

# Assessing income differences between the farm and non-farm households in the EU

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*MARIA MARINO, BENEDETTO ROCCHI E SIMONE SEVERINI*

# Background

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1. Common Agricultural Policy (CAP) objective: to “*ensure a fair income to farmers*”.
2. Government interventions has been historically justified, among other reasons, by the “**farm income problem**”: the level of farm income is systematically lower than nonfarm income (see Gardner 1992).
3. The 2 above issues poses two questions: **Are farmers really poorer than nonfarmers? Is the CAP a helpful strategy to support the well-being of farmers?**
4. Empirical studies provide evidence that the “farm income problem” is disappearing over time
  - most of them refer to USA (Mishra et al. 2002; Katchova 2008; Marshall and Peake 2009)
  - only few refer to Europe (Stefani et al. 2012; Rocchi 2014; de Frahan et al. 2017; Rocchi et al. 2018)
5. According to the literature, two reasons explain the disappearance of the farm income problem, the presence of off-farm work ((Mishra et al. 2002; Katchova 2008; Marshall and Peake 2009) and the role of the state intervention (Mishra and El-Osta 2008; Mishra et al., 2009; De Frahan et al, 2017)

# Challenges & solutions investigating the farm income problem

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## PRELIMINARY CHALLENGES

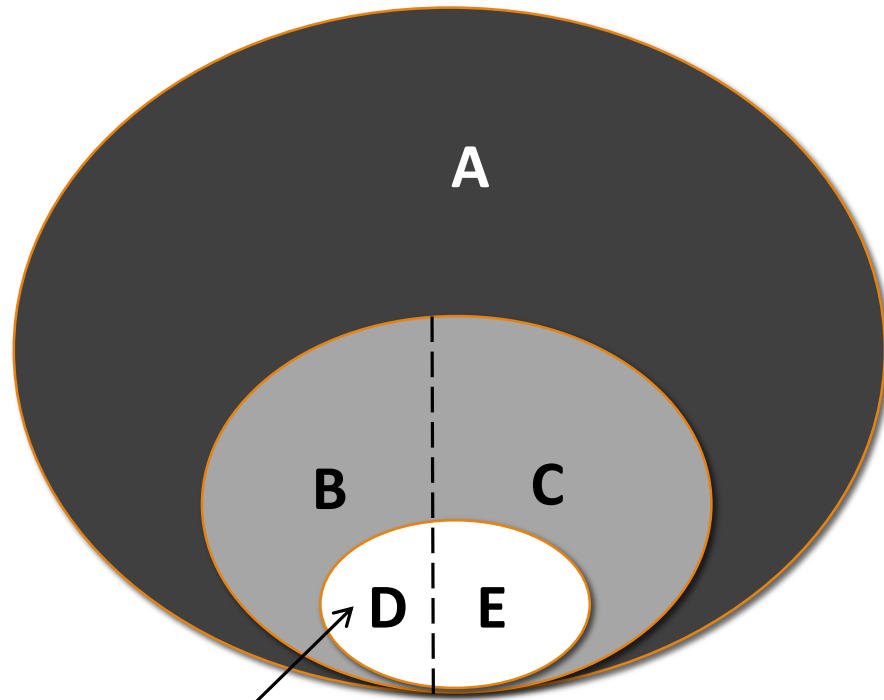
1. The **role of off-farm** income calls for a shift from the firm to the household.
2. The estimation of the income disparity between farmers and nonfarmers needs data which come not from a sector but a **general survey**.

## OUR PROPOSED SOLUTION

1. We propose to employ the EUSILC dataset (EU Statistics on Income and Living Conditions), a longitudinal micro-level dataset representative of the European population containing many information on the income of households.
2. EUSILC allows to identify **farmers** as individuals working as self-employed & in the agricultural sectors and then **farm households** (FH) in two ways:
  - ① Farm households have at least one self-employed member working in the agricultural sector (**Broad definition**).
  - ② Farm households have a farm income that is at least half of the total household income (**Narrow definition**).
4. It allows to create comparison groups among the nonfarm households (NFH).

# Farm and NFH groups

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■ Total Population

■ Selfemployed households

□ Farm households

Narrow  
Farm Households

# Sample size and population represented

## EUSILC. Years 2004 – 2015

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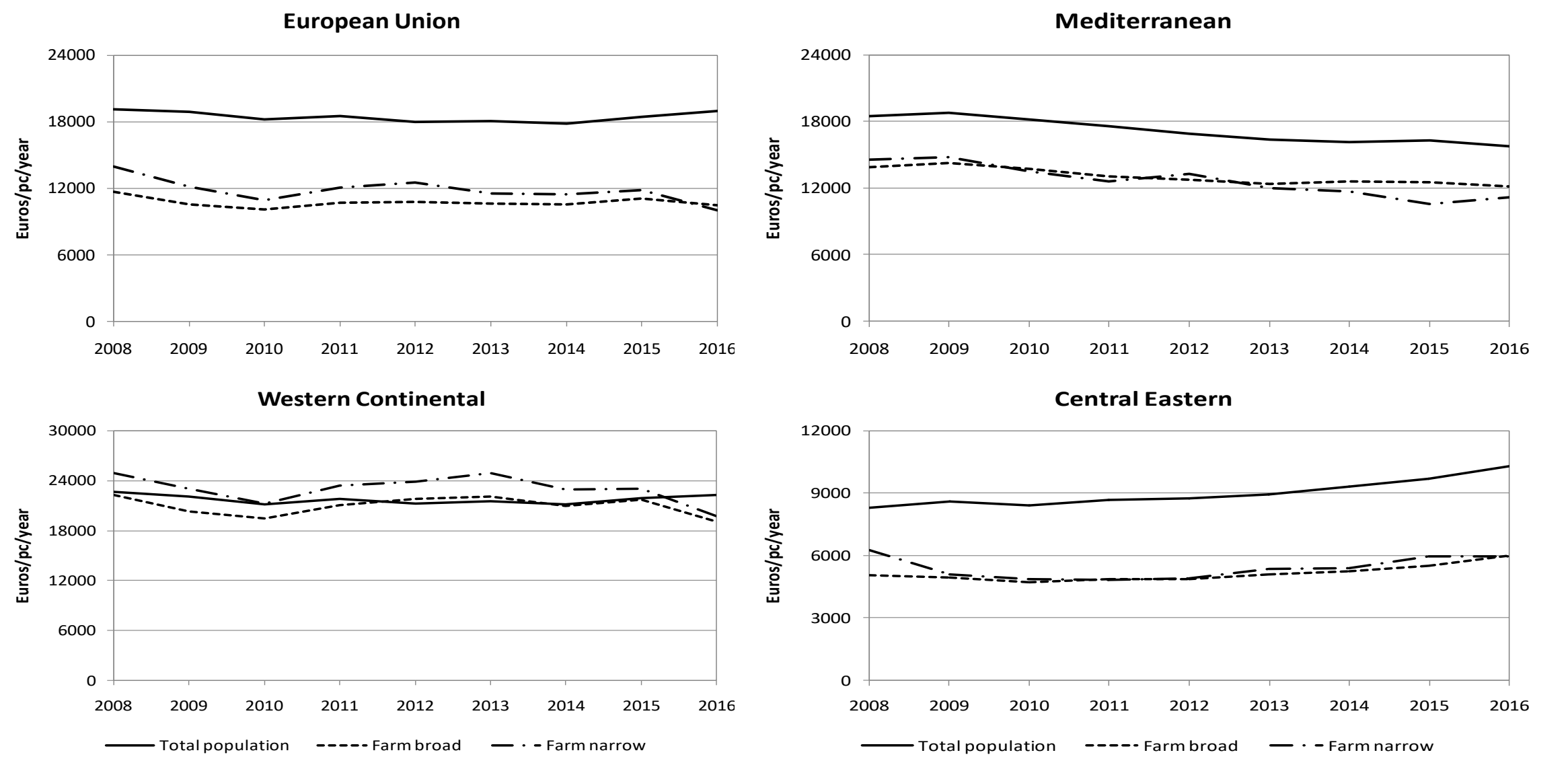
	Sample size		Represented households	
	Broad	Narrow	Broad	Narrow
Farm Households (FH)	43,516	15,344	65,708,939	22,243,826
Non-farm Households (NFH)	1,293,649	1,321,821	2,276,334,259	2,319,797,728
- of which:				
<i>Non-farm Self-employed (restricted sample)*</i>	<i>136,156</i>	<i>67,510</i>	<i>258,289,473</i>	<i>132,083,756</i>

# More on EUSILC ...

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- Since many countries have a low number of obs, we often control for geographical areas (WEC, MED, CEE) and time of entry (NMS and OMS) only.
- The income variable is the level of **household real equivalised disposable income** (PPP Euro 2015).
- Eusilc allows also to consider a definition of **extended income which includes plus in-kind incomes from self-production plus imputed rents**
- **Complex weights** are used and recalibrated to perform robust estimates of averages, control for heteroskedasticity, omitted variable problems and outliers.

