

$W(I-A)^4$



Where have all the Funds Gone? Multiregional Input-Output Analysis of the EAFRD effectiveness

*Monsalve, Fabio**
Zafrilla, Jorge Enrique
Cadarso, M^a Angeles
Tobarra, M^a Angeles

1. Introduction

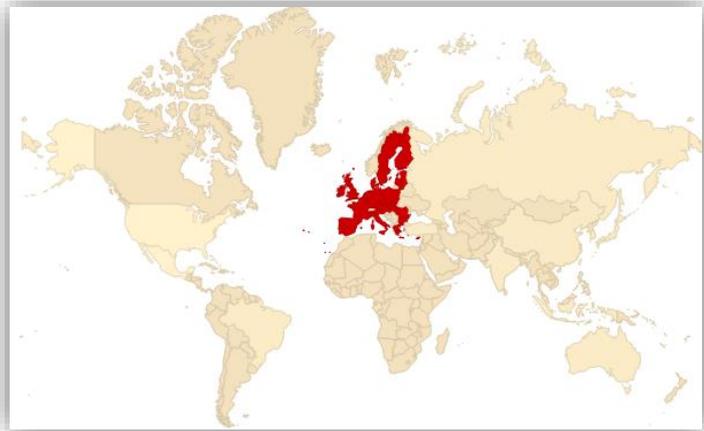


The European Agricultural Fund
for Rural Development:
Europe investing in rural areas

2. Data and Methodology

$$\begin{pmatrix} x^1 \\ x^2 \\ x^3 \\ \vdots \\ x^m \end{pmatrix} = \begin{pmatrix} A^{11} & A^{12} & A^{13} & \dots & A^{1m} \\ A^{21} & A^{22} & A^{23} & \dots & A^{2m} \\ A^{31} & A^{32} & A^{33} & \dots & A^{3m} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ A^{m1} & A^{m2} & A^{m3} & \dots & A^{mm} \end{pmatrix} \begin{pmatrix} x^1 \\ x^2 \\ x^3 \\ \vdots \\ x^m \end{pmatrix} + \begin{pmatrix} \sum_r y^{1r} \\ \sum_r y^{2r} \\ \sum_r y^{3r} \\ \vdots \\ \sum_r y^{mr} \end{pmatrix}$$

3. Main results



4. Discussion



1. Introduction
2. Data and methodology
3. Main results
4. Discussion

Budgetary **leakage** of European place-based policies *via* imports?



Rural Development Research

- *Rural economy is no longer a farm economy*
- *Sector-based policies are neither efficient nor effective rural development policies*

[Irwin et al. (2010)].

“The future of rural society”

- *The pressures of modern development to land use and the stability of the environment,*
- *The rural decline*
- *The abandonment of areas which are furthest from the mainstream of community life and access*

(EC 1988).

**Productivity
Food-
provisioning**

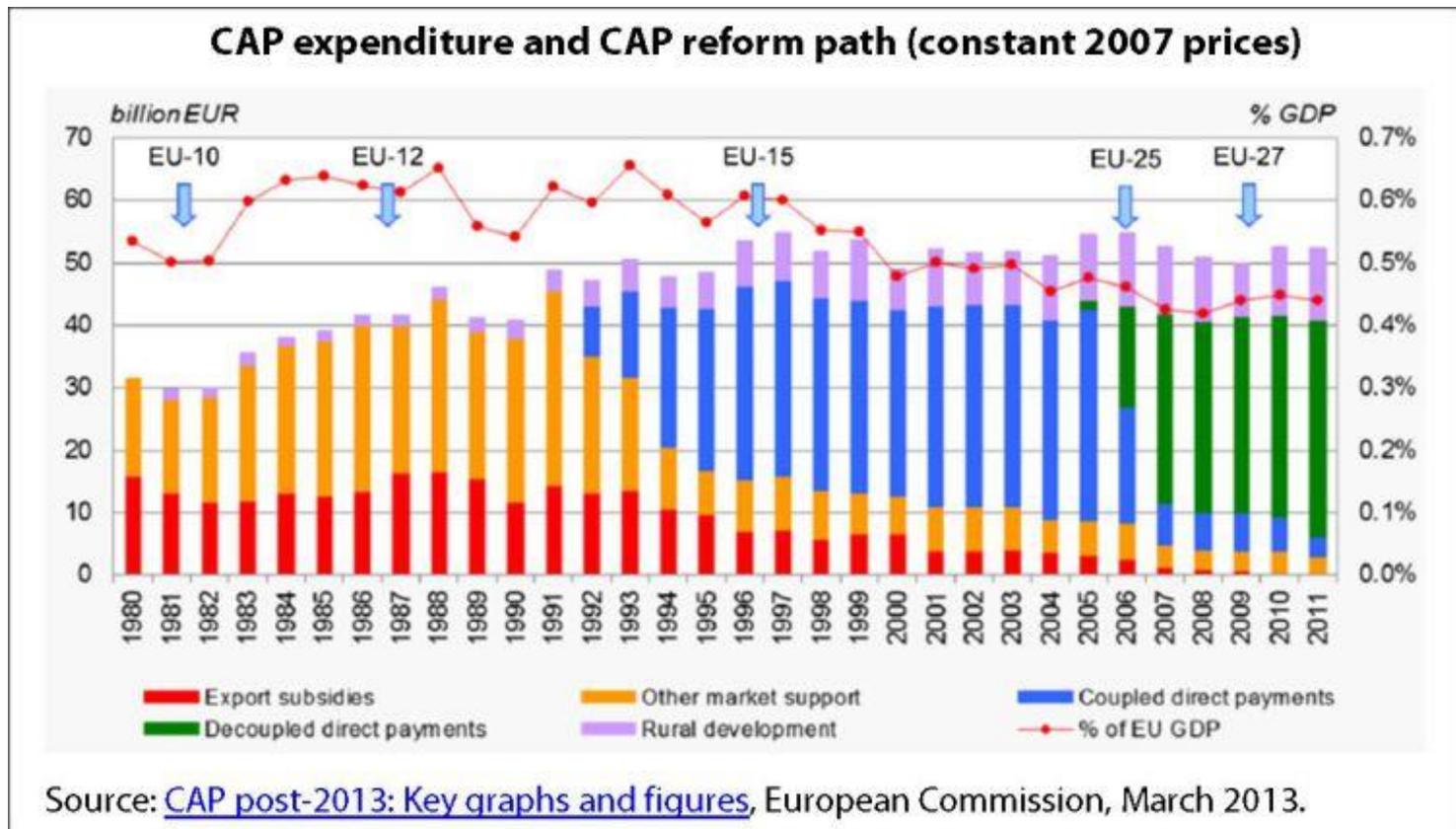
**Keep-Income
avoid surplus**

**Rural Develop.
Environment**

**New
CAP**

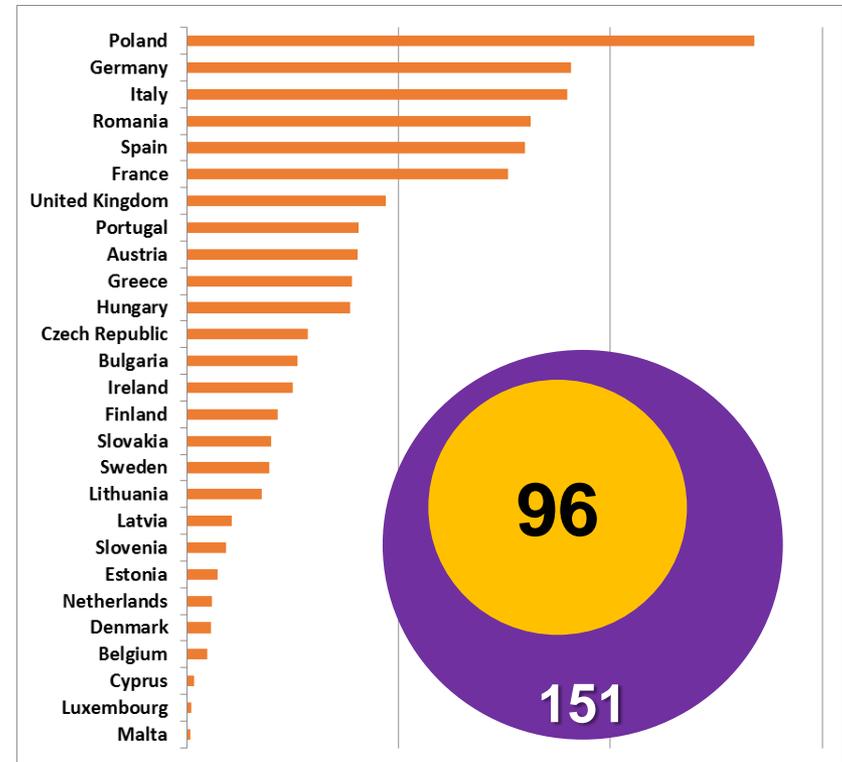


- ❑ **First Pillar.-** European Agricultural Guarantee Fund (EAFG)
- ❑ **Second Pillar.-** European Agricultural Fund for Rural Development (EAFRD)



