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Region-Specific versus Country-specific Poverty Lines in Analysis of Poverty

Abstract:
The standard practice in most OECD countries is to measure and evaluate poverty on the basis of a poverty line defined as a specific proportion of the median equivalent income within a country. However, this approach disregards regional differences in prices and needs within a country and may, therefore, provide an incomplete and even an incorrect picture of the extent as well as the geographical and demographical composition of the poor. To account for differences in prices and needs, this paper introduces an alternative method of measuring poverty based on a set of region-specific poverty lines. Applying Norwegian household register data for 2001 we find that the overall extent of poverty is only slightly affected by the change in definition of poverty line. However, the geographical as well as the demographical composition of poverty are shown to depend heavily on whether the method of measuring poverty relies on region-specific or country-specific thresholds. As expected, the results demonstrate that the analysis of poverty based on country-specific thresholds produces downward biased poverty rates in urban areas and upward biased poverty rates in rural areas. Moreover, when region-specific poverty thresholds form the basis of the poverty analysis, we find that the poverty rates among young singles and non-western immigrants are significantly higher than what is suggested by previous empirical evidence based on a joint country-specific poverty line.

Keywords: Measurement of poverty, poverty line, geographical and demographical poverty profile

JEL classification: I32

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1. Introduction

A number of different approaches to the measurement of poverty have been proposed and applied over the last decades. For years, a debate persisted over the appropriate definition of poverty. Absolute measures reflect the view that poverty can be defined in terms of some absolute level of minimum needs assumed to be time-invariant as well as directly applicable to different societies. However, as critics of this view argue, the concept of need is itself relative. Arguably, a poverty standard cannot be defined independently of the economic and social context within which needs arise and are defined (Smeeding et al., 1993). Consequently, a measure of poverty ought to reflect the society's cultural norms and prevailing standards of necessities.[1] Today, this view appears to be widely accepted among European poverty scholars (Brady, 2003). This has led to a convention, used in most OECD countries, where poverty lines are determined purely or partly in terms of relative income. Typically, this involves setting the poverty line at a particular percentage of the median (equivalent) income within a country. The poor are then determined as the individuals with equivalent income falling below this country-specific threshold.

An underlying assumption for the validity of analysis based on country-specific poverty lines is that the prices facing different groups of people are similar although this assumption is in conflict with conventional wisdom. For example, data from Norway show that prices on important goods, such as houses, differ significantly between urban and rural areas. Accounting for differences in prices could be achieved by using local price indices, but such indices are not standard in the OECD-countries. Furthermore, one could also question whether individuals' needs apply broadly to the entire nation or differ between regions.

A possible response to these problems, which is compatible with the relative income standard of measurement addressed above, is to categorise the municipalities according to information about prices on key goods and geographic regions. A set of region-specific poverty lines can then be determined by comparing the (equivalent) income between individuals who live in the same region and face similar prices. This method does not propose to control perfectly for differences in prices or needs. The objective is to increase the comparability of income between individuals, when the

[1] As Townsend argues: "Poverty is a dynamic, not a static concept. Man is not Robinson Crusoe living on a desert island. He is a social animal entangled in a web of relationships at work and in family and community which exert complex and changing pressures to which he must respond, as much in his consumption of goods and services as in any other aspect of this behaviour… Our general theory, then, should be that individuals and families whose resources over time fall seriously short of the resources commanded by the average individual or family in the community in which they live… are in poverty" (Townsend quoted in Brady, 2003: 745).

definition and measurement of income is supposed to be representative for the economic resources available for consumption.

The research objective of this paper is to introduce region-specific poverty lines and explore the effects of using such thresholds rather than a conventional joint country-specific poverty line on the *national and regional levels of poverty* as well as the *demographical poverty profile*. The outline of this paper is as follows. In Section 2, important concepts and methodological choices essential for the empirical analysis of poverty are discussed and defined. In Section 3, we intend to outline and make a theoretical case for the advantages of a method for measurement of relative poverty within a country based on a set of region-specific poverty lines. In Section 4, results from the empirical analyses of poverty based on region-specific poverty lines as well as conventional country-specific poverty lines are presented. By comparing the results from these analyses, one can draw inferences about the stated research questions. Finally, conclusions and a summary are presented in Section 5.

2. Methodological assumptions and data

Orshansky, an authority in the field of poverty research, once claimed that "For deciding who is poor, prayers are more relevant then calculations because poverty, like beauty, lies in the eyes of the beholder" (Orshansky, 1969: 37). Although rejecting the relevance of empirical estimation and calculation in the determination of poverty is a dubious approach, the statement reflects that quantifying the number of poor will depend on a number of conditions that are subject to debatable choices. The most important are the definitions of

- population and economic unit
- income and accounting period of income
- scale for comparability (equivalence scale)
- poverty line and aggregate poverty measure

Choice of population and economic unit

Acknowledging that "man is not Robinson Crusoe living on a desert island" (Townsend, 1962: p219), one realises that analysis of poverty cannot simply be based on information about individuals. In fact, the pooling of resources, economies of scale in consumption and joint decision-making that goes on in households entail that focus on individuals alone cannot provide a sufficient framework for analysis. It is, however, universally acknowledged that the traditional (nuclear) family is not the relevant economic unit for analysis of poverty simply because many people that are living together will be

treated as separate households, most notably cohabitants without children. The economic unit for this research project will therefore be the household.

The household definition applied in this paper treats cohabitants as well as non-relatives, such as roommates and boarders, as members of a common household. While there is strong consensus that cohabitants should be treated as members of a common household (Iceland, 2000), it is more controversial whether other extensions of the household definition should be considered as part of the same economic unit. The reason is that one could question the degree of pooling of income among such individuals. On the other hand, even if the actual resource sharing among non-relatives who are part of the same household can be low, they still receive significant benefits from economics of scale in consumption.[2] Moreover, a quality survey of the Norwegian census in 2001 indicates that the extent of common consumption goes far beyond sharing housing costs for most roommates and lodgers.[3] Thus, this study relies on a household unit of measurement where both cohabitants and non-relatives within a household are treated as members of a common household.

Definition of income

Traditionally, income is defined in the economic literature as the maximum expenditure possible without reducing net wealth. However, due to poor data for net wealth we will apply a broader definition, *after tax income*, typically used in analysis of income distribution and poverty in Norway. This after tax income term incorporates earnings, self-employment income, net capital income, transfers and taxes. Although after tax income is acknowledged to be a suitable indicator of individuals' economic resources (Buhmann et al., 1988) and to be in close agreement with international recommendations (e.g. Expert Group on Household Income Statistics, 2001), it fails to include all relevant elements, e.g. the value of public services and undeclared work.

[2] There is scarce empirical evidence in terms of resource sharing in various types of units. A study that indirectly examines this is Baumann (1999), which indicates less resource sharing in household units consisting of non-family members compared to households of family members. However, questioning the degree of pooling of income among members of households receiving benefits from economics of scale in consumption is only relevant for poverty estimates if there is significant disparity in income between the members. Otherwise, assuming that individuals share resources will not affect their equivalent income. Since one could suspect that for example roommates largely are individuals in similar circumstances of life, e.g. students, it might be reasonable to assume that their income are roughly similar. If so, the effect on poverty estimates by changes in the equivalent income from treating them as members of a common household can be minor.