# Evolution of farm and total population household income levels. Years 2008-2016.



# Beyond raw means

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➤ We aim at **estimating the income differential between farm and non-farm households within the EU** going beyond raw means by taking into account three issues:

1. Observable factors
2. Unobservables factors
3. Distribution



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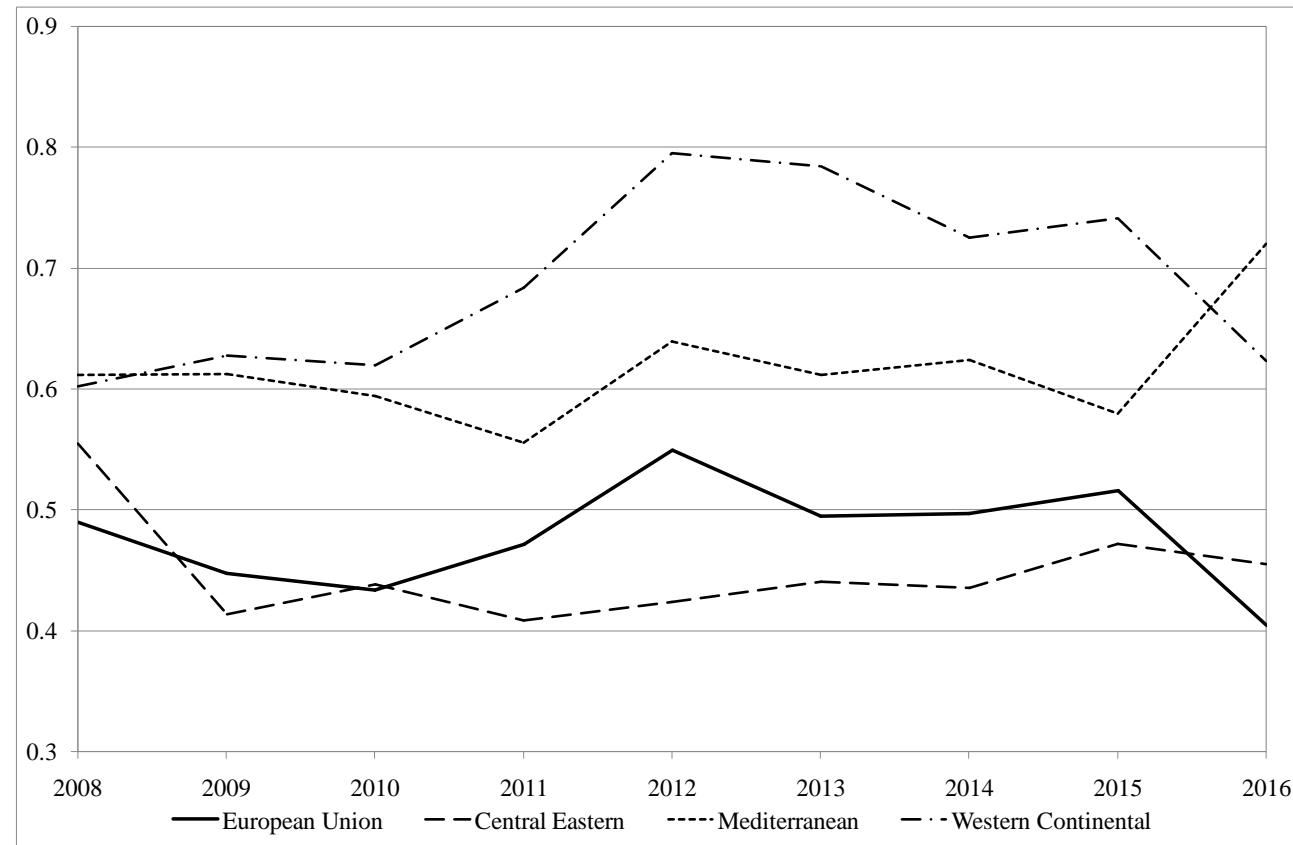
# Observable factors

# Quasi-experimental methods (covariates matching)

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- The comparison of raw mean incomes - FH vs NFH - can show several limits because of differences between the two groups.
- We thus mimic an experiment with being farmer considered as a treatment and focus on narrow FH and the narrow self-employed NFH.
- We test for the presence of unobservables using a **bivariate recursive mixed model** (Roodman, 2011) - Exclusion restriction: a variable indicating if the father or the mother of the farmer was also a farmer (only in 2011).
- We adjust for differences in observable characteristics with a **regression adjusted (RA) estimator** and identifying a "counterfactual" control group of NFH to be compared with the FH with a **covariate matching technique** (nearest-neighbor matching).

# Ratio of incomes of narrow farm households over incomes of other self-employed households.



# Differences in observable characteristics. All EU countries. Year 2011

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	Farm (narrow definition)	Non- farm	Difference	
Age	47.20	46.12	1.08	***
			(0.38)	
Male	0.88	0.77	0.11	***
			(0.01)	
Married	0.59	0.44	0.15	***
			(0.02)	
Education level	2.63	3.42	-0.79	***
			(0.04)	
Health status	0.59	0.61	-0.02	
			(0.02)	
Household size	2.30	1.93	0.37	***
			(0.04)	
Rural residence	0.74	0.24	0.50	***
			(0.02)	

# Income differentials between farm and non-farm self-employed households in 2011

## Whole EU and country groups. Year 2011.

	Non-Farm Households	Farm Households	Estimated income differential		
Raw mean values					
Whole EU	25,515.26	12,027.52	-13,487.74	(658.72)	***
Central Eastern	11,831.27	4,829.88	-7,001.39	(375.59)	***
Mediterranean	22,676.19	12,593.89	-10,082.30	(729.29)	***
Western Continental	34,244.21	23,414.74	-10,829.47	(1,590.91)	***
Regression Adjusted with covariates and country dummies					
Whole EU	14,887.46	12,027.52	-2,859.94	(621.40)	***
Central Eastern	6,171.71	4,829.88	-1,341.83	(320.48)	***
Mediterranean	15,269.64	12,593.89	-2,675.75	(874.88)	***
Western Continental	29,760.40	23,414.74	-6,345.65	(1,802.76)	***
Covariate Matching <sup>a</sup>					
Whole EU	14,738.51	12,027.52	-2,710.99	(985.35)	***
Central Eastern	6,360.32	4,829.88	-1,530.44	(207.99)	***
Mediterranean	14,557.33	12,593.89	-1,963.43	(580.23)	***
Western Continental	28,509.78	23,414.74	-5,095.03	(3,448.92)	



# Income differentials between farm and non-farm self-employed households in 2011

## Whole EU and country groups. Year 2011.

	Non-Farm Households	Farm Households	Estimated income differential		
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# Income differentials between farm and non-farm self-employed households in 2011

## Whole EU and country groups. Year 2011.

	Non-Farm Households	Farm Households	Estimated income differential		
Raw mean values					
Whole EU	25,515.26	12,027.52	-13,487.74	(658.72)	***
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Income differential between farm and non-farm self-employed households. Raw mean values and covariate matching estimates. Whole EU and country groups.

