

# **THE IMPACT OF PARENTHOOD ON THE GENDER WAGE GAP – A COMPARATIVE ANALYSIS OF EUROPEAN COUNTRIES AND FAMILY POLICIES**

**Ewa Cukrowska-Torzewska**  
University of Warsaw

**Anna Lovasz**  
Institute of Economics,  
Centre for Economic and Regional Studies  
Hungarian Academy of Sciences

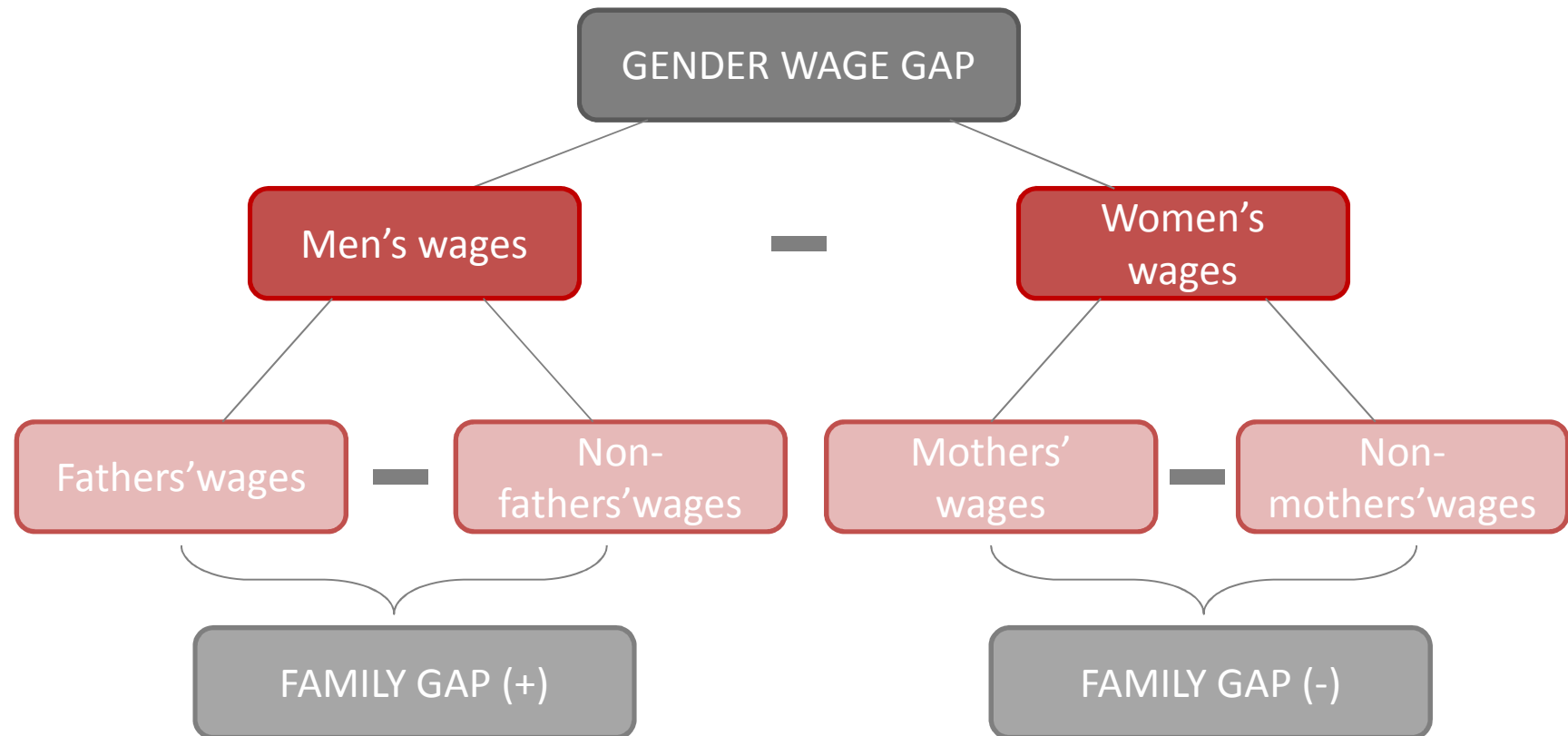
This research was supported by a grant from the National Science Center in Poland,  
grant numer UMO-2015/16/T/HS4/00309.

Mannheim, 3 March 2017

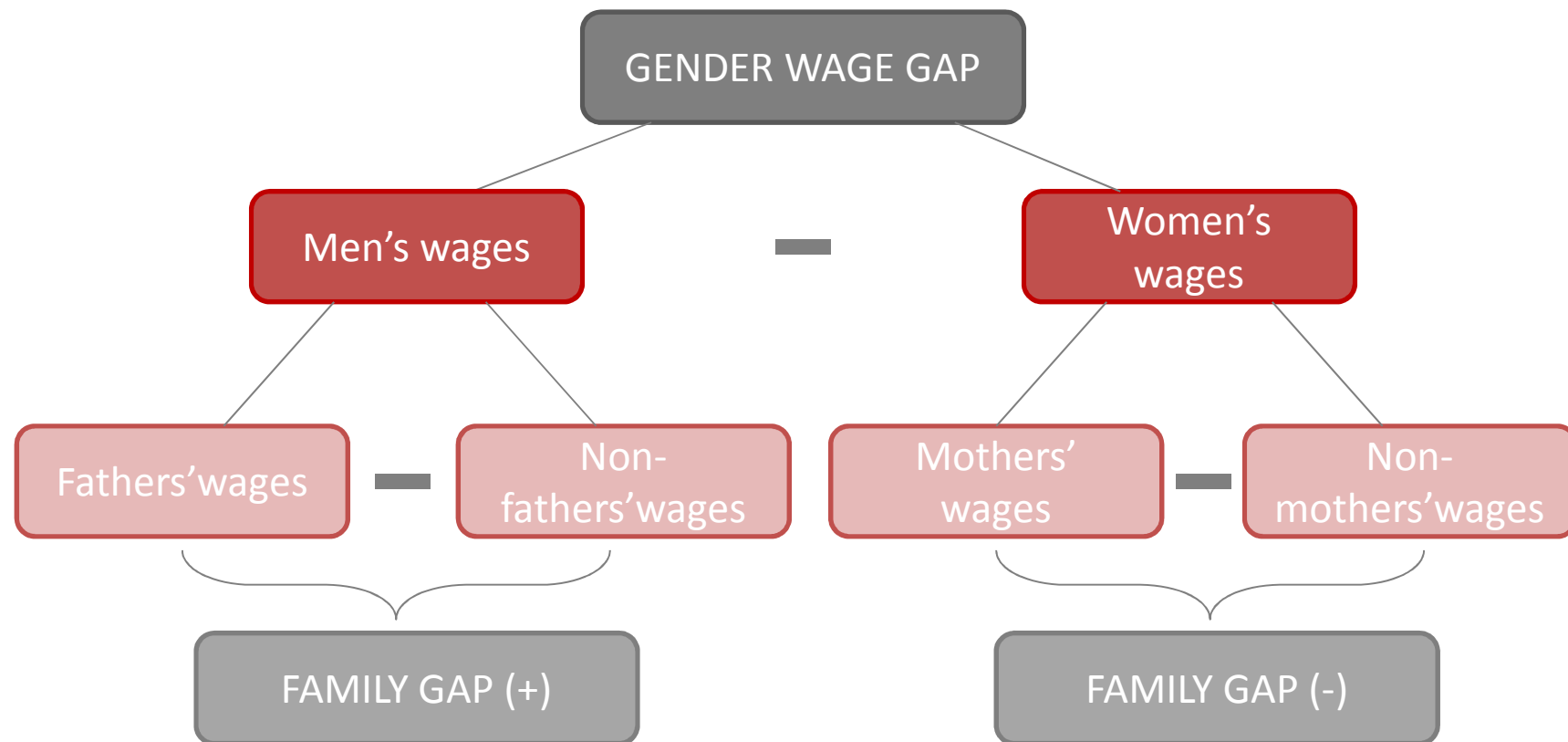
## RESEARCH QUESTIONS

- To what extent institutions and family policies, explain the evolution of the gender wage gap from the point of view of parenthood?
- Which family policies mitigate/increase the wage inequality among mothers and childless women, and consequently contribute towards lower/greater total gender wage inequality?

# MOTIVATION BEHIND THE RESEARCH



# MOTIVATION BEHIND THE RESEARCH




- Comparative studies find that countries differ substantially in the size of the family wage gaps (e.g. Davies and Pierre, 2005, Budig et al., 2012, Boeckmann et al., 2015).
- This country variation is usually assigned to family policies and cultural context.

## RESEARCH METHODS

- Cukrowska-Torzewska, E., Lovász, A. 2016. „Are children driving the gender wage gap? Comparative Evidence from Poland and Hungary”, *The Economics of Transition* 24(2): 259-297.

# RESEARCH METHODS


1) Estimate wage equations for men and women and parent/non-parent by country



Dubin's and McFadden's selection model (1984), which allows correcting for the selection processes that are likely to take place:  
(1) selection into employment; (2) selection into parenthood.

# RESEARCH METHODS

1) Estimate wage equations for men and women and parent/non-parent by country



Dubin's and McFadden's selection model (1984), which allows correcting for the selection processes that are likely to take place:  
(1) selection into employment; (2) selection into parenthood.

2) Decompose the GWG to show the relative contribution of family gaps into the overall gender wage differential.



A modification of the standard Oaxaca-Blinder decomposition (1973).

## RESEARCH METHODS - A modification of OB gender wage gap decomposition

We estimate four different wage equations: 1) for childless women, 2) for mothers, 3) for childless men and 4) for fathers.

Denote separate wage equations for parents and childless individuals as:

$$\ln w_j^c = X_j^c \beta_j^c + u_j^c$$

$c = \{CH, NCH\}$  refers to working parent (CH) and working childless (NCH),

$j = \{f, m\}$  stands to females (f) and males (m).

The mean wage level for men and women is:

$$\text{MEN: } \overline{\ln w_m} = p_m \overline{\ln w_m^{CH}} + (1 - p_m) \overline{\ln w_m^{NCH}}$$

$$\text{WOMEN: } \overline{\ln w_f} = p_f \overline{\ln w_f^{CH}} + (1 - p_f) \overline{\ln w_f^{NCH}}$$

$p_m$  and  $p_f$  are the shares of men and women who have children.



