Equivalence scales for measuring in-work poverty in Europe

Claudia Colombarolli, University of Bologna
Marianna Filandri, University of Turin

**7th European User Conference
for EU-Microdata**

March 25-26, 2021

Organized by German Microdata Lab, GESIS, in cooperation with Eurostat

Outline

- ➢ Motivation

- ➢ Theoretical framework
  - ○ Comparing income in poverty definition
  - ○ OECD and OECD Mod. equivalence scales

- ➢ Research questions

- ➢ Data, Variables and Method

- ➢ Results

- ➢ Conclusions

Motivation

➢ Equivalence scales are a crucial tool to compare the levels of resources of households of different size and composition by considering their economies of scale

➢ The principle of economies of scale implies that two people living together spend more than one person living alone but less than two people living separately

    o There are many forms of savings: e.g., sharing of rent, heating costs, lighting, family packages of food, shopping at the market or hard discount stores, etc.

➢ The economies of scale implemented by households, however, may differ depending on the employment status of the members (time available for economies of scale)

➢ In addition, there may be a relationship between the family dimension and being a working household

➢ Equivalence scales, and the implied economies of scales, are relevant since they provide the basis for calculating poverty and inequality measures

Theoretical framework

➢ Comparing income in poverty definition

○ Very often official national measures of poverty are based on unidimensional theoretical approaches (Lemmi 2019; Meyer and Sullivan 2012; McGuinness 2016; Orshansky 1963)

   ▪ This implies the use of a single monetary variable (usually income or consumption expenditure) as the only proxy variable for economic distress.

○ Furthermore, they make use of a dichotomous classification of the elementary statistical units between poor and non-poor

○ This dichotomy derives from using the so-called poverty line: the units whose income (or consumption expenditure) does not exceed the poverty threshold are considered to be poor.

○ The threshold is very often defined by arbitrary (50-60-66% of mean/median income or consumption)

   ➢ ROLE of the equivalence scale!

Theoretical framework

➢ Equivalence scales are implemented to convert households' income (or expenditures) into *equivalent individual income* by taking into account the economies of scale

$$\frac{Income}{?}$$

o Equivalence scales differ in terms of:

- how much elasticity they confer to the economic needs of additional members

- how many and which factors they consider: single parameter scales usually consider the households' size (e.g., Square root); two-parameter scales usually consider the size and the age of households' members (e.g., OECD, OECD Mod. - the one implemented by Eurostat)

- how they are computed: e.g., expert scales, consumption scales, subjective scales

Theoretical framework

➤ Examples of equivalence scales

	OECD *(1+0.7*adult+0.5*child)*	OECD Modified *(1+0.5*adult+0.3*child)*	Square root $\sqrt{n}$	Subjective scale (De Vos & Zaidi)
1 adult	1	1	1	1
2 adults	1.7	1.5	1.4	1.29
2 adults, 1 child	2.2	1.8	1.7	1.50
2 adults, 2 children	2.7	2.1	2.0	1.67
2 adults, 3 children	3.2	2.4	2.2	-

Decreasing elasticity

Theoretical framework

➢ The equivalence scales in the poverty estimation

Studies on equivalence scales were quite abundant in the 1990s (Buhmann et al., 1988; Coulter et al., 1992; Burkhauser et al., 1996; de Vos et Zaidi, 1997; Duclos et Mercader-Prats, 1999). Most of them were comparative and focused on *equivalence scales influence on poverty statistics*:

- o Effects on the poverty rates: (in general) U-shaped relation between relative poverty rates and the elasticity of the equivalence scales

- o Effects on the ranking of countries: no relevant changes

- o Effects on the composition of the poor

  - ▪ When the elasticity of the equivalence scale is low, poverty is concentrated on the elderly and the young, who usually constitute the smallest households.

  - ▪ When the elasticity is high, the risk of poverty is concentrated on households with two or more children.

Theoretical framework

➢ OECD and OECD Mod. equivalence scales

De Vos and Zaidi (1997) investigate the sensitivity of poverty statistics to the choice of equivalence scales

	OECD *(1+0.7*adult+0.5*child)*	OECD modified *(1+0.5*adult+0.3*child)*
1 adult	1	1
2 adults	1.7	1.5
2 adults, 1 child	2.2	1.8
2 adults, 2 children	2.7	2.1

o Poverty rates: small differences between OECD and OECD Mod.