- **EAFRD (2007-2013).- Aims and Endowments:**
 - *Improving the competitiveness of agriculture and forestry by supporting restructuring, development and innovation*
 - *Improving the environment and the countryside by supporting land management*
 - *Improving the quality of life in rural areas*

Pais	FEADER ENRD	GP ENRD
Austria	4,025,575,992.00	7,936,564,027.00
Belgium	487,484,306.00	1,326,370,830.00
Bulgaria	2,603,359,120.00	3,231,343,097.00
Cyprus	164,563,574.00	275,136,131.00
Czech Republic	2,857,506,354.00	3,670,064,101.00
Denmark	577,918,796.00	1,020,092,476.00
Estonia	723,736,855.00	935,350,513.00
Finland	2,135,018,907.00	6,829,702,089.00
France	7,584,497,109.00	13,564,659,532.00
Germany	9,078,001,363.00	14,539,160,395.00
Greece	3,906,228,424.00	4,747,295,517.00
Hungary	3,860,091,392.00	5,255,872,525.00
Ireland	2,494,540,590.00	4,309,452,483.00
Italy	8,985,781,883.00	17,663,097,576.00
Latvia	1,054,373,504.00	1,383,039,101.00
Lithuania	1,765,794,093.00	2,287,247,623.00
Luxembourg	94,957,826.00	393,366,942.00
Malta	77,653,355.00	101,611,140.00
Netherlands	593,197,167.00	1,121,343,667.00
Poland	13,398,928,156.00	17,430,072,995.00
Portugal	4,056,570,600.00	4,833,903,135.00
Romania	8,124,198,745.00	9,324,804,232.00
Slovakia	1,996,908,078.00	2,597,053,717.00
Slovenia	915,992,729.00	1,178,215,576.00
Spain	7,982,641,110.00	13,555,085,943.00
Sweden	1,953,061,954.00	4,212,975,617.00
United Kingdom	4,690,356,176.00	7,787,038,815.00
	96,188,938,158.00	151,509,919,795.00



Some considerations about Rural development evaluation...

- ❑ **Rural Development** is distinctively **more than rural growth**: economic diversification, sustainability, the enhancement of physical, cultural and human potential and the involvement of local people in the process is different from “more-of- everything”
- ❑ The “**common monitoring and evaluation framework**” have developed a systematic process of evaluation through a comprehensive set of indicators, which assess the achievement of the established objectives; but not the collateral spillovers and eventual financial leakages...



- ❑ *A multiregional impact analysis of the new fund could **contribute** to evaluate the efficiency of the rural policy and to assess the already mentioned spillovers effects and **budgetary leakage** out of EU.*

- ❑ *Triple Bottom Line Analysis*
 - ❑ ***People.-** Labour, Taxes*
 - ❑ ***Planet.-** Emissions, Water*
 - ❑ ***Profit.-** Economic impact, Value add*



1. Introduction
2. **Data and methodology**
3. Main results
4. Discussion

Sources



World Input-Output Database



Sectorial allocation

151
M€uros

Sectors	FEADER	AUS	AUT	BEL	4 to 40	Row
Agriculture, Hunting, Forestry and Fishing	6.254,88	0,00	151,95	5,34	///	0,00
From 2 to 12	0,00	0,00	2,00	3,00	///	0,00
Machinery, Nec	12.110,28	0,00	194,46	151,25	///	0,00
Electrical and Optical Equipment	4.711,88	0,00	114,89	55,11	///	0,00
From 15 to 17	0,00	0,00	2,00	3,00	///	0,00
Construction	28.744,06	0,00	580,39	346,62	///	0,00
From 19 to 21	0,00	0,00	2,00	3,00	///	0,00
Hotels and Restaurants	179,86	0,00	3,75	1,48	///	0,00
From 23 to 27	0,00	0,00	2,00	3,00	///	0,00
Financial Intermediation	5.326,27	0,00	115,28	62,84	///	0,00
Real Estate Activities	0,00	0,00	2,00	3,00	///	0,00
Renting of M&Eq and Other Business Activities	20.208,73	0,00	917,75	169,42	///	0,00
Public Admin and Defence; Compulsory Social Security	0,00	0,00	2,00	3,00	///	0,00
Education	1.894,88	0,00	108,59	47,44	///	0,00
From 33 to 35	0,00	0,00	0,00	0,00	///	0,00
Income	72.079,08	0,00	5.749,49	486,86		0,00
Total	151509,92	0,00	7.948,56	1.344,37	0,00	0,00



1. Introduction
2. Data and methodology
3. Main results
4. Discussion

Final Demand

151
M€uros

Final Demand Matrix		1 to 35				
		AUS	AUT	BEL	...	RoW
1 to 35	AUS	/	\	\	...	/
1 to 35	AUT	/	\	\	...	/
1 to 35	BEL	/	\	\	...	/
1 to 35
1 to 35	RoW	/	\	\	...	/

(1435*1435)



1. Introduction
2. Data and methodology
3. Main results
4. Discussion

Regional FEADER Allocation

* Expenditure.-

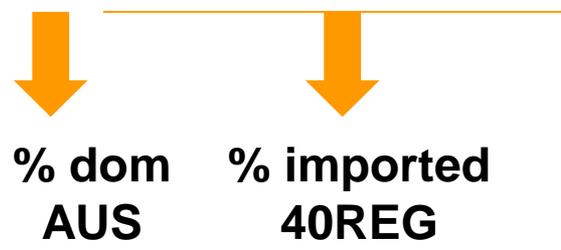
WIOD Final Demand

Rows Sum

		Final consumption expenditure by non-profit organisations serving households (NPISH)					Σ
		Final consumption expenditure by households	Final consumption expenditure by government	Gross fixed capital formation	Changes in inventories and valuables		
		EU	EU	EU	EU		
		c37	c38	c39	c41	c42	c37-41
1 to 35	AUS	///	///	///	///	///	///
1 to 35	AUT	///	///	///	///	///	///
1 to 35	BEL	///	///	///	///	///	///
1 to 35	...	///	///	///	///	///	///
1 to 35	RoW	///	///	///	///	///	///

Reshape

					Rows Sum
AUS	AUT	BEL	...	RoW	Σ
///	///	///	///	///	///



* Income.- Similar, but restricted to c37



1. Introduction
2. Data and methodology
3. Main results
4. Discussion

Methodology

		1 to 35	Final Demand									
		AUS	AUT	BEL	...	RoW	AUS	AUT	BEL	ym ...	Row	
1 to 35	AUS	Ad	Am	Am	...	Am	Yd	ym AUS	ym AUS	ym ...	ym AUS	
1 to 35	AUT	Am	Ad	Am	...	Am	ym AUT	Yd	ym AUT	ym ...	ym AUT	
1 to 35	BEL	Am	Am	Ad	...	Am	ym BEL	ym BEL	Yd	ym ...	ym BEL	
1 to 35	...	Am	Am	Am	...	Am	ym ...	ym ...	ym ...	Yd ...	Am	
1 to 35	RoW	Am	Am	Am	...	Ad	ym RoW	ym RoW	ym RoW	ym ...	Yd	
						(1435*1435)						(1435*1435)

$$\begin{pmatrix} x^1 \\ x^2 \\ x^3 \\ \vdots \\ x^m \end{pmatrix} = \begin{pmatrix} A^{11} & A^{12} & A^{13} & \dots & A^{1m} \\ A^{21} & A^{22} & A^{23} & \dots & A^{2m} \\ A^{31} & A^{32} & A^{33} & \dots & A^{3m} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ A^{m1} & A^{m2} & A^{m3} & \dots & A^{mm} \end{pmatrix} \begin{pmatrix} x^1 \\ x^2 \\ x^3 \\ \vdots \\ x^m \end{pmatrix} + \begin{pmatrix} \sum_r y^{1r} \\ \sum_r y^{2r} \\ \sum_r y^{3r} \\ \vdots \\ \sum_r y^{mr} \end{pmatrix}$$