## RESEARCH METHODS - A modification of OB gender wage gap decomposition

Transform mean wages of men and women as:

$$\text{MEN: } \overline{\ln w_m} = p_m \overline{\ln w_m^{CH}} + (1 - p_m) \overline{\ln w_m^{NCH}} \quad \longrightarrow \quad \text{MEN: } \overline{\ln w_m} = p_m (\overline{\ln w_m^{CH}} - \overline{\ln w_m^{NCH}}) + \overline{\ln w_m^{NCH}}$$

$$\text{WOMEN: } \overline{\ln w_f} = p_f \overline{\ln w_f^{CH}} + (1 - p_f) \overline{\ln w_f^{NCH}} \quad \longrightarrow \quad \text{WOMEN: } \overline{\ln w_f} = p_f (\overline{\ln w_f^{CH}} - \overline{\ln w_f^{NCH}}) + \overline{\ln w_f^{NCH}}$$

Incorporate transformed equations to the standard mean gender wage gap decomposition:

$$\underbrace{\overline{\ln(w_m)} - \overline{\ln(w_f)}}_{\text{GENDER WAGE GAP}} = \underbrace{p_m (\overline{\ln w_m^{CH}} - \overline{\ln w_m^{NCH}})}_{\text{FAMILY GAP AMONG MEN}} - \underbrace{p_f (\overline{\ln w_f^{CH}} - \overline{\ln w_f^{NCH}})}_{\text{FAMILY GAP AMONG WOMEN}} + \underbrace{(\overline{\ln w_m^{NCH}} - \overline{\ln w_f^{NCH}})}_{\text{GENDER WAGE GAP AMONG CHILDLESS}}$$

GENDER WAGE  
GAP

FAMILY GAP  
AMONG MEN

FAMILY GAP  
AMONG WOMEN

GENDER WAGE  
GAP AMONG  
CHILDLESS

## RESEARCH METHODS - A modification of OB gender wage gap decomposition

Transform mean wages of men and women as:

$$\text{MEN: } \overline{\ln w_m} = p_m \overline{\ln w_m^{CH}} + (1 - p_m) \overline{\ln w_m^{NCH}} \quad \longrightarrow \quad \text{MEN: } \overline{\ln w_m} = p_m (\overline{\ln w_m^{CH}} - \overline{\ln w_m^{NCH}}) + \overline{\ln w_m^{NCH}}$$

$$\text{WOMEN: } \overline{\ln w_f} = p_f \overline{\ln w_f^{CH}} + (1 - p_f) \overline{\ln w_f^{NCH}} \quad \longrightarrow \quad \text{WOMEN: } \overline{\ln w_f} = p_f (\overline{\ln w_f^{CH}} - \overline{\ln w_f^{NCH}}) + \overline{\ln w_f^{NCH}}$$

Incorporate transformed equations to the standard mean gender wage gap decomposition:

$$\underbrace{\overline{\ln(w_m)} - \overline{\ln(w_f)}}_{\text{GENDER WAGE GAP}} = \underbrace{p_m (\overline{\ln w_m^{CH}} - \overline{\ln w_m^{NCH}})}_{\text{FAMILY GAP AMONG MEN}} \underbrace{(-p_f (\overline{\ln w_f^{CH}} - \overline{\ln w_f^{NCH}}))}_{\text{FAMILY GAP AMONG WOMEN}} + \underbrace{(\overline{\ln w_m^{NCH}} - \overline{\ln w_f^{NCH}})}_{\text{GENDER WAGE GAP AMONG CHILDLESS}}$$

GENDER WAGE  
GAP

FAMILY GAP  
AMONG MEN

FAMILY GAP  
AMONG WOMEN

GENDER WAGE  
GAP AMONG  
CHILDLESS

# DATA

## INDIVIDUAL LEVEL DATA:

- EU-SILC cross-sectional harmonized data for 25 European countries.
- Sample: individuals aged 25-59 in full-time employment.
- Time: 2004-2013 (varies by country)

# DATA

## INDIVIDUAL LEVEL DATA:

- EU-SILC cross-sectional harmonized data for 25 European countries.
- Sample: individuals aged 25-59 in full-time employment.
- Time: 2004-2013 (varies by country)

## INSTITUTIONAL AND FAMILY POLICIES DATA:

- Several data sources: World Bank, Eurostat, Eurobarometer, OECD Family database, Multilinks database.

## DATA – DATA PROBLEMS

# DATA – DATA PROBLEMS

## THE HOURLY WAGE RATE

- Income measures:
  - (1) monthly earnings at the time of the interview
  - (2) employee cash or near cash income received during an income reference period
- Usual hours of work per week (at the time of an interview)

# DATA – DATA PROBLEMS

## THE HOURLY WAGE RATE

- Income measures:
  - (1) monthly earnings at the time of the interview
  - (2) employee cash or near cash income received during an income reference period
- Usual hours of work per week (at the time of an interview)



NOT AVAILABLE  
FOR ALL THE COUNTRIES

# DATA – DATA PROBLEMS

## THE HOURLY WAGE RATE

- Income measures:
  - (1) monthly earnings at the time of the interview
  - (2) employee cash or near cash income received during an income reference period
- Usual hours of work per week (at the time of an interview)

NOT AVAILABLE  
FOR ALL THE COUNTRIES

APPROACH: **FOCUS ON FULL-TIME WORKERS ONLY**

HOURLY WAGE DEFINED AS:

$$\text{WAGE} = ((\text{income received during IRP}) / 12) / (\text{usual hours of work per week} * 4)$$



# DATA – DATA PROBLEMS

## THE HOURLY WAGE RATE

- Income measures:
  - (1) monthly earnings at the time of the interview
  - (2) employee cash or near cash income received during an income reference period
- Usual hours of work per week (at the time of an interview)

## THE PRESENCE OF A CHILD

- A child is a person who is living in the same household as parents and who is below 25 years old
- A parent is a person for whom a child indicates „mother/father ID”

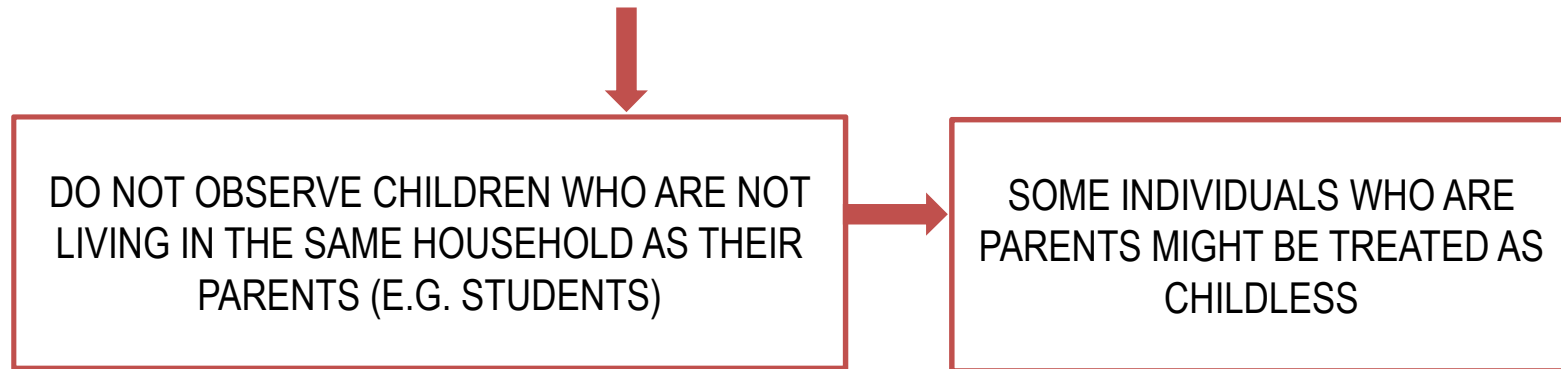
# DATA – DATA PROBLEMS

## THE HOURLY WAGE RATE

- Income measures:
  - (1) monthly earnings at the time of the interview
  - (2) employee cash or near cash income received during an income reference period
- Usual hours of work per week (at the time of an interview)

## THE PRESENCE OF A CHILD

- A child is a person who is living in the same household as parents and who is below 25 years old
- A parent is a person for whom a child indicates „mother/father ID”



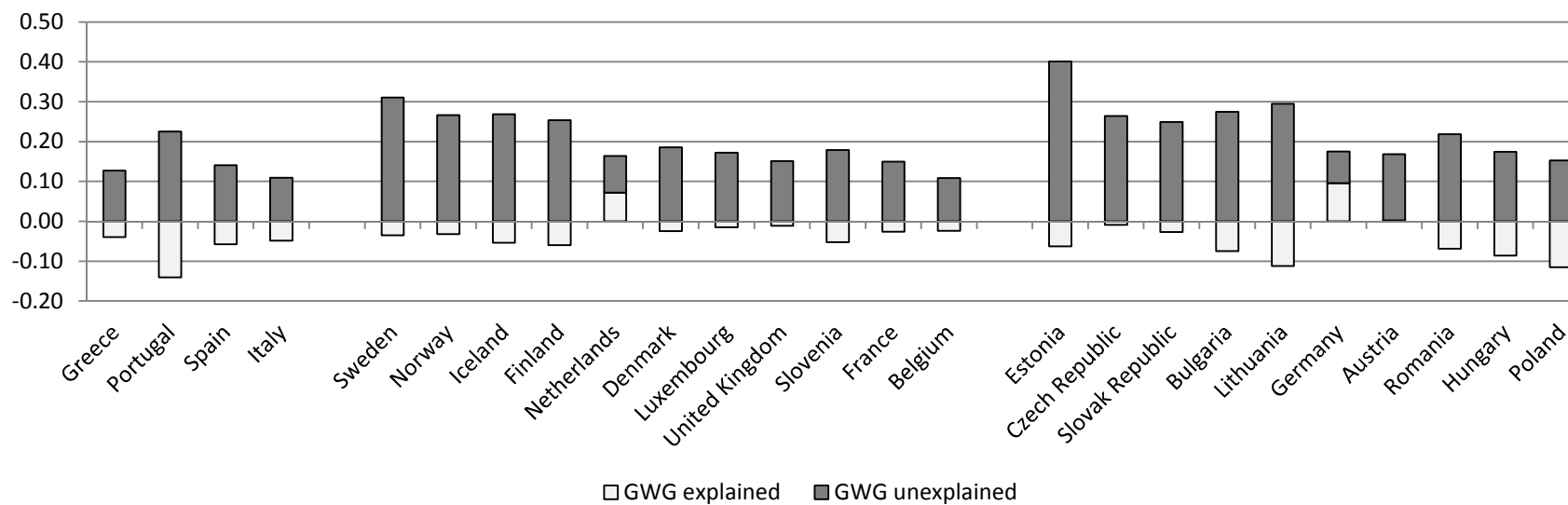
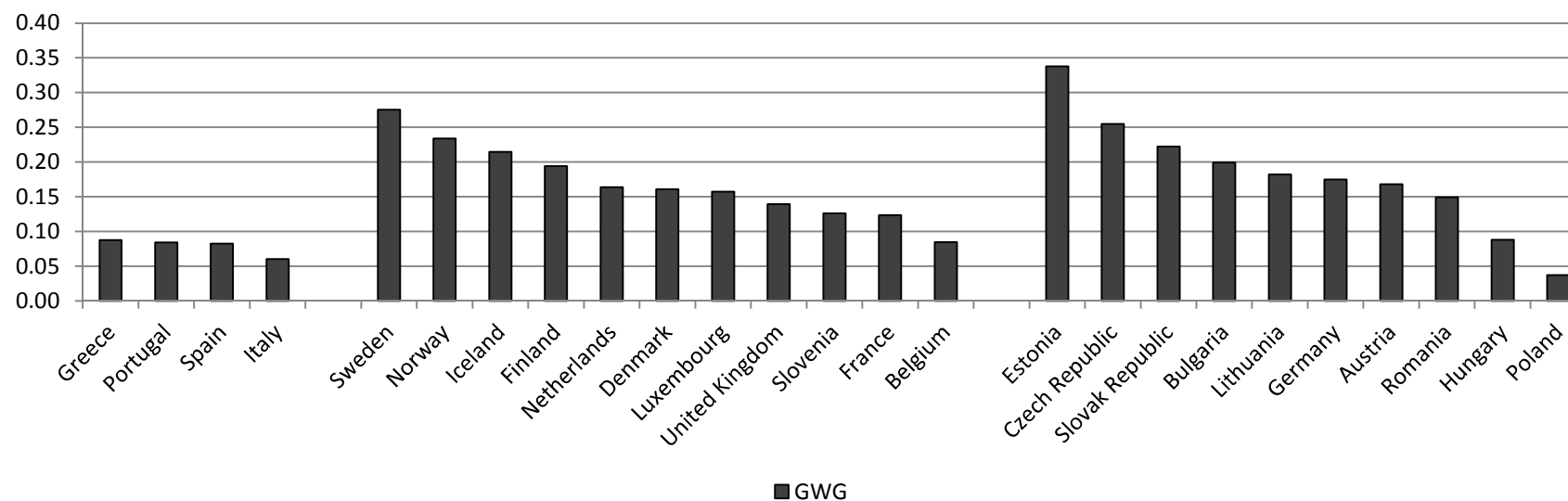
# RESULTS