[3] Source: Statistics Norway, Division for Statistical Methods and Standards

Table 1. Overview of Income Components

Market income =	Employment Income • earnings • income from self-employment • net capital income
Total income =	Market Income + Transfers, such as: • old age pension • unemployment, disability and rehabilitation benefits • child allowance and single parents benefits • social assistance
Income after tax =	Total income - taxes

Choice of equivalence scale

When analysing poverty among households of varying size and composition, it is necessary to adjust income to enable comparison across individuals. In analysis based on the relative income standard of measurement the standardisation of income is done by imposing equivalence scales exogenously. This study applies the standard OECD scale, where the needs of the first adult are set equal to 1, additional adults are assumed to increase the needs with a factor of 0.7, and children increase the needs with a factor of 0.5.[4]

There are, of course, objections that can be made against the scale chosen. Firstly, one could argue that adjustments in income should be made not merely for the number of children and adults, but also for the ages and possibly also the sex of the children as well as the adults. Secondly, it can seem unreasonable that the economics of scale assumed in a given equivalence scale are independent of the respective household's level of income. Despite the weaknesses of the OECD scale, it is beyond the scope of this paper to apply more complex equivalence scales. Furthermore, applying a standard equivalence scale enables us more easily to compare and contrast the empirical results with prior empirical findings.

Choice of poverty lines and aggregate poverty measure

In this paper, we will follow the relative income standard of measurement. Specifically, the poverty lines will be determined as half of the median income. However, recognising the inherent arbitrariness

[4] Individuals are defined to be children if they are younger than 16 years.

in specifying the poverty line,[5] it can be instructive to apply a variety of thresholds to evaluate the robustness of the results. Moreover, by applying multiple thresholds one can obtain a fuller picture of the problem of poverty in a society. Thus, we will supplement the analysis with *low income lines* defined as 5/4 of the poverty line, i.e. 62.5 % of the median income.

Above, we focused on how a poverty line should be set, i.e. the identification problem (Sen, 1976). Another important issue is how to derive a summary statistic representing the extent of poverty in a society, i.e. the aggregation problem (ibid). After Sen's (1976) influential axiomatic approach to the aggregation problem, numerous aggregators have been proposed. In fact, the available aggregators range from a simple count of the individuals below the poverty line to more complex measures reflecting the inequality among the poor as well as the depth of poverty. In this paper, we will, although acknowledging Sen's 'Ordinal Revolution', restrict to the headcount method. A reason is that the objective of the empirical analysis in this paper is to improve the procedure for identification of the poor, rather then focusing in aggregation issues per se. Furthermore, since most empirical analysis of poverty in Norway summarise the extent of poverty simply by counting the poor, applying the headcount method is necessary in order to compare and contrast the empirical findings with prior empirical results.

Data

This study is based on Statistics Norway's Population and Housing Census 2001[6] supplemented with information from the income register for 2001. The population includes all individuals registered as residents in Norway, including foreigners, at the date of the census, i.e. 4 520 947 individuals. The census information is obtained by combining questionnaires and detailed register information for the entire population. In addition, extensive measures, including interviews and sample surveys, have been taken to ensure the quality of the census data.

The income data of Statistics Norway is collected from taxation and other administrative registers, rather then interviews and self-reporting methods, which are standard procedures in most other

[5] The arbitrariness lies in the fact that it is difficult to justify why exactly 50 per cent rather than for example 49 per cent should be chosen as the cut off line. Nevertheless, there are rationales for defining the poverty lines as about half of the median income. According to Palmer et al. (2002: 17), such cut-off lines can be viewed to represent "a level of income that was of the same order of magnitude as independent experts' estimates of 'low, but acceptable' levels of income". Even if one questions the validity of this argument, a poverty line defined as half of the median income can be viewed as relevant for measurement of relative poverty, since it is related to the general standard of living in a society and focuses on the lower part of the income distribution.

[6] For more information about the Census see Statistic Norway's homepage: http://www.ssb.no/fob_en/

countries.[7] Thus, the quality, coverage and reliability of Norwegian income registers are acknowledged to be very high. In fact, the quality of such national datasets of income received the highest rating in a data quality survey of the recognised Luxembourg Income Study database (Atkinson et al., 1995).

An objective of this paper is to assess the sensitivity of poverty estimates in rural and urban areas to the choice between region-specific and country-specific poverty lines. Thus, it is essential to be able to estimate poverty on local level. In fact, it is necessary to have data, which enables us to distinguish between rural and urban areas within the same region. In Norway, this amounts to having detailed information about each of its 435 municipalities. Therefore, it is advantageous to have household information from the census containing detailed information about each of the roughly 4.5 million individuals registered as residents in Norway at the date of the census. In contrast, limited survey information will not suffice to analyse poverty from a regional perspective. As a consequence we must rely on information about income for a single year in our empirical analysis, since the census in contrast to some surveys is carried out each decade, rather then yearly. Arguably, there are problems related to such an approach since some individuals can temporary have low income without suffering from serious deprivation, while others can temporary have high income but still suffer from deprivation (Aaberge et al., 2000). However, panel household data are required to draw inference about temporary and permanent poverty.

3. Measurement of poverty reflecting regional differences in prices and needs

As referred to above, there are convincing arguments in favour of a relative poverty measure, i.e. the poverty measure should be determined in relation to the economic and social context within which the respective society's needs arise and are defined. In fact, this view appears today to be widely accepted among European poverty scholars. This has led to a convention, used in most OECD countries, where poverty lines are determined purely or partly in terms of relative income.

An authority in the field of economics, Sen (1979, 1984), criticises a rigid relativistic view arguing that there is an irreducible absolutist core in the idea of poverty, including elements like starvation and diseases, independently of what the relative picture looks like. In turn, he criticises a rigid relativistic view of poverty for implying that a general decline in the living standard in a society, e.g. due to

[7] The main source of income data is the personal tax return records obtained from the Directorate of Taxes. This data is supplemented with information from the following sources: Tax Statistics for Personal Taxpayers, Register of Wage Sums, Register of Social Assistance, data from the National Insurance Administration, data from the State Education Loan Fund, and data from the Norwegian State Housing Bank.

famine or economic depression, will not necessarily increase poverty since the relative picture might be unchanged. Townsend (1985) and other advocates of a purely relativistic view of poverty respond by arguing that this absolute core is itself relative to time and place. For example, nutritional requirements are arguably dependent on the work roles at different points in history and in different cultures, while our understanding of avoidable diseases depends on the level of medical technology (Gordon, 2000). Even if one agrees with Sen that "there is an irreducible core of 'absolute deprivation' in the notion of poverty" (Sen, 1979: 289), one could argue that the argument is of little practical relevance for empirical analysis of poverty in developed countries, since such countries are less vulnerable to famines and other sudden major changes in the general standard of living. Moreover, as Ravallion (1998) argues, even if poverty is absolute in terms of capabilities it can be appropriate to view poverty as relative in terms of economic resources, and therefore measure it relative to the general standard of living in a society. In fact, Sen also recognises this pointing out that "absolute deprivation in terms of a person's capabilities relates to relative deprivation in terms of a person's commodities, income and resources" (Sen, 1984: 326).[8] Along these lines, one can infer that relative measurement of poverty is acceptable, and also favourable compared to the alternatives, for analysis of poverty in developed countries.[9]

3.1 Motivation and rationales

An underlying assumption for the validity of analysis where the relative income standard of measurement is applied to determine a country-specific poverty line is that the prices facing different individuals are similar. Conversely, empirical data from Norway shows that prices on important goods, such as houses, differ significantly between urban and rural areas. Obviously, NOK 100 000 will give greater consumption possibilities in areas with low housing prices, compared to areas where housing prices are relatively high, ceteris paribus. Thus, neglecting price differences between regions can result in biased estimates of poverty. A possible response is to use local price indices to control for differences in prices, but such indices are not standard in the OECD-countries.[10] Furthermore, one could question whether individuals' needs apply broadly to the entire nation or differ between regions. Arguably, the perception of minimum needs depends on the reference group's circumstances, which

[8] This view is explained in Sen (1992: 115) where he argues: "In a country that is generally rich, more income may be needed to buy enough commodities to achieve the same social functioning, such as 'appearing in public without shame.' The same applies to the capability of 'taking part in the life of the community.' These general social functionings impose commodity requirements that vary with what others in the community standardly have." However, he maintains that the deprivation in terms of the feeling of shame is absolute, i.e. the relevant question is whether the individual is ashamed or not, rather then whether he is more or less ashamed than others.

