Impacts of Policies on Poverty

Relative Poverty Lines

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by

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1   SUMMARY

This module illustrates how to define "relative" **poverty lines**, i.e. poverty lines based on approaches that consider the welfare position of each individual or household in relation to the welfare position of other individuals or households belonging to the same community. In particular, the module, after emphasizing the importance of the **relative poverty concept** in policy work, discusses two methods to define **relative poverty lines**: a) the "income levels" method; and b) the "income positions" method. It also shows in what these methods differ, and how they can be made operational, by means of step-by-step procedures and examples. In policy work, relativist concepts of poverty are widely used.

2   INTRODUCTION

The aim of this module is to provide the reader with concepts and tools to build poverty lines on the basis of relative concepts of poverty and to illustrate related advantages and shortcomings implicit in these methods. This topic is particularly relevant in policy work both in less industrialized and in industrialized countries because relative poverty measures may encompass almost all poverty measures based on a monetary definition of well-being. Furthermore, the effects of anti-poverty policies and the impacts of other policies on poverty are often assessed on the basis of their impacts on relative poverty. This module also belongs to a set of modules that discuss the definition of poverty, the identification of poverty and measurement of poverty.

Target audience

This module targets applied analysts who want to work on poverty issues. In addition, academics, officers in ministries and other professionals can make use of this material for their work. Furthermore, students interested in poverty issues may find this material relevant for their studies.

Required background

The trainer should verify that the audience is familiar with the concept of income distribution and with the concept of poverty and the way in which poverty is defined. Elementary knowledge of mathematics and statistics is required. Familiarity with the definition of poverty and the identification of poverty is also required.

A complete set links of other related EASYPol modules are included at the end of this module. However, you will also find links to related material throughout the text where relevant[1].

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[1] EASYPol hyperlinks are shown in blue, as follows:
  a) training paths are shown in **underlined bold font**
  b) other EASYPol modules or complementary EASYPol materials are in ***bold underlined italics***;
  c) links to the glossary are in **bold**; and
  d) external links are in *italics*.

3   CONCEPTUAL BACKGROUND

Poverty may be conceptualised either in absolute terms or in relative terms[2].
This module will analyse the **relative concepts**.

In particular, the following methods will be investigated:

▪   income levels (IL);

▪   income positions (IP).

These methods rely on defining a threshold that is relative to a widely accepted measure of well-being. In particular, they rely on a threshold that is relative to either income or expenditure. The final aim is to define a **poverty line**. In both cases, the "relative" definition of poverty may make the poverty line responsive to the way in which the income is distributed among individuals as well as the mean income[3].

In this module, we will take **income** as a reference variable. Whatever will be said, however, holds its validity if **expenditure** is considered instead of income. In applied works, expenditure is sometimes taken as a more correct welfare indicator than income, as transitory shocks may drive observed income far from its **permanent (or life-cycle) level**. Expenditures, instead, are thought to better reflect this level of permanent income[4]. Expenditure may therefore be more appropriate if concerns rest primarily on the level of welfare attained by a given individual or household. However, Atkinson, 1989, argued that where poverty is concerned with the right to a certain level of participation in a society, a minimum level of income might be more appropriate than expenditure (based on consumption).

3.1 Income levels (IL)

Any income distribution may be characterized by its measures of location, e.g, MEDIAN or MEAN. Using IL methods means expressing poverty in relation to a measure of location of the income distribution. The features of the IL method are as follows:

▪   It defines a poverty line as «**less than mean income**», «**less than median income**» or «**less than a given percentage of either mean or median income**». In any case, what counts is the **level** of individual incomes in the income distribution. By this property, the value of the poverty line automatically evolves over time as far as mean or median income evolve;

▪   It makes poverty analysis a subset of inequality analysis;

▪   It requires that the appropriate threshold of income be determined below which an individual is consdiered to be poor. In some sense, this choice has some degree of arbitrariness (e.g.: mean or median income? 50 per cent or 60 per cent of mean income?);

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[2] See the EASYPol Module 005: ***Impacts of Policies on Poverty: Absolute Poverty Lines***.

[3] See Fuchs, 1965, and Fuchs, 1976.

[4] The classical references are Modigliani and Brumberg, 1954; Friedman, 1957.