	Estimated income differential																	
	2008		2009		2010		2011		2012		2013		2014		2015		2016	
	Equivalised disposable income: raw mean values																	
Whole EU	-14,583.04 *** (1,062.65)	-14,964.29 *** (693.09)	-14,269.01 *** (665.51)	-13,487.74 *** (658.72)	-10,283.59 *** (627.41)	-11,765.63 *** (842.08)	-11,610.88 *** (766.19)	-11,089.41 *** (773.60)	-14,712.74 *** (1,076.45)									
Central Eastern	-5,024.01 *** (380.98)	-7,213.53 *** (488.72)	-6,256.35 *** (323.39)	-7,001.39 *** (375.59)	-6,686.90 *** (318.51)	-6,810.17 *** (351.26)	-7,007.46 *** (303.12)	-6,685.61 *** (379.00)	-7,125.88 *** (343.88)									
Mediterranean	-9,239.23 *** (696.62)	-9,360.18 *** (799.61)	-9,259.01 *** (711.53)	-10,082.30 *** (729.29)	-7,479.20 *** (896.12)	-7,610.36 *** (718.23)	-7,094.76 *** (765.99)	-7,696.85 *** (638.75)	-4,353.76 *** (1,588.79)									
Western Continental	-16,451.50 *** (3,244.27)	-13,696.28 *** (2,069.39)	-13,064.51 *** (1,862.28)	-10,829.47 *** (1,590.91)	-6,166.78 *** (1 416.48)	-6,857.30 *** (2 560.75)	-8,714.13 *** (1,940.93)	-8,042.68 *** (1,891.05)	-11,945.93 *** (1,933.65)									
	Equivalized disposable income: covariate matching <sup>a</sup>																	
Whole EU	-2,763.57 (2,270.14)	-2,237.01 *** (470.27)	-3,187.55 *** (548.27)	-2,710.99 *** (985.35)	-1,014.21 ** (437.94)	-1,265.14 ** (532.24)	-2,636.26 *** (458.91)	-3,483.08 *** (802.27)	-3,319.72 *** (706.89)									
Central Eastern	-718.34 *** (251.73)	-1,920.15 *** (223.32)	-1,796.38 *** (237.43)	-1,530.44 *** (207.99)	-1,072.09 *** (176.72)	-1,100.74 *** (240.67)	-1,640.73 *** (222.17)	-2,651.23 *** (257.92)	-1,931.61 *** (253.96)									
Mediterranean	-1,254.63 ** (560.67)	-1,819.95 *** (668.72)	-2,301.47 *** (544.04)	-1,963.43 *** (580.23)	55.83 (853.46)	-1,693.25 *** (569.52)	-1,976.98 *** (690.41)	-2,850.47 *** (527.68)	124.01 (618.62)									
Western Continental	-7,840.05 (8,119.73)	-3,396.74 * (1,818.72)	-8,897.17 *** (2,370.16)	-5,095.03 (3,448.92)	-2,168.81 * (1,279.95)	-1,098.42 (2,217.30)	-5,101.33 *** (1,613.94)	-4,942.16 * (2,570.30)	-10,644.18 *** (2,872.57)									
	Equivalized disposable income plus in-kind incomes from self-production plus imputed rents: covariate matching <sup>a</sup>																	
Whole EU	-5,342.60 * (2,793.60)	-3,740.64 *** (752.29)	-5,661.24 *** (1,061.32)	-4,175.27 ** (1,768.03)	-1,652.89 ** (783.30)	-1,264.32 (1,227.47)	-3,350.95 *** (846.81)	-5,006.87 *** (1,313.16)	-4,708.38 *** (1,113.55)									
Central Eastern	-1,287.94 ** (576.58)	-3,778.49 *** (548.14)	-3,724.85 *** (673.58)	-2,663.26 *** (575.10)	-1,690.72 *** (546.63)	-2,393.41 *** (510.00)	-2,891.13 *** (494.01)	-5,434.02 *** (466.84)	-3,056.88 *** (576.17)									
Mediterranean	-2,136.80 * (1,126.12)	-2,301.91 * (1,252.97)	-3,530.79 *** (1,091.21)	-1,794.43 (1,138.31)	514.0574 (1,329.34)	-2,796.05 ** (1,136.08)	-1,887.77 * (1,087.18)	-4,612.01 *** (971.61)	345.9766 (1,256.94)									
Western Continental	-15,604.53 (9,908.78)	-5,195.35 ** (2,590.95)	-15,614.80 *** (4,508.55)	-8,310.67 (6,119.89)	-4,156.67 * (2,300.68)	3,308.24 (5,173.62)	-5,484.92 * (2,980.02)	-4,587.21 (4,244.27)	-13,975.15 *** (3,594.71)									



# Income differential between farm and non-farm self-employed households. Raw mean values and covariate matching estimates. Whole EU and country groups. Years 2008 - 2016.

	Estimated income differential																	
	2008		2009		2010		2011		2012		2013		2014		2015		2016	
Equivalised disposable income: raw mean values																		
Whole EU	-14,583.04 (1,062.65)	***	-14,964.29 (693.09)	***	-14,269.01 (665.51)	***	-13,487.74 (658.72)	***	-10,283.59 (627.41)	***	-11,765.63 (842.08)	***	-11,610.88 (766.19)	***	-11,089.41 (773.60)	***	-14,712.74 (1,076.45)	***
Central Eastern	-5,024.01 (380.98)	***	-7,213.53 (488.72)	***	-6,256.35 (323.39)	***	-7,001.39 (375.59)	***	-6,686.90 (318.51)	***	-6,810.17 (351.26)	***	-7,007.46 (303.12)	***	-6,685.61 (379.00)	***	-7,125.88 (343.88)	***
Mediterranean	-9,239.23 (696.62)	***	-9,360.18 (799.61)	***	-9,259.01 (711.53)	***	-10,082.30 (729.29)	***	-7,479.20 (896.12)	***	-7,610.36 (718.23)	***	-7,094.76 (765.99)	***	-7,696.85 (638.75)	***	-4,353.76 (1,588.79)	***
Western Continental	-16,451.50 (3,244.27)	***	-13,696.28 (2,069.39)	***	-13,064.51 (1,862.28)	***	-10,829.47 (1,590.91)	***	-6,166.78 (1 416.48)	***	-6,857.30 (2 560.75)	***	-8,714.13 (1,940.93)	***	-8,042.68 (1,891.05)	***	-11,945.93 (1,933.65)	***
Equivalized disposable income: covariate matching <sup>a</sup>																		
Whole EU	-2,763.57 (2,270.14)		-2,237.01 (470.27)	***	-3,187.55 (548.27)	***	-2,710.99 (985.35)	***	-1,014.21 (437.94)	**	-1,265.14 (532.24)	**	-2,636.26 (458.91)	***	-3,483.08 (802.27)	***	-3,319.72 (706.89)	***
Central Eastern	-718.34 (251.73)	***	-1,920.15 (223.32)	***	-1,796.38 (237.43)	***	-1,530.44 (207.99)	***	-1,072.09 (176.72)	***	-1,100.74 (240.67)	***	-1,640.73 (222.17)	***	-2,651.23 (257.92)	***	-1,931.61 (253.96)	***
Mediterranean	-1,254.63 (560.67)	**	-1,819.95 (668.72)	***	-2,301.47 (544.04)	***	-1,963.43 (580.23)	***	55.83 (853.46)		-1,693.25 (569.52)	***	-1,976.98 (690.41)	***	-2,850.47 (527.68)	***	124.01 (618.62)	
Western Continental	-7,840.05 (8,119.73)		-3,396.74 (1,818.72)	*	-8,897.17 (2,370.16)	***	-5,095.03 (3,448.92)		-2,168.81 (1,279.95)	*	-1,098.42 (2,217.30)		-5,101.33 (1,613.94)	***	-4,942.16 (2,570.30)	*	-10,644.18 (2,872.57)	***
Equivalized disposable income plus in-kind incomes from self-production plus imputed rents: covariate matching <sup>a</sup>																		
Whole EU	-5,342.60 (2,793.60)	*	-3,740.64 (752.29)	***	-5,661.24 (1,061.32)	***	-4,175.27 (1,768.03)	**	-1,652.89 (783.30)	**	-1,264.32 (1,227.47)		-3,350.95 (846.81)	***	-5,006.87 (1,313.16)	***	-4,708.38 (1,113.55)	***
Central Eastern	-1,287.94 (576.58)	**	-3,778.49 (548.14)	***	-3,724.85 (673.58)	***	-2,663.26 (575.10)	***	-1,690.72 (546.63)	***	-2,393.41 (510.00)	***	-2,891.13 (494.01)	***	-5,434.02 (466.84)	***	-3,056.88 (576.17)	***
Mediterranean	-2,136.80 (1,126.12)	*	-2,301.91 (1,252.97)	*	-3,530.79 (1,091.21)	***	-1,794.43 (1,138.31)		514.0574 (1,329.34)		-2,796.05 (1,136.08)	**	-1,887.77 (1,087.18)	*	-4,612.01 (971.61)	***	345.9766 (1,256.94)	
Western Continental	-15,604.53 (9,908.78)		-5,195.35 (2,590.95)	**	-15,614.80 (4,508.55)	***	-8,310.67 (6,119.89)		-4,156.67 (2,300.68)	*	3,308.24 (5,173.62)		-5,484.92 (2,980.02)	*	-4,587.21 (4,244.27)		-13,975.15 (3,594.71)	***