Group	Country	Employment to population ratio (%)		Part-time employment (%)		Culture 1	Culture 2	Length leaves (weeks)				Childcare coverage		Familization of policies
		Female	Male	Female	Male			Total	Maternity	Parental	Paternity	Aged 0-3	Aged 3-6	Type
Source		Eurostat				Eurobarometer		OECD + Multilinks				Eurostat		Leitner (2003)
A	Italy	46	69	28	5	71%	43%	47.67	21.67	26	0	25	91	optional
	Greece	47	71	10	3	55%	30%	33.25	17	16.25	0	12	68	explicit/implicit
	Spain	53	69	23	5	58%	35%	16	16	0	2	37	92	defamilization
	Portugal	61	71	16	8	57%	24%	25.79	11.79	14.00	13	33	73	optional
B	Sweden	71	75	40	13	30%	6%	67	15.57	51.43	10	51	93	optional
	Denmark	72	79	36	14	22%	14%	64	18	46	2	73	94	optional
	UK	65	76	43	11	37%	25%	52	52	0	2	33	87	defamilization
	Slovenia	62	70	12	8	47%	25%	49	15	34	18	32	86	optional
	Norway	74	78	43	14	N/A	N/A	46.75	9	37.75	8	39	83	optional
	France	60	69	30	6	31%	14%	42	16	26	2	37	95	optional
	Luxembourg	56	73	37	4	36%	18%	42	16	26	26	33	70	optional
	Finland	68	71	19	9	37%	23%	41.80	17.5	24.3	8	27	77	optional
	Netherlands	69	81	76	24	20%	16%	29	16	13	13	47	89	optional
	Belgium	56	68	42	8	36%	26%	28.54	15	13.54	16	41	99	optional
Iceland	79	84	34	10	N/A	N/A	26	13	13	13	40	97	optional	
C	Czech Rep.	57	74	9	2	51%	35%	214	28	186	0	3	70	explicit
	Slovak Rep.	53	67	5	2	51%	48%	164	29.50	134.5	0	3	71	explicit
	Estonia	64	69	13	5	38%	21%	150	20	130	2	18	88	explicit
	Austria	64	76	42	8	58%	41%	138	16	122	16	9	76	explicit
	Germany	64	75	45	8	52%	26%	109.15	14	95.15	4	20	89	explicit
	Bulgaria	57	64	3	2	66%	38%	107.57	33.86	73.71	2	9	65	explicit
	Hungary	51	62	7	4	71%	48%	108	24	84	1	8	76	explicit
	Lithuania	61	63	10	7	52%	26%	106	18	88	6	11	63	explicit
	Romania	52	66	11	9	63%	37%	106	18	88	1	7	57	explicit
	Poland	51	64	12	6	57%	40%	19.50	19.5	0	1	3	36	implicit

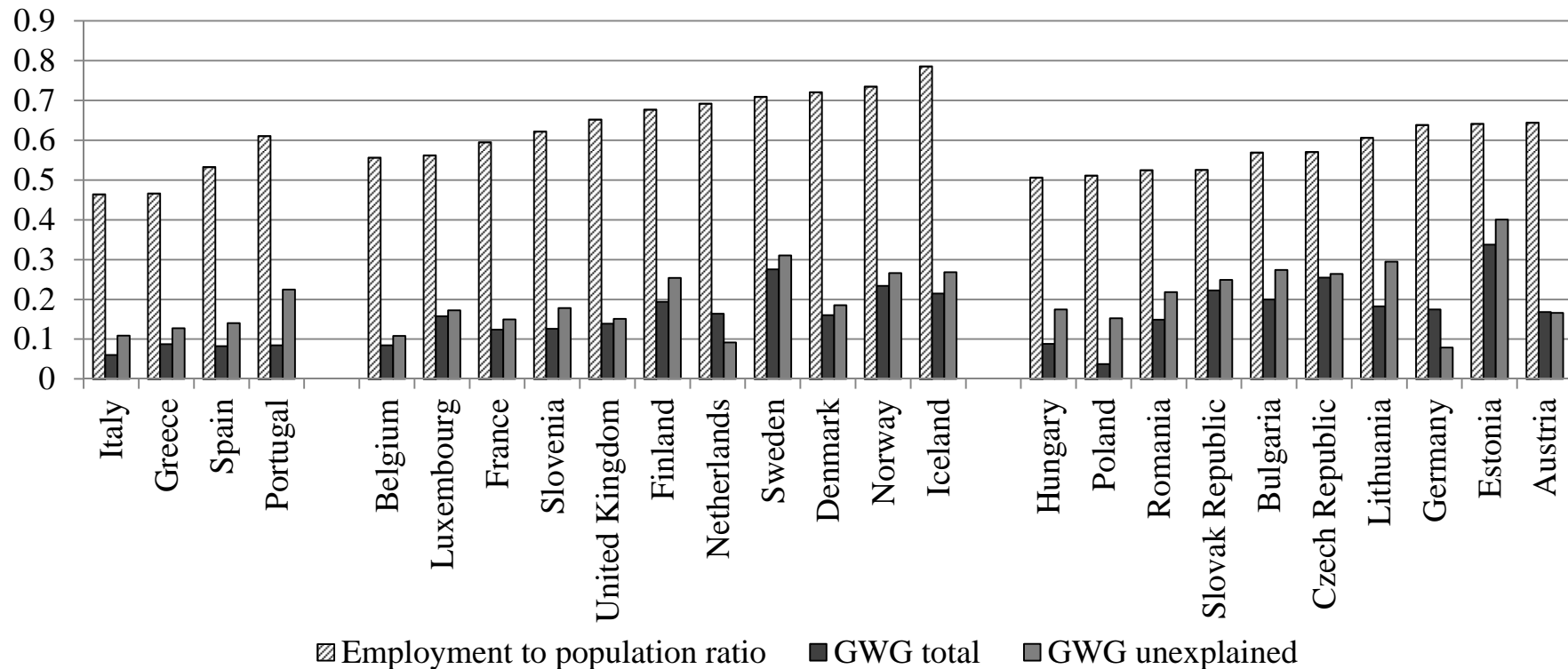
Culture 1: Share of individuals that agree with the statement that overall men are less competent than women to perform household tasks

Culture 2: Share of individuals that agree with the statement that a father must put his career ahead of looking after his young child

# RESULTS – GENDER WAGE GAP ESTIMATES



## RESULTS – GENDER WAGE GAP ESTIMATES

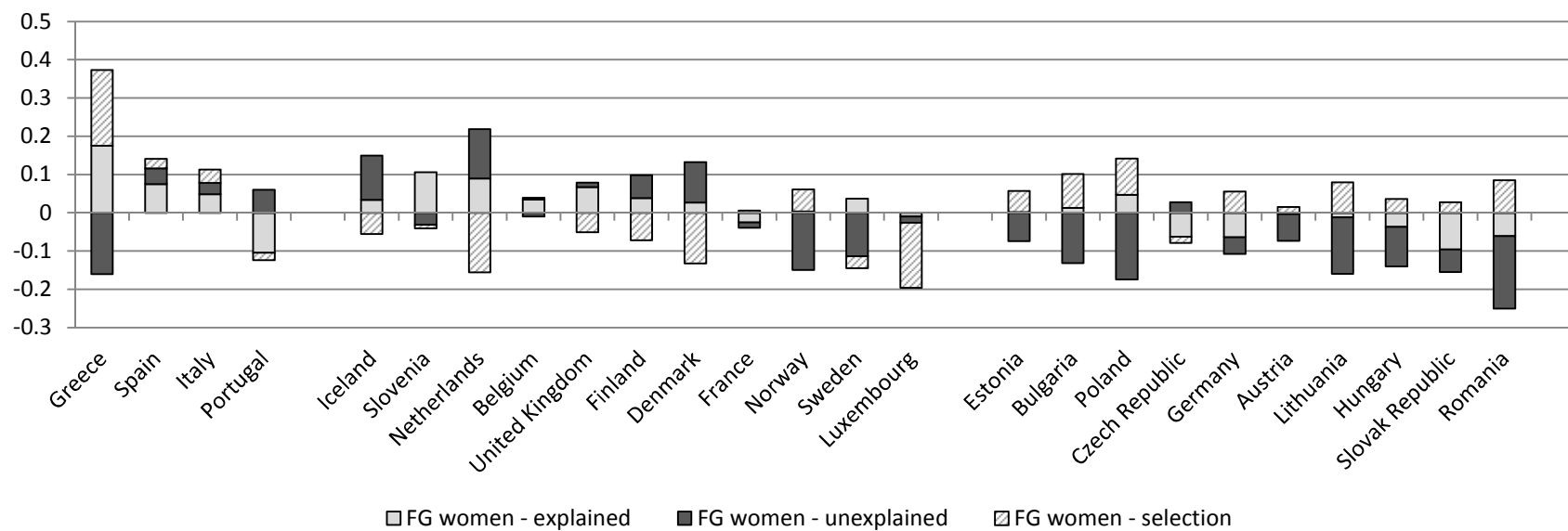
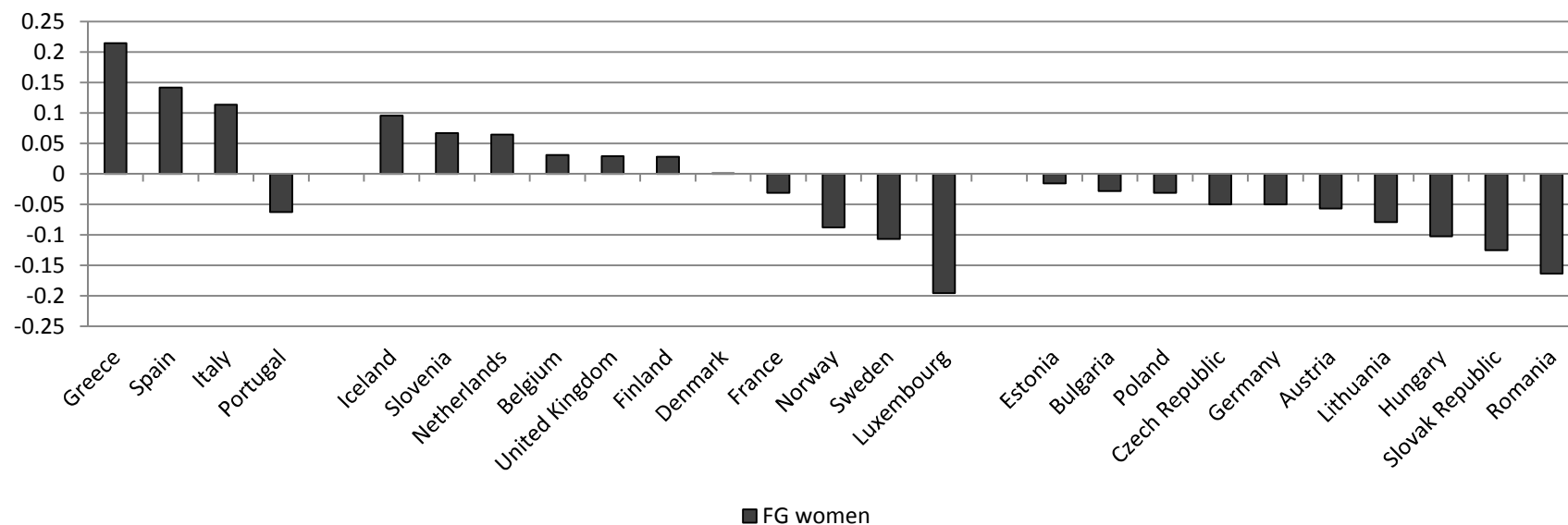