Also expressed in compact form by:

$$x = Ax + y$$

Through Leontief Inverse [L=(I - A)⁻¹]:

$$x = (I - A)^{-1} y$$

Factors contents of the Triple bottom analysis

$$x = (I - A)^{-1} y$$

$$V = \hat{v}a(I - A)^{-1}\hat{y} = VA\hat{y}$$

$$L = \hat{l}(I - A)^{-1}\hat{y} = LB\hat{y}$$

$$T = \hat{t}(I - A)^{-1}\hat{y} = TX\hat{y}$$

$$E = \hat{e}(I - A)^{-1}\hat{y} = EM\hat{y}$$

$$W = \hat{w}(I - A)^{-1}\hat{y} = WT\hat{y}$$

Output

Value Added

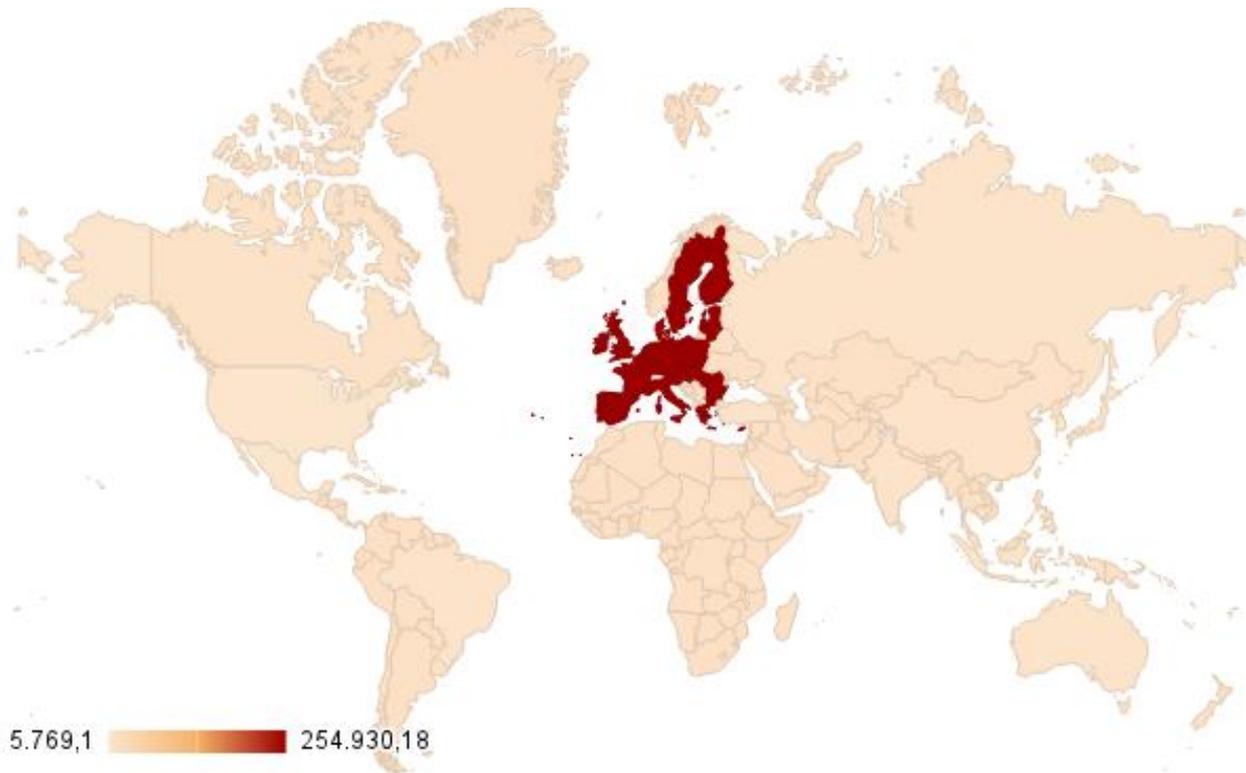
Labour

Taxes

Emissions

Water

6 Region-World Spillovers

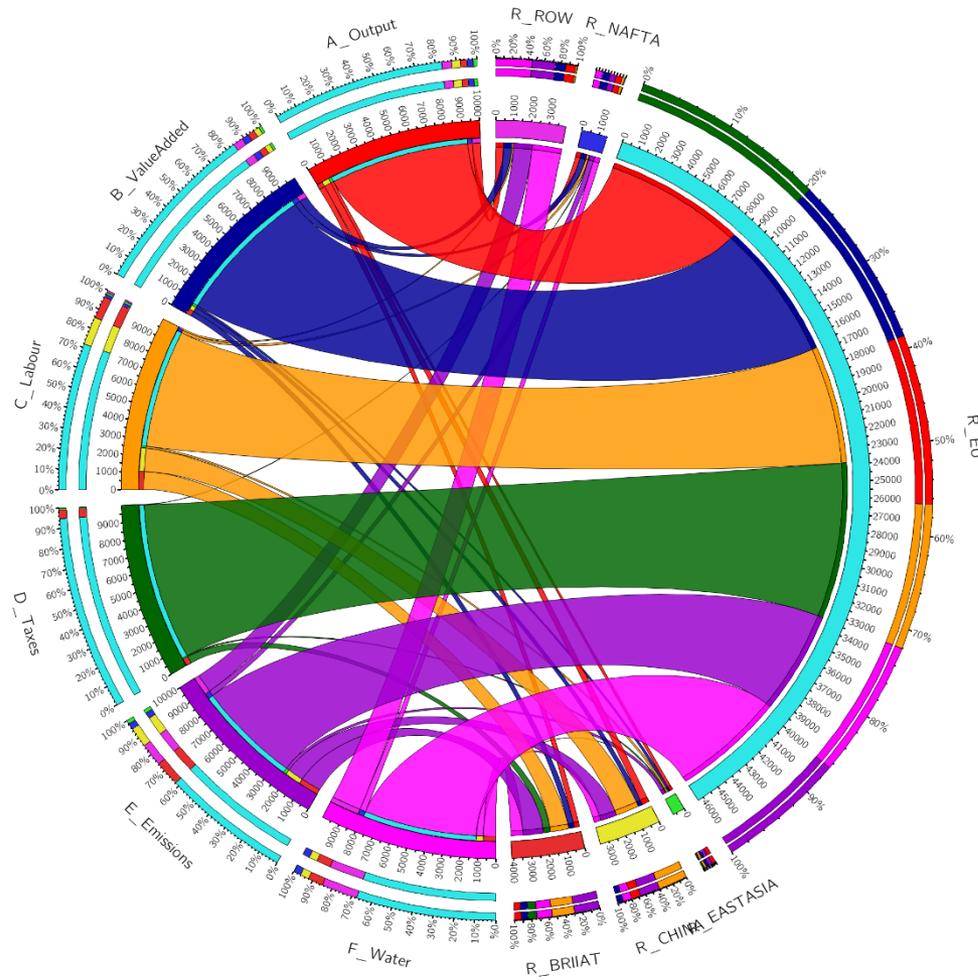


	EU	NAFTA	China	East Asia	BRIIAT	Row	Total
Output	251.654,76	8.677,56	13.231,09	5.466,48	9.504,37	14.248,72	302.782,99
%	83,11%	2,87%	4,37%	1,81%	3,14%	4,71%	100,00%