[9] Many poverty scholars draw this inference, e.g. Atkinson (1998).

[10] Wodon (1999) pursues such an approach when he constructs poverty lines using information about the cost of 'minimal nutritional requirements' as well as data about non-food expenditure in different geographical areas. However, this estimation approach may suffer from methodological problems, e.g. determining the appropriate level of minimal nutritional requirement, deciding which non-food goods that are necessities, allowing for different tastes etc.

presumably are heavily influenced by the community to which they belong. If one agrees with Sen (1984) that it is significant variability in the commodity requirements within a given country, then using a single country-specific poverty line can be inappropriate. Instead, poverty lines should reflect that "there are differences between rural and urban communities and even between different urban communities which would compel different overall definitions of their needs" (Townsend, 1979: 53).

A possible response to these problems, which is compatible with the relative income standard of measurement, is to construct a set of region-specific poverty lines based on key prices and information about individuals' places of living. This can be accomplished by grouping the municipalities according to region and price level on key goods. Each group's region-specific poverty line can then be determined by the median equivalent income in that group, i.e. by comparing the equivalent income between individuals who live in the same community and face similar prices. According to the different region-specific poverty lines, the poor can be identified as those who lack the economic resources to participate in the community to which they belong. This is compatible with the definition of relative poverty, where it was argued that individuals determine their consumption and behaviour in light of expectations largely caused by the network of relationships in their community, e.g. through the interaction at work, with friends and within the family. Thus, the poor should be defined as those whose resources fall short of the resources commanded by the "representative" individual in their community. The relevance of this approach is supported by the empirical results presented in Van Praag et al. (1982), where survey data indicate that the socially perceived level of income necessary to avoid poverty is greater in cities compared to rural areas.

Notice that the construction of region-specific poverty lines based on information about key prices and individuals' places of living can be viewed as a structural response to the two fundamental problems related to measuring poverty in terms of income short-falls, put forward by Sen (1979, 291):

> "First, if the pattern of consumption behaviour has no uniformity there will be no specific level of income at which the 'typical' consumer meets his or her minimum needs. Second, if prices facing different groups of people differ, e.g. between social classes or income groups or localities, then poverty threshold will be group-specific, even when uniform norms and uniform consumption habits are considered. These are real difficulties and cannot be wished away"

By applying region-specific poverty lines, one attempts to improve the poverty estimates by comparing income between individuals who face similar prices on key goods and live in the same community, so that there will be some degree of uniformity in needs. Although the proposed method

will not enable the researcher to control perfectly for differences in prices or needs, it should increase the comparability of income between individuals within a country. At the very least, it may be considered as an improvement compared to the standard approach where the heterogeneity in prices and needs within a country simply is ignored. Such a refinement of the relative income standard is of considerable practical relevance, as many OECD countries apply poverty lines determined as fractions of the median income in the respective country when studying the extent and composition of poverty in the population (Palmer et al., 2002).

According to some economists, most notably Friedman (1962) and other advocates of the Chicago school, individuals should be held accountable for outcomes resulting from their own choices. Along these lines, one could question whether individuals should be compensated for living in areas with a relatively high price level. However, actual choices depend not only on preferences, but also on opportunities. In other words, differences in place of residence cannot merely be attributed to heterogeneity in preferences, but do also reflect heterogeneity in opportunities of choice, affected by childhood environment, family situation and labour market opportunities. Fundamentally, choices are truly voluntary only when nearly equivalent alternatives exist. Therefore, holding individuals accountable for outcomes resulting from their own choices, independent of their alternatives, seems indefensible. Additionally, one could question whether individuals should be held accountable for their choices even if they follow strictly from preferences, since preferences may be, in part or completely, formed by their social and biological endowments. As Roemer (1993, 1998, 2002) and other advocates of the equality of opportunity principle argue, it is from a moral point of view critical when discussing compensation to distinguish between outcomes caused by circumstances beyond the individual's control (compensation factors) and autonomous choice or ambition (responsibility factors). According to this conception, differences in consumption possibilities caused by heterogeneity in preferences should be, at least to some degree, compensated if the preferences are formed by compensation factors.[11]

3.2 Outline of the method

As suggested above, a response to the heterogeneity in needs and prices within a country is to construct a set of region-specific poverty lines based on information about key prices and individuals' places of living. To account for differences in needs between communities in the measurement of

[11] In a deeper sense, the question of whether individuals should be compensated for living in areas where prices are relatively high may be related to the definition of the term 'liberty'. Berlin (1969) distinguishes between 'negative liberty', i.e. as emphasised by Friedman (1962) the freedom to act without interference, and 'positive liberty', which is associated with the range and quality of alternatives open to the individuals. Arguably, freedom to act is meaningless unless one enjoys the means of action. Hence, introducing region-specific thresholds, designed to reflect the heterogeneity in prices and needs within a country, can be viewed as an attempt to ensure positive liberty in a society by improving consumption possibilities for residents facing relatively high prices.

poverty in Norway, it appears relevant to use the standard regional classification of the 435 municipalities. The current seven regions consist of municipalities from the following counties;

1. Oslo and Akershus (Oslo, the capital, and its surrounding municipalities)
2. Hedmark and Oppland (Eastern Norway)
3. Østfold, Buskerud, Vestfold and Telemark (South Eastern Norway)
4. Agder and Rogaland (South Western Norway)
5. Hordaland, Sogn og Fjordane, Møre og Romsdal (Western Norway)
6. Sør-Trøndelag and Nord-Trøndelag (Mid Norway)
7. Nordland, Troms and Finmark (Northern Norway)

Additionally, since housing costs are one of the main expenditures for most households, especially for those with low income, it can be attractive to use housing prices as the other categorisation variable. This is accomplished by sorting the municipalities according to their average housing price.[12] This is possible since data on prices per square meter for detached houses sold in each municipality are available for the year 2001.[13] We divide the municipalities into quartiles according to their average housing price per square meter. [14] Then, the 1st quartile consists of the 25 per cent of the municipalities with the lowest average price per square meter, while the 4th quartile includes the 25 per cent with highest prices. Next, we divide the municipalities into three groups corresponding to their quartiles. That is, the 1st quartile is given the characteristic *low housing prices*, the 2nd and 3rd quartiles are denoted *medium housing prices,* while the 4th quartile is denoted *high housing prices*.[15]

By combining the three housing price categories with the 7 regions, 21 groups are constructed. Figure 1 illustrates the allocation of municipalities in each region in terms of average housing price. This figure shows that there are no municipalities with low housing prices in the region Oslo and Akershus. This was expected since Oslo, which is the capital, and the surrounding municipalities are considered as particular expensive areas to live.