**Group A:** not all the women work, employed women are relatively highly skilled and highly paid → lower GWG

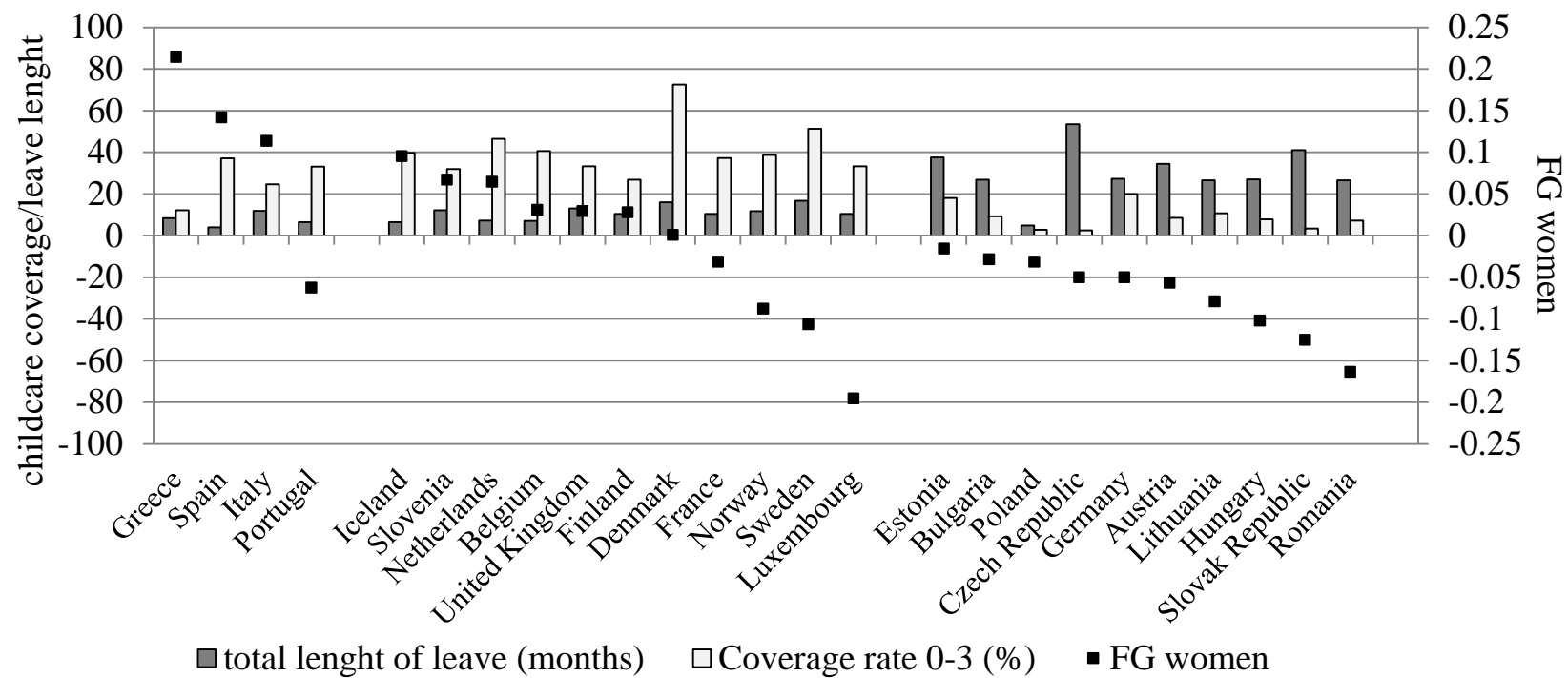
**Group C:** some evidence that countries with the lowest GWGs also display relatively lower employment rates.

→ Labor market selection as a mechanism behind low gender wage inequality

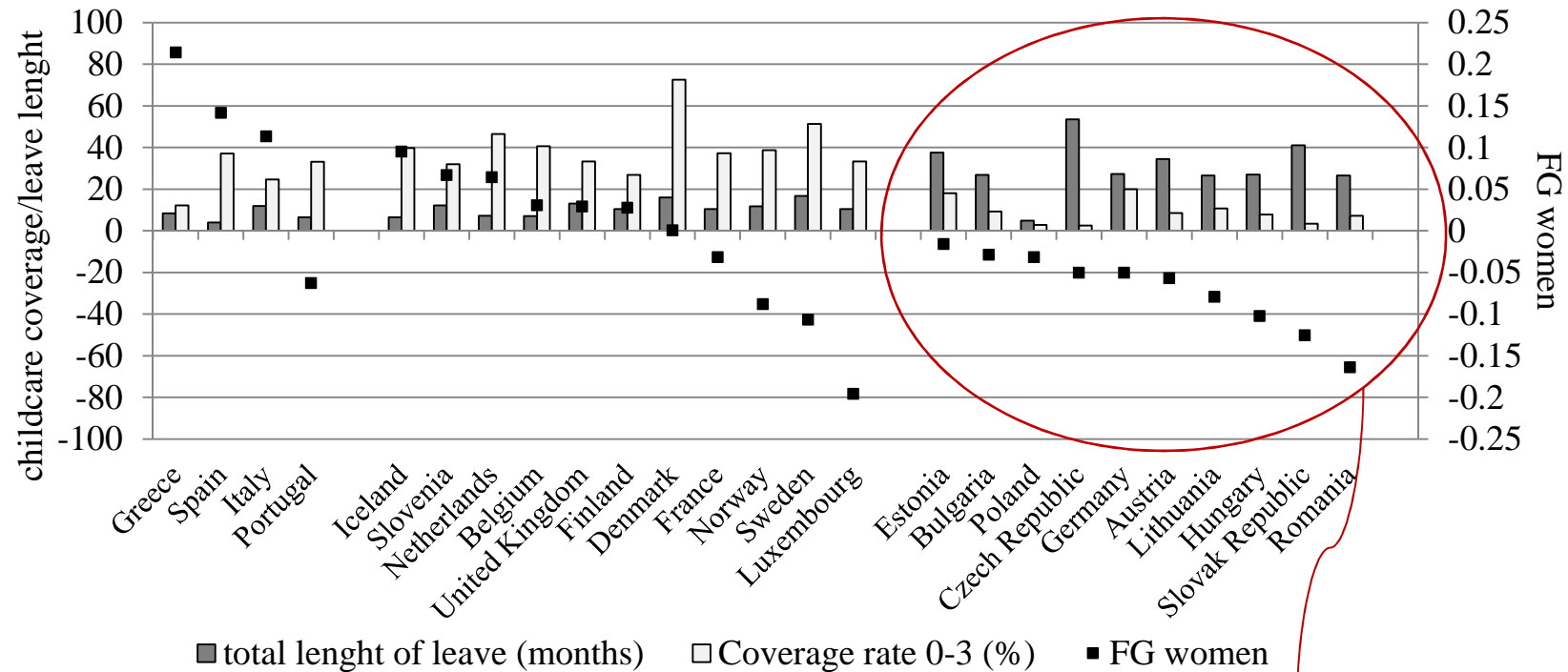
# RESULTS – FAMILY GAP AMONG WOMEN



## RESULTS – FAMILY GAP AMONG WOMEN



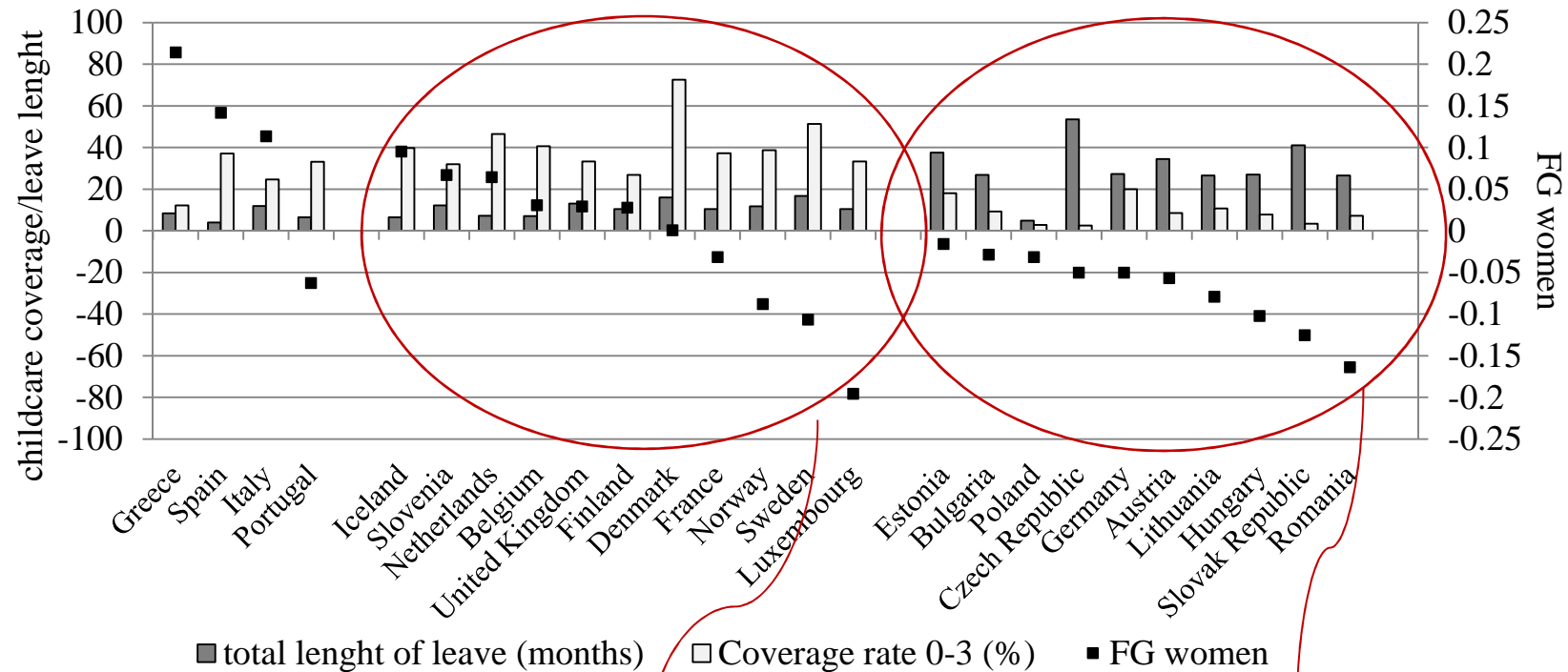
## RESULTS – FAMILY GAP AMONG WOMEN



**Group C:** negative gaps, even when selection is accounted. Family policies: long paid leaves + low accessibility of childcare institutions + traditional gender roles → these may lead to mothers' long absences from work and thus to their lower wages.