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	Estimated income differential																	
	2008		2009		2010		2011		2012		2013		2014		2015		2016	
Equivalised disposable income: raw mean values																		
Whole EU	-14,583.04	***	-14,964.29	***	-14,269.01	***	-13,487.74	***	-10,283.59	***	-11,765.63	***	-11,610.88	***	-11,089.41	***	-14,712.74	***
	(1,062.65)		(693.09)		(665.51)		(658.72)		(627.41)		(842.08)		(766.19)		(773.60)		(1,076.45)	
Central Eastern	-5,024.01	***	-7,213.53	***	-6,256.35	***	-7,001.39	***	-6,686.90	***	-6,810.17	***	-7,007.46	***	-6,685.61	***	-7,125.88	***
	(380.98)		(488.72)		(323.39)		(375.59)		(318.51)		(351.26)		(303.12)		(379.00)		(343.88)	
Mediterranean	-9,239.23	***	-9,360.18	***	-9,259.01	***	-10,082.30	***	-7,479.20	***	-7,610.36	***	-7,094.76	***	-7,696.85	***	-4,353.76	***
	(696.62)		(799.61)		(711.53)		(729.29)		(896.12)		(718.23)		(765.99)		(638.75)		(1,588.79)	
Western Continental	-16,451.50	***	-13,696.28	***	-13,064.51	***	-10,829.47	***	-6,166.78	***	-6,857.30	***	-8,714.13	***	-8,042.68	***	-11,945.93	***
	(3,244.27)		(2,069.39)		(1,862.28)		(1,590.91)		(1 416.48)		(2 560.75)		(1,940.93)		(1,891.05)		(1,933.65)	
Equivalized disposable income: covariate matching <sup>a</sup>																		
Whole EU	-2,763.57		-2,237.01	***	-3,187.55	***	-2,710.99	***	-1,014.21	**	-1,265.14	**	-2,636.26	***	-3,483.08	***	-3,319.72	***
	(2,270.14)		(470.27)		(548.27)		(985.35)		(437.94)		(532.24)		(458.91)		(802.27)		(706.89)	
Central Eastern	-718.34	***	-1,920.15	***	-1,796.38	***	-1,530.44	***	-1,072.09	***	-1,100.74	***	-1,640.73	***	-2,651.23	***	-1,931.61	***
	(251.73)		(223.32)		(237.43)		(207.99)		(176.72)		(240.67)		(222.17)		(257.92)		(253.96)	
Mediterranean	-1,254.63	**	-1,819.95	***	-2,301.47	***	-1,963.43	***	55.83		-1,693.25	***	-1,976.98	***	-2,850.47	***	124.01	
	(560.67)		(668.72)		(544.04)		(580.23)		(853.46)		(569.52)		(690.41)		(527.68)		(618.62)	
Western Continental	-7,840.05		-3,396.74	*	-8,897.17	***	-5,095.03		-2,168.81	*	-1,098.42		-5,101.33	***	-4,942.16	*	-10,644.18	***
	(8,119.73)		(1,818.72)		(2,370.16)		(3,448.92)		(1,279.95)		(2,217.30)		(1,613.94)		(2,570.30)		(2,872.57)	
Equivalized disposable income plus in-kind incomes from self-production plus imputed rents: covariate matching <sup>a</sup>																		
Whole EU	-5,342.60	*	-3,740.64	***	-5,661.24	***	-4,175.27	**	-1,652.89	**	-1,264.32		-3,350.95	***	-5,006.87	***	-4,708.38	***
	(2,793.60)		(752.29)		(1,061.32)		(1,768.03)		(783.30)		(1,227.47)		(846.81)		(1,313.16)		(1,113.55)	
Central Eastern	-1,287.94	**	-3,778.49	***	-3,724.85	***	-2,663.26	***	-1,690.72	***	-2,393.41	***	-2,891.13	***	-5,434.02	***	-3,056.88	***
	(576.58)		(548.14)		(673.58)		(575.10)		(546.63)		(510.00)		(494.01)		(466.84)		(576.17)	
Mediterranean	-2,136.80	*	-2,301.91	*	-3,530.79	***	-1,794.43		514.0574		-2,796.05	**	-1,887.77	*	-4,612.01	***	345.9766	
	(1,126.12)		(1,252.97)		(1,091.21)		(1,138.31)		(1,329.34)		(1,136.08)		(1,087.18)		(971.61)		(1,256.94)	
Western Continental	-15,604.53		-5,195.35	**	-15,614.80	***	-8,310.67		-4,156.67	*	3,308.24		-5,484.92	*	-4,587.21		-13,975.15	***
	(9,908.78)		(2,590.95)		(4,508.55)		(6,119.89)		(2,300.68)		(5,173.62)		(2,980.02)		(4,244.27)		(3,594.71)	

# Income differential between farm and non-farm self-employed households. Raw mean values and covariate matching estimates. Whole EU and country groups. Years 2008 - 2016.

	Estimated income differential																	
	2008		2009		2010		2011		2012		2013		2014		2015		2016	
Equivalised disposable income: raw mean values																		
Whole EU	-14,583.04	***	-14,964.29	***	-14,269.01	***	-13,487.74	***	-10,283.59	***	-11,765.63	***	-11,610.88	***	-11,089.41	***	-14,712.74	***
	(1,062.65)		(693.09)		(665.51)		(658.72)		(627.41)		(842.08)		(766.19)		(773.60)		(1,076.45)	
Central Eastern	-5,024.01	***	-7,213.53	***	-6,256.35	***	-7,001.39	***	-6,686.90	***	-6,810.17	***	-7,007.46	***	-6,685.61	***	-7,125.88	***
	(380.98)		(488.72)		(323.39)		(375.59)		(318.51)		(351.26)		(303.12)		(379.00)		(343.88)	
Mediterranean	-9,239.23	***	-9,360.18	***	-9,259.01	***	-10,082.30	***	-7,479.20	***	-7,610.36	***	-7,094.76	***	-7,696.85	***	-4,353.76	***
	(696.62)		(799.61)		(711.53)		(729.29)		(896.12)		(718.23)		(765.99)		(638.75)		(1,588.79)	
Western Continental	-16,451.50	***	-13,696.28	***	-13,064.51	***	-10,829.47	***	-6,166.78	***	-6,857.30	***	-8,714.13	***	-8,042.68	***	-11,945.93	***
	(3,244.27)		(2,069.39)		(1,862.28)		(1,590.91)		(1,416.48)		(2,560.75)		(1,940.93)		(1,891.05)		(1,933.65)	
Equivalized disposable income: covariate matching <sup>a</sup>																		
Whole EU	-2,763.57		-2,237.01	***	-3,187.55	***	-2,710.99	***	-1,014.21	**	-1,265.14	**	-2,636.26	***	-3,483.08	***	-3,319.72	***
	(2,270.14)		(470.27)		(548.27)		(985.35)		(437.94)		(532.24)		(458.91)		(802.27)		(706.89)	
Central Eastern	-718.34	***	-1,920.15	***	-1,796.38	***	-1,530.44	***	-1,072.09	***	-1,100.74	***	-1,640.73	***	-2,651.23	***	-1,931.61	***
	(251.73)		(223.32)		(237.43)		(207.99)		(176.72)		(240.67)		(222.17)		(257.92)		(253.96)	
Mediterranean	-1,254.63	**	-1,819.95	***	-2,301.47	***	-1,963.43	***	55.83		-1,693.25	***	-1,976.98	***	-2,850.47	***	124.01	
	(560.67)		(668.72)		(544.04)		(580.23)		(853.46)		(569.52)		(690.41)		(527.68)		(618.62)	
Western Continental	-7,840.05		-3,396.74	*	-8,897.17	***	-5,095.03		-2,168.81	*	-1,098.42		-5,101.33	***	-4,942.16	*	-10,644.18	***
	(8,119.73)		(1,818.72)		(2,370.16)		(3,448.92)		(1,279.95)		(2,217.30)		(1,613.94)		(2,570.30)		(2,872.57)	
Equivalized disposable income plus in-kind incomes from self-production plus imputed rents: covariate matching <sup>a</sup>																		
Whole EU	-5,342.60	*	-3,740.64	***	-5,661.24	***	-4,175.27	**	-1,652.89	**	-1,264.32		-3,350.95	***	-5,006.87	***	-4,708.38	***
	(2,793.60)		(752.29)		(1,061.32)		(1,768.03)		(783.30)		(1,227.47)		(846.81)		(1,313.16)		(1,113.55)	
Central Eastern	-1,287.94	**	-3,778.49	***	-3,724.85	***	-2,663.26	***	-1,690.72	***	-2,393.41	***	-2,891.13	***	-5,434.02	***	-3,056.88	***
	(576.58)		(548.14)		(673.58)		(575.10)		(546.63)		(510.00)		(494.01)		(466.84)		(576.17)	
Mediterranean	-2,136.80	*	-2,301.91	*	-3,530.79	***	-1,794.43		514.0574		-2,796.05	**	-1,887.77	*	-4,612.01	***	345.9766	
	(1,126.12)		(1,252.97)		(1,091.21)		(1,138.31)		(1,329.34)		(1,136.08)		(1,087.18)		(971.61)		(1,256.94)	
Western Continental	-15,604.53		-5,195.35	**	-15,614.80	***	-8,310.67		-4,156.67	*	3,308.24		-5,484.92	*	-4,587.21		-13,975.15	***
	(9,908.78)		(2,590.95)		(4,508.55)		(6,119.89)		(2,300.68)		(5,173.62)		(2,980.02)		(4,244.27)		(3,594.71)	

