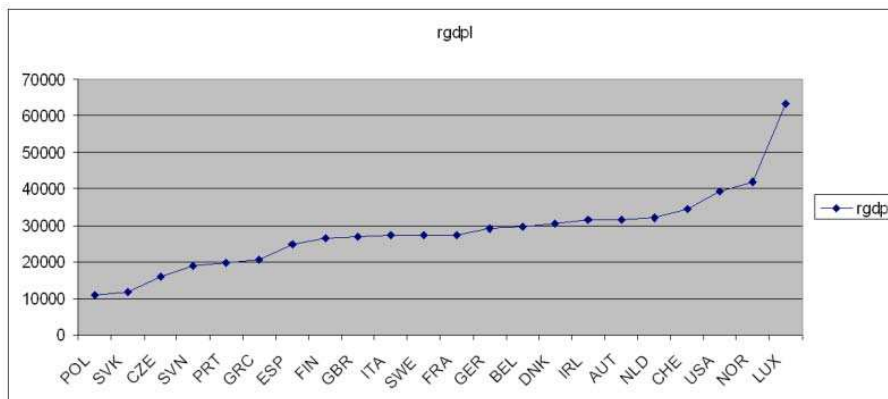


Figure 2: GDP per capita from the Pen Tables, constant prices

Figure 2 presents the ranking of countries for Real GDP per capita in constant prices drawn from the Pen Tables (variable `rgdpl`). If the global ranking is the same as the one found by Brandolini, there is a huge difference for the UK.

In Figure 3, we draw a similar graph using this time GDP per capita adjusted for PPP. Note the differences with Figure 2. Data can be downloaded, but these are tabulated data.

## 4.6 World Wealth and Income Data base

It can be accessed at <http://wid.world/>. The World Wealth and Income Database (WID.world) relies on the combined effort of an international network of over a hundred researchers covering more than seventy countries from all continents. WID.world is coordinated by an executive committee composed of five co-directors among who are Thomas Picketty (PSE) and Emmanuel Saez. (Berkeley).

The aim of the team is to combine different data sources such as survey data, administrative data, fiscal data, in order to get a picture of the income distribution for as many countries as possible over the world. A particular focuss is devoted to high incomes. Note that wealth data are also included. There does not seem to be poverty indicators. Some indicators such as average income per adult seems to be quite different from other sources, see for instance data concerning Luxemburg which is said to be the richest country of the EU and which appears to be in a much less favourable situation in this data base. The average national income per adult is 32 448 euros (2016) for Luxemburg against 37 878 for Germany, 36 324 for the UK, 41 381 for the

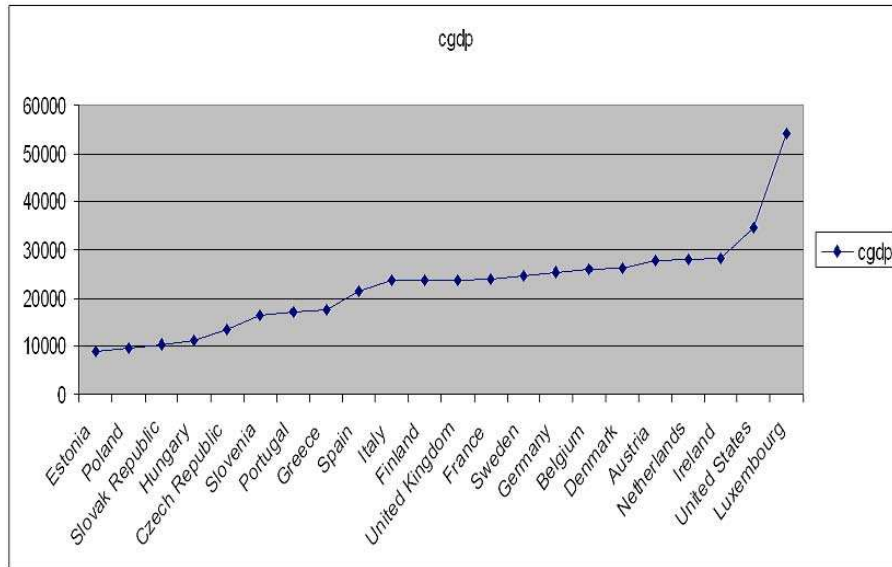


Figure 3: GDP per capita from the Pen Tables at PPP

Netherlands and 33 962 in France. Graphs reveal a huge increase after 1985 and also a large drop after 2008 with oscillations. In that data base, the Netherlands are the richest country in the EU.