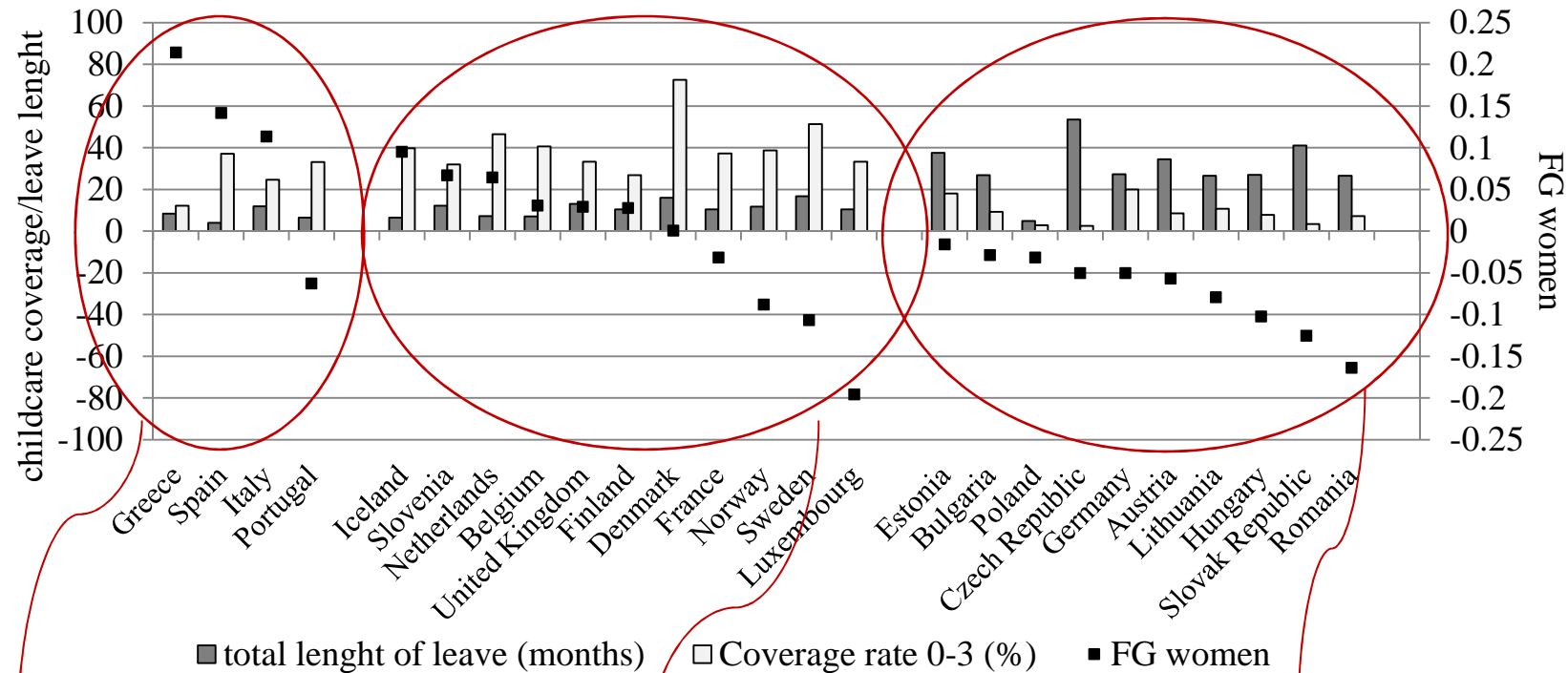
## RESULTS – FAMILY GAP AMONG WOMEN



**Group B:** high variation in gaps; no apparent relation to family policies

**Group C:** negative gaps, even when selection is accounted. Family policies: long paid leaves + low accessibility of childcare institutions + traditional gender roles → these may lead to mothers' long absences from work and thus to their lower wages.

## RESULTS – FAMILY GAP AMONG WOMEN

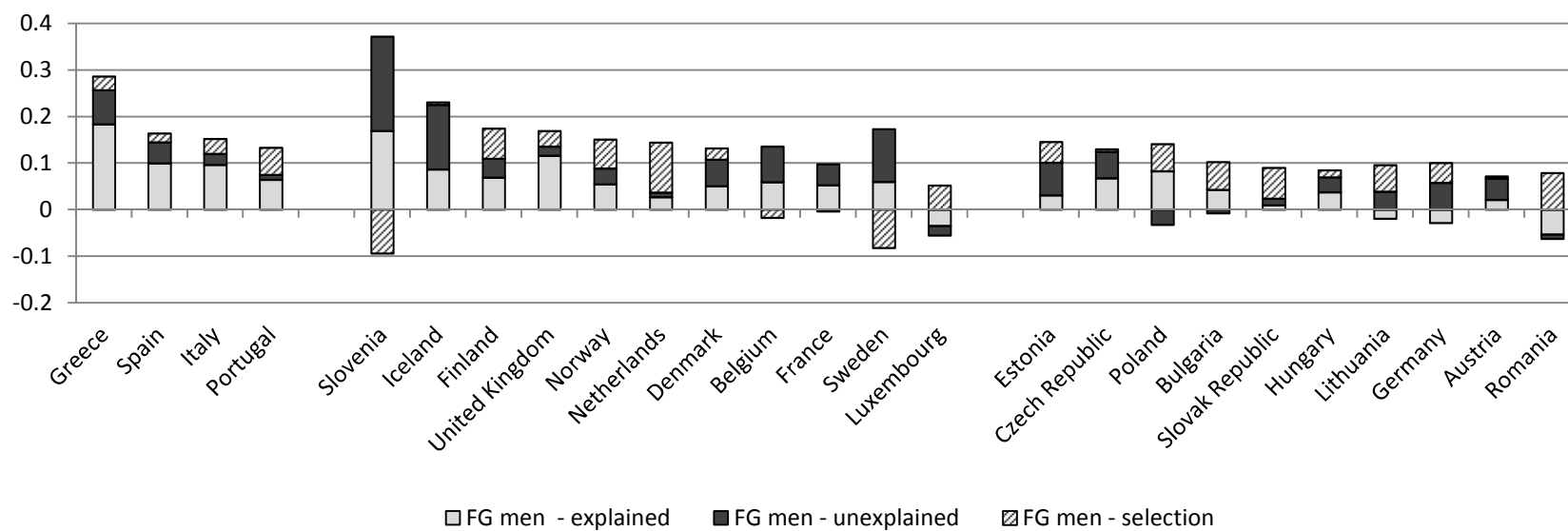
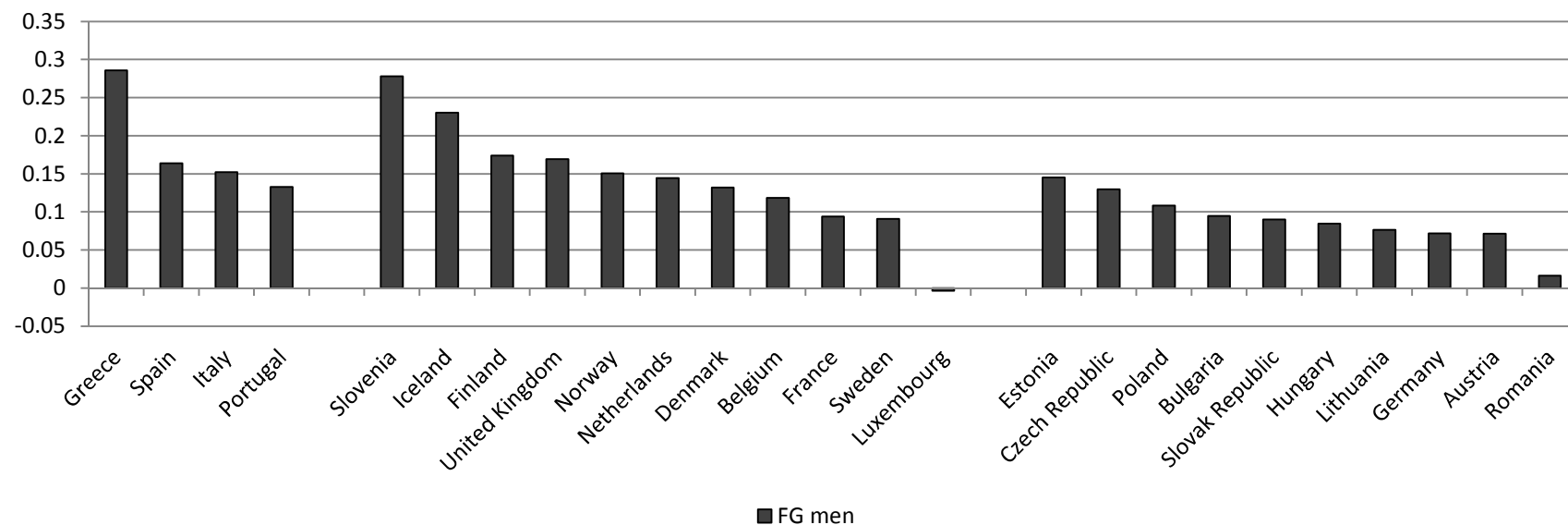


**Group A:** mostly positive estimates; partially due to selection → mothers who work are likely to be especially career-oriented, highly skilled, and thus well paid.

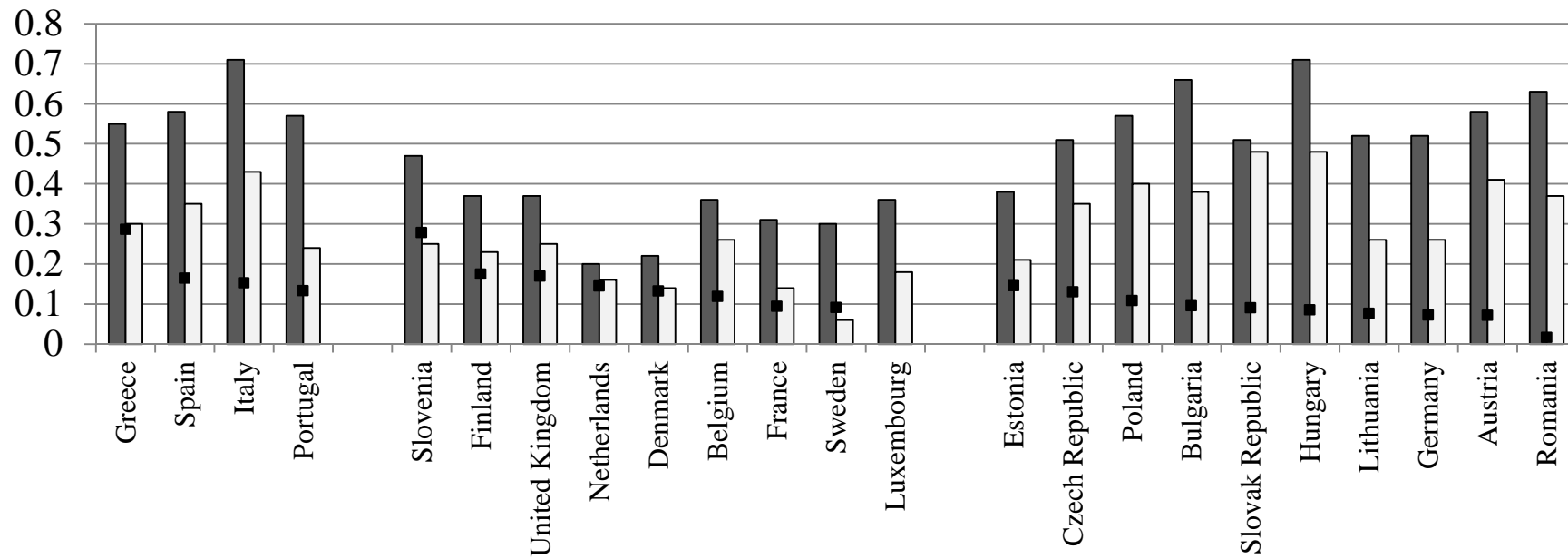
**Group B:** high variation in gaps; no apparent relation to family policies

**Group C:** negative gaps, even when selection is accounted. Family policies: long paid leaves + low accessibility of childcare institutions + traditional gender roles → these may lead to mothers' long absences from work and thus to their lower wages.