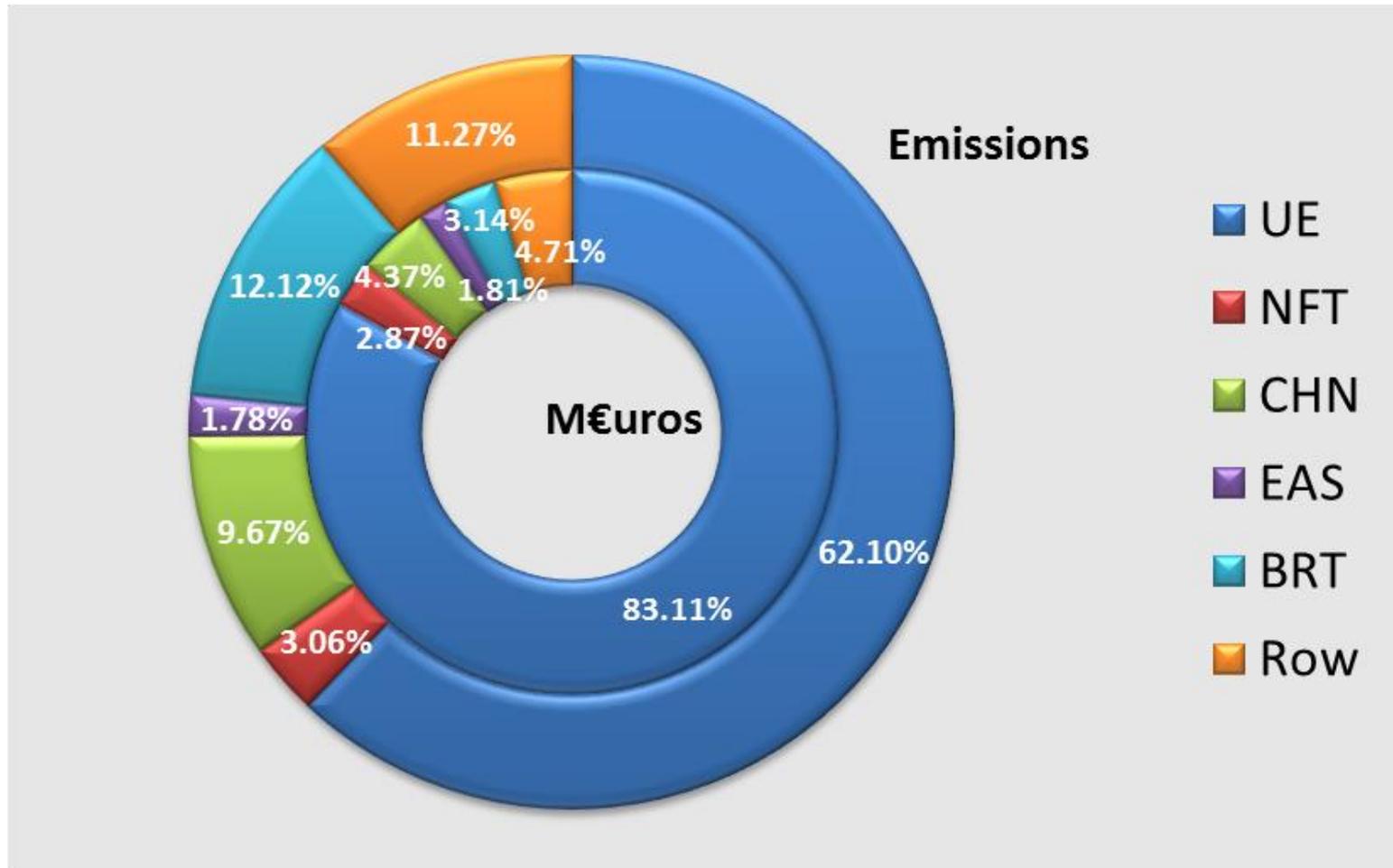


1. Introduction
2. Data and methodology
3. **Main results**
4. Discussion

Economic, Social and Environmental Impacts



1. Introduction
2. Data and methodology
3. **Main results**
4. Discussion



Impacts per €

Datos SIN-FEADER (M€uros)

	<i>EU</i>	<i>NAFTA</i>	<i>China</i>	<i>East Asia</i>	<i>BRIIAT</i>	<i>Row</i>	<i>Total</i>
VA.2011	0.47273	0.55572	0.32789	0.47922	0.49828	0.49184	0.47540
Empleo.2009	0.00930	0.00918	0.04875	0.00838	0.06462	0.00314	0.02098
Impuestos.2011	0.02548	0.00187	0.00000	0.00416	0.02644	0.00000	0.01005
Emisiones.2011	0.15983	0.26860	0.51523	0.17025	0.54119	0.48744	0.33681
Agua.2009	28.65683	69.80657	105.56056	11.19445	277.81564	260.68444	113.26690

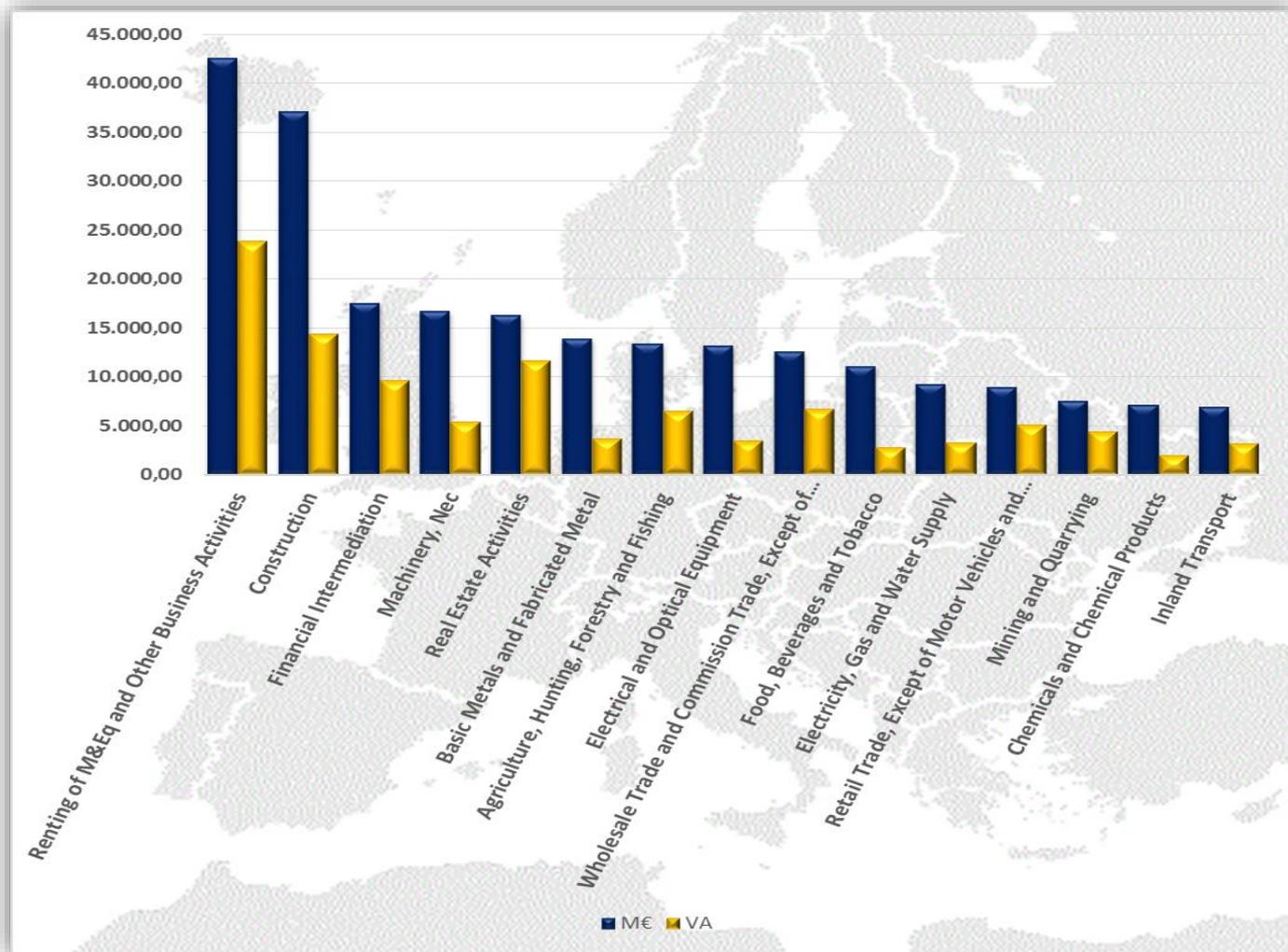
Impacto FEADER (M€uros)

	<i>EU</i>	<i>NAFTA</i>	<i>China</i>	<i>East Asia</i>	<i>BRIIAT</i>	<i>Row</i>	<i>Total</i>
VA.2011	0.4501	0.5346	0.2765	0.3294	0.4731	0.4625	0.4440
Empleo.2009	0.0133	0.0077	0.0492	0.0094	0.0538	0.0030	0.0154
Impuestos.2011	0.0254	0.0020	0.0000	0.0083	0.0297	0.0000	0.0222
Emisiones.2011	0.2348	0.3358	0.6956	0.3095	1.2131	0.7526	0.3143
Agua.2009	87.6689	130.9270	104.1221	6.8032	252.4255	403.0954	108.1831