▪ Households as units of analysis: poverty rates are usually higher with OECD Mod.

▪ Individuals as units of analysis: poverty rates tend to be higher with OECD

▪ The effect on the poverty incidence depends on the distribution of the household size groups

Recently, studies on equivalences scales focused on, *inter alia*: the formulation of specific equivalence scales for each country or form of well-being (Daley et al., 2020; Bishop et al., 2014); the effect on poverty estimation among countries with different consumption expenditures (Mysíková, Želinský, 2019)

Research questions

➢ What is the role of the equivalence scales in including or excluding families from poverty?

- i.e. How large is the population of households considered to be poor when adopting the OECD Mod. equivalence scale instead of the OECD one? And *viceversa*?

➢ How important is the employment status of households in the probability of being included or excluded from the poverty definition?

- i.e. How many working households are poor according to the OECD and OECD Mod. equivalence scales? How does the estimate of in-work poverty change?

➢ Is the ability to make economies of scale different between working and non-working households?
  - i.e. What is the income level needed to not be poor according to working and non-working households?

Data, Variables and Method

➢ EU-SILC 2018 cross-sectional data; all EU-28 countries, except for Malta*; sample size: 255,399 households

➢ Dependent variables:

❖ Households' poverty condition, based on the **equivalized** total disposable household income. In relative terms, we identify as poor all the households with an income below the 60% of the median **equivalized** income: 1) equivalized with OCSE Mod.; 2) equivalized with OCSE

❖ The typology of the poverty conditions resulting from the intersection of the two equivalence scales

		Poverty accoding to OECD	
		No	Yes
Poverty accoding to OECD Mod.	No	Never poor	Poor with OECD
	Yes	Poor with OECD Mod	Always poor

❖ The income inadequacy: the disposable income is lower than what is considered necessary to make ends meet

- *In your opinion, what is the very lowest net monthly income that your household would have to have in order to make ends meet, that is to pay its usual necessary expenses?*

*(because the information on age was not available at the time of the analysis)

Colombarolli and Filandri – **Equivalence scales for measuring in-work poverty in Europe**

Data, Variables and Method

➢ Independent variable

❖ Household working condition, i.e., having at least one person aged between 18 and 64 years old who worked a minimum of seven months in the income reference year

➢ Control variables

❖ Disposable income (income quintiles); n. of adults and minors; presence of a couple; age of the referent person; highest education level of the referent person; foreign born (whether at least one of the adults is born in a foreign country); tenure status

➢ Method

❖ Descriptive approach

❖ Logistic regressions on the probability of reporting income inadequacy. The results of the logit models are reported graphically as differences in predicted probabilities (Bartus, 2005; Long and Freese, 2014)

Data, Variables and Method

	N (households)	Working households
Austria	6,084	64.7
Belgium	5,823	58.2
Bulgaria	7,135	59.8
Croatia	8,272	58.1
Cyprus	4,168	70.7
Czech Republic	8,620	65.3
Denmark	5,566	57.3
Estonia	6,015	65.1
Finland	9,660	53.8
France	10,812	58.7
Germany	12,885	61.3
Greece	24,199	56.2
Hungary	7,444	64.8
Ireland	4,330	64.9
Italy	21,100	61.9
Latvia	5,782	63.2
Lithuania	4,882	61.5
Luxembourg	3,783	66.6
Netherlands	12,394	61.4
Poland	14,982	62.5
Portugal	13,643	63.5
Romania	7,211	63.9
Slovakia	5,543	72.1
Slovenia	8,535	62.8
Spain	13,315	64.7
Sweden	5,645	60.9
United Kingdom	11,584	63.3

➢ Sample: 255,399 households in 27 EU countries

Colombarolli and Filandri – **Equivalence scales for measuring in-work poverty in Europe**