- It focuses exclusively on income as an indicator of poverty. In this sense, it is mostly uni-dimensional, as no other indicator is usually taken into account to define poverty.

The notion of relative poverty has convincing, yet indirect, support by Townsend, 1979, who says that, lacking an alternative criterion, the best assumption would be to relate sufficiency to the average rise (or fall) in real incomes. One critique has been formulated by Sen, 1983, that argues that consequences of taking a rigid relativist view is that poverty cannot – simply cannot – be eliminated, and an anti-poverty programme can never really be quite successful. A counter-critique to this argument is by Atkinson, 1983, who replies that it is quite possible to imagine a society in which no one has less than a half the average income, and therefore where there is no poverty according to this definition.

3.2 Income positions (IP)

An alternative, yet similar way of defining relative poverty is to look not at income levels but at the **income position** in the income distribution. The income distribution may be represented by quantiles. The IP method defines as being "poor" all those individuals (or households) who fall below a given quantile (usually the tenth or the twentieth) of the income distribution ranked in ascending order.

The main features of the IP method are:
- It looks at the position of the individual in the income distribution;
- Poverty is seen as a part of the total income distribution, i.e. «**poverty as inequality**»;
- It requires that the position below which an individual falls in poverty be defined. In some sense, this choice has some degree of arbitrariness (e.g. bottom 10 or 20 per cent of the population?);
- It gives rise to the case where «**poverty will be always with us**»[5]. Every income distribution, indeed, has a bottom end of the distribution, unless it is perfectly egalitarian;
- It usually focuses on income as the indicator of poverty, as for IL. In this sense, it is mostly uni-dimensional, as no other indicator is usually taken into account to define poverty.

A widely quoted statement supporting this approach is from Miller and Roby, 1970. They say that casting the issue of poverty in terms of stratification leads to regarding poverty as an issue of inequality. In this way, we look at the nature and size of the differences between the bottom 20 or 10 per cent and the rest of society. The main concern of a poverty averse decision maker, they say, is to narrow the differences between those who are worse off and those who are better-off in each stratification dimension.

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[5] See Fiegehen, Lansley and Smith, 1977; p. 14.

A general warning that should be considered when using relative poverty lines of both IL and IP types described above is to be sure that they are meaningful in the context in which they are used. This implies matching information on both relative and absolute standards of living. This reinforces the impression that these methods should not be seen as mutually exclusive, rather they should be considered complementary to poverty analysis.

Let us consider, for example, the case developed by Tinios *et al*., 1993, for **Tanzania**. Using absolute poverty lines based on calorific-defined poverty lines, they found that the proportion of poor people was measured in about 52 per cent. Using relative poverty lines measured as half of the median national income, they found that this percentage would drop to about 24 per cent. The main reason is that average income, in Tanzania, was substantially below the monetary requirement to satisfy the absolute caloric intake. Since in a typical income distribution the median income is less than the mean income, using half of the median income as a poverty line resulted in an extremely low poverty line, leaving more poor people artificially above the poverty line.

This issue, however, is not peculiar of less developed countries. In a study based on **Canada**, Anderson and Ibbott, 1999, have shown that between 1978 and 1982 the **income-based** poverty measure declined, while the **necessity expenditure-based** poverty measure increased. Between 1982 and 1986, the income-based measure increased, while the necessity expenditure-based measure declined.

4   A STEP-BY-STEP PROCEDURE AND EXAMPLES FOR THE INCOME LEVELS (IL) METHOD

Figure 1, below, illustrates the simple steps needed to calculate poverty lines using IL methods. **Step 1** requires that we sort the income distribution by income levels. This is not compulsory, but it is always better looking at a pre-sorted income distribution. **Step 2** requires that we choose the representative indicator of the income distribution. Typically the choice falls on either the mean or the median income. **Step 3** requires that we define which percentage of this indicator is suitable to represent the poverty line. It may be 50 per cent of the mean or 40 per cent of the median, and so on. In this step lies the arbitrariness of the procedure to set the poverty line. There is no scientific basis to decide upon the appropriate percentage. The poverty line can therefore be set by multiplying either the mean or the median income of the distribution by the chosen percentage.