## 5 The dynamics of poverty in Europe

Up to now we were concerned by investigating the importance of data definition and statistical procedures for international comparisons. We sequentially had a look at Atkinson (1998) and Brandolini (2007). Here we are going to take advantage of the existence of the European Panel. It is available only for a limited number of European countries, but allows to follow representative individuals over time. We shall follow Kuchler and Goebel (2003). They use the ECHP for the years 1994-1997 (the ECHP is available from 1994 to 2001). A panel survey follows the same households over the years. However, some households may leave the panel for various reasons, while others are entering. A balanced panel is a panel where are eliminated all the households which are not present over all the years. This practice might introduce an attrition bias if the missing households are not missing at random.

Considering a balanced panel introduces a new dimension in the analysis. Occasional poverty (once in the panel) is not at all the same as permanent poverty (a state of poverty over all the waves of the panel). Of course new tools are necessary for this analysis.

### 5.1 The three I's of poverty

Before considering dynamics, it is useful to go back to the FGT indices of Foster et al. (1984) because they allow to distinguish several aspects of poverty. The general formula is, supposing that the income variable  $x_{[i]}$  is ordered and that  $z$  is the poverty line

$$P_{\alpha}(x, z) = \frac{1}{n} \sum_{i=1}^q \left( \frac{z - x_{[i]}}{z} \right)^{\alpha},$$

where  $q$  is the number of individuals below the poverty line. Depending on the value of  $\alpha$ , we have several possible measures

- For  $\alpha = 0$ , we have poverty incidence, or in other terms the head-count ratio.
- For  $\alpha = 1$ , we have poverty intensity, which measures the average poverty gap, the average distance to the poverty line.
- For  $\alpha = 2$ , we have poverty inequality, which measures the distribution of the poor below the poverty line. Are individuals concentrated at certain locations below the poverty line or are they evenly distributed?

Reporting these different indices is very informative. For instance, Thuysbaert (2008) report those indices for Belgium using as a poverty line 50% of the mean contemporary income. We see that poverty incidence has dropped from 8% in 1976 to 5% in 1985 and then progressively risen to reach 7% in 1997. The progression of poverty intensity does not follow the same pattern as well as poverty inequality. How could we summarise these figures? Jenkins and Lambert (1997) propose to summarise these three aspects of poverty, namely incidence, intensity and inequality into a cumulative curve of poverty gaps which has a number of nice properties. This curve is named the TIP curve because it means the three I's of poverty. Let us consider an



Table 11: FGT measures of poverty for Belgium

Indices	1976	1985	1988	1992	1997
$P_0$	0.0786 (0.0035)	0.0505 (0.0028)	0.0515 (0.0042)	0.0606 (0.0047)	0.0729 (0.0044)
$P_1 \times 10$	0.157 (0.009)	0.087 (0.007)	0.076 (0.008)	0.125 (0.018)	0.117 (0.009)
$P_2 \times 100$	0.54 (0.29)	0.29 (0.19)	0.19 (0.003)	0.62 (0.16)	0.34 (0.05)

income distribution  $F(x)$  and a poverty line  $z$ . The TIP curve is a function of  $p$ , a proportion of individuals below the poverty line when the income distribution is  $F(\cdot)$ :

$$TIP(p, z) = \int_0^{F^{-1}(p)} (z - x) \mathbf{1}(x \leq z) dF(x),$$

where  $\mathbf{1}(\cdot)$  is the indicator function. The TIP curve can be normalised by considering

$$TIP(p, z) = \int_0^{F^{-1}(p)} \left( \frac{z - x}{z} \right) \mathbf{1}(x \leq z) dF(x).$$

The TIP curve is estimated by considering the ordered incomes,  $x_{[i]}$  and

$$TIP(k/n, z) = \frac{1}{n} \sum_{i=1}^k (z - x_{[i]}) \mathbf{1}(x_{[i]} \leq z),$$

while the normalised version is

$$TIP(k/n, z) = \frac{1}{n} \sum_{i=1}^k \left( \frac{z - x_{[i]}}{z} \right) \mathbf{1}(x_{[i]} \leq z).$$

It becomes very easy to plot these graphs, plotting the sequence  $k/n$  against the corresponding values  $TIP(k/n, z)$ . The point on the horizontal axis where the curve becomes flat and horizontal is the head-count ratio  $P_0(z)$  or incidence point. The corresponding ordinate on the vertical axis is the average poverty gap or poverty intensity. In the normalised case, it is equal to  $P_1(z)$ . Finally, the curvature of the TIP curve reflects inequality of income distribution among the poor, offering a symmetric view of a Lorenz curve.