# RESULTS – FAMILY GAP AMONG MEN



## RESULTS – FAMILY GAP AMONG MEN

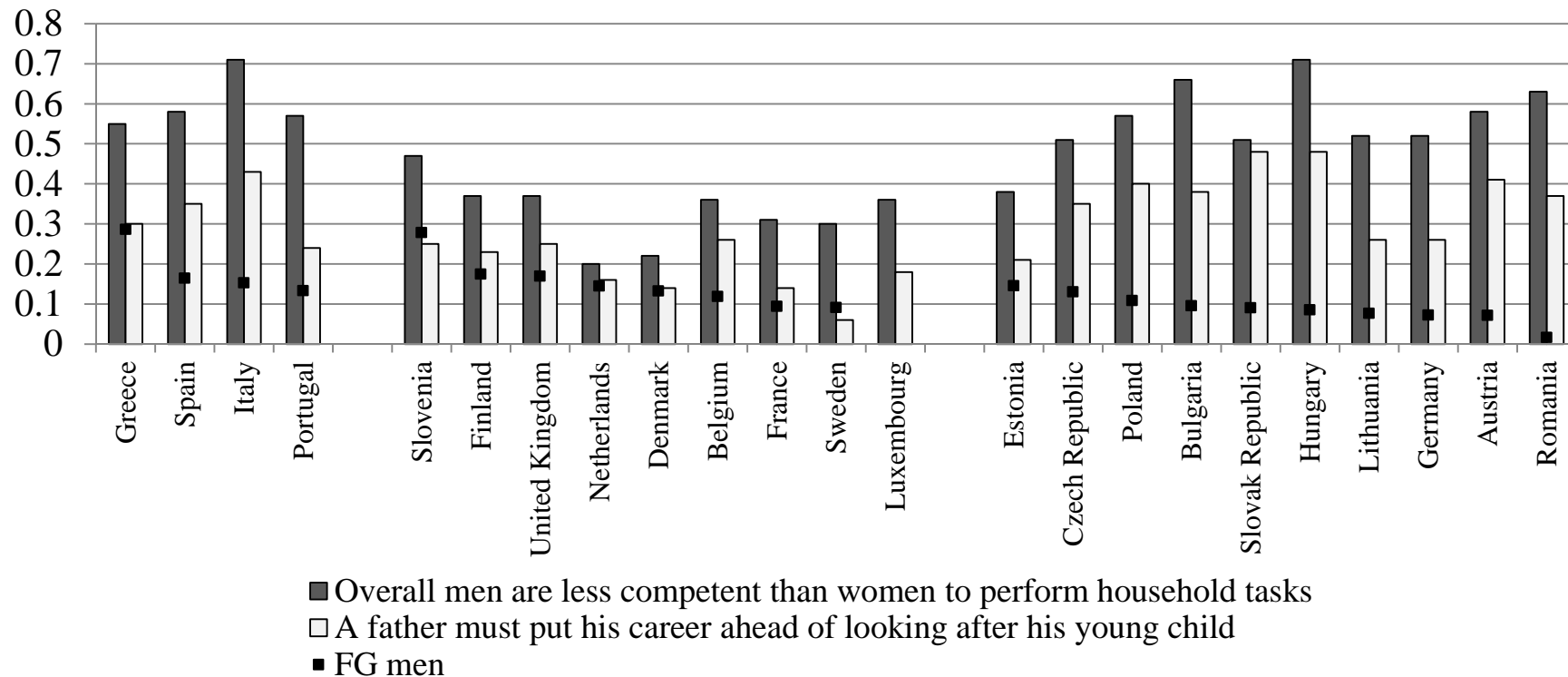


■ Overall men are less competent than women to perform household tasks

□ A father must put his career ahead of looking after his young child

■ FG men

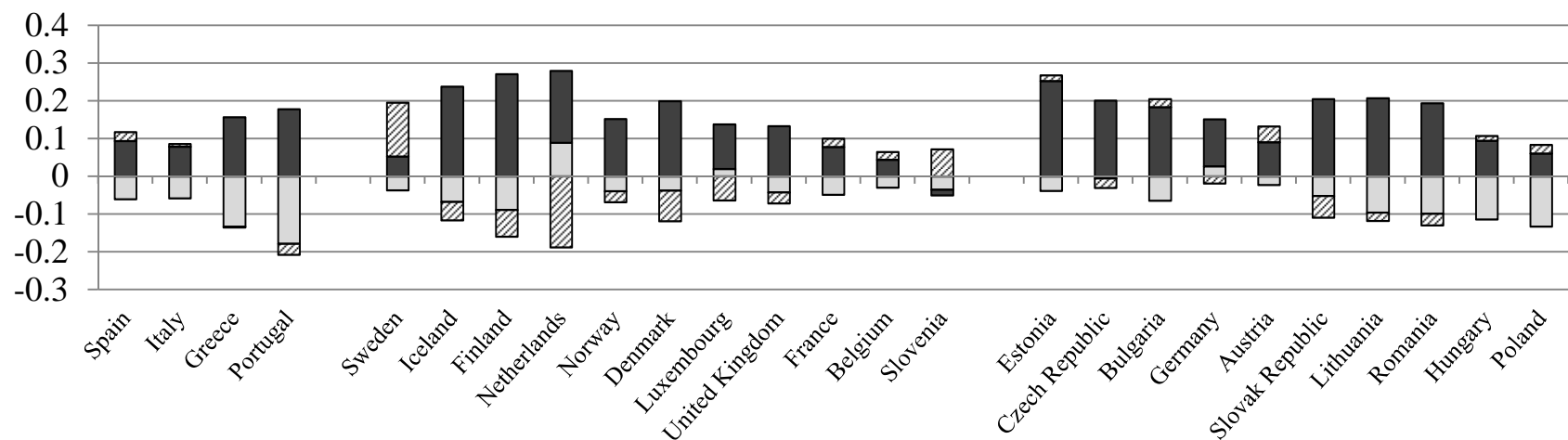
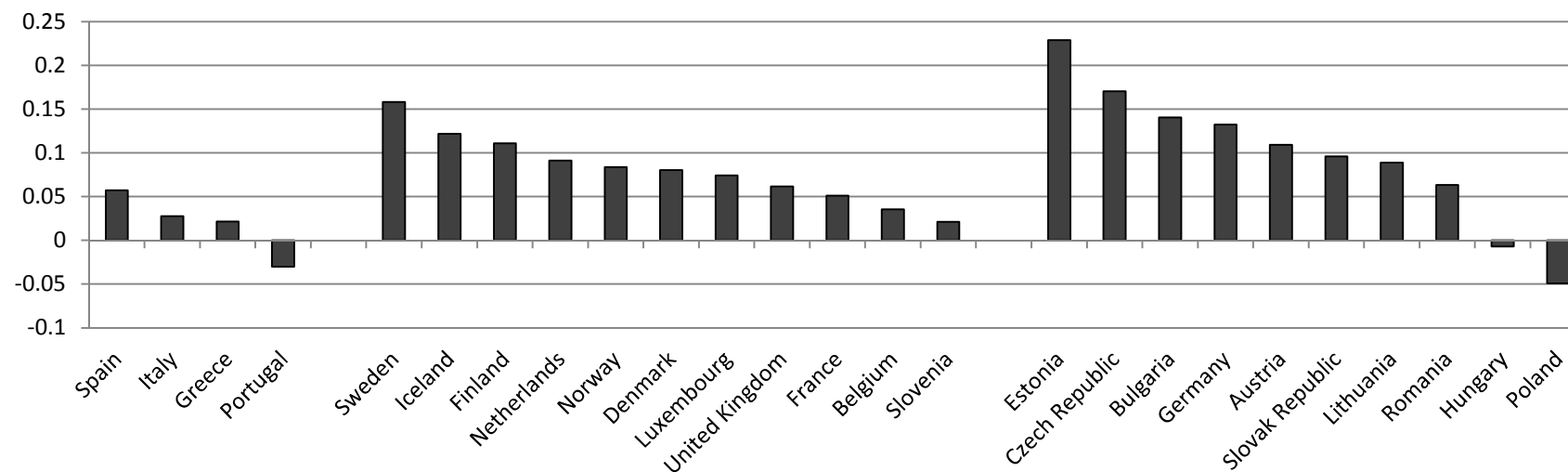
## RESULTS – FAMILY GAP AMONG MEN



In almost all countries a positive fatherhood wage premium; only partially due to the selection.

Differences among the groups of countries with respect to cultural attitudes towards men's role in the childcare do not seem to provide an explanation for the emerging patterns.