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[12] In this paper, we will categorise the municipalities according to real estate prices. However, one could argue that rental prices would be a more appropriate categorisation variable for determination of poverty thresholds. On the other hand, detailed data on local level for rental prices are not available in Norway. Moreover, most people in Norway are, by large, owners rather then renters. Furthermore, Norwegian data show that the geographical pattern for real estate prices is remarkably similar to the geographical pattern for rental prices (Langsether and Medby, 2004).

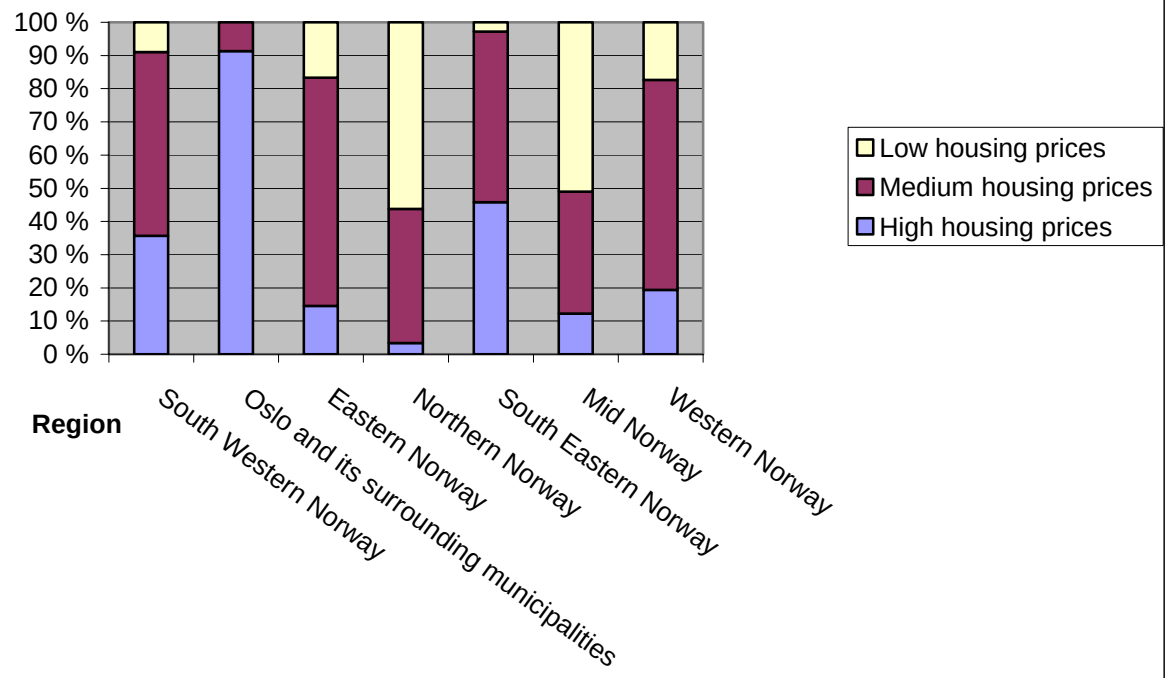
[13] Source: Statistics Norway, Division for Construction and Service Statistics.

[14] In municipalities with less then 17 sales of detached houses in 2001, the municipal's average housing price is set equal to the average price on detached houses sold in the respective county.

[15] The price intervals for the housing prices (NOK) per square meter are:

$3360 \leq$ low housing prices < 4320, $4320 \leq$ medium housing prices < 6960, $6960 \leq$ high housing prices ≤ 20400

Figure 1. Allocation of municipals on different regions according to housing prices, 2001



After dividing the municipalities into 21 groups according to their average housing price and geographic location, region-specific poverty lines are determined as half of the median equivalent income in each of the respective groups. Moreover, we construct region-specific low income lines as 62.5 per cent of each group's median equivalent income. These poverty and low income thresholds are illustrated in Table 2. Intuitively, one might expect a positive association between a municipal's region-specific thresholds and average housing price. A reason is that if the general income level in a municipality is relatively high, the willingness to pay for housing is likely to be relatively high. Furthermore, a high general income level means that the median income will be high and in turn the thresholds as well. The results presented in Table 1 confirm this intuition. Therefore, a resident in a municipality with high housing prices will need relatively high income to be defined as non-poor, compared to an individual living in a municipality where housing prices are relatively low.

Table 2. Region-specific poverty and low income lines, 2001

Group	Region	Housing prices	No. of municipalities	Poverty line (NOK)	Low income line (NOK)
1	Oslo and its surrounding municipalities	Low	0	-	-
2	Oslo and its surrounding municipalities	Medium	2	81700	102100
3	Oslo and its surrounding municipalities	High	21	93800	117300
4	Eastern Norway	Low	8	73700	92100
5	Eastern Norway	Medium	33	76900	96100
6	Eastern Norway	High	7	81500	101900
7	South Eastern Norway	Low	2	79000	98800
8	South Eastern Norway	Medium	37	79500	99400
9	South Eastern Norway	High	33	83000	103800
10	South Western Norway	Low	5	75400	94300
11	South Western Norway	Medium	31	77400	96800
12	South Western Norway	High	20	83000	103800
13	Western Norway	Low	17	77000	96300
14	Western Norway	Medium	62	78700	98400
15	Western Norway	High	19	83400	104300
16	Mid Norway	Low	25	73000	91300
17	Mid Norway	Medium	18	76100	95300
18	Mid Norway	High	6	83800	104800
19	Northern Norway	Low	50	78100	97600
20	Northern Norway	Medium	36	79400	99300
21	Northern Norway	High	3	86100	107600

According to the different region-specific poverty lines, one can identify the poor in each municipality by comparing the equivalent income from individuals in that municipality to the respective poverty line. Then, one can aggregate the number of poor on the municipal level, in order to calculate the extent of poverty in each of the 19 counties and on the national level. Hence, one avoids comparing income between individuals from municipalities with high housing prices and individuals from municipalities with relatively low housing prices, even if these municipalities are part of the same region. For example, the urban municipality of Trondheim with high housing prices will not be a part of the same group as its rural neighbouring municipality Agdenes where housing prices are low. Moreover, the poverty lines reflect that the conceptualisation of minimum needs is likely to differ not merely between urban and rural communities, but also between different urban or rural communities across the country.

Conversely, analyses based on a country-specific poverty line specify the poverty threshold in terms of the median equivalent income in the country as a whole. Hence, one implicitly makes the unreasonable assumption that all individuals within a country face the same prices and have identical needs (after controlling for differences in economics of scale in consumption according to the chosen equivalence scale). Table 3 illustrates the country-specific poverty and low income line. By comparing these thresholds with the region-specific thresholds presented in Table 2, it is clear that the country-specific thresholds are below the region-specific thresholds in some regions with high housing prices. On the other hand, the country-specific thresholds are greater then the region-specific thresholds when housing prices are low or medium.

Table 3. Country-specific poverty and low income line, 2001

	NOK
Poverty line 50 per cent of the median equivalent income	83 200
Low income line 62.5 per cent of the median equivalent income	104 000

Obviously, there are price differentials on other goods than housing that matter when comparing income between different individuals. However, this will only be an argument against the proposed grouping procedure if there is greater variation in the price on the respective good within a group of municipalities then across the groups. Therefore, unless there are price differentials on important goods with systematically different patterns compared to the pattern in housing prices, such arguments will not be critical for the proposed method. Furthermore, even if one suspects that there are price differentials within a country which are incompatible with the pattern in housing prices, it is necessary to keep in mind the serious drawbacks with the conventional method of measurement where the heterogeneity in needs and prices simply is ignored.