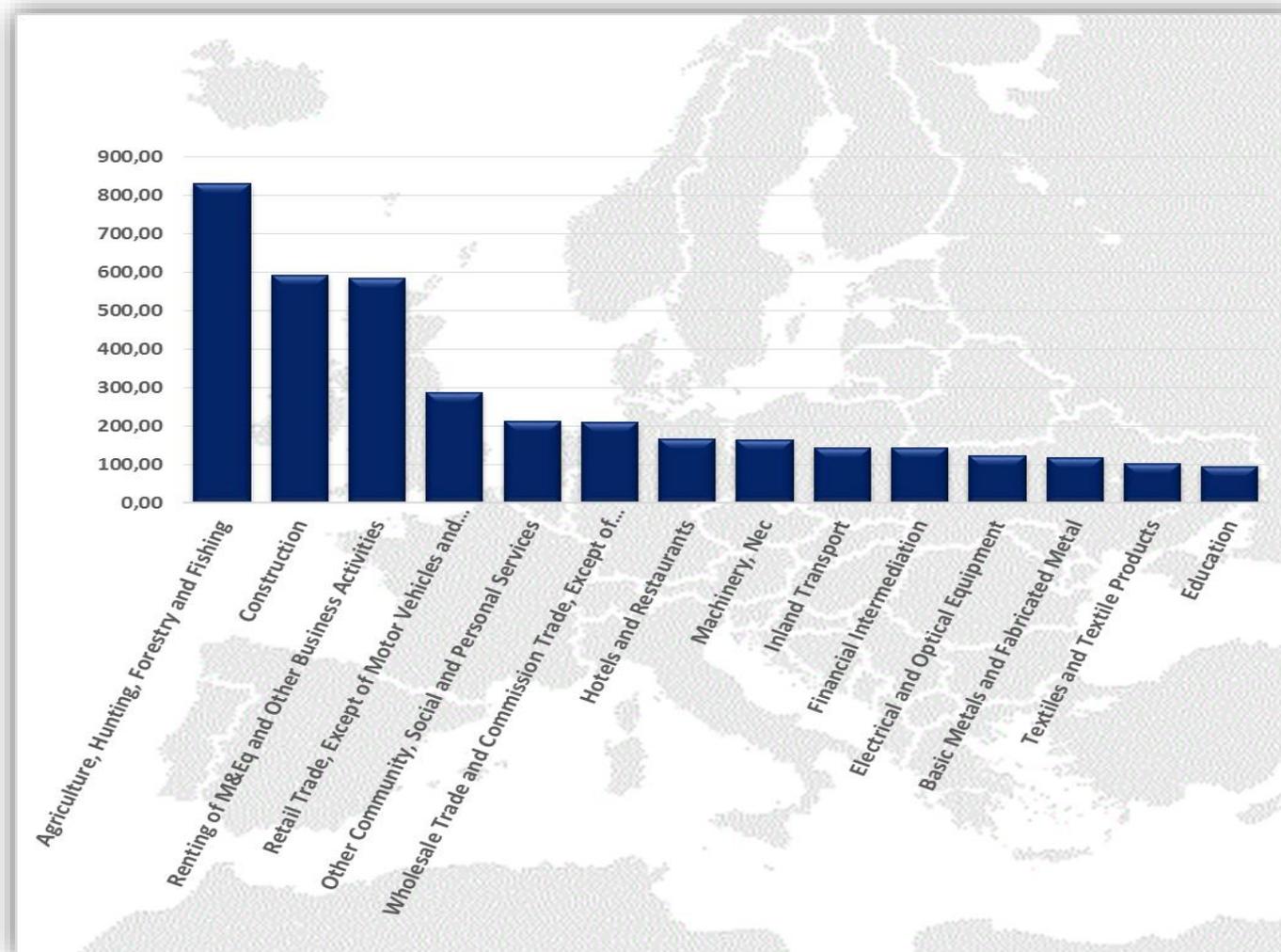
1. Introduction
2. Data and methodology
3. **Main results**
4. Discussion

Sectorial Economic Impact (millones de €)



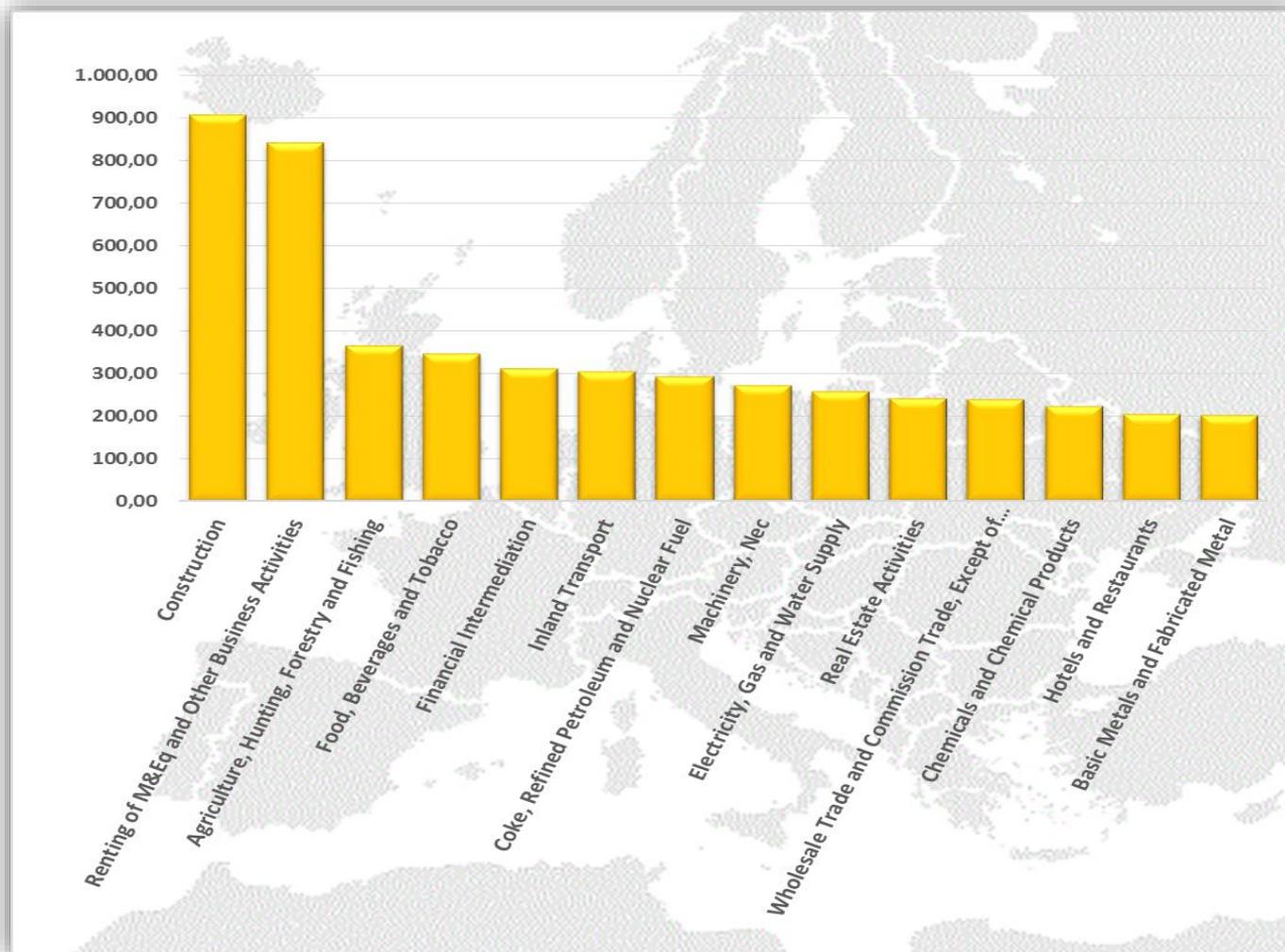
1. Introduction
2. Data and methodology
3. **Main results**
4. Discussion

Sectorial Labour impacts – (thousands of persons engaged)



