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Do CAP Payments Reduce Farm Labour Migration ? A Panel Data Analysis Across EU Regions

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FACTOR MARKETS
COMPARATIVE ANALYSIS OF FACTOR MARKETS FOR AGRICULTURE ACROSS THE MEMBER STATES

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Objective

- We study the determinants of labour out-farm migration across EU regions
- Tow main research questions:
  - Did CAP subsidies play a role in keeping labor force in agriculture ?
  - Which CAP instruments matter the most ?
    - Pillar I vs. Pillar II policies
    - coupled vs. decoupled payments …

Main findings

- Overall CAP payments gave its contribution to maintain job in agriculture
  - However, the effect is heterogeneous across CAP instruments:
    - **Pillar I** effect is 2-3 times stronger than Pillar II subsidies
    - **Coupled** payments > decoupled payments
    - Agri-environmental payments **week** effect, sometime positive !

Outline

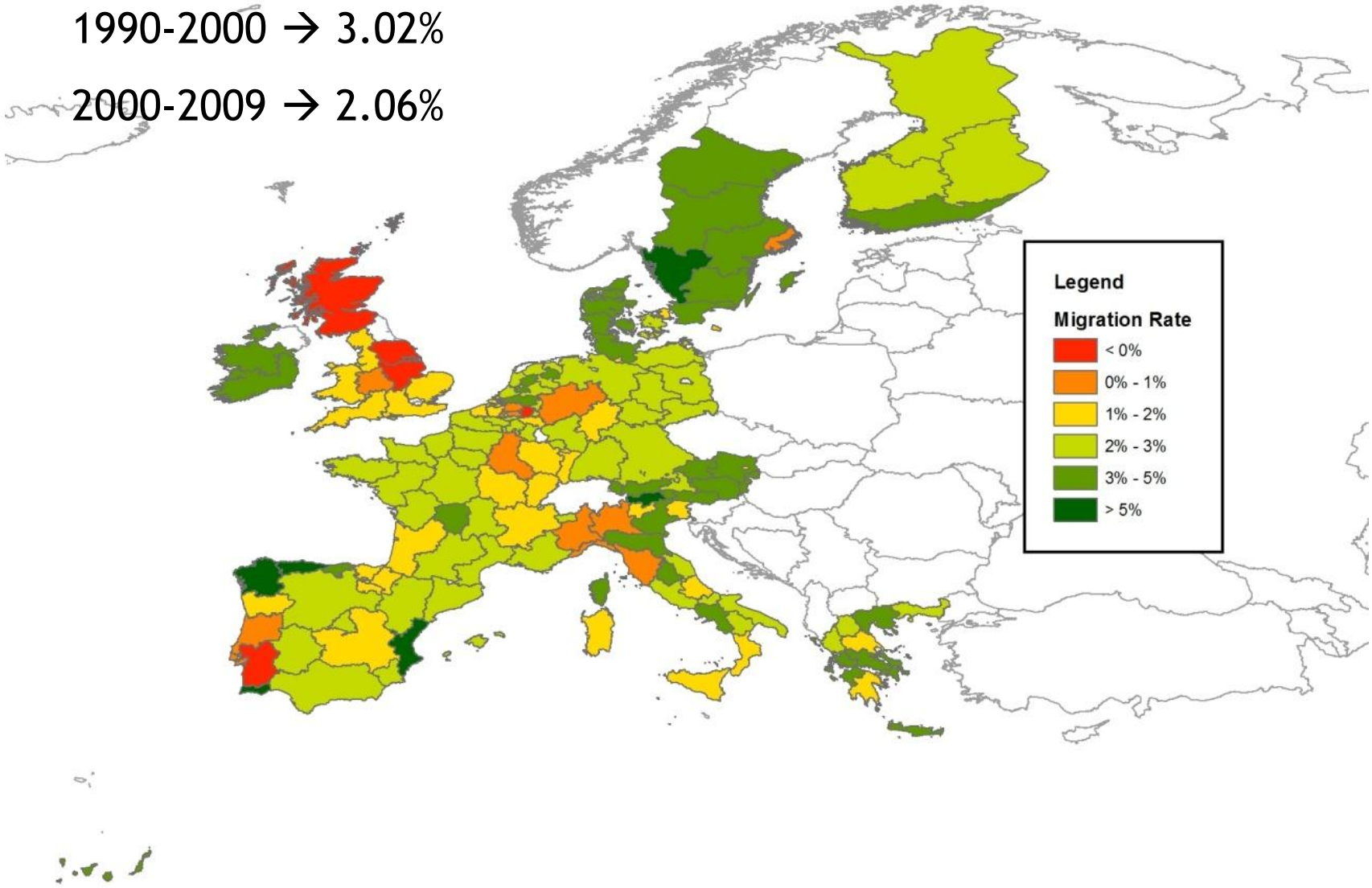
- **Motivation and previous evidence**
- Econometric strategy
- Data description
  - Policy data
- Results
- Concluding comments