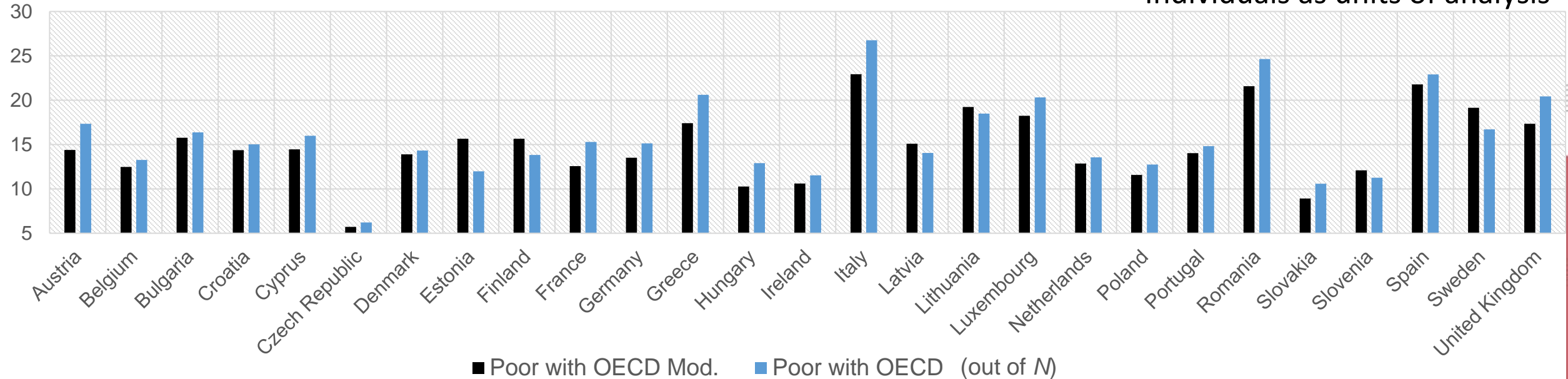# Results

➢ Poverty statistics

Households as units of analysis
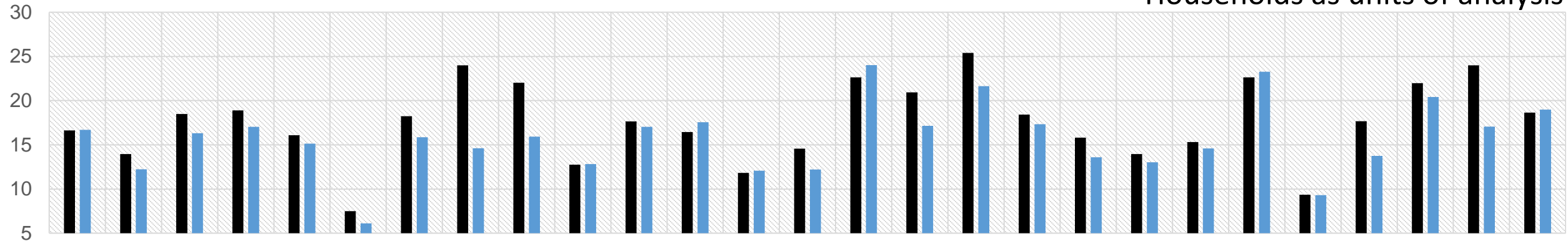
Individuals as units of analysis