4. Empirical analysis of poverty based on region-specific and country-specific poverty lines

4.1. Poverty rates on national and county level

The results presented in Tables 4 and 5 show that there are 3.2 per cent poor and 9.1 per cent with low income in Norway in 2001, when conventional country-specific thresholds are applied. In comparison, the results based on the region-specific thresholds give fairly similar estimates of the extent of poverty and low income. In fact, the difference in poverty estimates is only 0.1 percentage point. Hence, the estimated level of poverty on national level is only slightly affected by the use of region-specific instead of country-specific thresholds. However, even though poverty estimates on the national level

are similar, the geographical and demographical poverty profiles may differ according to whether region-specific or country-specific thresholds are applied.

In general, the empirical results presented in this paper show significant geographical variation in the extent of poverty and low income in Norway. The results presented in Tables 4 and 5 imply that Oslo is the county with the highest proportions of the population in poverty and with low income, independent of whether region-specific or country-specific thresholds are applied. In fact, these results suggest that poverty is largely a problem associated with the capital, especially when the analysis is based on region-specific thresholds designed to take into account geographical differences in prices and needs. This is compatible with prior empirical analysis of poverty as well as general living standard analysis conducted in Norway. A reason is that Oslo's population consists of a relatively high proportion of immigrants from non-western countries with somewhat limited opportunities in the labour market. However, as demonstrated by Galloway and Aaberge (2005), positive effects from integration will over time reduce poverty among many groups of immigrants in Norway.

Conversely, the county of Akershus, which consists of the surrounding municipalities of Oslo, has the lowest proportions of the population in poverty and with low income when the analysis is based on country-specific thresholds. However, Akershus is no longer the county with the lowest proportions of the population in poverty and with low income when a joint country-specific poverty line is replaced with a set of region-specific thresholds. In fact, the proportions of the population in poverty and with low income are reduced in most counties when region-specific thresholds are applied instead of country-specific thresholds. The exceptions are Akershus and Oslo where the proportion of the population in poverty increased by 1.1 and 2.3 percentage points, respectively. This was expected since the capital and its surrounding areas have relatively high housing prices, and a positive association between the level of income and the housing prices has been documented. Thus, one could argue on the basis of the poverty estimates in the different counties that analysis of poverty based on country-specific in contrast to region-specific poverty lines seems to underestimate the level of poverty in urban compared to rural areas. However, such an inference can be premature since one should not discount that there could be significant variations in the extent of poverty within each county. For example, it is possible that the rural communities within the counties systematically have relatively high proportions of the population in poverty compared to urban communities when region-specific poverty lines are applied. Therefore, it is necessary to examine poverty in Norway's 435 municipalities to draw any firm conclusion about the effect on poverty estimates in rural and urban areas, from applying region-specific rather then country-specific thresholds.

Table 4. Poverty rates by county, 2001

County	Region-specific poverty lines defined as half of the median equivalent income	Country-specific poverty line defined as half of the median equivalent income	Differences in poverty estimates based on country-specific and region-specific poverty lines
Østfold	2.9	3.0	-0.1
Akershus	3.3	2.2	1.1
Oslo	8.3	6.0	2.3
Hedmark	2.2	2.9	-0.7
Oppland	2.2	2.8	-0.6
Buskerud	2.8	2.9	-0.1
Vestfold	2.6	2.6	0.0
Telemark	2.7	3.1	-0.4
Aust-Agder	2.8	3.1	-0.3
Vest-Agder	3.0	3.2	-0.2
Rogaland	2.7	2.9	-0.2
Hordaland	2.9	3.0	-0.1
Sogn og Fjordane	2.1	2.5	-0.4
Møre og Romsdal	2.1	2.3	-0.2
Sør-Trøndelag	3.0	3.3	-0.3
Nord-Trøndelag	2.1	2.9	-0.8
Nordland	2.4	2.8	-0.4
Troms	2.8	2.9	-0.1
Finnmark	2.5	2.8	-0.3
Norway	**3.3**	**3.2**	**0.1**

Table 5. Low income rates by county, 2001

County	Region-specific low income lines defined as 62.5% of median equivalent income	Country-specific low income line defined as 62.5% of the median equivalent income	Differences in low income estimates based on region-specific and country-specific low income lines
Østfold	8.9	9.3	-0.4
Akershus	9.2	5.5	3.7
Oslo	16.3	11.2	5.1
Hedmark	6.8	10.6	-3.8
Oppland	7.4	10.5	-3.1
Buskerud	8.0	8.6	-0.6
Vestfold	7.9	8.0	-0.1
Telemark	8.0	9.8	-1.8
Aust-Agder	8.5	9.9	-1.4
Vest-Agder	9.1	10.3	-1.2
Rogaland	7.9	8.7	-0.8
Hordaland	8.3	9.0	-0.7
Sogn og Fjordane	7.3	9.4	-2.1
Møre og Romsdal	7.1	8.8	-1.7
Sør-Trøndelag	7.8	9.4	-1.6
Nord-Trøndelag	6.1	10.6	-4.5
Nordland	7.6	9.8	-2.2
Troms	8.2	9.2	-1.0
Finnmark	6.7	8.0	-1.3
Norway	**8.9**	**9.1**	**-0.2**

4.2. Poverty rates by municipality

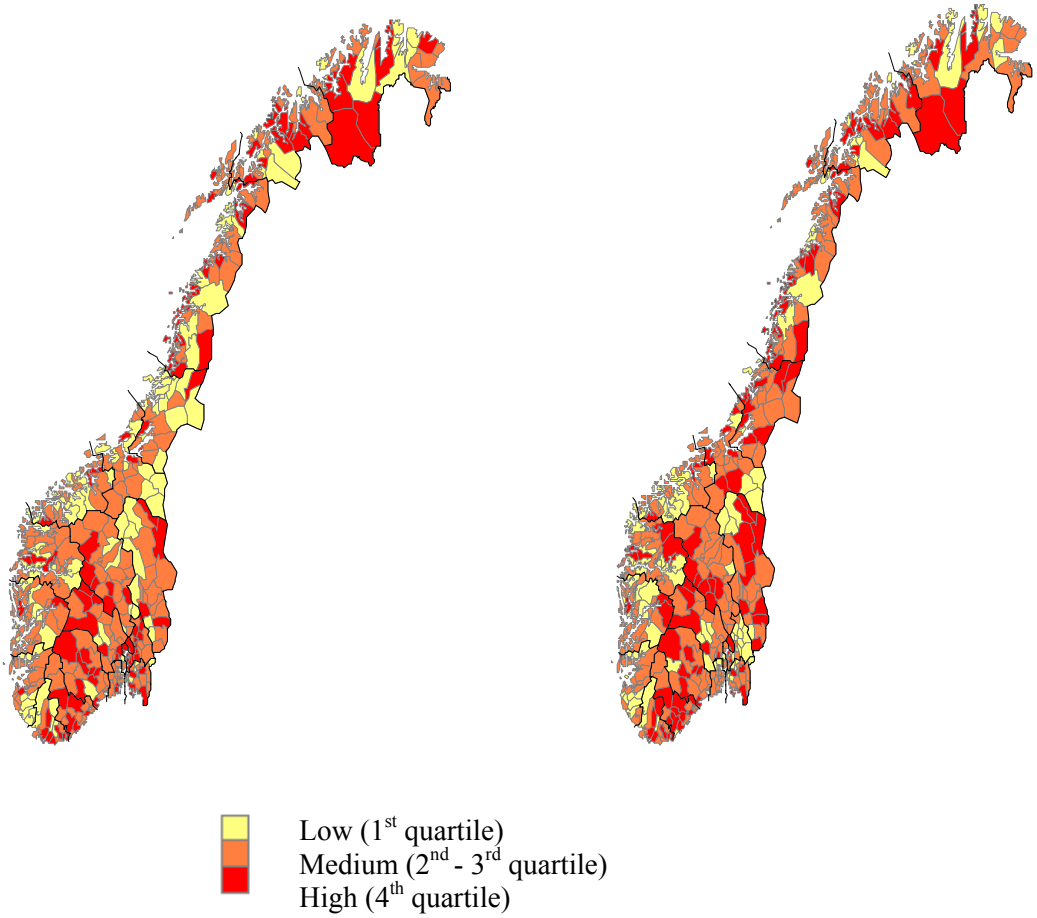
Figure 2 displays poverty rates by municipality when country-specific and region-specific poverty lines are applied. Here, the municipalities are divided into three groups according to the magnitude of the poverty rates; the first group consists of the quartile of the municipalities with the lowest poverty rates, the third group consists of the quartile of the municipalities with the highest poverty rates, and the intermediate group consists of the remaining 50 per cent of the municipalities.