## RESULTS – GWG AMONG CHILDLESS

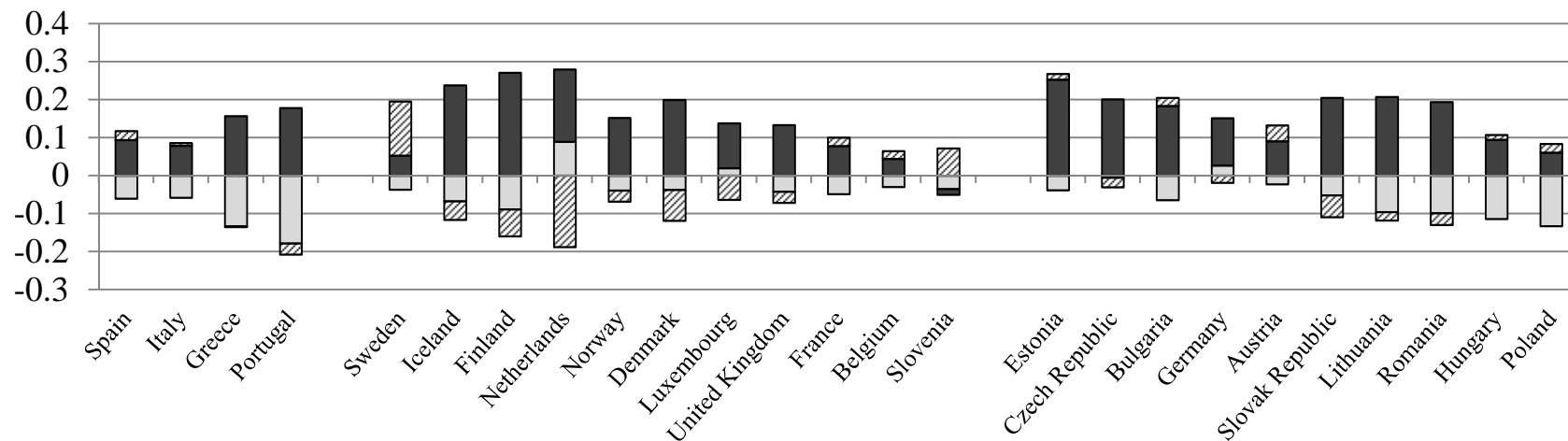
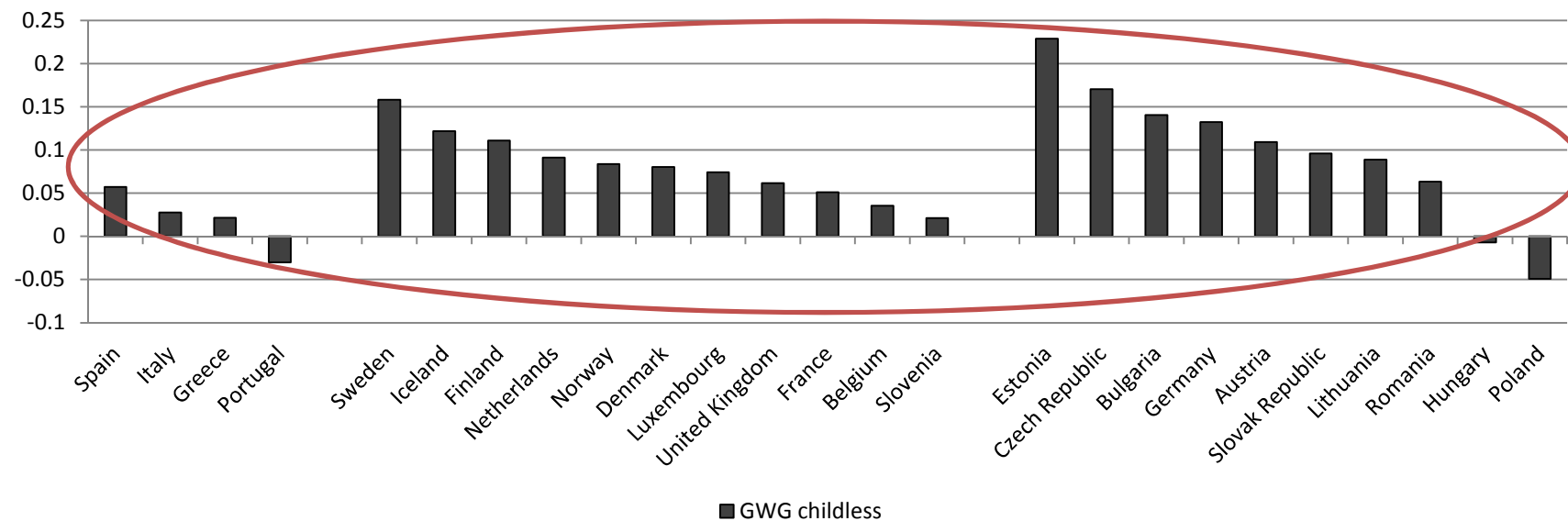


□ GWG childless - explained

■ GWG childless - unexplained

▨ GWG childless - selection

## RESULTS – GWG AMONG CHILDLESS

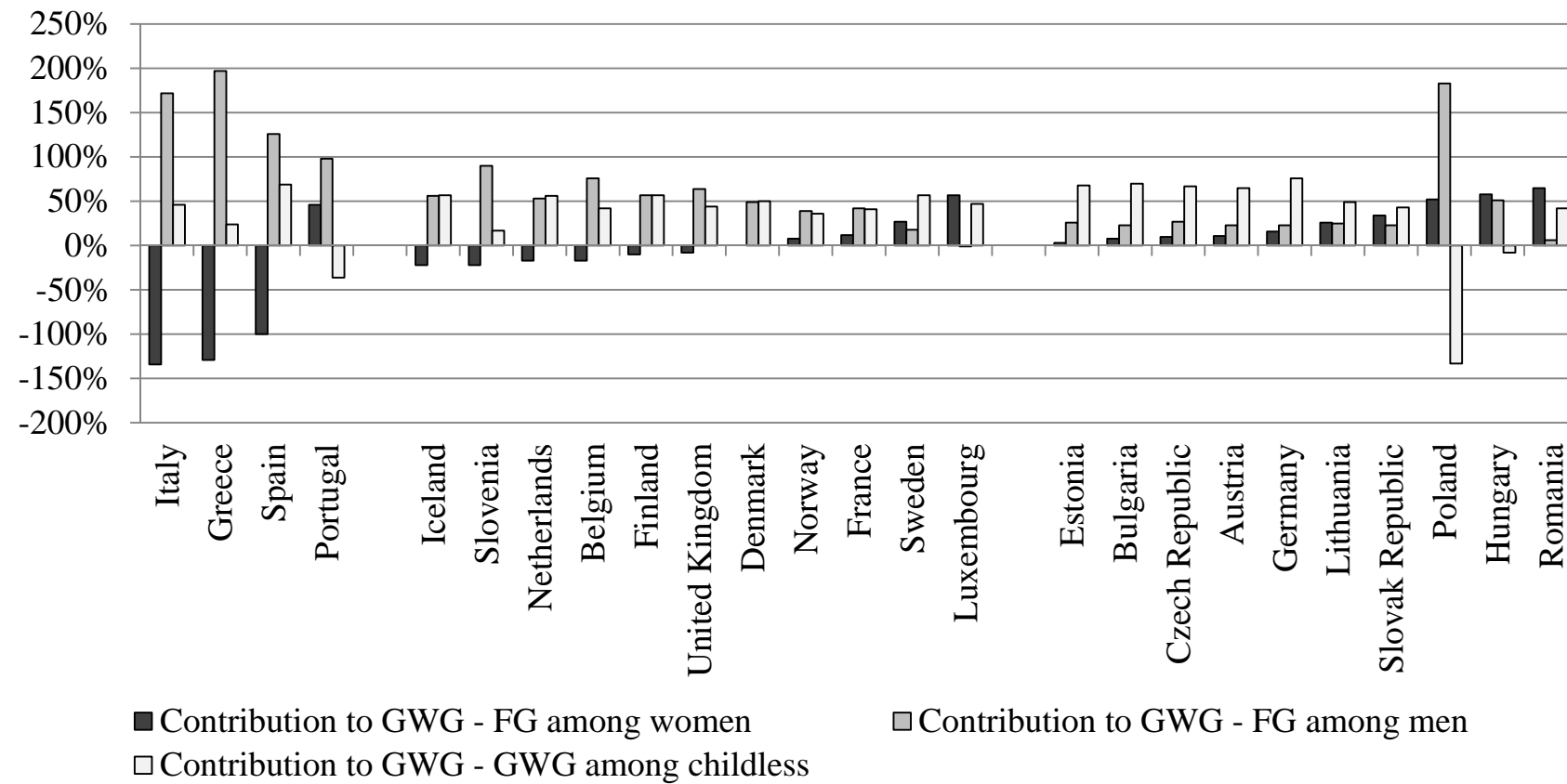


□ GWG childless - explained

■ GWG childless - unexplained

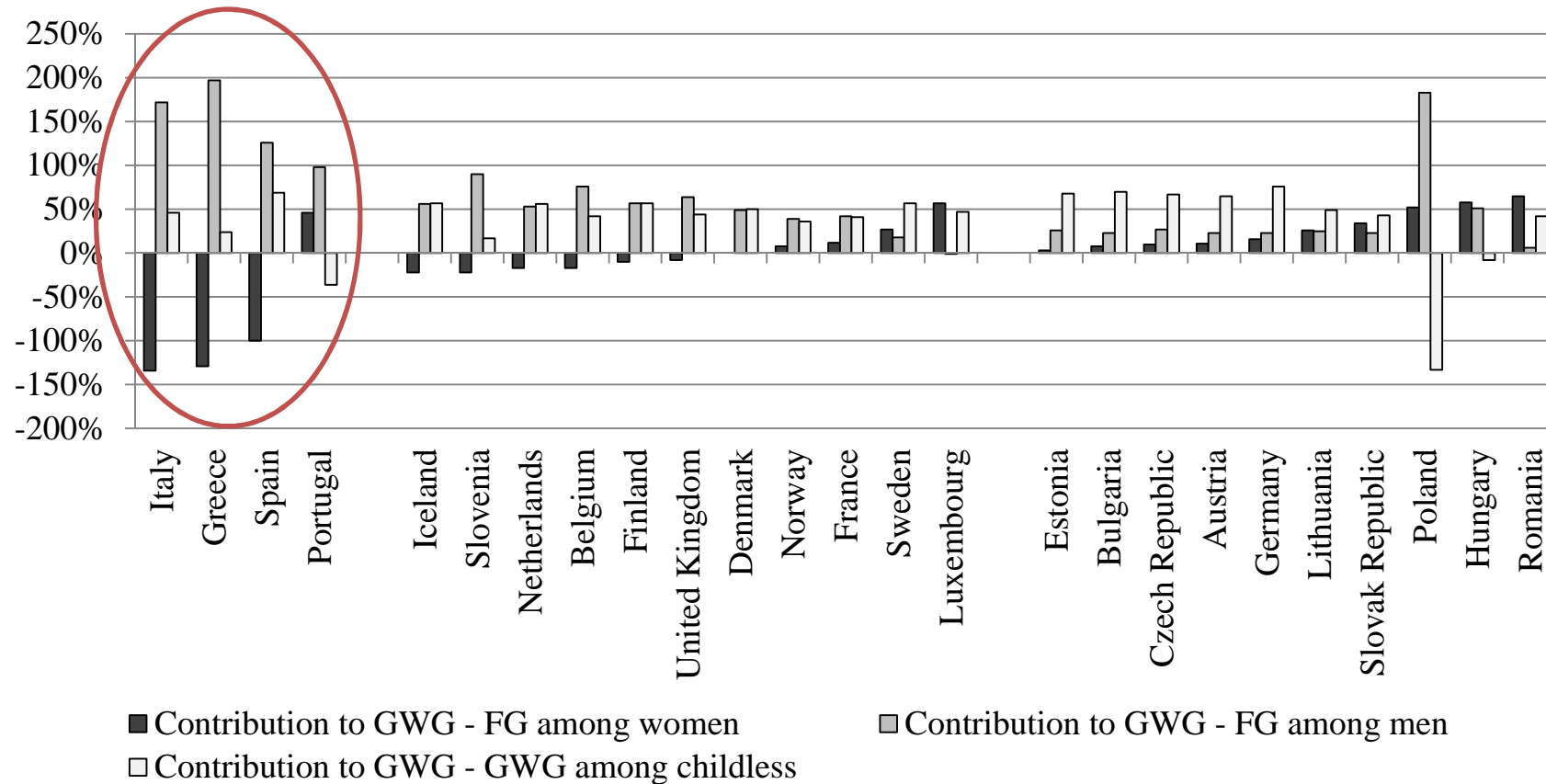
▨ GWG childless - selection

**RESULTS** - The contributions of the family gaps among women and men, and the gender gap among childless to the overall gender wage gap