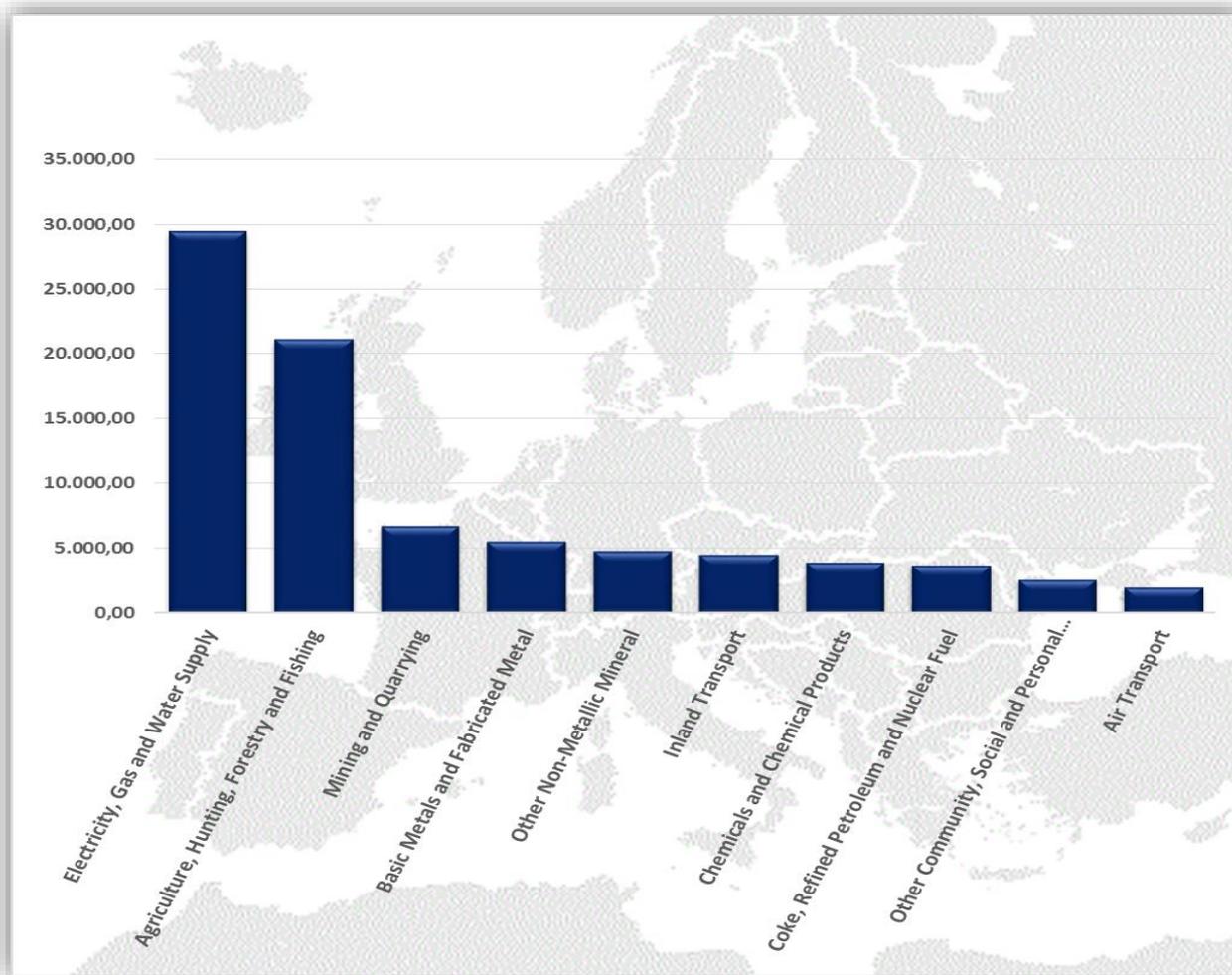
1. Introduction
2. Data and methodology
3. **Main results**
4. Discussion

Sectorial Taxes impact.- (Millions of €uros)

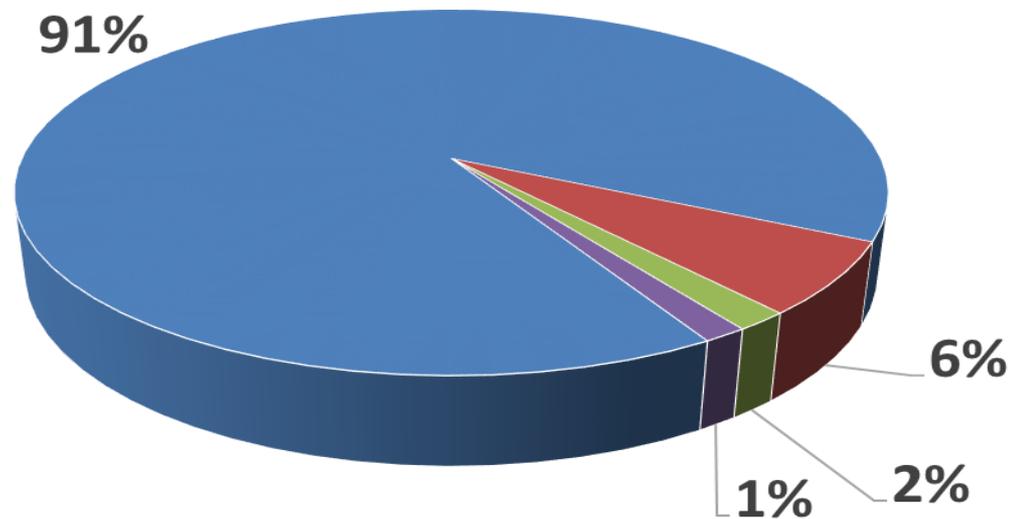


1. Introduction
2. Data and methodology
3. **Main results**
4. Discussion

Sectorial Emissions (KtCO₂eq)



Sectorial Water consumption (1000 m3)



- Agriculture, Hunting, Forestry and Fishing
- Electricity, Gas and Water Supply
- Chemicals and Chemical Products
- Basic Metals and Fabricated Metal



Where have all the Funds Gone?

Mainly remains in Europe (83,11%)

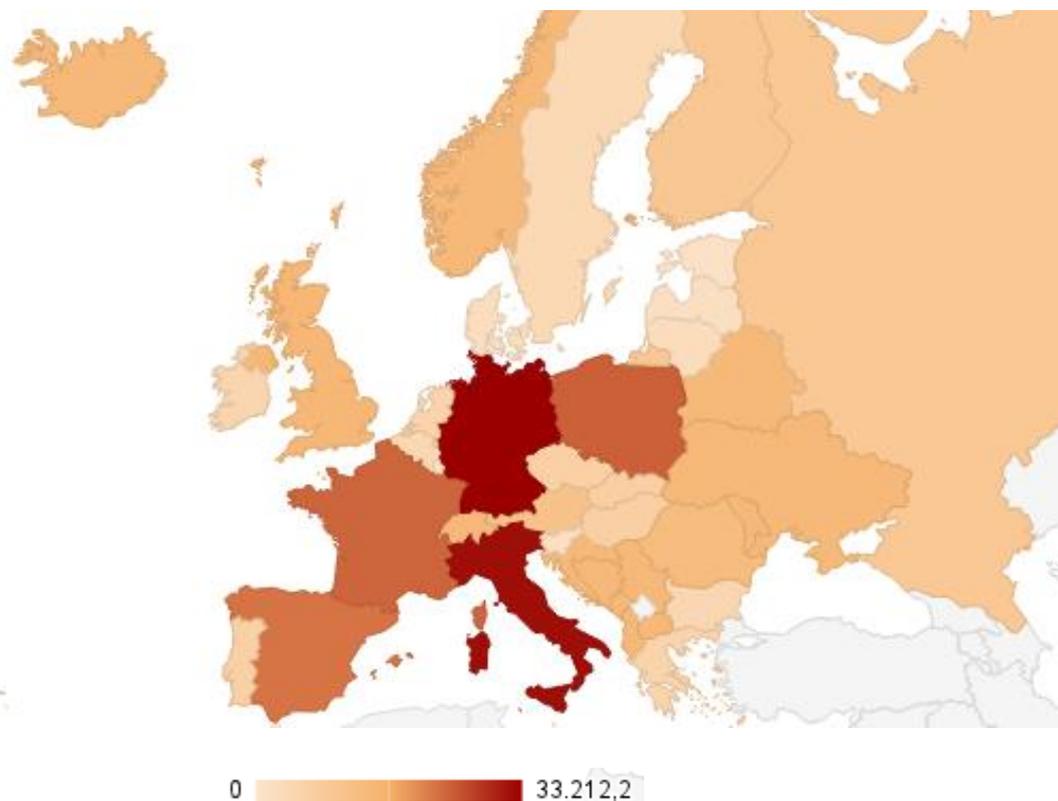
...and what about inside Europe?