Figure 2 demonstrates significant geographical variation in the extent of poverty between the municipalities. For example, when the analysis is based on region-specific poverty lines then the poverty level in Oslo, which is the municipality with the highest poverty rate, is 7.9 percentage points above Mosvik, which is the municipality with the lowest poverty rate. In fact, it is significant variation in the extent of poverty not merely between municipalities from different counties, but also between municipalities within the same county. In the county Sogn og Fjordane for example, the poverty rate in

Fjaler is 7.1 percentage points greater then the poverty rate in Årdal. Thus, a thorough examination of the extent of poverty in the different municipalities is necessary to assess the sensitivity of poverty estimates in rural and urban areas to the choice between region-specific and country-specific thresholds.

The comparison of the geographical poverty profiles provided by Figure 2 shows that the poverty rate increases in most city municipalities such as Oslo, Trondheim, Bergen, Alta and Tromsø as well is in the majority of the municipalities in the surroundings of Oslo when a joint country-specific poverty line is replaced by a set of region-specific poverty lines. Common for these municipalities is that they all have relatively high housing prices. Conversely, the poverty rate in most municipalities in the counties of Nord-Trøndelag, Sør-Trøndelag and Hedmark is significantly reduced. In fact, for 19 of these municipalities the poverty rate is reduced by more then 1.5 percentage points when region-specific instead of country-specific poverty lines are applied. A common feature of these municipalities is that they all have relatively low housing prices. These findings are not surprising in light of the estimated positive association between housing prices and the level of region-specific poverty lines.

Figure 2: Poverty rates in the municipals derived from region-specific poverty lines (left) and a country-specific poverty line (right), 2001



The poverty patterns of Figure 2 show that the poverty rates increased significantly in most city municipalities as well as in the surrounding areas of Oslo when a joint country-specific poverty line was replaced by a set of region-specific poverty lines. Conversely, the poverty rates in most of the rural municipalities in the counties of Nord-Trøndelag, Sør-Trøndelag and Hedmark were significantly reduced by this methodological choice. In Table 6, summary statistics illustrating the poverty rates in central and non-central municipalities are presented.[16] These results indicate that the average poverty rate is lower in central municipalities compared to non-central municipalities, when the analysis is based on standard country-specific poverty lines. This is compatible with prior empirical analysis of poverty, where it commonly is concluded that poverty is a problem largely associated with non-central municipalities in addition to Oslo (see e.g. Kirkeberg, 2003).

[16] Centrality is defined according to Statistics Norway's official classification of municipalities. Centrality is here a measure of a municipality's geographical position seen in relation to a centre where a higher order of central functions is found. Following standard procedure, the four most populated cities [Oslo, Bergen, Trondheim and Stavanger] are excluded from the classification of municipalities according to centrality.

Table 6. Summary statistics of poverty rates for central and non- central municipalities, 2001[17]

	Central municipalities						Non-central municipalities					
	No. of municipalities	Mean	St. dev.	Min.	Max.	Median	No. of municipalities	Mean	St. dev.	Min.	Max.	Median
Country-specific poverty line	228	2.7	0.7	1	5.6	2.5	203	3.0	1.1	0.7	7.7	2.8
Region-specific poverty lines	228	2.4	0.7	0.7	5.9	2.3	203	2.3	1.0	0.4	7.6	2.1

As addressed in the previous section, basing analysis on a country-specific thresholds means ignoring the heterogeneity in prices and needs within a country. For example, only 5 out of the 228 non-central municipalities have high housing prices, while as many as 100 out of the 203 central municipalities have high housing prices. This suggests that we exaggerate the standard of living a given level of economic resources can provide in central municipalities compared to non-central municipalities. Hence, we are likely to overestimate poverty rate in non-central municipalities when the empirical analysis is based on country-specific poverty lines. The results from the analysis based on region-specific poverty lines show that the average poverty rate now is higher in central municipalities compared to non-central municipalities. In fact, the empirical analysis based on region-specific poverty lines implies that more then 61 per cent of the central municipalities have a poverty rate above the median poverty level of the non-central municipalities.

The results of Tables 7 and 8 demonstrate that there is a substantial overlap in the pattern of poverty among the municipalities with highest and lowest poverty rates following from the alternative specifications of the poverty lines. Moreover, except for Oslo we find that the 10 smallest as well as the 10 largest poverty rates derived from region-specific poverty lines are smaller than the corresponding poverty rates derived from the joint country-specific poverty line. Oslo emerges as the only urban municipality among the 10 municipalities with largest poverty rates, independent of whether the poverty thresholds are region-specific or country-specific.[18]

[17] Notice that the standard deviations presented in table 6 should be interpreted as reflecting the variations in the proportions of the population in poverty between the municipalities, rather then as measures for the precision of the estimates.

[18] The high poverty rates in some less populated municipalities, such as Ås, Våler, Vang and Nesodden, are significantly affected by the presence of refugee reception centres.

Table 7. The 10 municipalities with lowest poverty rates following from analysis based on region- and country-specific poverty lines, 2001

Country-specific poverty line		*Region-specific poverty lines*	
Municipality	***Poverty rate***	***Municipality***	***Poverty rate***
Årdal	0,7	Mosvik	0,4
Leikanger	0,7	Årdal	0,5
Rømskog	0,9	Fedje	0,6
Audnedal	1,0	Audnedal	0,7
Vaksdal	1,0	Rindal	0,7
Stordal	1,2	Leikanger	0,7
Sørum	1,3	Vaksdal	0,8
Austrheim	1,3	Selje	0,9
Nes	1,3	Skjervøy	0,9
Spydeberg	1,4	Rømskog	0,9

Table 8. The 10 municipalities with highest poverty rates following from analysis based on region- and country-specific poverty lines, 2001

Country-specific poverty line		*Region-specific poverty lines*	
Municipality	***Poverty rate***	***Municipality***	***Poverty rate***
Rødøy	7,7	Oslo	8,3
Fjaler	7,7	Fjaler	7,6
Vang	6,5	Ås	5,9
Oslo	6,0	Våler	5,6
Kautokeino	5,9	Vang	5,3
Træna	5,7	Rødøy	5,2
Våler	5,6	Nesodden	5,0
Vevelstad	5,5	Hemsedal	4,9
Sør-Aurdal	5,2	Etnedal	4,8
Hemsedal	5,1	Nore og Uvdal	4,4

4.3. The demographical poverty profile

Previous empirical analyses of poverty in Norway have concluded that poverty is a phenomenon largely associated with young singles, single parents, as well as both first- and second-generation non-western immigrants.[19] Figures 3-5 below display poverty rates confirming this demographical poverty profile.