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# Unobservable factors

# Methodology – Panel regression

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The longitudinal nature of the EU-SILC dataset can be conveniently exploited also to control for unobserved heterogeneity. We thus use fixed effect regression:

$$y_{it} = \alpha_i + \gamma_t + x_{it}\beta + F_{it}\delta + \varepsilon_{it}$$

$F_{it}$  is a dummy taking value one if the  $i$ -th observation at time  $t$  is a farm household thus  $\delta$  provides an estimate of the conditional income disparity between farm households (FH) and non-farm households (NFH).

# Y – the income variable

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## Our income variable

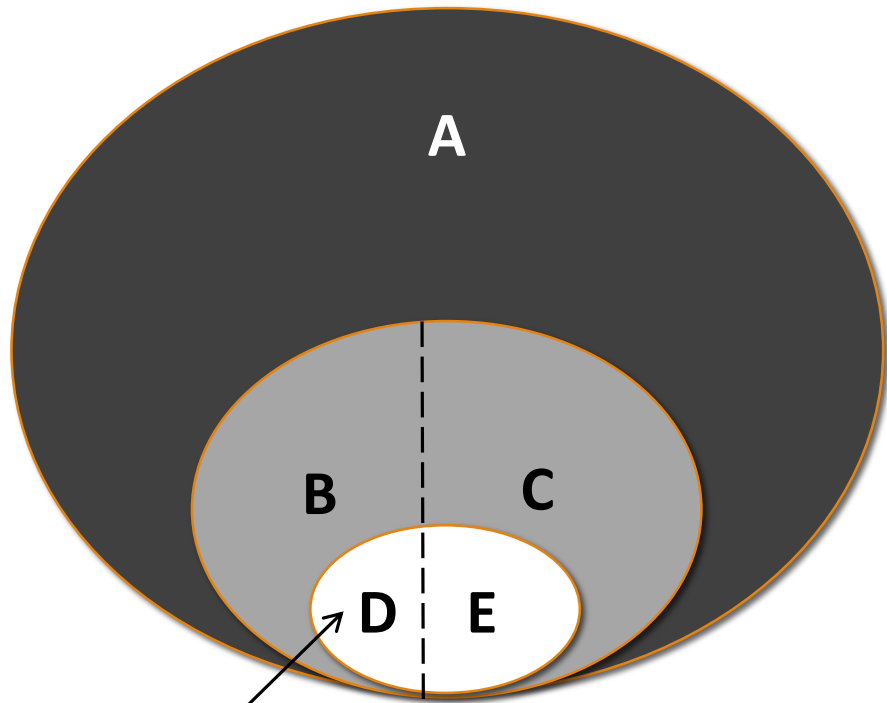
- Inverse Hyperbolic Sine transformation of the household per capita equivalent disposable income at PPP Values 2015 prices

## Additional measures of income

- Extended income including non monetary sources
- The above income measures **net of the Decoupled Direct Payments**. The latter are taken from the FADN public database and computed in the following way: 1) Average incidence of DDP over a Net Farm Income differentiated by year, region and classes of farm income; 2) Applied to farm income earned by each household; 3) The proxy measure of DDP subtracted to the household income

**Strong Assumption: No FHs adjustment to policy modification!**

# F – Farm households and control groups



- Total Population
- Selfemployed households
- Farm households

Narrow  
Farm Households

Model I  
Model II  
Model III  
Model IV

D+E (broad) vs. A+B+C  
D (narrow) vs. A+B+C+E  
D+E (broad) vs. B+C  
D (narrow) vs. B

# Data - Average income levels

---

	Broad Farm Households	Non-farm households		Narrow Farm Households	Non-farm households	
		All	Only SELF		All	Only SELF
Income	6915.24 (72.33)	14604.36 (20.94)	18180.21 (94.99)	7924.11 (139.60)	14454.10 (20.29)	19171.53 (143.31)
Extended Income	7902.87 (78.20)	16364.10 (21.69)	20052.42 (89.33)	9102.47 (151.07)	16207.03 (22.68)	21236.80 (193.86)



# Data - Average income levels

	Broad Farm Households	Non-farm households		Narrow Farm Households	Non-farm households	
		All	Only SELF		All	Only SELF
Income	6915.24 (72.33)	14604.36 (20.94)	18180.21 (94.99)	7924.11 (139.60)	14454.10 (20.29)	19171.53 (143.31)
Extended Income	7902.87 (78.20)	16364.10 (21.69)	20052.42 (89.33)	9102.47 (151.07)	16207.03 (22.68)	21236.80 (193.86)

# Income disparity between FH and NFH ( $\delta$ coefficient) – EU, NMS and OMS

EU

	Farm Households vs. All Non-farm households		Farm Households vs. Non-farm Self-employed households	
	Broad (MODEL I)	Narrow (MODEL II)	Broad (MODEL III)	Narrow (MODEL IV)
Income	-0.0346 (0.0244)	0.5436*** (0.0556)	-0.0593 (0.0720)	-0.1111** (0.0559)
Extended Income	-0.0223 (0.0155)	0.3712*** (0.0470)	-0.0262 (0.0366)	-0.0853** (0.0369)

	Farm Households vs. All Nonfarm households		Farm Households vs. Nonfarm Self-employed households	
	Broad (MODEL I)	Narrow (MODEL II)	Broad (MODEL III)	Narrow (MODEL IV)
New Member States				
Income	-0.0533*** (0.0153)	0.2806*** (0.0225)	-0.0651* (0.0392)	-0.0581 (0.0446)
Extended Income	-0.0403*** (0.0131)	0.1992*** (0.0179)	-0.0567 (0.0360)	-0.0396 (0.0401)
Old Member States				
Income	-0.0228 (0.0417)	0.7423*** (0.0963)	-0.0622 (0.0993)	-0.1338 (0.0876)
Extended Income	-0.0126 (0.0255)	0.4973*** (0.0815)	-0.0170 (0.0489)	-0.1082** (0.0538)