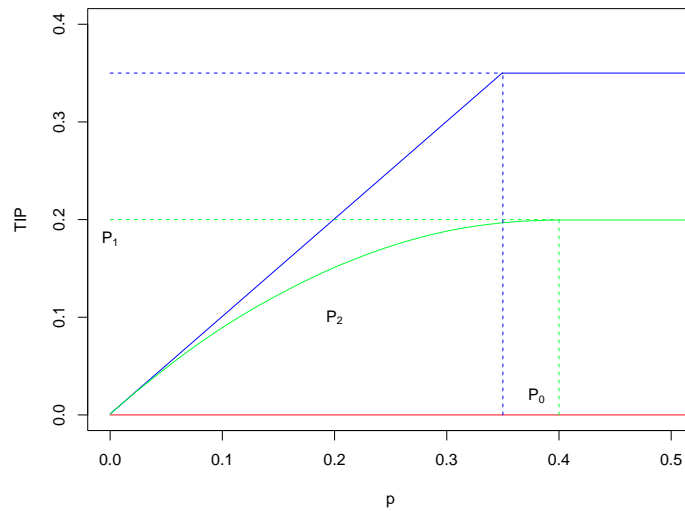


Figure 4: TIP curves from different income distributions

Figure 4 is interesting for understanding the functioning of TIP curves. The blue curve corresponds to a situation where all the poor have a zero income. This is a situation of maximum poverty. It corresponds to a straight line where poverty incidence is equal to poverty intensity ( $P_0 = P_1$ ). The green curve is an intermediate situation. It was built using a uniform distribution of income. Note however that if poverty inequality and poverty intensity are lower, we have a higher poverty incidence.  $P_0$  was chosen greater than in the previous case. So even if that green curve is lower than the blue curve, we have a better situation only for two poverty criterion, not for three. The red curve corresponds to a situation where all the poor have an income equal to the poverty line  $z$ . The TIP curve is horizontal.

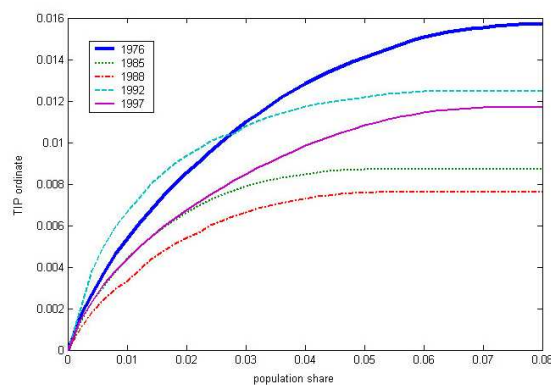


Figure 5: TIP curves for Belgium

TIP curves are closely related to the Generalised Lorenz curve. Decomposing the integral in

two, we have, for the un-normalised version of the TIP curve:

$$TIP(p, z) = z \int_0^{F^{-1}(p)} \mathbf{1}(x \leq z) f(x) dx - \int_0^{F^{-1}(p)} x \mathbf{1}(x \leq z) f(x) dx$$

The first integral is just equal to  $p$ , so that its value is  $zp$ . The second integral is the definition of the Generalised Lorenz Curve (it is not divided by the mean) times the indicator function  $\mathbf{1}(x \leq z)$ . So the final result is:

$$TIP(p, z) = zp - GLC(p).$$

This equivalence is valid only for the lower part of the Lorenz curve, till  $p = q/n$  the head-count ratio. The normalised version is obtained by dividing by  $z$ . It follows from this partial equivalence that we can rank distributions using the TIP curve in a similar way as can be done using Generalised Lorenz curves, which means second order stochastic dominance. This opens the way to a ranking of distributions, with a focus on poverty. Jenkins and Lambert (1997) define TIP dominance as follows:

**Definition 2** *Let us consider two income distributions  $A$  and  $B$  with a common poverty line  $z$ . Let us call  $TIP_A$  and  $TIP_B$  their associated TIP curves. Distribution  $A$  TIP dominates distribution  $B$  if*

$$TIP_A(p, z) \geq TIP_B(p, z), \quad \forall p \in [0, 1].$$

These notions are further developed in Jenkins and Lambert (1998a,b). When the curves intersect, of course we cannot compare them. This is the case for 1976 and 1992. Poverty intensity is lower on average in 1992. However, poverty intensity is greater in 1992 for  $p \in [0, 0.028]$ . For the poorest of the poor, the situation has deteriorated.

## 5.2 Two approaches for poverty dynamics

Income is a random variable, the level of which is determined by the level of human capital, to say it short (Mincer's equation). Consequently, a cross-section vision of poverty can be false for a given individual, if it corresponds to a temporary state of unemployment. It is in general useful to distinguish between permanent income and transitory income to deliver a more realistic vision of poverty or to allow for income transfers between the years (savings).

Kuchler and Goebel (2003) distinguish two possible approaches to characterise poverty and they try to combine them in their paper.