[19] See e.g. Andersen et al. (2003).

Introducing region-specific poverty lines significantly highlights this picture. For example, the poverty rate for second-generation immigrants increases by 4.6 percentage points when region-specific poverty lines are applied instead of a joint country-specific poverty line. An exception is the poverty rate for single parents, which is reduced somewhat in the case where the analysis is based on region-specific rather then country-specific thresholds. In comparison, the poverty rates for most other household types as well as individuals with Norwegian and Nordic origin, is remarkably unaffected by this methodological choice. An important reason for this observed change in poverty rates by applying region-specific poverty lines rather than a joint country-specific poverty line, is that non-western immigrants and young singles are overrepresented in Oslo.

Figure 3. Poverty rates by ethnic origin, 2001

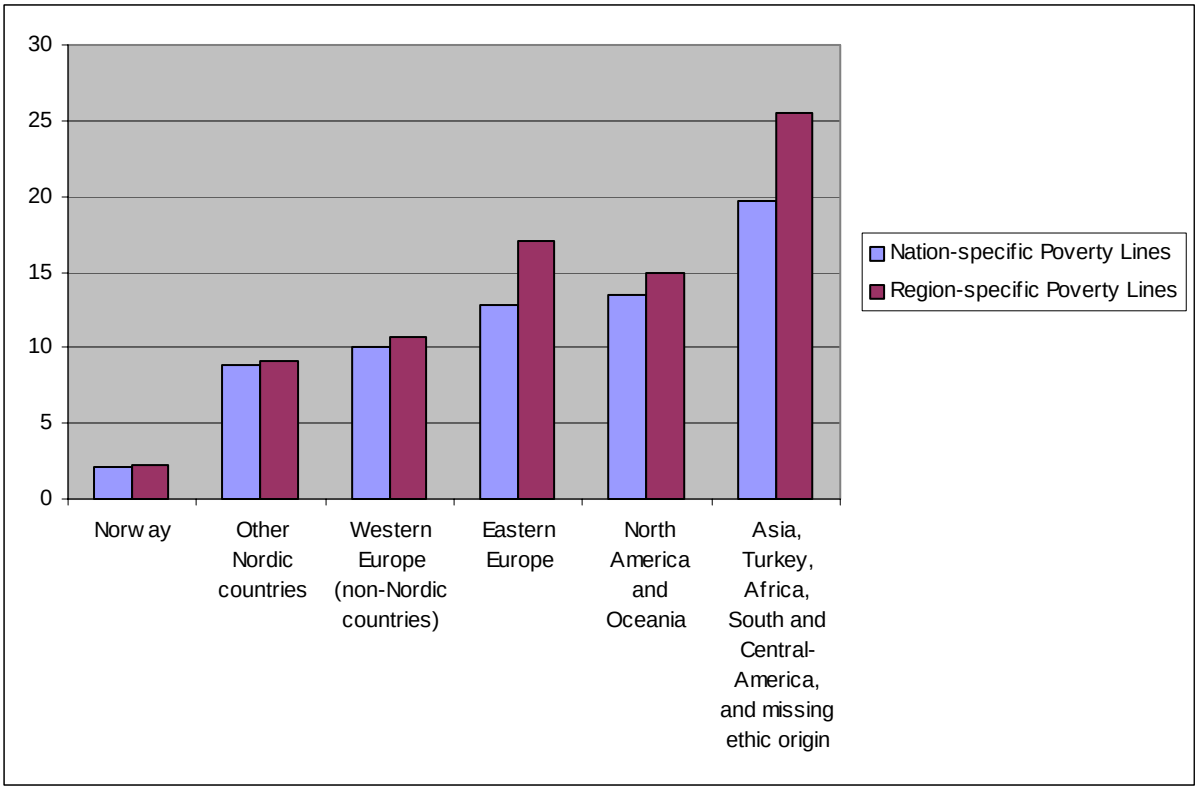


Figure 4. Poverty rates by immigration status, 2001

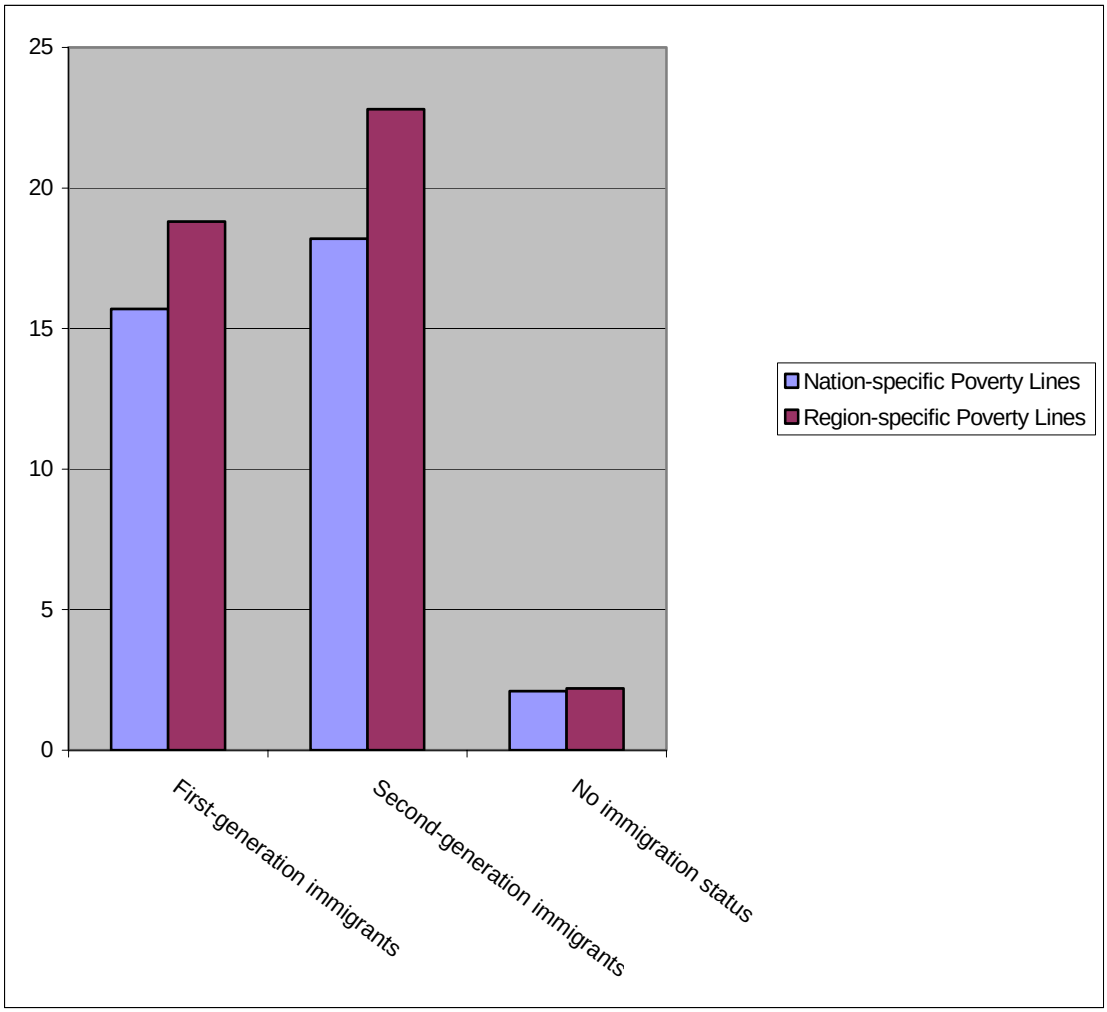
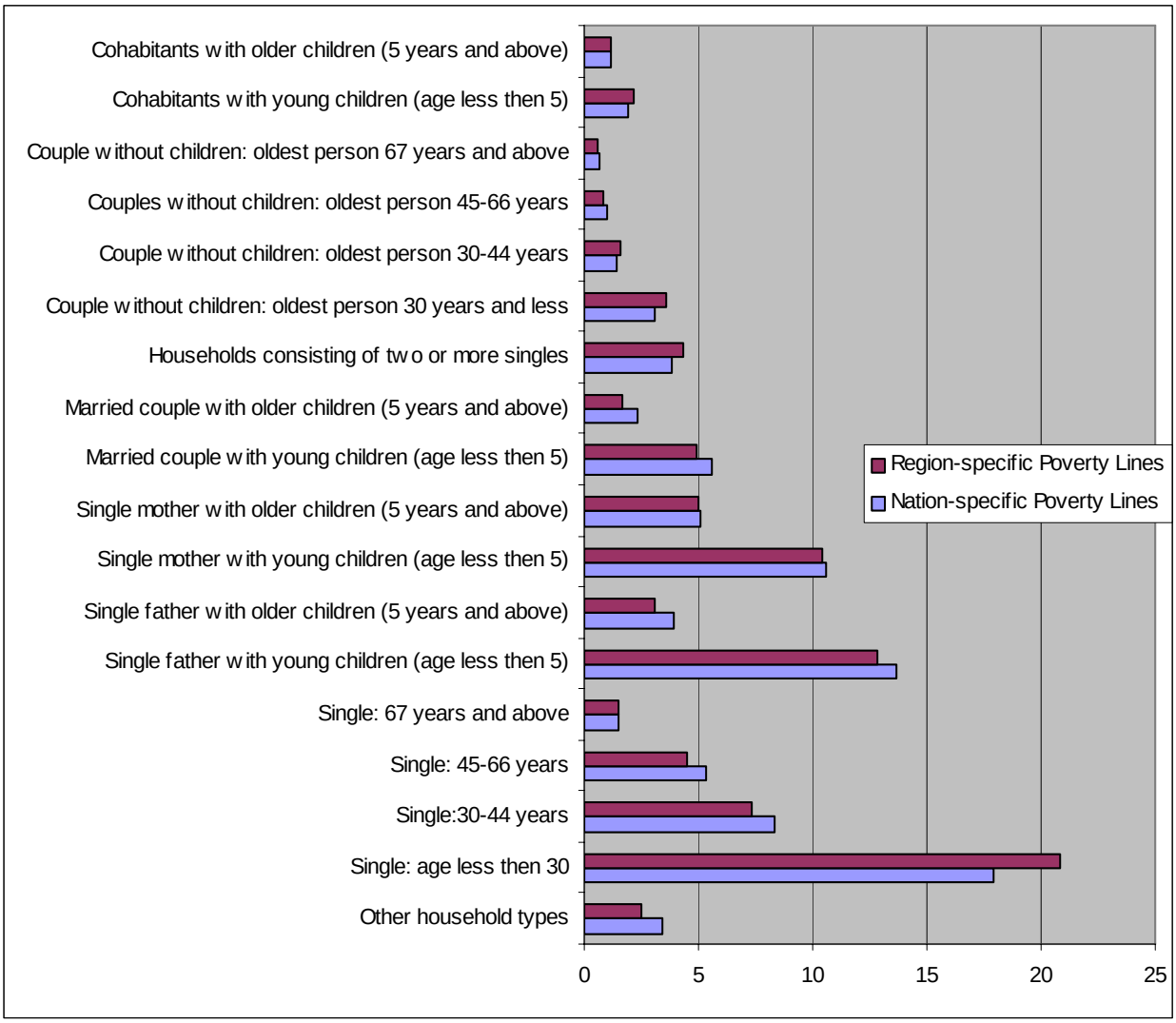


Figure 5. Poverty rates by household type, 2001



5. Summary and conclusions

The standard approach in most OECD countries is to define the poverty threshold as a specific proportion of the median (equivalent) income within a country. The poor are then determined as those falling below this line. An underlying assumption for the validity of analysis where the relative income standard of measurement is applied to determine a country-specific poverty line is that the prices facing different individuals are similar. Conversely, empirical data from Norway show that prices on important goods, such as houses, differ significantly between urban and rural areas. Thus, ignoring price differentials between regions can result in biased estimates of poverty. A possible response is to use local price indices to control for differences in prices, but such indices are not commonly available in the OECD-countries. Furthermore, one could question whether individuals' needs apply broadly to an entire nation or diverge between regions. Arguably, the perception of individuals' minimum needs

depends on the reference group's circumstances, which presumably are heavily influenced by the community to which they belong.