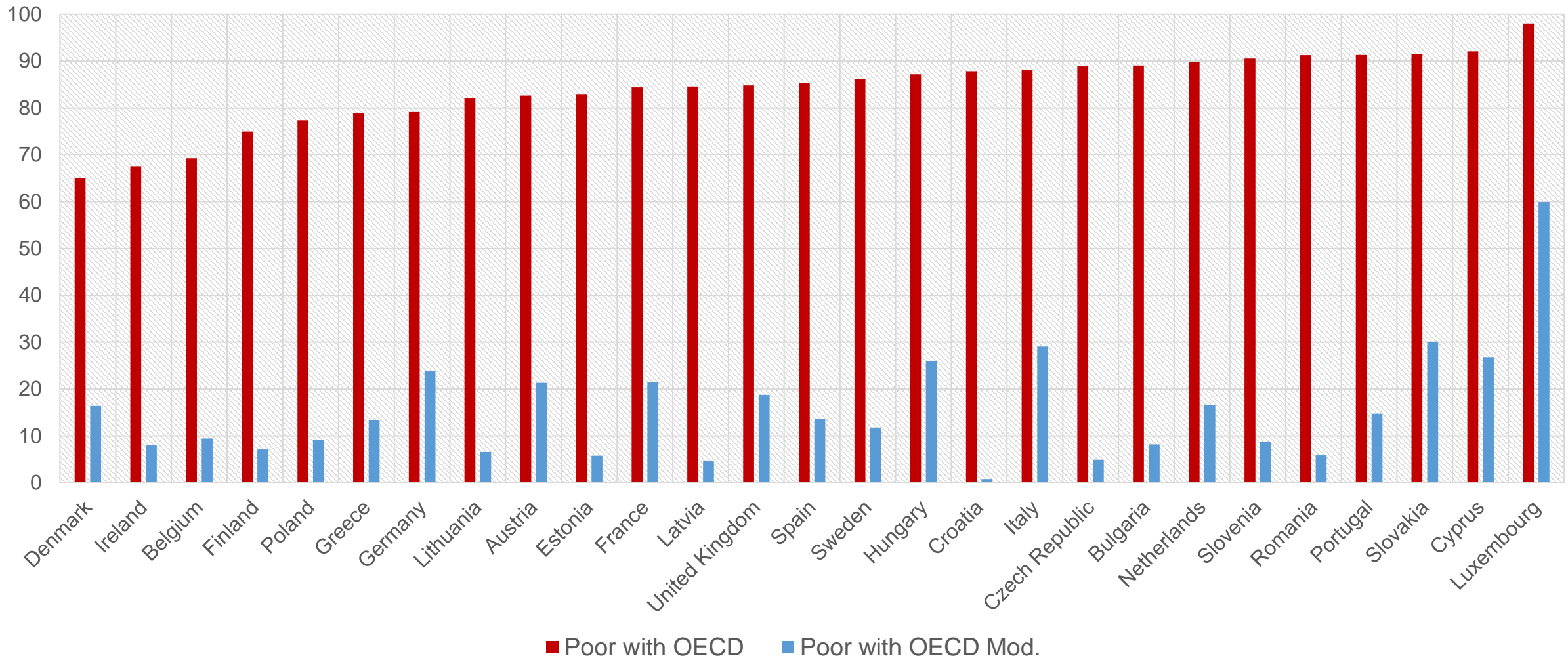■ Poor with OECD Mod.   ■ Poor with OECD (out of *N*)

Colombarolli and Filandri – **Equivalence scales for measuring in-work poverty in Europe**

Results

➢ Types of poor households according to the equivalence scales

■ Poor with OECD ■ Poor with OECD Mod. ■ Always poor (out of *N*)

Colombarolli and Filandri – **Equivalence scales for measuring in-work poverty in Europe**
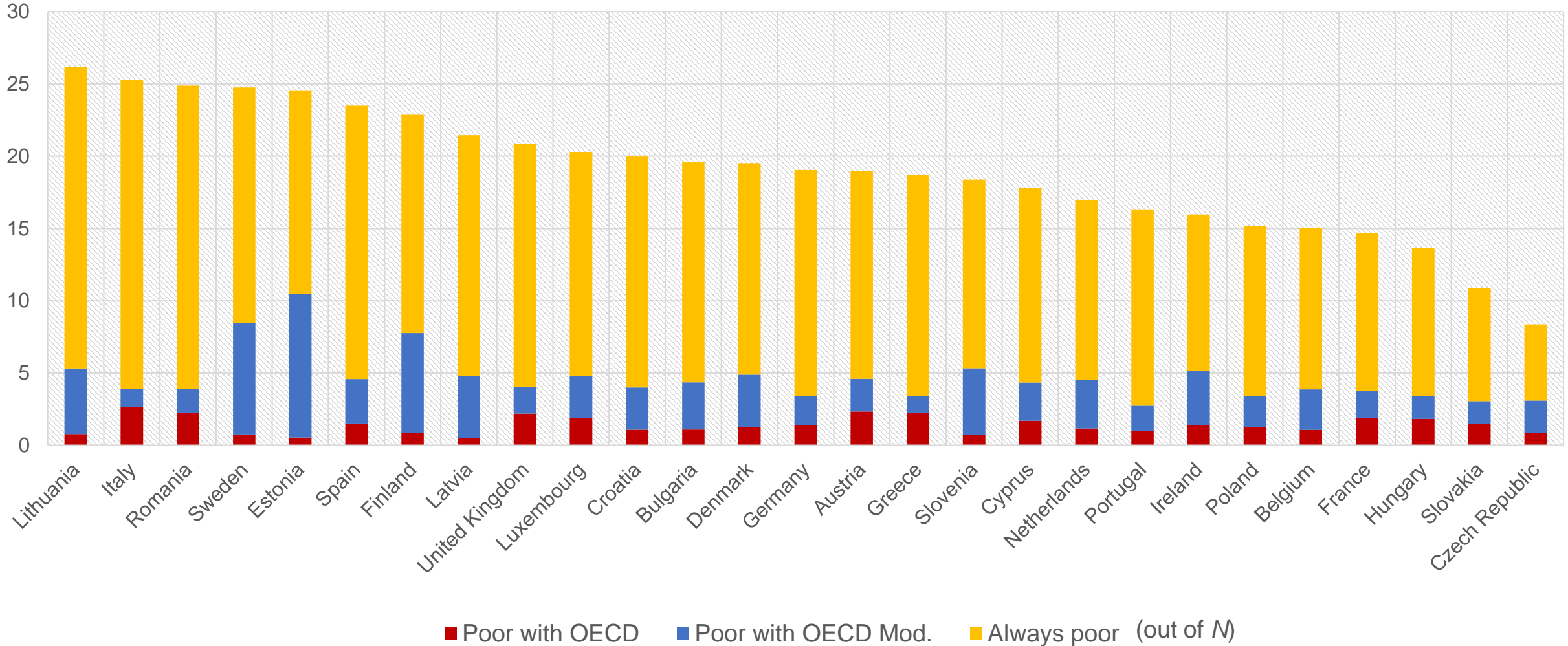
Results