Figure 1 - A step-by-step procedure to define a poverty line using IL

STEP	Operational content
1	Sort the income distribution by income level
2	Choose the representative moment of the distribution (mean or median)
3	Define which percentage of either the mean or the median best represents the poverty line
4	Set the poverty line, by multiplying the percentage in **Step 3** by the representative moment chosen in **Step 2**

Examples for the IL method

4.1 A simplified step-by step numerical example for the IL method

Table 1 shows how to calculate the poverty line using IL for a simplified income distribution where there are five individuals ranked by ascending level of income.

Table 1 - An example of how to calculate the poverty line using IL

STEP 1 Sort income distribution by income levels		STEP 2 Define either mean or median income		STEP 3 Choose the percentage of either mean or median income		STEP 4 Calculate the poverty line	
Individuals	Income levels						
1	3						
2	6						
3	9						
4	12						
5	20						
Total income	50	**Mean income**	10.0	**Percentage**	0.40	**Poverty line (mean)**	4.0
Mean income	10	**Median income**	9.0			**Poverty line (median**	3.6

In the simulated income distribution, the mean income is **10** and the median income is **9**. The chosen percentage of these incomes for poverty line purposes is **40 per cent**. Corresponding poverty lines are obtained by multiplying the percentage of Step 3 to

either mean or median income. In the first case, the poverty line is **4**; in the second case is **3.6**.

4.2 The IL method in South Africa

An example of how to select a relative poverty line may be taken from Deaton, 1997, for South Africa.

Step 1 – In applied works, this step is often omitted or implicit in the procedure.

Step 2 – According to data availability (South African Living Standard Survey - SALSS), the author concentrates again **average expenditure** rather than income as a monetary indicator. The main reason is that poverty here is investigated to take into account racial differences.

Step 3 – The author implicitly relies on a **26 per cent** of individual **average** expenditure to define the poverty threshold. It found that poverty is much higher among the Blacks and almost zero among the Whites.

Step 4 – As the individual average expenditure has been measured as 406 rand per month for total population, the poverty line is set to about **105 rand per month**.

4.3 The IL method in the European Union and Portugal

Another example of how to select a relative poverty line may be taken from de Vos and Zaidi, 1998 for the European Union.

Step 1 – In applied works, this step is often omitted or implicit in the procedure.

Step 2 – The moment of the distribution they select is the **mean**. According to data availability (Household budget surveys carried out by the National Statistical Institutes in the Member States in 1988), the authors concentrate on **expenditure** rather than income as a monetary indicator. Their justification is based on its better attitude to reflect permanent income, as discussed above.

Step 3 – The authors argue that **50 per cent** of average expenditure in each member state is the best indicator. They analyse also other hypotheses. In particular, they apply to the analysis two common poverty lines: a) the first is defined by 50 per cent of the average expenditure in Portugal; b) the second is defined by 50 per cent of the average expenditure of the European Union as a whole.

Step 4 – In national currency, the average expenditure per person in Portugal in 1989 was 679,442. The poverty line (50 per cent of the average) would therefore be equal to 339,721. In France, the same figure was 85,685, with a poverty line of 42,842. The authors calculated these poverty lines for all member countries. Of particular importance, they found that **changing the cut-off percentage** (40 per cent and 60 per cent, instead of 50 per cent) may dramatically alter the percentage of person in poverty.

5   STEP-BY-STEP PROCEDURE AND EXAMPLES FOR THE INCOME POSITION (IP) METHOD

Figure 2, below, illustrates the step-by-step procedure needed to build a poverty line with the IP method. **Step 1** is again concerned with sorting the income distribution by income levels. **Step 2** requires that we divide income distribution in quantiles. If we think that a good representation of our problem is to divide population in, say, ten classes of equal size, we will use decile. If we prefer to divide it in twenty classes of equal size, we will choose quintiles, etc. Whatever the choice, it gives corresponding income values. For example, if we choose deciles, there will be nine income levels defining the intervals an equal number of individuals will fall within. **Step 3** requires that we choose how many quantiles should be considered for poverty analysis (e.g., the first two deciles, etc.). The corresponding level of income defines the poverty line. (**Step 4**).

Figure 2 - A step-by-step procedure to define a povery line using IP

STEP	Operational content
1	Sort the income distribution by income level
2	Divide the income distribution in quantiles
3	Choose the quantile that defines the poverty line (i.e. the first decile, the bottom quintile, etc.)
4	The poverty line is the income corresponding to that quantile.