1. A first approach, they call the *N – Times – Poor* or *NTP*, counts the number of times a person is in a state of poverty over the duration of the panel survey. If that person is only occasionally poor, he will belong to the transitory poor category. If he remains poor over the whole sample, he will belong to the persistently poor category. The poverty line is defined for every year. One can count the number of poverty spells. However, as poverty spells are censored (uncompleted spells), this counting method leads to biased results. A better way is to model the length of poverty spells and compute the probability of exit

as in the very often quoted paper of Bane and Ellwood (1986). The status of a person is determined only by considering a static definition of poverty. This is just a kind of generalisation of the cross section approach. And no account is taken of the intensity of poverty.

2. A second approach supposes that the individual is able to smooth his income over the period of the panel survey in order to define a kind of permanent income. This approach was advocated by Rodgers and Rodgers (1993). This second approach is less frequent and is illustrated for instance in Hill and Jenkins (2001). This is the smooth income poverty approach (SIP). One of its advantages is that it is no longer on just a counting approach, but allows for poverty intensity and inequality.

Other approaches are possible and reviewed for instance in Rodgers and Rodgers (1993) or Jenkins (2000).

### 5.3 Smoothed income poverty

Rodgers and Rodgers (1993) give the following example which is quite illuminating for understanding the difference between chronic and transient poverty.

**Example 1** *Let us suppose that the poverty line is  $z = 100$ .*

Person	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
A	300	300	300	99	99	300
B	101	101	101	10	10	101
C	300	300	99	99	99	300

*If we measure the duration of poverty spells, person C has the longest poverty spell compared to A and B. But if we suppose that a person can smooth his income over the years, spare money and transfer money to the next period, then clearly person B is in a state of chronic poverty.*

We shall consider a linear decomposable poverty index and a period of length  $T$ . The most common choice is the FGT index. We first compute that index for every period and note it  $P_t$  for a given poverty line  $z_t$ . Then we have the following definitions of average, chronic and transitory poverty rates:

1. *Average annual poverty rate.* It is defined as a weighted sum of annual poverty measures. Most of the time the weights  $w_t$  are equal to  $1/T$ . This average is possible because the index  $P$  is linearly decomposable:

$$A_P(T) = \sum_{t=1}^T w_t P_t.$$

There is no possible inter year income transfers. This is in a way the maximum poverty rate as said in Hill and Jenkins (2001) (verify).

2. *Chronic poverty.* We now assume that it is possible to transfer income between the years. We call  $Y_i^*$  the permanent income of person  $i$ . There are  $n$  individuals in the sample. So chronic poverty is defined as a poverty index applied to the series of the  $n$  smoothed incomes:

$$C_P(T) = P(Y_1^*, \dots, Y_n^*).$$

Rodgers and Rodgers (1993) have a complicated way of computing the permanent income. Hill and Jenkins (2001) and Kuchler and Goebel (2003) use a much simpler formula.

3. *Transitory poverty.* As the poverty index  $P$  is supposed to be linearly decomposable, transitory poverty can be found using a difference

$$T_P(T) = A_P(T) - C_P(T).$$

A positive  $T_P(T)$  represents the amount of poverty which is not chronic for an average year. Negative values are possible according to Rodgers and Rodgers (1993), depending on the chosen  $P$  and the way permanent income is computed.

When using the FGT index, we measure average or total poverty and chronic poverty:

$$A_{FGT}(T) = \frac{1}{nT} \sum_{t=1}^T \sum_{i=1}^{q_t} (1 - y_{it}/z)^\alpha \quad (1)$$

$$C_{FGT}(T) = \frac{1}{n} \sum_{i=1}^{qY^*} (1 - Y_i^*/z)^\alpha \quad (2)$$

Using the PSID over 1977-1986 (10 years) and  $P_0$ , Rodgers and Rodgers (1993) found that with the permanent income approach that  $A = 9.40\%$ ,  $C = 6.25\%$ , so transitory poverty should be 3.15%. Using the tabulation approach, the usual definition of chronic poverty is that an individual must be in poverty for 8 years or more out of 10. In this case 3.8% of individuals were in this case when those who were at least once poor were 26.6% which means that chronic poverty represented 14.3% of the once ever poor. With the permanent income approach, the proportion of chronic poverty is much higher with  $C/A = 66\%$ . In order to get comparable figures between the two approaches, one has to define chronic poverty has being poor in at least 6 years out of 10. The great advantage of the SIP approach is that it can be based on  $P_\alpha$  for any value of  $\alpha$ , when the tabulating or NTP approach relies only on  $P_0$  (head-count). Using  $P_1$ , Rodgers and Rodgers (1993) found that the proportion of chronic poverty over total poverty converges to around 37% when the period for computing the smoothed income is increased up to 10 years.