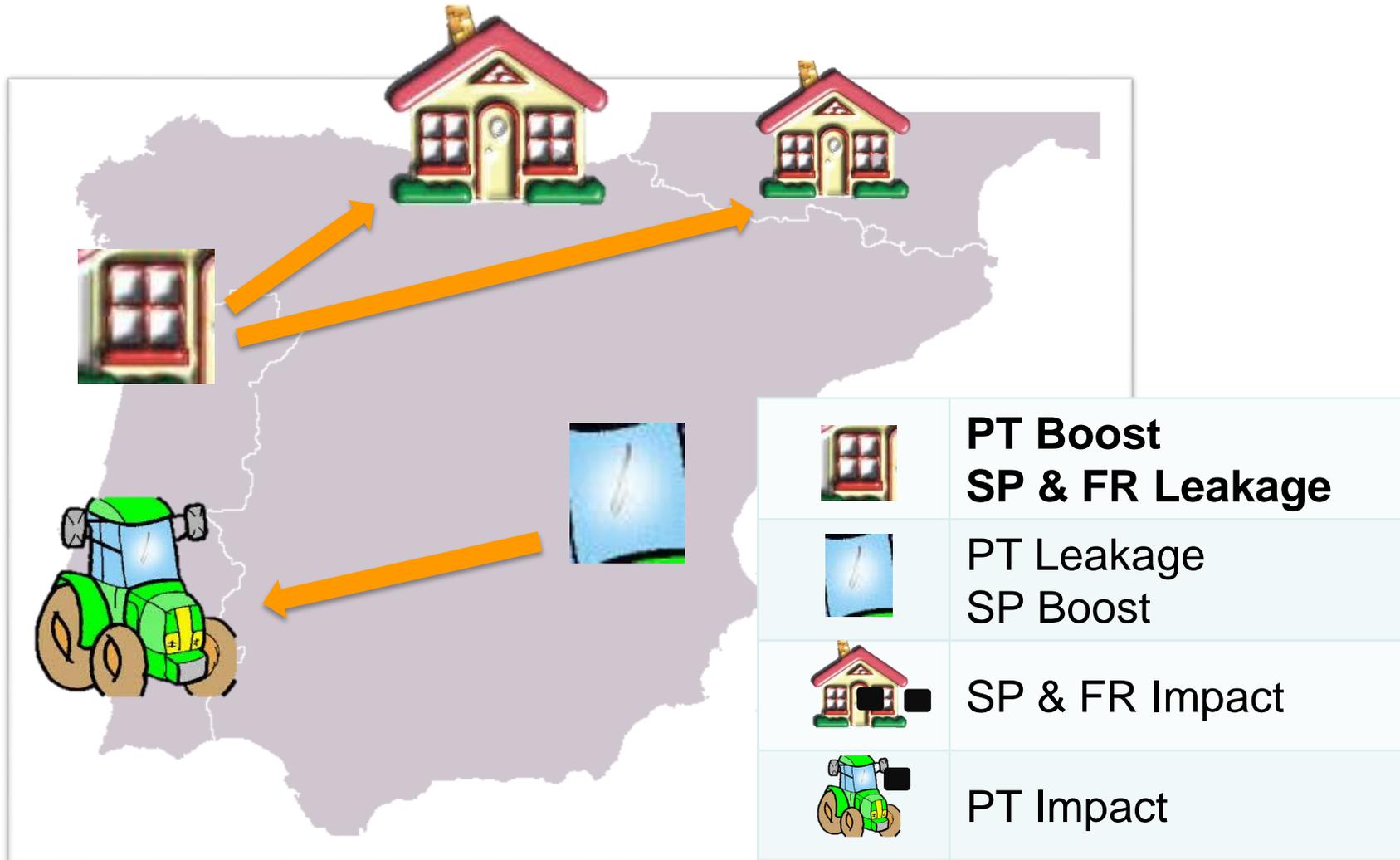
1. Introduction
2. Data and methodology
3. Main results
4. Discussion

...and what about inside Europe?

Country	Presupuesto (Mill.€)		Impacto
	Feeder	GP	M€uro: ↓↑
Germany	8.538,56	13.675,20	33.212,20
Italy	8.451,82	16.613,50	31.915,55
Poland	12.602,72	16.394,32	24.294,27
France	7.133,80	12.758,60	23.680,33
Spain	7.508,29	12.749,60	22.360,72
United Kingdom	4.411,64	7.324,31	14.657,09
RoW	0,00	0,00	14.248,72
China	0,00	0,00	13.231,09
Romania	7.641,43	8.770,69	13.141,18
Austria	3.786,36	7.464,95	11.235,99
Finland	2.008,15	6.423,86	9.634,34
BRIIAT	0,00	0,00	9.504,37
Nafta	0,00	0,00	8.677,56
Hungary	3.630,71	4.943,55	7.120,61
Sweden	1.837,00	3.962,63	7.113,29
Czech Republic	2.687,70	3.451,98	6.910,32
Portugal	3.815,52	4.546,66	6.848,51
Greece	3.674,11	4.465,20	5.512,72
East Asia	0,00	0,00	5.466,48
Netherlands	557,95	1.054,71	5.448,88
Ireland	2.346,31	4.053,37	4.862,28
Bulgaria	2.448,66	3.039,33	4.551,01
Belgium	458,52	1.247,55	4.242,80
Slovakia	1.878,25	2.442,73	4.060,01
Lithuania	1.660,86	2.151,33	2.573,24
Denmark	543,58	959,48	2.366,57
Latvia	991,72	1.300,85	1.911,60
Slovenia	861,56	1.108,20	1.633,56
Estonia	680,73	879,77	1.226,43
Luxembourg	89,32	369,99	649,08
Cyprus	154,78	258,79	346,51
Malta	73,04	95,57	145,68