An example of the IP method

The use of the IP method is less frequent in less developed countries. This is part of the general attitude of all studies in less developed countries to use absolute methods of defining a poverty line. Furthermore, the IP method is basically useless if we want to compare the evolution of poverty over time, as the bottom, say, 20 per cent of the population is always there. The main concern of many studies on less developed countries is indeed that of understanding how poverty evolves and not how the bottom 20 per cent of the population perform. This explains why studies on less developed economies rarely use this method[6].

On the other hand, the IP method, is more powerful if we want to compare the performance of a given fraction of the population over space, i.e. in a cross-sectional

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[6] In actual fact, we were not able to find any published study to take as an example for less developed countries.

perspective. This is more typical of those studies on more developed economies. For example, Gottschalk and Smeeding, 1998, start their paper asking what can be considered as the fundamental question the IP method can provide answers to. They say: «For example, do households below the 20th percentile in the United States have a lower standard of living than comparable Swedish households?». They developed their methods using dominance methods that are, however,not really useful to illustrate the approach in this case.

In the absence of an empirical example on this method, we rely on a simulated example following the step-by-step procedure. Table 2, below, illustrates the IP method by considering a different simulated income distribution compared with that of Table 1. This is done in order to have sufficient observations to split in intervals of equal numbers. After ranking income distribution by income levels (**Step 1**), in **Step 2** income levels corresponding to 10 classes of equal numbers of individuals are calculated (deciles). For example, 20 per cent of the population has incomes below 7,234, while 90 per cent of the population has incomes below 12,611. **Step 3** requires that we choose one income level to define the poverty line, which is actually set in **Step 4**. Hypothetically, the income level is that which corresponds to the second decile, i.e. **7,234** currency units[7]. It amounts to look at what happens to the lowest 20 per cent of the population.

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[7] Deciles in Table 2 have been calculated in Excel starting from the income distribution using the command =PERCENTILE($C$8:$C$37,0.1), where C8:C37 is the interval where the data are stored and 0.1 is the parameter needed to split the income distribution in deciles.

Table 2 - An example of how to calculate the poverty line using IP

STEP 1 Sort income distribution by income levels		STEP 2 Define quantiles, e.g. deciles		STEP 3 Choose the quantile defining the poverty line	STEP 4 Calculate the poverty line
Individual	Income distribution A	Decile	Income levels	Second decile	Poverty line 7,234
1	2,417	1	5,873		
2	4,392	2	7,234		
3	5,200	3	7,810		
4	5,948	4	8,234		
5	6,500	5	8,616		
6	7,048	6	9,356		
7	7,280	7	10,213		
8	7,800	8	11,282		
9	7,800	9	12,611		
10	7,814				
11	8,011				
12	8,143				
13	8,295				
14	8,450				
15	8,489				
16	8,744				
17	9,111				
18	9,239				
19	9,531				
20	9,822				
21	10,072				
22	10,540				
23	10,906				
24	11,168				
25	11,739				
26	12,316				
27	12,572				
28	12,957				
29	14,519				
30	15,239				

6   SYNTHESIS AND CONCLUSIONS

Methods of calculating relative poverty lines are easier than methods used for calculating absolute poverty lines. The basic result of this module is that if we agree on the concept of relative poverty, we only need to decide which level of income/expenditure in an income/expenditure distribution properly defines poverty. However, there is something arbitrary in this choice. The analyst should test results adopting different poverty lines and should also compare relative and absolute poverty lines, where available.

Table 3, below, gives a synthesis of the two methods to calculate relative poverty lines. We can easily see that both are defined in terms of the level of income below which an individual is poor. However, the IL method relies on defining a measure of location of the income distribution (mean/median) and on choosing an appropriate percentage of it. Whereas, the IP method requires that we define an appropriate income quantile.

Unlike the approaches applied to calculate absolute poverty lines, the income/expenditure indicator used for both IL and IP methods is usually not linked to any consideration about the allocation of income/expenditure on specific goods. Therefore, an individual is identified as poor if his/her income falls below that level of income. In this sense, both IL and IP methods adhere to a concept of **income poverty**.