## 5.4 Poverty dynamics in Europe

Kuchler and Goebel (2003) start from the relative income position of individual  $i$  in the sample of size  $n$  at time  $t$  which is

$$y_{it}^r = \frac{y_{it}}{\bar{y}_t}, \quad \bar{y}_t = \frac{1}{n} \sum_{i=1}^n y_{it}.$$

Dividing by the sample mean allows to avoid having to divide by a price index. Incomes are made comparable using the modified OECD scale. Using these data, it is possible to compute average annual poverty, the index  $A_{FGT}(T)$  of Rodgers and Rodgers (1993), using the data displayed in Table 1 of Kuchler and Goebel (2003). The poverty line is 50% of the average  $y_{it}^r$ . This is called total poverty in Hill and Jenkins (2001). So Table 12 represents total maximum poverty.

Table 12: Average annual income poverty: 1994-1997

Country	Total poverty		
	Incidence	Intensity	Inequality
	$P_0$	$P_1 \times 10$	$P_2 \times 100$
Denmark	5.63	1.28	0.54
Netherlands	9.98	3.83	2.43
Germany	13.85	4.98	3.01
France	14.68	3.83	1.84
Italy	16.95	6.40	3.96
Belgium	16.45	4.85	2.55
UK	18.25	6.73	4.08
Spain	19.10	6.58	3.68
Ireland	20.10	3.95	1.47
Greece	21.38	7.63	4.04
Portugal	24.53	8.43	4.55

Source: Kuchler and Goebel (2003), Table 1 and own calculations.

Quite different pictures of total poverty are obtained when considering incidence or intensity. Denmark and the Netherlands have the smallest poverty incidence. At the other extreme, Spain, Ireland Greece and Portugal have the highest poverty incidence. However, when considering the intensity of poverty, Denmark and the Netherlands remain in the group where intensity is the smallest, but they are joined by France and by Ireland. Greece and Portugal remain in the group where poverty is highest. But they are joined by Italy, the UK and Spain.

Let us now turn to chronic poverty which aims at measuring poverty when we allow for inter-temporal income transfers. Smoothed or permanent income can be computed in different ways. Rodgers and Rodgers (1993) adopt a complicated mechanism based on borrowing and lending which might lead to apparent incoherencies (negative transitory poverty). The later literature adopted some kind of smoothing. We could imagine exponential smoothing, non-parametric smoothing following the time series literature where a topic is the decomposition of a time series in permanent and cyclical components. Kuchler and Goebel (2003) adopt the simplest way to define permanent income, using in fact just the mean income, resulting in a single value for each individual. So the time dimension is compressed. In a panel of size  $T$ , the smoothed relative income position of individual  $i$  is:

$$\bar{y}_i^r = \frac{1}{T} \sum_{t=1}^T y_{it}^r.$$

The poverty line will be defined now as 50% of the mean smoothed relative income position. It

results the following picture of chronic poverty as depicted in Table 14. Chronic income poverty

Table 13: Smoothed or chronic income poverty: 1994-1997

Country	Incidence $P_0$	Intensity $P_1 \times 10$	Inequality $P_2 \times 100$
Denmark	2.4	0.2	0.04
Netherlands	6.1	1.0	0.38
Germany	8.2	2.0	0.91
France	13.8	2.2	0.55
Ireland	17.1	2.3	0.48
UK	13.5	2.8	1.03
Belgium	13.1	3.1	1.28
Italy	12.4	3.2	1.38
Spain	14.8	3.6	1.43
Greece	17.5	4.6	1.77
Portugal	21.6	6.7	3.11

Source: Kuchler and Goebel (2003), Table 2.

is a minor phenomenon in Denmark, and also in the Netherlands; while Portugal and Greece are at the other extreme. Between total and chronic poverty, the ranking does not change, except for France which has a higher chronic poverty as measured by  $P_0$ . It is interesting to analyse and compare three countries which can look similar: France, Germany and the UK. We have already compared France and the UK in the previous section, using different data and periods. For Germany, we are well before 2003, the time when Gerhard Schröder launched his cuts in the social welfare system. And for the UK, we are well after the Thatcher's period. For total poverty, the UK is well above Germany and France while France has the lowest intensity and inequality. For chronic poverty, France and the UK have very similar incidence, well above that of Germany. For chronic poverty severity and inequality, the UK is in the least favourable position, while France and Germany become comparable.