# Income disparity between FH and NFH ( $\delta$ coefficient) – EU, NMS and OMS

	Farm Households vs. All Non-farm households		Farm Households vs. Non-farm Self-employed households	
	Broad (MODEL I)	Narrow (MODEL II)	Broad (MODEL III)	Narrow (MODEL IV)
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	Farm Households vs. All Nonfarm households		Farm Households vs. Nonfarm Self-employed households	
	Broad (MODEL I)	Narrow (MODEL II)	Broad (MODEL III)	Narrow (MODEL IV)
New Member States				
Income	-0.0533*** (0.0153)	0.2806*** (0.0225)	-0.0651* (0.0392)	-0.0581 (0.0446)
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Income	-0.0228 (0.0417)	0.7423*** (0.0963)	-0.0622 (0.0993)	-0.1338 (0.0876)
Extended Income	-0.0126 (0.0255)	0.4973*** (0.0815)	-0.0170 (0.0489)	-0.1082** (0.0538)

# Income disparity between FH and NFH ( $\delta$ coefficient) – EU, NMS and OMS

	Farm Households vs. All Non-farm households		Farm Households vs. Non-farm Self-employed households	
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# Income disparity between FH and NFH ( $\delta$ coefficient) – EU, NMS and OMS

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	Broad (MODEL I)	Narrow (MODEL II)	Broad (MODEL III)	Narrow (MODEL IV)
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	Broad (MODEL I)	Narrow (MODEL II)	Broad (MODEL III)	Narrow (MODEL IV)
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Extended Income	-0.0126 (0.0255)	0.4973*** (0.0815)	-0.0170 (0.0489)	-0.1082** (0.0538)

# Income disparity between FH and NFH ( $\delta$ coefficient) – EU, NMS and OMS

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	Farm Households vs. All Nonfarm households		Farm Households vs. Nonfarm Self-employed households	
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Extended Income	-0.0126 (0.0255)	0.4973*** (0.0815)	-0.0170 (0.0489)	-0.1082** (0.0538)

# Farm Household income with and without DDPs.




	EU		New Member States		Old Member States	
	Broad	Narrow	Broad	Narrow	Broad	Narrow
Income	6,915.24 (72.33)	7,924.11 (139.60)	1,289.50 (10.78)	1,412.66 (25.73)	14,038.71 (121.84)	14,474.52 (213.81)
Income excluding DDP	6,082.06 (62.12)	6,214.40 (107.61)	1,168.28 (9.24)	1,117.63 (19.51)	12,304.01 (105.97)	11,341.66 (169.30)
<i>DDP/Income</i>	<i>13.70%</i>	<i>27.50%</i>	<i>10.40%</i>	<i>26.40%</i>	<i>14.10%</i>	<i>27.60%</i>
Extended Income	7,902.87 (78.20)	9,102.47 (151.07)	1,564.64 (11.93)	1,719.73 (28.52)	15,928.51 (127.64)	16,529.38 (224.30)
Extend. Inc. excluding DDP	7,088.14 (67.92)	7,423.27 (118.62)	1,444.23 (10.34)	1,425.45 (22.20)	14,234.60 (111.27)	13,456.99 (178.04)
<i>DDP/Extended income</i>	<i>11.50%</i>	<i>22.60%</i>	<i>8.30%</i>	<i>20.60%</i>	<i>11.90%</i>	<i>22.80%</i>

# Farm Household income with and without DDPs.

	EU		New Member States		Old Member States	
	Broad	Narrow	Broad	Narrow	Broad	Narrow
Income	6,915.24 (72.33)	7,924.11 (139.60)	1,289.50 (10.78)	1,412.66 (25.73)	14,038.71 (121.84)	14,474.52 (213.81)
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<i>DDP/Extended income</i>	<i>11.50%</i>	<i>22.60%</i>	<i>8.30%</i>	<i>20.60%</i>	<i>11.90%</i>	<i>22.80%</i>



Income disparity between FH and NFH ( $\delta$  coefficient).  
Income net of CAP decoupled direct payments – EU, NMS and OMS

	Farm Households vs. All Non-farm households		Farm Households vs. Non-farm Self-employed households	
	Broad (MODEL I)	Narrow (MODEL II)	Broad (MODEL III)	Narrow (MODEL IV)
Whole EU 				
Income (No Ddp)	-0.1412*** (0.0252)	0.2845*** (0.0563)	-0.2205*** (0.0754)	-0.4258*** (0.0743)
Extended Income (No Ddp)	-0.1047*** (0.0159)	0.1820*** (0.0467)	-0.1428*** (0.0390)	-0.3079*** (0.0552)
New Member States 				
Income (No Ddp)	-0.1513*** (0.0179)	0.0817*** (0.0279)	-0.1999*** (0.0453)	-0.2655*** (0.0472)
Extended Income (No Ddp)	-0.1095*** (0.0144)	0.0584*** (0.0205)	-0.1657*** (0.0419)	-0.1921*** (0.0406)
Old Member States 				
Income (No Ddp)	-0.1359*** (0.0427)	0.4371*** (0.0969)	-0.2334** (0.1038)	-0.5182*** (0.1189)
Extended Income (No Ddp)	-0.1052*** (0.0258)	0.2710*** (0.0809)	-0.1368*** (0.0517)	-0.3795*** (0.0871)

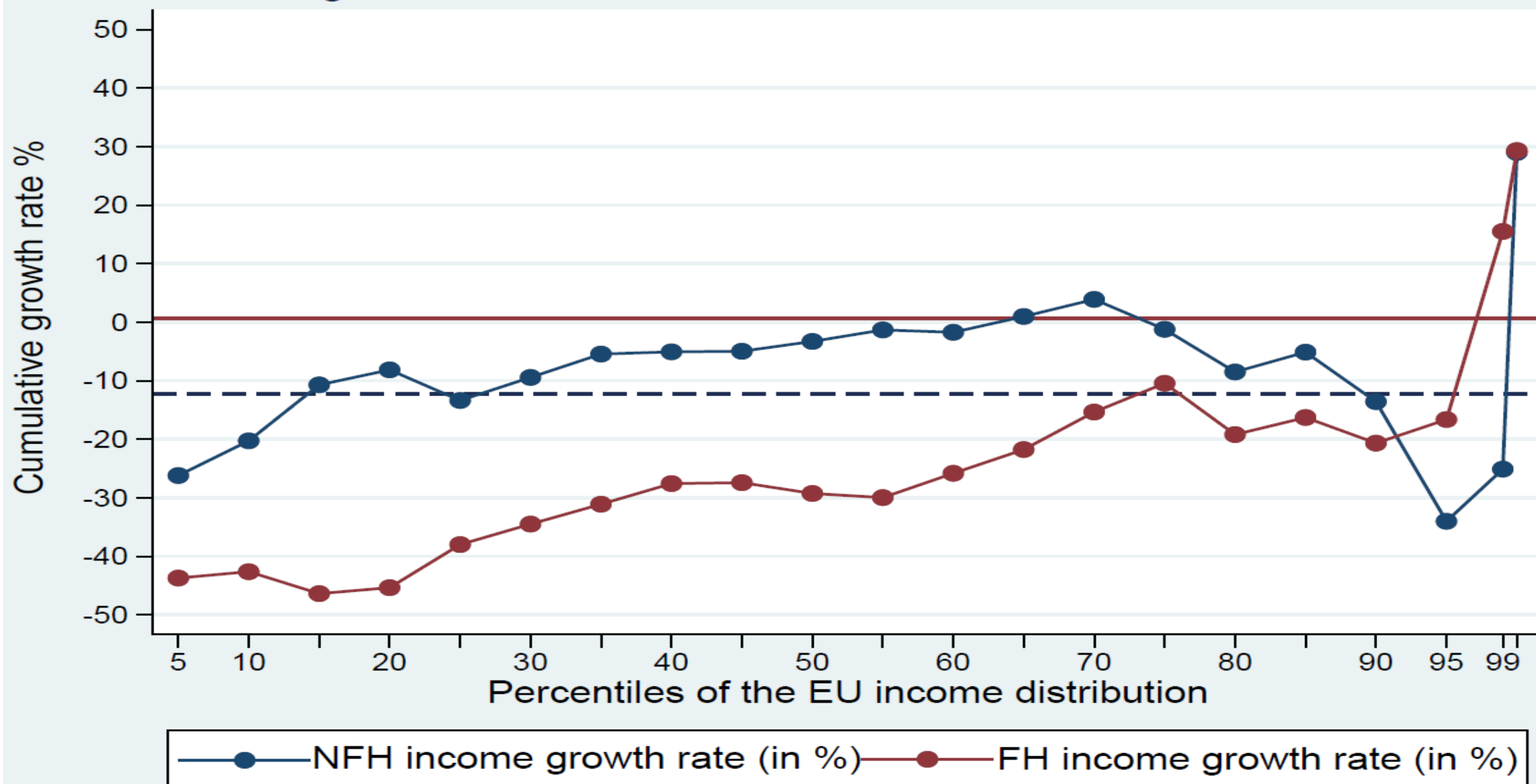
Income disparity between FH and NFH ( $\delta$  coefficient).  
Income net of CAP decoupled direct payments – EU, NMS and OMS