➤ Share of working households among poor households

Poor with OECD ■ Poor with OECD Mod.

Results

➤ Average number of members within working and non-working households

■ Non-working household   ■ Working household
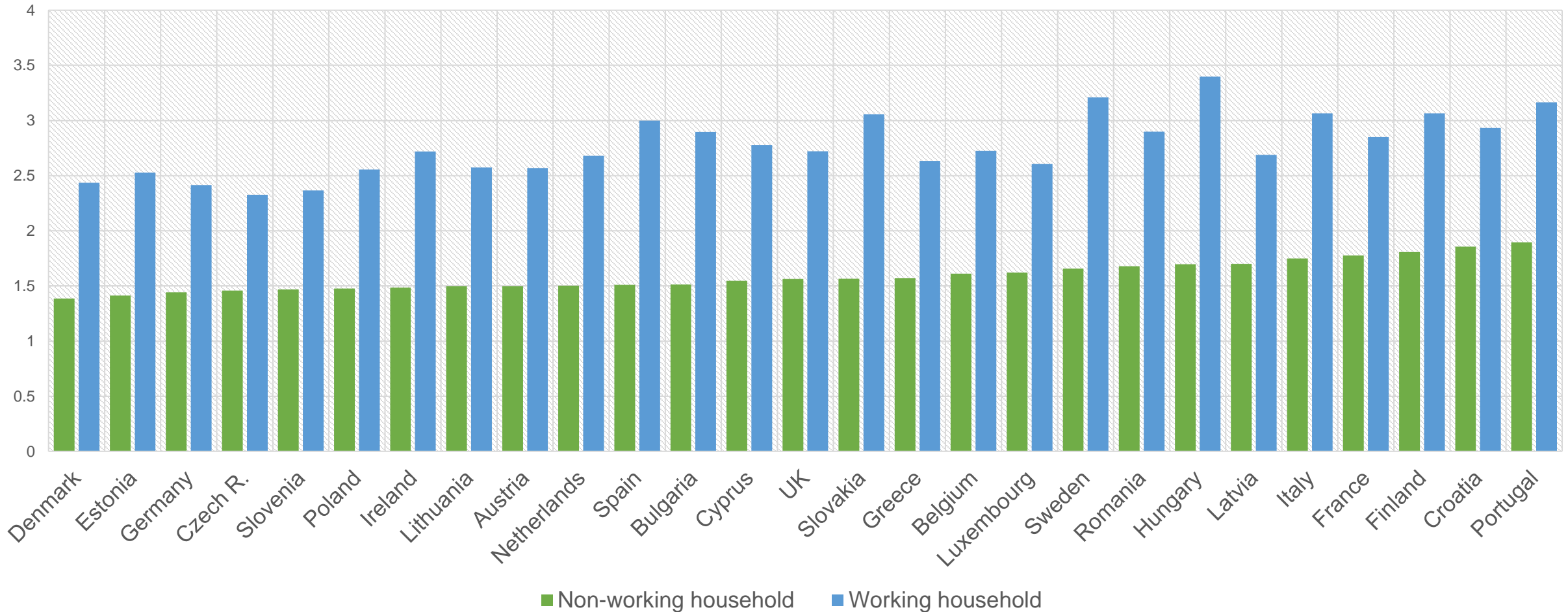
Results