Kuchler and Goebel (2003) have chosen to classify these 11 countries in reference to a welfare regime typology: a liberal welfare state (the UK, Ireland) together with the Mediterranean countries (Italy, Spain, Greece, Portugal) on one side and what they call the corporatist-conservative welfare regime (Germany, France, Belgium, the Netherlands), together with nordic countries, here Denmark. Using the TIP curves reported in Figures 6 and 7, these countries can be ranked. The vertical lines intersecting with the  $x$  axis represents chronic poverty incidence while the horizontal lines intersection with the  $y$  axis represents chronic poverty intensity. The curvature represents chronic poverty inequality. However, these curves cannot be ranked in term of poverty dominance because the poverty lines are not the same.

In Figure 6, Belgium has the highest poverty intensity. At the other extreme, Denmark and the Netherlands have the lowest intensity and incidence. The case of France might be similar to that of Germany for intensity, but is quite different for incidence and severity. The two curves are intersecting for these two countries.

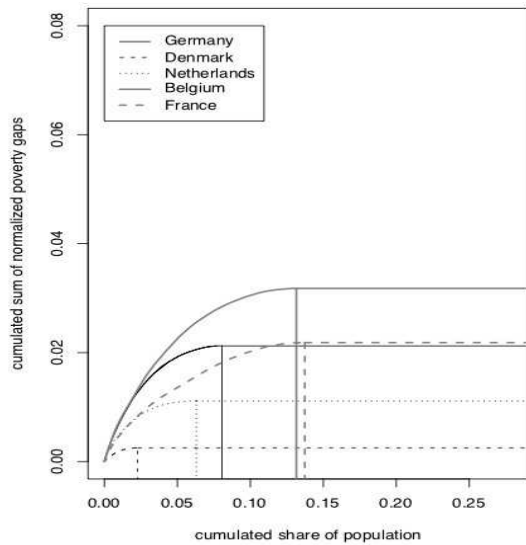


Figure 6: TIP curves for nordic European countries

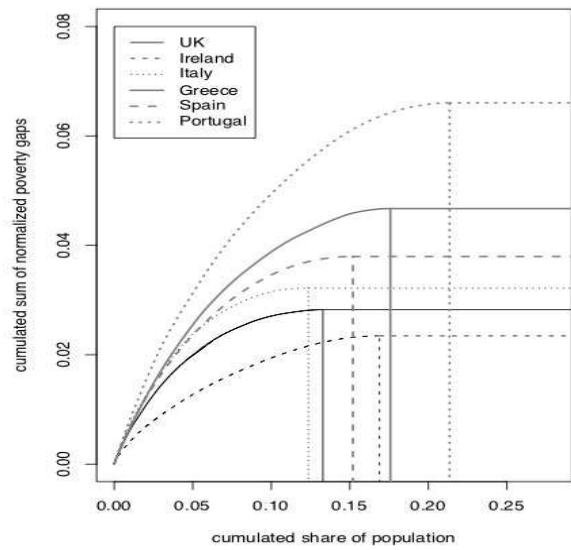


Figure 7: TIP curves for liberal and southern European countries

Smoothed net equivalent disposable household income position, modified OECD equivalence scale, poverty line: 50% of mean of smoothed relative income position. Source: UDB ECHP 2001: Wave 1 (1994) – Wave 4 (1997), balanced panel, weighted. Figure extracted from Kuchler and Goebel (2003).

In Figure 7, Portugal and Greece have the highest chronic poverty intensity and incidence. Even if the TIP curves do not intersect, the other countries can be ranked according to chronic poverty intensity, but have a different ranking for poverty incidence. Ireland has the lowest poverty intensity and inequality, but a higher poverty incidence than Italy, the UK and Spain. So these four countries are difficult to rank. Examining only one indicator is not enough.

By inspecting the proportion of chronic poverty over total poverty, we can have an idea of social mobility among the poor. Here again Denmark and the Netherland have the best position according to intensity. Portugal and Greece are at the bottom, but paradoxically with Belgium. Further analysis would be needed in order to study social mobility.



Table 14: Proportion of chronic poverty  
over total poverty: 1994-1997

Country	Incidence $P_0$	Intensity $P_1 \times 10$	Inequality $P_2 \times 100$
Denmark	43.67	15.69	07.37
Netherlands	61.16	26.14	15.62
Germany	59.21	40.20	30.28
UK	73.97	41.64	25.23
Italy	73.16	50.00	34.87
Spain	73.40	54.75	38.89
France	94.04	57.52	29.97
Ireland	85.08	58.23	32.77
Greece	81.87	60.33	43.81
Belgium	79.64	63.92	50.30
Portugal	88.07	79.53	63.32

Source: Kuchler and Goebel (2003), Table 1 and 2 and own calculations.

## 6 The evolution of the access to data bases

For analysing income distribution and poverty, we need to have access to household survey containing individual data. The collection of household surveys started quite a long time ago. However, their scope enlarged during the last twenty years. As an example, the well known US PSID (Panel Study of Income Dynamics), went from 400 variables in 1968 to 3000 in 2005.