	Farm Households vs. All Non-farm households		Farm Households vs. Non-farm Self-employed households	
	Broad (MODEL I)	Narrow (MODEL II)	Broad (MODEL III)	Narrow (MODEL IV)
		Whole EU		
Income (No Ddp)	-0.1412*** (0.0252)	0.2845*** (0.0563)	-0.2205*** (0.0754)	-0.4258*** (0.0743)
Extended Income (No Ddp)	-0.1047*** (0.0159)	0.1820*** (0.0467)	-0.1428*** (0.0390)	-0.3079*** (0.0552)
		New Member States		
Income (No Ddp)	-0.1513*** (0.0179)	0.0817*** (0.0279)	-0.1999*** (0.0453)	-0.2655*** (0.0472)
Extended Income (No Ddp)	-0.1095*** (0.0144)	0.0584*** (0.0205)	-0.1657*** (0.0419)	-0.1921*** (0.0406)
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Income (No Ddp)	-0.1359*** (0.0427)	0.4371*** (0.0969)	-0.2334** (0.1038)	-0.5182*** (0.1189)
Extended Income (No Ddp)	-0.1052*** (0.0258)	0.2710*** (0.0809)	-0.1368*** (0.0517)	-0.3795*** (0.0871)

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# Distribution (preliminary analysis!)

EU growth incidence curve at the household level, 2004-2016

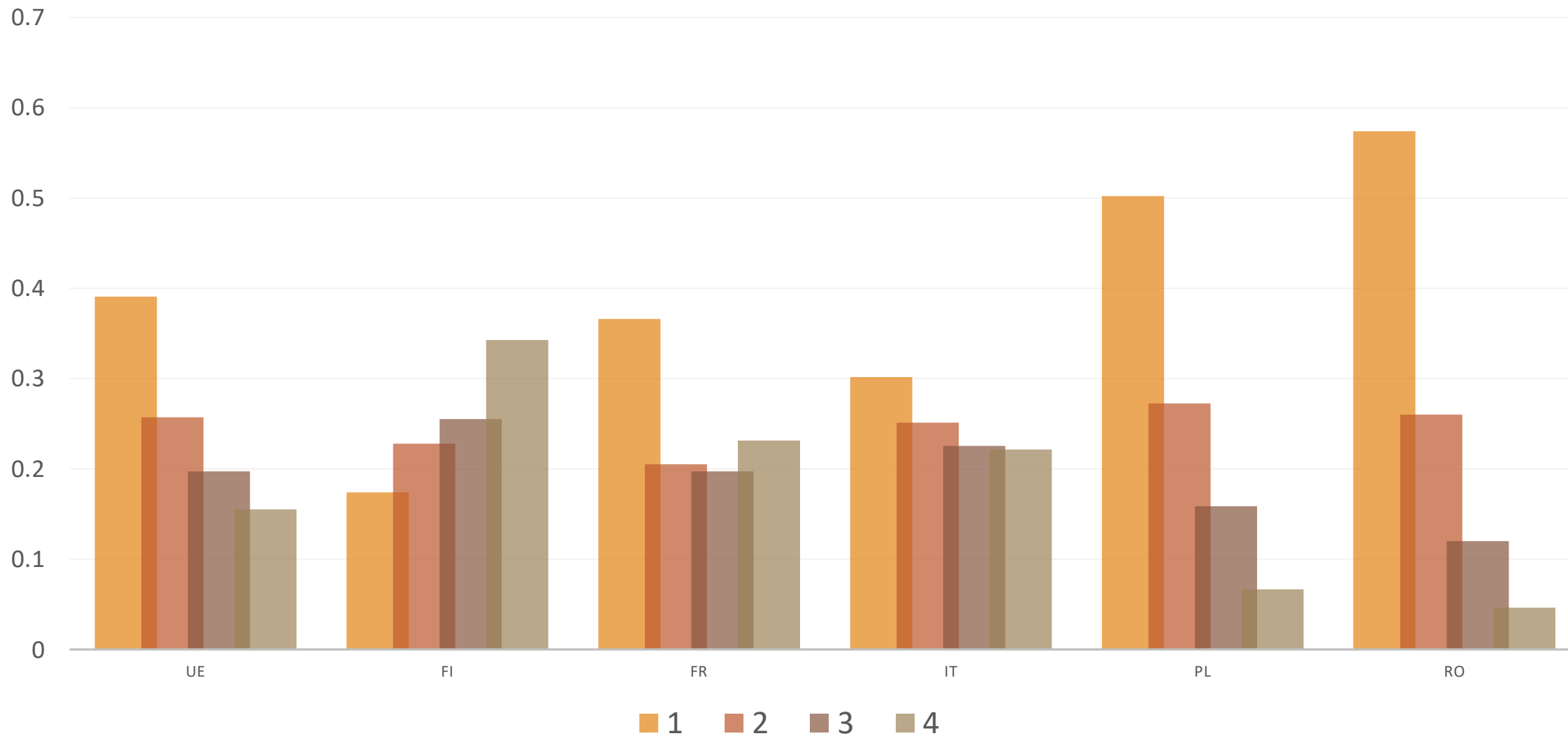


# Investigating the income distribution of FH within EUSILC.

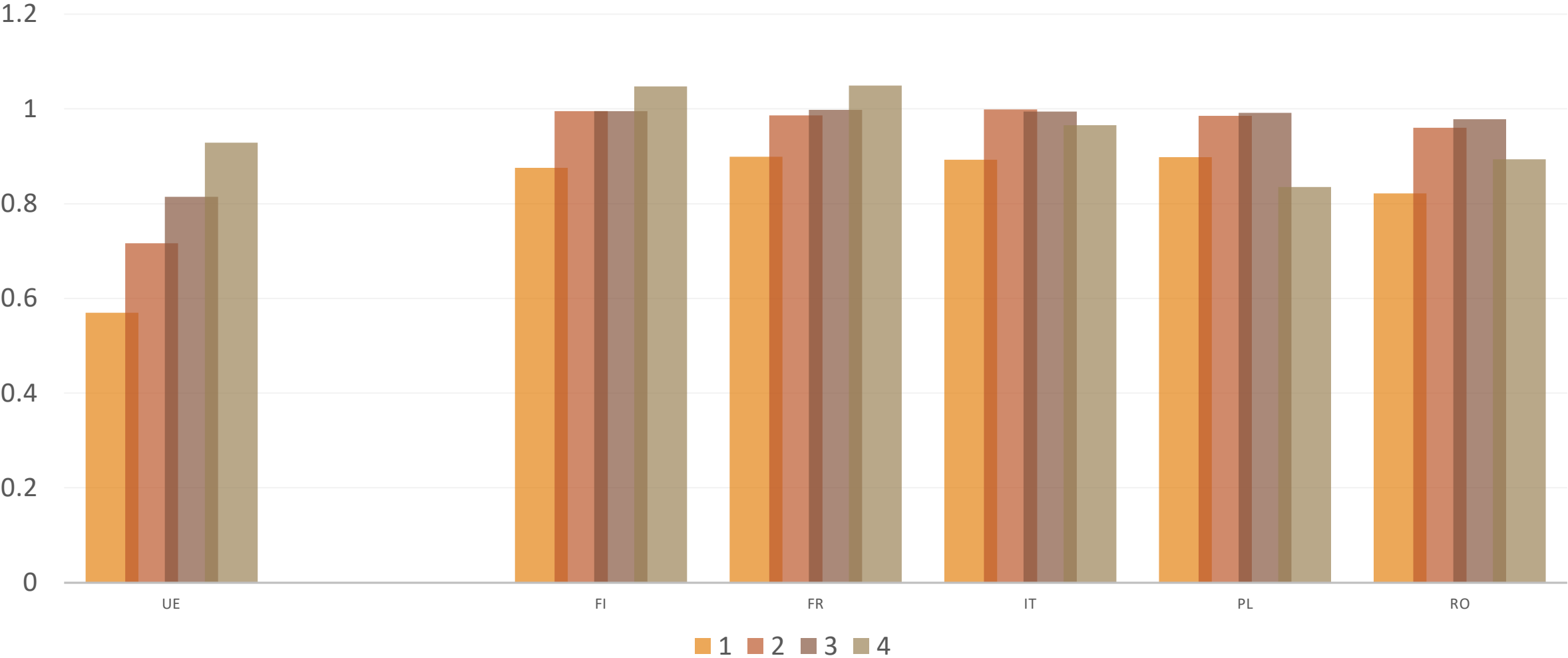
Since some countries show a small number of FH, we consider only countries which have **at least 100 broad FHs each year**. Moreover, we focus on 5 countries: France –FR - and Finland - FI (for the West Continental countries), Italy - IT (for the Mediterranean countries) and Poland -PL and Romania -RO (for the Central Eastern countries).