To account for heterogeneity in prices and needs, we propose a method for construction of region-specific poverty lines based on information about housing prices and individuals' places of living. To this end we group the 435 municipalities in Norway according to their respective region. Moreover, since housing costs are the main item of expenditure for most households, especially those with low income, it appears reasonable to use housing prices as the other grouping variable. By combining the three categories of housing prices with 7 regions, we have divided the municipalities into 21 groups. Next, in each group a region-specific poverty line is determined as half of the median equivalent income of the group. Thus, the poverty rate in each municipality depends exclusively on the median income of the group of municipalities to which it belongs. Finally, we aggregate the number of poor across municipalities to assess the overall poverty rate in Norway. By following this approach we avoid comparing income between individuals from municipalities with high housing prices and individuals from municipalities with relatively low housing prices, even if these municipalities are part of the same region. Moreover, the poverty lines reflect that the conceptualisation of minimum needs is not likely to differ merely between urban and rural areas, but also between different urban or rural communities. By contrast, analysis based on a joint country-specific poverty line determines the thresholds in terms of the median equivalent income in the country as a whole. Hence, the effect of heterogeneity in housing prices and needs on consumption possibilities is ignored.

This study relies on a joint country-specific threshold as well as a set of region-specific thresholds designed to reflect regional differences in prices and needs. The empirical results show that the overall poverty level is not significantly affected by the chosen definition of poverty threshold. However, both the geographical and the demographical poverty profile appear to depend largely on whether region-specific or country-specific thresholds are applied. In fact, in contrast to the case when a country-specific poverty line is applied, the average poverty rate is higher in central municipalities than in non-central municipalities when region-specific poverty lines are applied. The results demonstrate that the analysis of poverty based on country-specific thresholds produces downward biased poverty rates in urban areas and upward biased poverty rates in rural areas. Moreover, the analysis based on region-specific poverty lines highlights that poverty in Norway largely is a problem associated with the capital Oslo, as well as with young singles and non-western immigrants.

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