However, the access for researchers to these data bases causes the problem of confidentiality and raises the question of anonymisation. When analysing the data, the researcher should not be able to recover the identity of the household. For instance, one should not be able to recover the tax declaration of a well known person. It is quite evident that the greater the number of variables that are documented, the more difficult it will be to fully anonymise the data contained in the survey. When access is given to a researcher, in general he should sign a declaration of having no intention to uncover the identity of individuals. The concern that National Agencies have of this question varies a lot between countries and this variation is translated into the ease of access to those data. Of course if no access is given, anonymity remains perfect. But researchers are not happy in this case and the production of these data are not very useful. We are going to now sketch the situation for different countries.

### 6.1 France

in France, INSEE is the main provider of survey data. Accessing those data has always been a problem for french researchers, so that in 1999 Claude Allègre, the Minister in charge of research and higher education gave instructions to Roxane Silberman in order to provide the necessary instruments to facilitate access to these data. The Silberman report of 1999 will give birth in 2001 to the creation of an *unité mixte de service* by the CNRS, that will be called *Centre Quetelet* after the name of a Belgian statistician and sociologist. This center has done a whole job in order to homogenise different surveys. Concerning poverty, the main surveys are the INSEE survey *Enquete sur les budgets des familles*.

From this initiative, remains today only the Questelet network which is a data web access for research in social sciences: <http://www.centre.quetelet.cnrs.fr>. There is a link to the research center Maurice Halbwachs (previously the LASMAS) in Paris which is in charge of their diffusion. Access is free, but regulated. For instance it is explicitly said on the web site that *La plus grande partie des fichiers disponibles est également exclue d'une utilisation à des fins d'enseignement*. And the data have to be destroyed when the research project is finished. So we are back to the initial situation as the researcher depend on the policy of diffusion from INSEE, policy that became more and more restrictive over time. There is a notable difference between the researchers who are members of a lab depending of INSEE and the other researchers.

In 2009, INSEE created the Autorité de la Statistique Publique, a commission in charge of guaranteeing the independence and objectivity in the production of official data. This commission is chaired by Paul Champsaur. This role should be very important, because if independence is not guaranteed, nobody will believe that official data represent reality and not the views of the government.

## 6.2 Europe

A french researcher can look toward the European network EQUALSOC (Economic Change, Quality of Life and Social Cohesion <http://www.equalsoc.org>) in order to have a free access to the European Panel, after agreement. The European Panel was a European Survey on living conditions in Europe started at the initiative of of EUROSTAT fifteen years ago. In 2001, this survey was replaced by a larger survey on incomes and living consitions in the European Union (EU-SILC, "European Union-Statistics on Income and Living Conditions"). With this new survey, each country has a legal obligation to provide the data to Eurostat, when this obligation did not exist for the European Panel. This new tool should allow researchers to better analyse exclusion phenomenon and the impact of social and fiscal policies on income redistribution at the European level.

The Luxembourg Income Study (LIS, <http://www.lisproject.org>) corresponds to an old project (1983). It collects household surveys for around thirty countries. However, these are not panel data. Among the concerned countries, we find European countries, but also Australia, Canada, Israel, Mexico, Taiwan, Russia and the USA. Starting from national surveys, the LIS is producing an individual data base concerning income and related variables. It has been at the basis of many international comparison studies (see Jenkins and Micklewright 2007 for a survey). We must note the pioneering role of LIS for the access to individual data. But if this access is free, it is however limited. It is possible to access these data only in the form of a SAS program with no possibility to download them in order to execute a local analysis, using for instance another software.

## 6.3 The case of the UK, Germany and the USA

The situation i those two countries is relatively particular, and certainly more in accordance with the usual practice of researchers. In the seventies, British researchers had access only to grouped data. They can now access directly the data of the Family Expenditure Survey (FES) over the last thirty years by downloading them on <http://www.data-archive.ac.uk/findingData/fesTitles.asp>. But one has to be registered and have a password. In order to be registered, to have to apply, declare what you intend to do with the data, and sign a document of confidentiality. You can then download the FES and the BHPS (British Household Survey Panel). The BHPS started in 1991 and ended in 2008 (18 years).

The German Socio-Economic Panel (GSOEP) is a longitudinal panel data set of the population in Germany. It is a household based study which started in 1984 and which reinterviews adult household members annually. Additional samples have been taken of East Germans (from 1990, coincident with reunification) and immigrants (in 1994) as well as in 1998, 2000, 2002 and 2006. In 2007, there were about 12,000 households, and more than 20,000 adult persons sampled. Some of the many topics surveyed include household composition, occupation, employment, earnings, health and life satisfaction. The annual surveys are conducted by the German Institute for Economic Research (DIW Berlin). Data are available to social science researchers in Germany and abroad in SPSS/PSPP, SAS/DAP, Stata, R/S-PLUS and ASCII format. Extensive

documentation in English and German is available online.