➤ In-work poverty statistics

Legend: ■ In-work poor with OECD Mod. ■ In-work poor with OECD

Share of poor working households out of the total working households
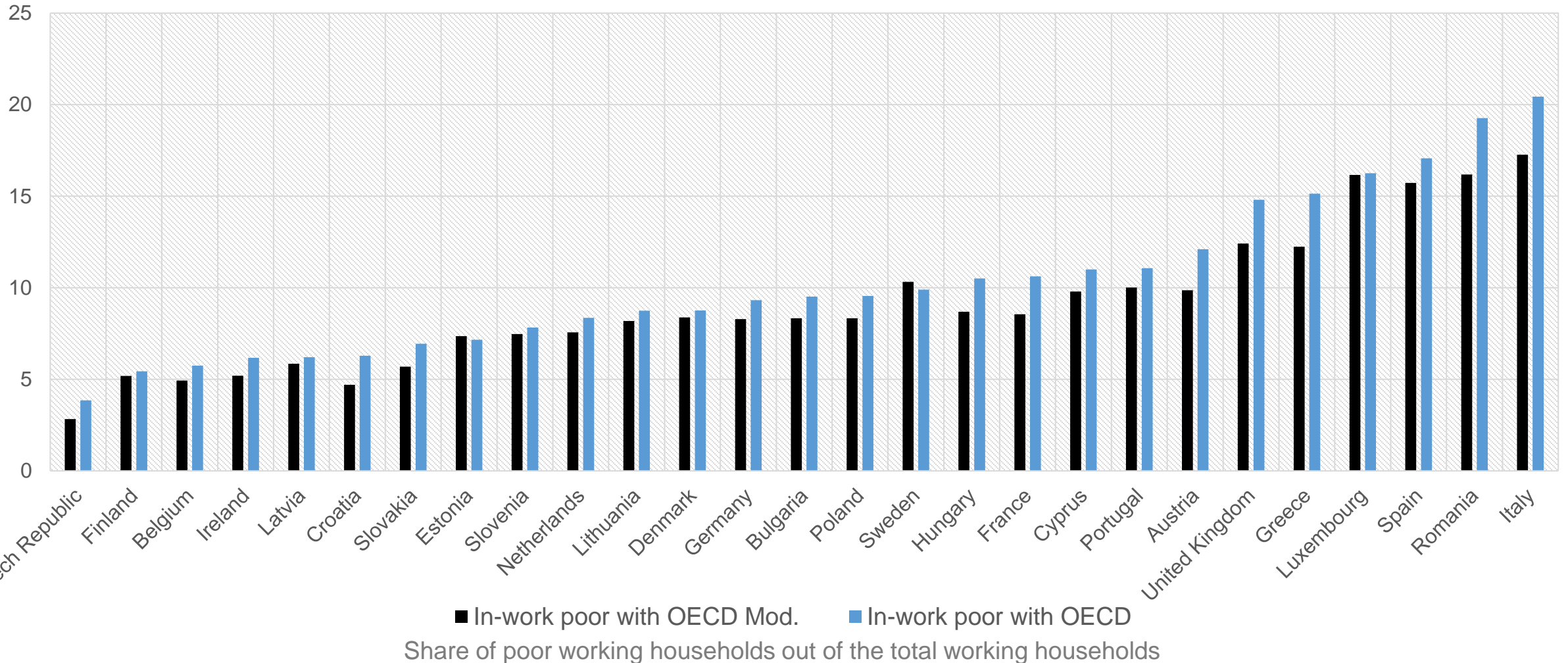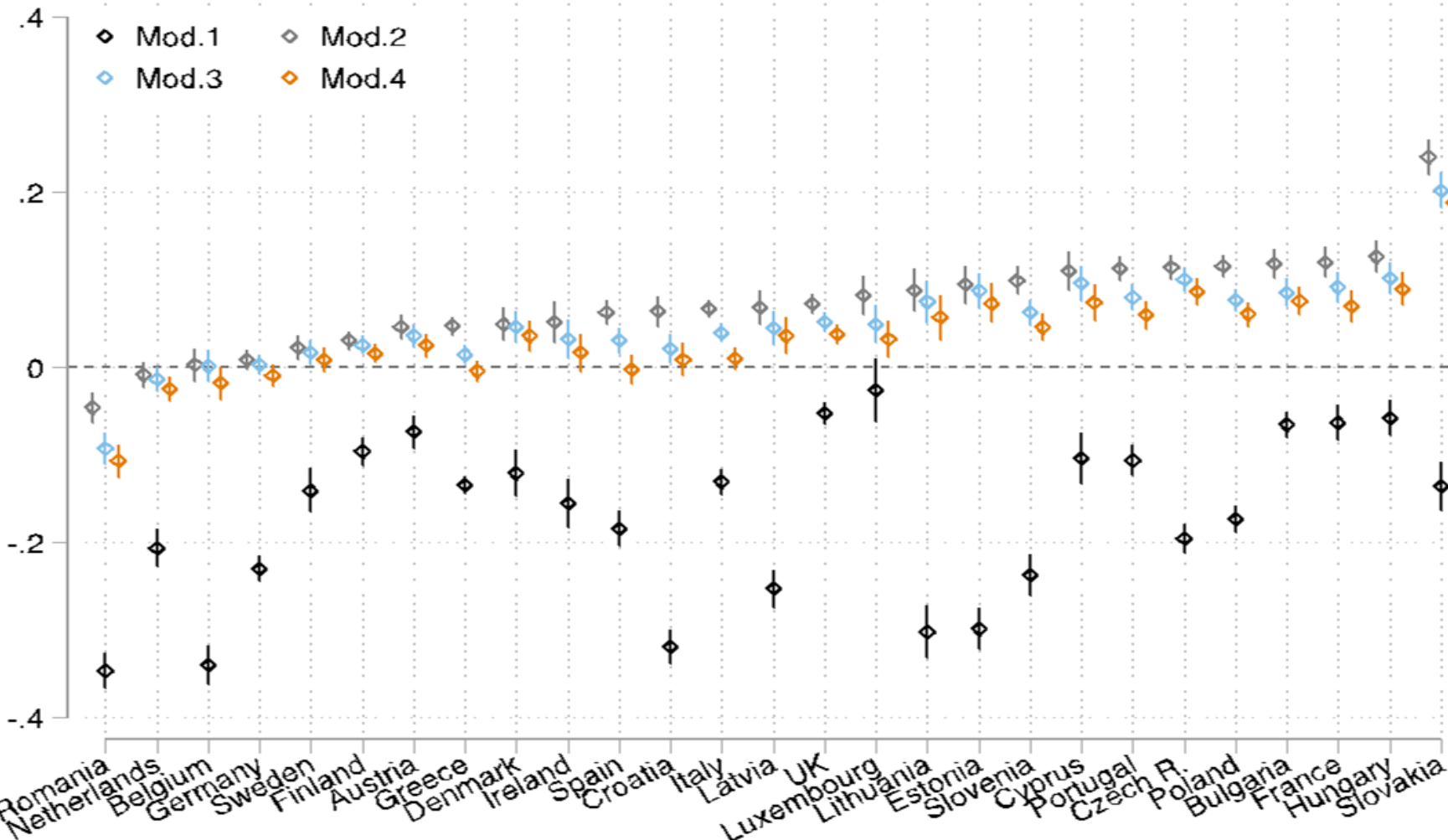
Results

➤ Income inadequacy of working and non-working households

Model 1: working status

Model 2: + income quintiles

Model 3: + n. of adults and minors

Model 4: + age, education, couple, tenure status, foreign born

Colombarolli and Filandri – **Equivalence scales for measuring in-work poverty in Europe**

Conclusions

➢ The use of an equivalence scale is not neutral

➢ Working status leads to more everyday expenses (e.g., transport costs)

➢ Countries could consider adopting different equivalence scales according to the policies implemented and their targets (e.g., basic income for non-working families or family allowances for working families)

➢ Data discussion: we used the variable HY020 (the households' disposable income), that is not collected homogeneously throughout EU countries: according to the country, it could be net, gross or mixed and the reference period might differ.
Moreover, Germany, The Netherlands, Portugal and Slovenia lack territorial information (DE, NL, SI lack DB100; DE, NL, PT lack DB040).

Thank you!

There is nothing more unfair than to have equal parts among unequal
Lorenzo Milani

Claudia Colombarolli, claudia.colombaroll2@unibo.it
Marianna Filandri, marianna.filandri@unito.it