country	quartiles	# FHs	# NFHs	country	quartiles	# FHs	# NFHs
UE				IT			
	1	26728	364895		1	1317	54025
	2	17584	393220		2	1096	58962
	3	13494	399393		3	983	61840
	4	10612	403915		4	966	64526
FI				PL			
	1	1577	24472		1	7334	36575
	2	2063	29628		2	3976	37922
	3	2313	33394		3	2319	37380
	4	3104	42283		4	975	34975
FR				RO			
	1	893	32775		1	6525	12122
	2	500	33953		2	2956	17053
	3	481	34816		3	1365	17904
	4	565	37246		4	525	17228

# Distribution of FHs over quartiles



# FH/NFH income ratio over the distribution



# Methodology – Unconditional quantile regression (UQR) – ONLY BROAD FH

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This method allows us to get results at different quintiles of the income distribution:

$$(ln(hh\_inc)_{it}) = \alpha(\tau) + x_{it}\beta(\tau) + F_{it}\gamma(\tau) + u_{it}$$

where  $q_{\tau}(ln(hh\_inc)_{it})$  is the  $\tau$ -th quantile of the distribution of the log household disposable income conditional. The vector of estimated coefficients  $\beta(\tau)$  provides the estimated rates of return to the different covariates at the  $\tau$ -th quantile of the distribution. The estimated coefficient  $\gamma(\tau)$  represents the FH income penalty/premium at the various quantiles.



# OLS and UQR - $\delta$ coefficient

	coeff.	se	Cilw	Ciup		coeff.	se	Cilw	Ciup
	European Union					Italy			
<b>OLS</b>	-0.2833**	(0.0029)	-0,283644	-0,280914		-0.1194**	(0.0015)	-0,120688	-0,116400
<b>Q25</b>	-0.2587**	(0.0032)	-0,260655	-0,254634		-0.1104**	(0.0020)	-0,112848	-0,106042
<b>Q50</b>	-0.0592**	(0.0014)	-0,060580	-0,057438		-0.0466**	(0.0023)	-0,048879	-0,041997
<b>Q75</b>	0.0337***	(0.0015)	0,031629	0,035617		0.0027	(0.0018)	0,000632	0,006050
	Finland					Poland			
<b>OLS</b>	-0.0253**	(0.0078)	-0,023516	-0,015349		-0.2766**	(0.0031)	-0,279793	-0,271928
<b>Q25</b>	-0.0311**	(0.0096)	-0,034985	-0,024622		-0.2510**	(0.0076)	-0,257504	-0,240561
<b>Q50</b>	0.0007	(0.0064)	-0,002102	0,008899		-0.2120**	(0.0063)	-0,217317	-0,207496
<b>Q75</b>	0.0906***	(0.0054)	0,088659	0,096965		-0.1813**	(0.0043)	-0,188221	-0,176572
	France					Romania			
<b>OLS</b>	-0.1255**	(0.0042)	-0,128238	-0,121806		-0.4818**	(0.0126)	-0,493726	-0,473689
<b>Q25</b>	-0.1970**	(0.0073)	-0,202223	-0,191673		-0.6908**	(0.0169)	-0,718796	-0,665617
<b>Q50</b>	-0.0823**	(0.0115)	-0,087085	-0,077733		-0.3359**	(0.0069)	-0,346879	-0,329311
<b>Q75</b>	0.0279**	(0.0114)	0,023355	0,033797		-0.1461**	(0.0063)	-0,153927	-0,140150

# OLS and UQR FH - $\delta$ coefficient (without DDPs)

	coeff.	se	Cilw	Ciup		coeff.	se	Cilw	Ciup
European Union					Italy				
<b>OLS</b>	-0.4090***	(0.0056)	-0,409281	-0,406547		-0.1965***	(0.0192)	-0,197786	-0,193497
<b>Q25</b>	-0.3859***	(0.0036)	-0,388241	-0,381692		-0.1850***	(0.0021)	-0,187600	-0,179632
<b>Q50</b>	-0.1242***	(0.0014)	-0,125727	-0,122447		-0.0969***	(0.0023)	-0,099229	-0,092193
<b>Q75</b>	-0.0115***	(0.0015)	-0,013470	-0,009028		-0.0306***	(0.0020)	-0,033675	-0,027909
Finland					Poland				
<b>OLS</b>	-0.2332***	(0.0061)	-0,231073	-0,222846		-0.3567***	(0.0028)	-0,359890	-0,351942
<b>Q25</b>	-0.1754***	(0.0085)	-0,178303	-0,167288		-0.3576***	(0.0076)	-0,363811	-0,347016
<b>Q50</b>	-0.1849***	(0.0057)	-0,188813	-0,174421		-0.2809***	(0.0048)	-0,286522	-0,275440
<b>Q75</b>	-0.1001***	(0.0048)	-0,100942	-0,090102		-0.2246***	(0.0044)	-0,230634	-0,219527
France					Romania				
<b>OLS</b>	-0.3157***	(0.0037)	-0,318236	-0,311692		-0.5878***	(0.0137)	-0,599136	-0,578360
<b>Q25</b>	-0.3856***	(0.0106)	-0,389576	-0,375657		-0.8133***	(0.0199)	-0,840217	-0,783132
<b>Q50</b>	-0.2156***	(0.0103)	-0,222027	-0,209277		-0.3783***	(0.0067)	-0,388390	-0,371296
<b>Q75</b>	-0.0736***	(0.0103)	-0,081651	-0,068124		-0.1581***	(0.0064)	-0,165696	-0,150726

# Conclusions and policy considerations

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- In the EU on average, there is a negative differential between the narrow FH and self-employed NFH when considering **raw means**.
- Part of the differential can be explained by households **observable characteristics** and partially addressed by policy measures actually implemented within the second pillar of the CAP. The **residual income differential** (very **unstable**) is likely to depend more on **sectorial differences** which also call for specific government interventions.
- Part of these difference disappears when controlling for geographical areas: the differential is persistent only for Central Eastern countries.

# Conclusions and policy implications

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- Controlling also for unobservable characteristics, the average disparity in the income level between narrow FH and narrow NFH disappears when controlling for time of entry in the EU.
- However, when comparing the narrow FH with the rest of the population, we find that they are richer than their control group.
- Not all types of FH face an income gap: narrow and broad strongly differ also with respect to the comparison group.
- A relevant problem of targeting of DDP exists: the support of the income (useful for broad farm households) seems not needed for filling an (non-existing) income gap in narrow farm households.

# Conclusions and policy implications

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- When exploring the distribution, it emerges that being self-employed in agriculture still represents a relative disadvantage across the EU and several countries.
- However, higher quantiles have farmers (broad definition) richer than the population, in particular in the countries most representative of WEC and MED.
- This call for specific measures of the CAP aimed at tailoring the support to specific farm households (in the lower quantiles) and in more needed countries (CEE).

# Limits

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- Nature of the EUSILC sample of farm households
- Only a proxy measure of CAP payments with a strong assumption

Thanks for listening.

Questions and suggestions are welcomed.