Table 3 - Poverty lines in a relative perspective

	METHODS	Definition	General concept	Main requirements	Flaws/Criticism	Poverty line numeraire
1	Income levels	The percentage of **mean/median** income below which an individual is poor	Income/expenditure poverty	Determine the measure of location of the income distribution to be taken as reference and the percentage of it	Uni-dimensional. It neglects other poverty dimensions.	Income/expenditure units
2	Income position	The **income quantile** below which an individual is poor	Income/expenditure poverty	Determine the income quantile that better represents the threshold	a) Uni-dimensional. It neglects other poverty dimensions. b) Poverty is always with us. Not useful for temporal comparisons. More useful for comparisons across space	Income/expenditure units

The main criticism to both indicators is that they are uni-dimensional. Furthermore, the IP method is useless for temporal comparisons. In both cases, finally, the poverty line is expressed in terms of income or expenditure units.
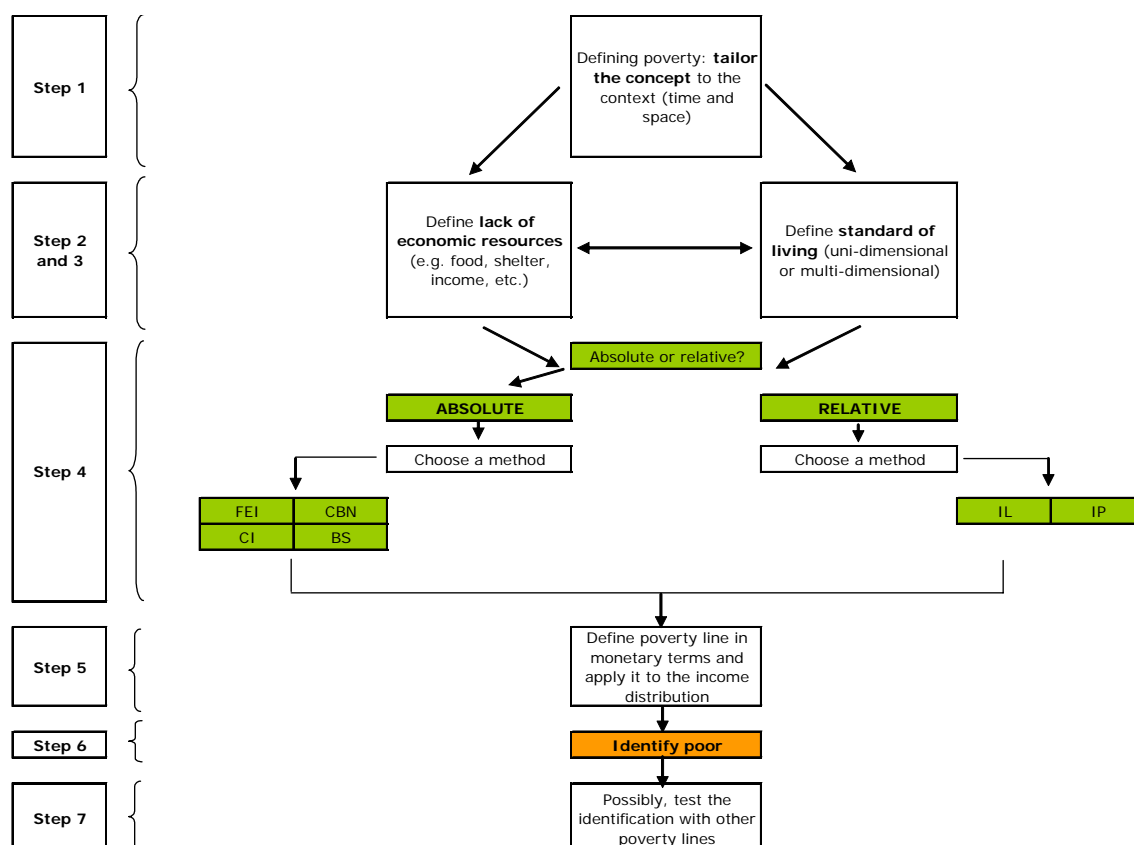
7   A COMPREHENSIVE STEP-BY-STEP PROCEDURE TO SELECT A POVERTY LINE

It may be useful to have a comprehensive view of how to address the choice of a poverty line, taking into account the possibility of both absolute and relative poverty concepts. This is done with the help of Figure 3.

▪ **Step 1**: **Set the context**. we first need to understand the **context** where poverty has to be measured. For example, are we measuring poverty in a static context or are we comparing it over time or space? Are we measuring poverty with regard to total population or, say, in rural areas? Are we measuring it in a less or more industrialised countries?