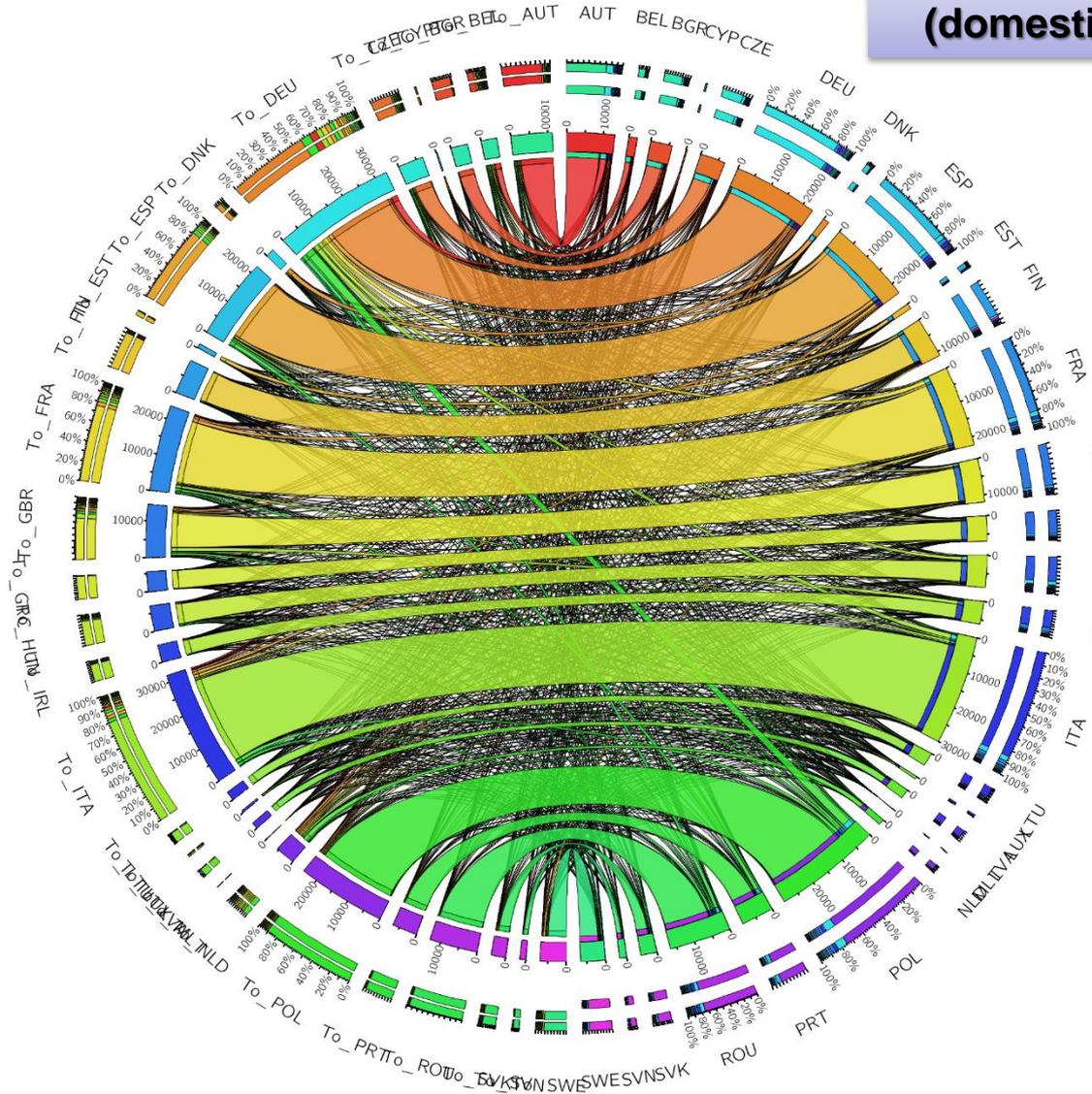


Direct Impact, leakage and boost effects



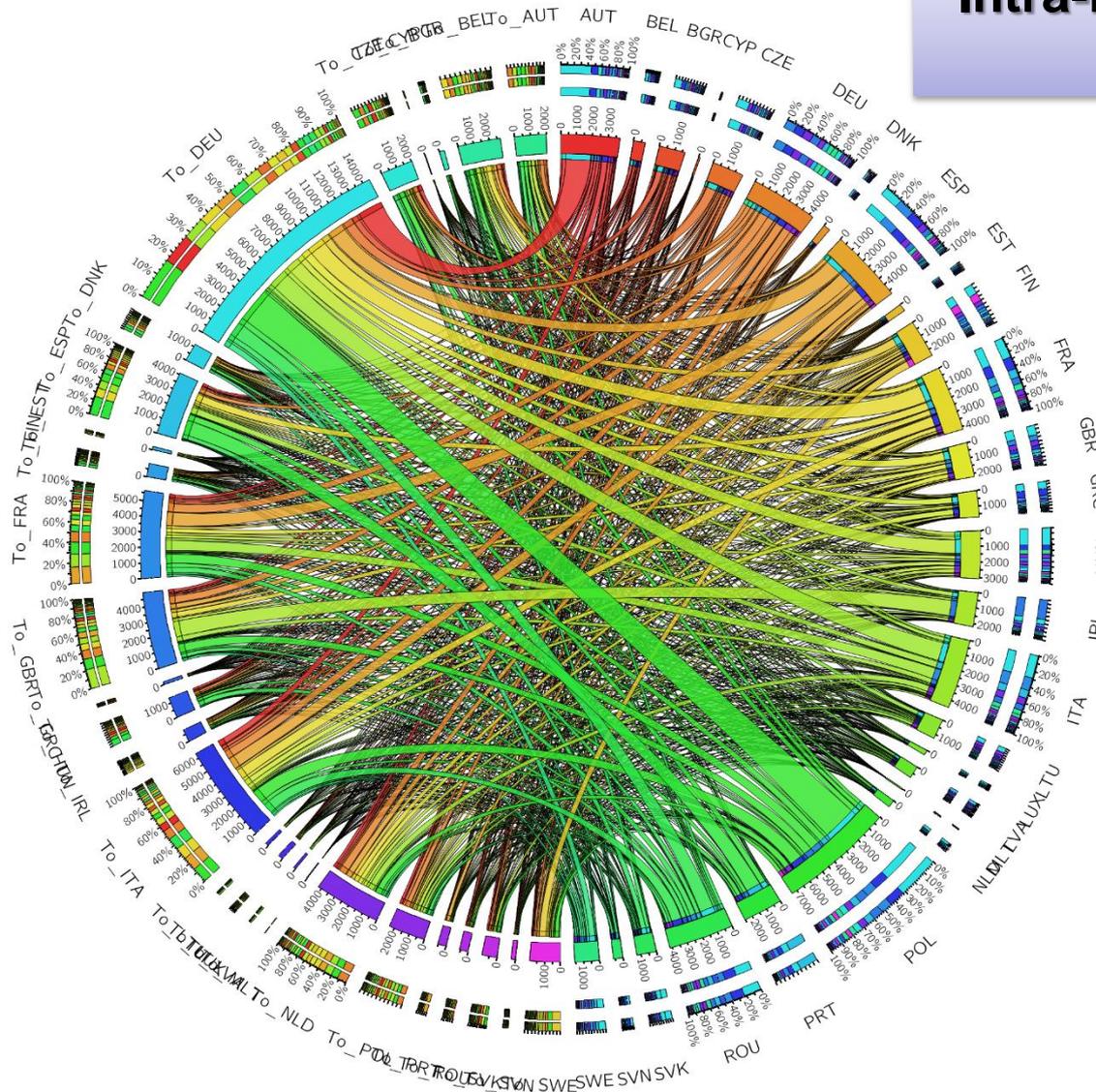
1. Introduction
2. Data and methodology
3. Main results
4. Discussion

EU FEADER impacts (domestic and intra-EU leakages)



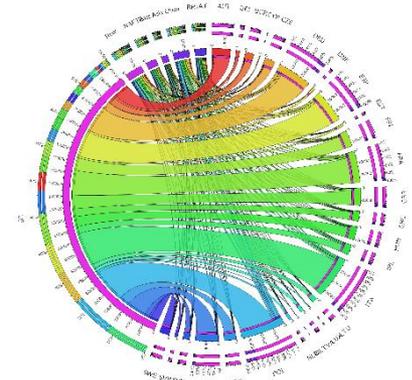
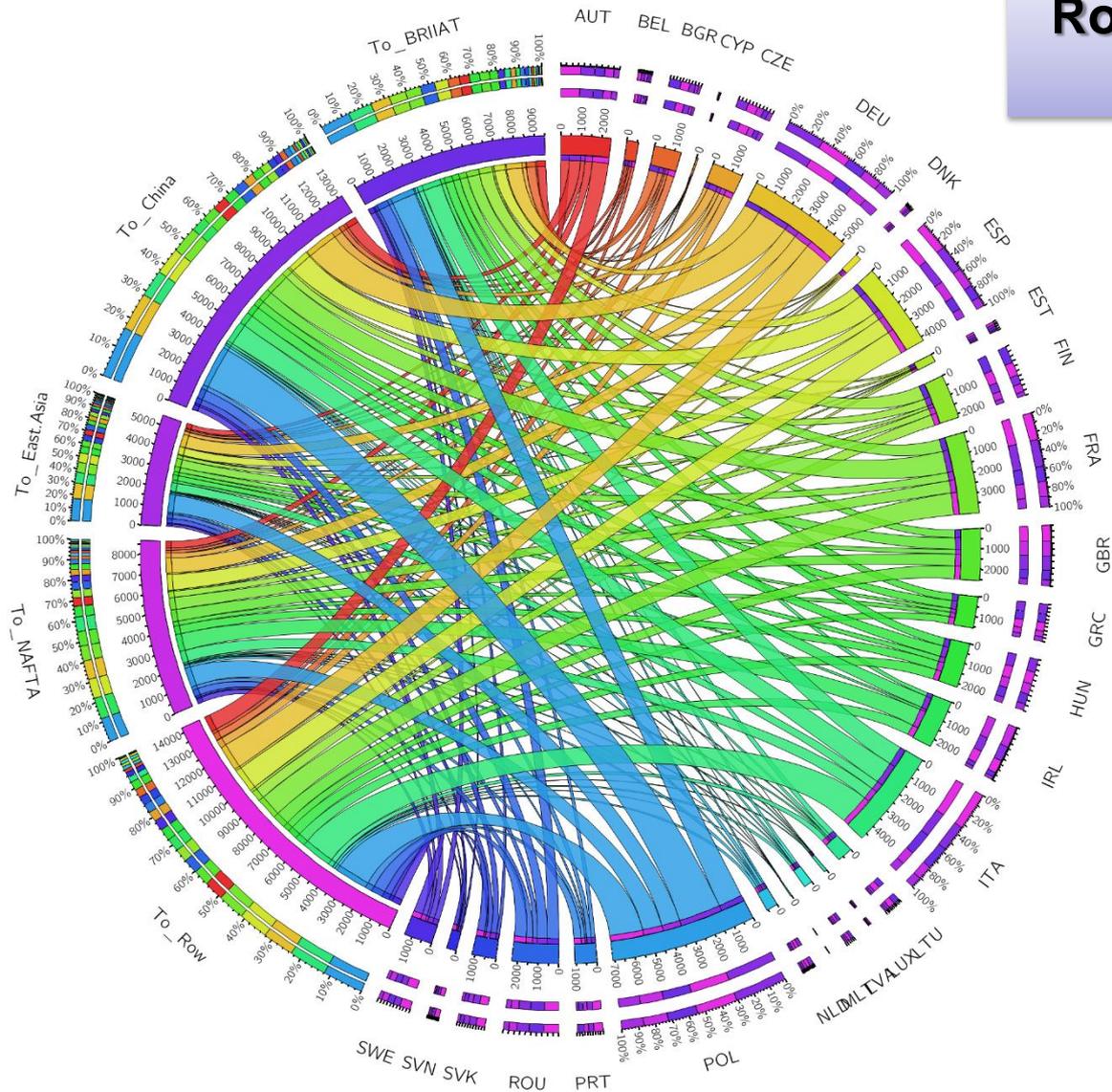
1. Introduction
2. Data and methodology
3. Main results
4. Discussion

Intra-EU FEADER impacts (leakages)



1. Introduction
2. Data and methodology
3. Main results
4. Discussion

RoW FEADER impacts (leakages)



W(I-A)⁴



Thanks for your attention!