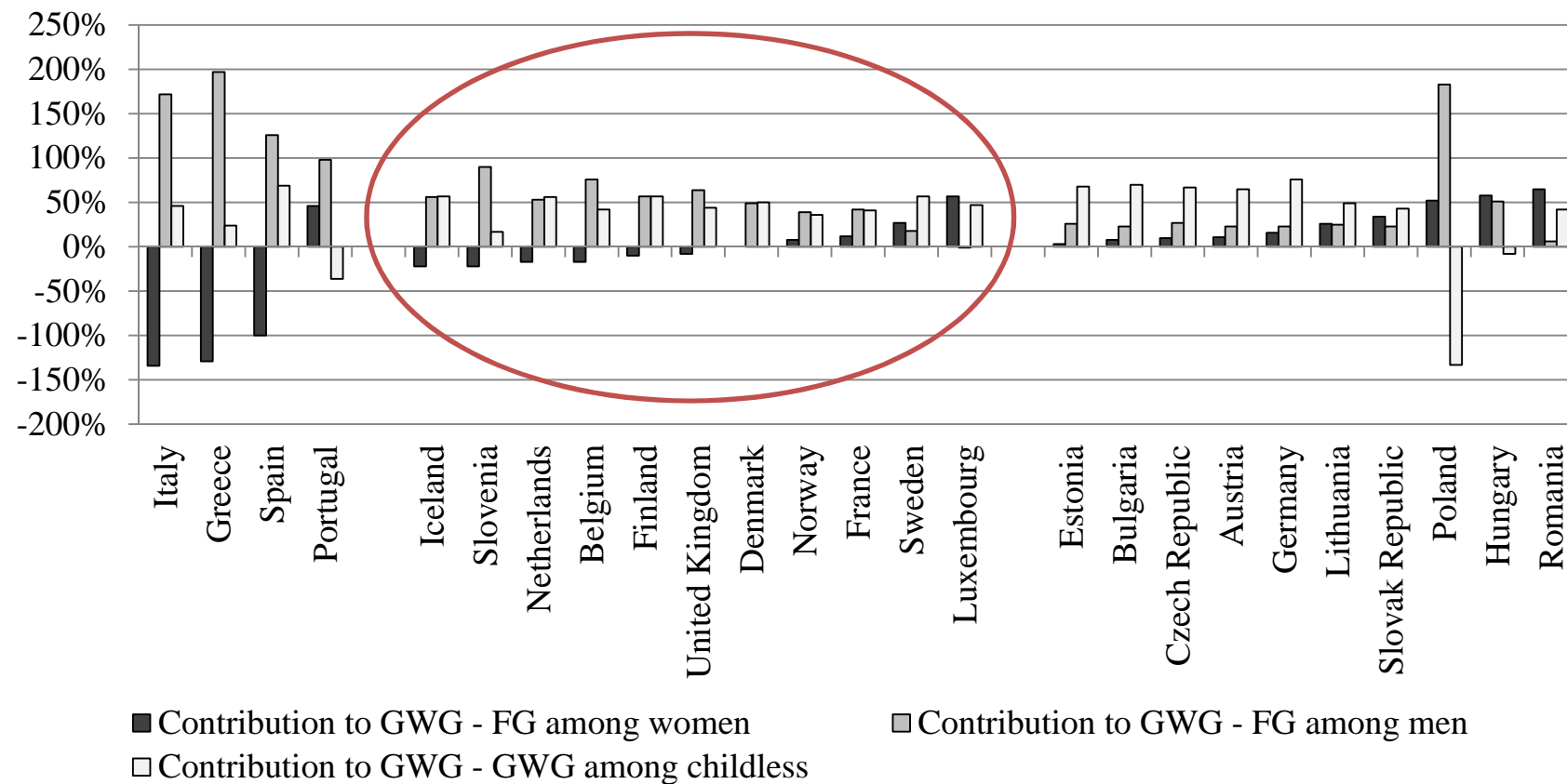
**RESULTS** - The contributions of the family gaps among women and men, and the gender gap among childless to the overall gender wage gap



**Group A:** GWG mostly driven by positive FG among MEN.

The FG among WOMEN is also positive, meaning that motherhood increases women's average wages, and thus it contributes towards decreasing overall GWG → partially due to selection.

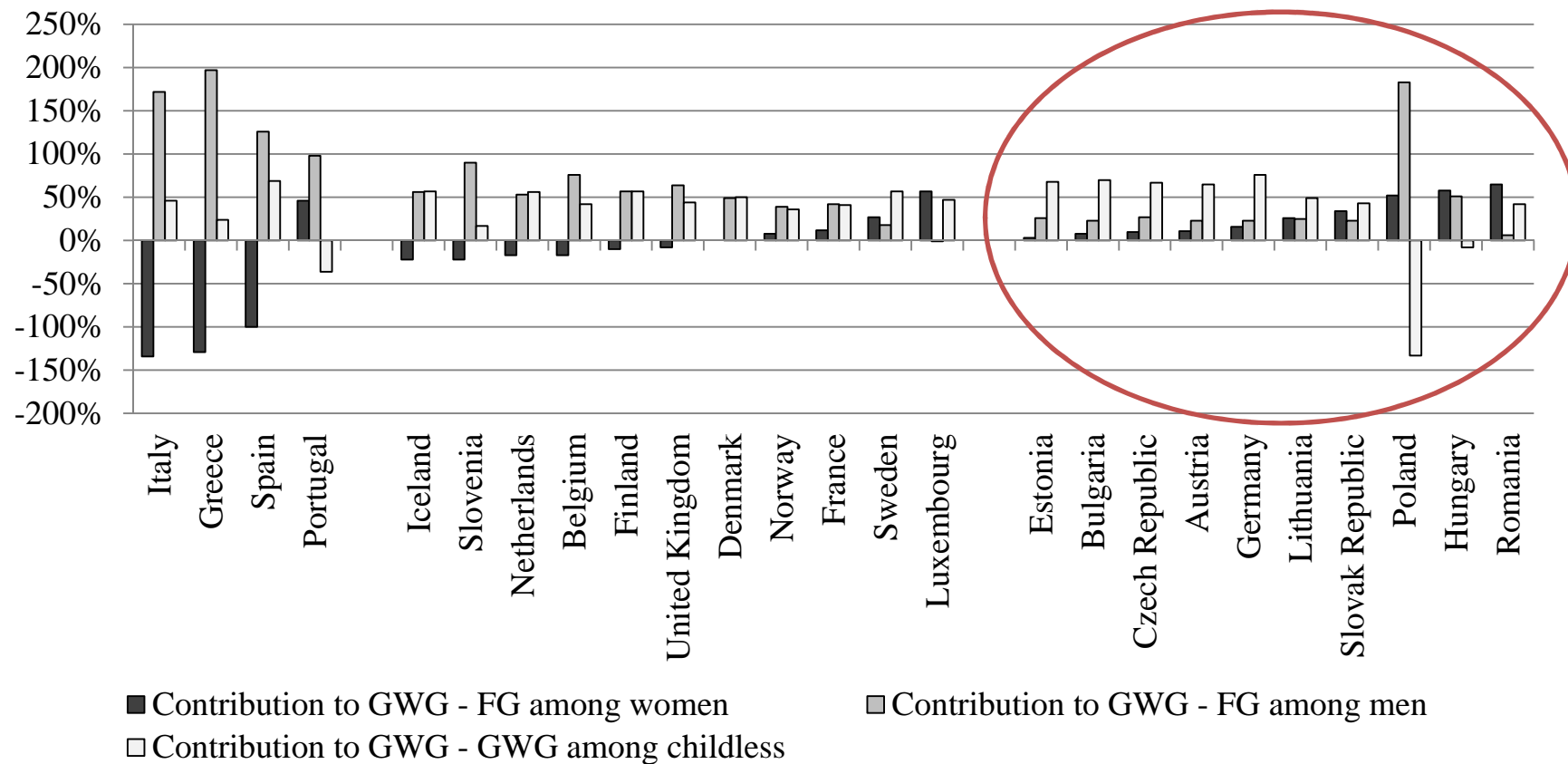
**RESULTS** - The contributions of the family gaps among women and men, and the gender gap among childless to the overall gender wage gap



**Group B:** GWG mostly driven by positive FG among MEN and GWG among childless.

The role of FG among WOMEN is rather small → the role of institutional incentives to combine work and family obligations (flexible LM, relatively easy access to childcare, moderate length leaves)

**RESULTS** - The contributions of the family gaps among women and men, and the gender gap among childless to the overall gender wage gap



**Group C:** GWG mostly driven by FG among MEN and FG among WOMEN.

Parenthood is an important factor contributing towards the divergence of men's and women's wages.

The role of FG among women is the greatest here → the role of institutions, i.e. family policies that explicitly support mothers in their caring function for children (long leaves, very low access to childcare), traditional gender norms, inflexible LM.

## CONCLUSIONS

- **Southern European countries:** low female employment coexisting with low GWG and positive FG among women

Importance of women's and mothers' selection to work

- **Western European countries (+Slovenia):** FG among women varies and is not a significant contributor to the overall GWG

Policies, cultural norms and LM characteristics supportive of maternal employment

- **Central and Eastern European countries (+Austria and Germany):** FG among women is significant and the most important contributor to the overall GWG

Policies, cultural norms and LM characteristics unsupportive of maternal employment

- **All countries:** The fatherhood premium is an important contributor to the GWG.

THE NEED OF POLICIES ENCOURAGING THE GREATER INVOLVEMENT OF FATHERS IN CHILDCARE DUTIES FOR ACHIEVING GENDER EQUALITY

THANK YOU FOR YOUR KIND ATTENTION!

[ecukrowska@wne.uw.edu.pl](mailto:ecukrowska@wne.uw.edu.pl)

[lovasz.anna@krtk.mta.hu](mailto:lovasz.anna@krtk.mta.hu)

## RESEARCH METHODS 1 - Estimation of the wage equations

- Formally the choice of employment-parenthood is given by the a multinomial logit model of a form:

$$Y_{s,j}^* = X_{s,j} \vartheta_{s,j} + \omega_{s,j} ,$$

Where  $j = \{f, m\}$  refers to females ( $f$ ) and males ( $m$ ) and  $s = \{1, 2, 3, 4\}$  denotes four possible alternatives.

- And the wage equation for each possible combination of employment- parenthood decision is:

$$Y_{s,j} = X_{s,j} \beta_{s,j} + U_{s,j} .$$

- The problem occurs because of the correlation of the error terms. When the relation between the error terms is assumed linear then:

$$E(u_{1,j} | \omega_{1,j}, \dots, \omega_{s,j}) = \sigma \frac{\sqrt{6}}{\pi} \sum_{s=1}^S r_{s,j} (\omega_{s,j} - E(\omega_{s,j})) ,$$

## RESEARCH METHODS 1 - Estimation of the wage equations

It can be shown that if the relation between the error terms is linear and the error terms of selection equations are identically Gumbel distributed (modeled by multinomial logit) then expected value of these errors can be expressed as:

$$E(\omega_{1,j} - E(\omega_{1,j})) | Y_{1,j} > \max_{t \neq s}(Y_{t,j}) = -\ln(P_{1,j});$$

$$E(\omega_{s,j} - E(\omega_{s,j})) | Y_{1,j} > \max_{t \neq s}(Y_{t,j}) = \frac{P_{s,j} \ln(P_{s,j})}{1 - P_{s,j}};$$

Where  $P_s = P(Y_s > \max_{j \neq s}(Y_j))$

Then the outcome equation conditional on choosing  $s=1$  is:

$$Y_{1,j} = x_{1,j}\beta_{1,j} + \underbrace{\sigma \frac{\sqrt{6}}{\pi} \sum_{s=2}^S r_{s,j} \left[ \frac{P_{s,j} \ln(P_{s,j})}{1 - P_{s,j}} + \ln(P_{1,j}) \right]}_{\text{In practice we have 3 correction terms representing the correlations of error terms from each outcome and selection equation.}} + v_{1,j}.$$

In practice we have 3 correction terms representing the correlations of error terms from each outcome and selection equation.

## RESEARCH METHODS 1 - Estimation of the wage equations

To estimate DMF model we need to have some variables that would allow it's identification (i.e. exclusion restrictions).

For the identifaction we use:

- Household's non-labor income (financial and from various benefits)
- An indicator whether the spouse is employed
- Total number of people living in the HH
- Housing tenure
- Number of rooms available to the HH
- Age of the spouse