▪ **Step 2**: **Identify relevant economic resources.** An important step is to define what it is intended by **lack of economic resources**. This also depends on the context. For example, if we are observing poverty in a rural area in a non-idustrialised country, it may be that there is a relevant lack of command over food. If we are, instead, observing an industrialised economy, it may be that the relevant lack of command expands over a wider range of commodities, including shelter, recreational activities, etc, or on income itself. Appropriately addressing this step may help choosing the right view of poverty.

▪ **Step 3**: **Define a "socially acceptable" standard of living**. In particular, we need to choose either a uni-dimensional or a multi-dimensional approach to poverty. In the first case, poverty may be income poverty or food poverty, etc. In the second case, other well-being indicators may support income or food. The following steps are however tailored on a uni-dimensional approach. The multi-dimensional approach is left to more advanced material.

- **Step 4**: **Choose between absolute or relative poverty.** After having defined lack of command and standard of living, we must define whether the poverty line must be absolute or relative. In the first case, we have four basic possibilities: FEI, CBN, CI, BS. In the second case, we have two basic possibilities: IL, IP.

Figure 3 - A step-by-step procedure to select a povery line

- **Step 5**: **Calculate the poverty line**. Whatever the method of calculation, they all end up with a monetary value, the POVERTY LINE. Once the poverty line has been calculated, it can be applied to the income distribution.
- **Step 6**: **Identify the poor**. The application of the poverty line to the income distribution allows us to **identify poor**. If poor is the only concern of the analysis, its identification may be seen as a censored income distribution, up to the poverty line.
- **Step 7**: **Run sensitivity tests**. As different methods of calculating the poverty line may lead to different results, it is always useful to test the identification of poor people with other methods, both absolute and relative, in order to verify the sensitivity and the robustness of the analysis. As identification of poor occurs before

measurement, bad identification may lead to bad measurement and to bad policies. Particular care must therefore be used with the identification activity.

8   READERS' NOTES

8.1 Time requirements

The delivery of this module to an audience already familiar with the definition of poverty and with the identification of poverty by absolute concepts may take up two hours.

8.2 Frequently asked questions

Some frequently asked questions are:

✓ **What is better, relative or absolute concepts of poverty?** There is no conclusive answer. Poverty is to some extent a matter of value judgment. An analysis embodying both concepts is strongly suggested, whenever available data allow it.
✓ **How do we build a relative poverty line?** The main methods are IL and IP. Their basic functioning is the same. The common feature is that they record income poverty, without taking into consideration other indicators.
✓ **If we use relative approaches, does this not mean that poverty is always with us?** To some extent, this is true. However, if we make recourse to the IP method, it is true that the same fraction of population is always poor. For this reason, the IP method should not be used in a time perspective, but only on cross-sectional comparisons. On the other hand, the use of the IL method does not imply that poverty is always with us, as it is perfectly conceivable that, at a given point in time, no one has an income less than half the average income.

8.3 Links to other EASYPol modules

Complementary EASYPol modules are:

- EASYPol Module 004: *Impacts of Policies on Poverty: The Definition of Poverty*
  which is propaedeutic to this module;
- EASYPol Module 005: *Impacts of Policies on Poverty: Absolute Poverty Lines*
  which complements the relative poverty approach of this module;
- EASYPol Module 007: *Impacts of Policies on Poverty: Basic Poverty Measures*
- EASYPol Module 035: *Impacts of Policies on Poverty: Poverty and Dominance*

  which is useful to understand how to skip the controversial issue of setting a poverty line. The "Poverty and Dominance" module, however, can be fully appreciated by the reader if the other modules on poverty identification, definition and measurement are addressed first.

9   REFERENCES AND FURTHER READINGS

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Module metadata

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4. Summary

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5. Date

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7. Module type	☐ Thematic overview ☐ Conceptual and technical materials ☒ Analytical tools ☐ Applied materials ☐ Complementary resources
8. Topic covered by the module	☒ Agriculture in the macroeconomic context ☐ Agricultural and sub-sectoral policies ☐ Agro-industry and food chain policies ☐ Environment and sustainability ☐ Institutional and organizational development ☐ Investment planning and policies ☒ Poverty and food security ☐ Regional integration and international trade ☐ Rural Development
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