The Panel Study of Income Dynamics (PSID), started in 1968 in the USA. It is a panel survey providing a representative sample of living conditions in the USA. It concerns roughly 8 000 household which are followed every two years. The same households are surveyed. You can download the data on <http://psidonline.isr.umich.edu>. You have to register, but the registration is quite easy.

## 6.4 The World Bank and the developing countries

Since 1980, The World Bank started to build micro economic survey data bases, the *Living Standards Measurement Surveys* concerning a majority of developing countries, roughly forty countries. You can access to these data on the Web Site of the World Bank: <http://www.worldbank.org/lsms>. Deaton (1997) is giving a good survey of the various studies that were made possible thanks to these data sets. On the same web site, one can find the Stata code that were used in Deaton (1997).

## References

- Anyaegbu, G. (2010). Using the oecd equivalence scale in taxes and benefits analysis. *Economic and Labour Market Review*, 4(1).
- Atkinson, A. (1998). *Poverty in Europe*. Blackwell, Oxford.
- Bane, M. J. and Ellwood, D. T. (1986). Slipping into and out of poverty: the dynamics of spells. *Journal of Human Resources*, 21(1):1–23.
- Brandolini, A. (2007). Measurement of income distribution in supranational entities: the case of the European Union. In Jenkins, S. P. and Micklewright, J., editors, *Inequality and Poverty Re-examined*, pages 62–83. Oxford University Press, Oxford.
- Deaton, A. (1997). *The Analysis of Household Surveys*. The John Hopkins University Press, Baltimore and London.
- Duclos, J.-Y. and Araar, A. (2006). *Poverty and Equity: Measurement, Policy and Estimation with DAD*. Springer, Newy-York.
- Foster, J., Greer, J., and Thorbecke, E. (1984). A class of decomposable poverty measures. *Econometrica*, 52:761–765.
- Hagenaars, A. J. M. and van Praag, B. M. S. (1985). A synthesis of poverty line definitions. *Review of Income and Wealth*, 31(2):139–154.
- Hill, M. S. and Jenkins, S. P. (2001). Poverty among British children: Chronic or transitory? In Bradbury, B., Mickelwright, J., and Jenkins, S., editors, *Falling in, climbing out: the dynamics*

- of child poverty in industrialised countries*, chapter 7, pages 174–195. Cambridge University Press.
- Hourriez, J.-M. and Olier, L. (1997). Niveau de vie et taille du ménage: estimation d'une échelle d'équivalence. *Economie et Statistique*, 308-309-310(8/9/10):65–94.
- Jenkins, S. P. (2000). Modelling household income dynamics. *Journal of Population Economics*, 13:529–567.
- Jenkins, S. P. and Lambert, P. J. (1997). Three 'I's of poverty curves, with an analysis of UK poverty trends. *Oxford Economic Papers*, 49(3):317–327.
- Jenkins, S. P. and Lambert, P. J. (1998a). Ranking poverty gap distributions: Further TIPs for poverty analysis. In Slottje, D., editor, *Research on Economic Inequality*, volume 8, pages 31–38. JAI Press Inc.
- Jenkins, S. P. and Lambert, P. J. (1998b). Three I's of poverty curves and poverty dominance: TIPs for poverty analysis. In Slottje, D., editor, *Research on Economic Inequality*, volume 8, pages 39–56. JAI Press Inc.
- Jenkins, S. P. and Micklewright, J. (2007). *Inequality and Poverty Re-Examined*. Oxford University Press, Oxford.
- Kuchler, B. and Goebel, J. (2003). Incidence and intensity of smoothed income poverty in European countries. *Journal of European Social Policy*, 13(4):357–369.
- Leroux, A. and Livet, P., editors (2009). *La pauvreté dans les pays riches. Leçons de philosophie économique*. Economica, Paris.
- Rodgers, J. R. and Rodgers, J. L. (1993). Chronic poverty in the United States. *The Journal of Human Resources*, 28(1):25–54.
- Thuysbaert, B. (2008). Inference for the measurement of poverty in the presence of a stochastic weighting variable. *The Journal of Economic Inequality*, 6(1):33–55.
- Van den Bosch, K., Callan, T., Estivill, J., Hausman, P., Jeandidier, B., Muffeis, R., and Yfantopoulos, J. (1993). A comparison of poverty in seven european countries and regions using subjective and relative measures. *Journal of Population Economics*, 6:235–259.