Motivation and previous evidence

Average annual migration rate 1990-2009

1990-2000 → 3.02%

2000-2009 → 2.06%



Motivation and previous evidence

- Which role of the CAP ?
  - Sectors **income differences** should be the key driver of agricultural labor reallocation
  - If **CAP income** subsidies **reduced** these differences it should slow down out-migration
  - However, the EU farm sector continue to experience important labor adjustments
  - One interpretation is that the **CAP** has been largely **ineffective** as income support policy

Motivation and previous evidence

Effect of farm subsidies on off-farm migration

	Country	*Level of analysis*	*Methods*	*Off-farm migr.*
Barkley (1990)	US	Country	Time-series	**0**
Goetz and Debertin (1996)	US	2230 conties	Cross-section	**+**
Glauben et al. (2006)	W-Germany	236 counties	Cross-section	**0**
Breustedt and Glauben (2007)	EU15	93 Regions	Cross-section	**–**
van Herck (2009)	EU25	144 Regions	Cross-section	**+**
D'Antoni and Mishra (2010)	US	Country	Time-series	**–**
Petrick and Zier (2011)	E-Germany	69 Landkreise	Panel	**+**

- Current interpretation (van Herck, 2009)
  - Second order effects of farm subsidies may dominate first order income effects, e.g. due to factor markets imperfections (land and credit markets)

Main value added

- We extend previous findings in three main directions
  - We adopt an European-wide perspective, 150 EU Regions, 20 years
  - We work with a broad policy coverage
  - We use panel data methods, to account for heterogeneity, dynamics and endogeneity bias
- All that is possible because we provide a ‘new’ simple strategy to measure CAP subsidies from FADN data

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Econometric strategy

- Two sectors (perfect world) model (Barkely, Mundlak)

Out-farm migration (*m*) = *f* (*Y*, *L*, *X*)

$$m_{it} = \beta_0 + \beta_1 \widehat{ri}_{it-1} + \beta_2 s_{it-1} + \rho_n X_{it-1} + \varepsilon_{it}$$

- $\widehat{ri}$, relative income ***net*** of farm subsidies
- ***s***, CAP subsidies
- ***X***, vector of controls (**relative labor, population density, unemployment rate, labor market institutions, and family workers …**)
- ε comprises a time f.e. component a_t, time invariant regional f.e. μ_i , and an iid error terms π_{it}
- Our expectation is that $\beta_1 > 0$ and $\beta_2 < 0$

Econometric strategy

Identification issues

- Measurement errors in the dep. variable
- Endogeneity of CAP subsidies *s*
  - Other than a static **LSDV** model, we run dynamic **DIFF-GMM** estimator (Arellano and Bond, 1991)
    - Treating the policy variable ***S*** as exogenous or endogenous
    - accounting for dynamic, as out-farm migration is an adjustment process (Petrick and Zier 2012)
  - Key identification assumption: unobserved heterogeneity is **time invariant**

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Data description

- **Sample**: 150 EU-15 regions, over 1990-2009
- **Data source**: Cambridge Econometrics, Eurostat, FADN, OECD
- **Dependent variable**: rate of out-farm migration m_{it}

$$m_{it} = [L_{i,t-1}(1+n_{it}) - L_{it}] / L_{i,t-1}$$

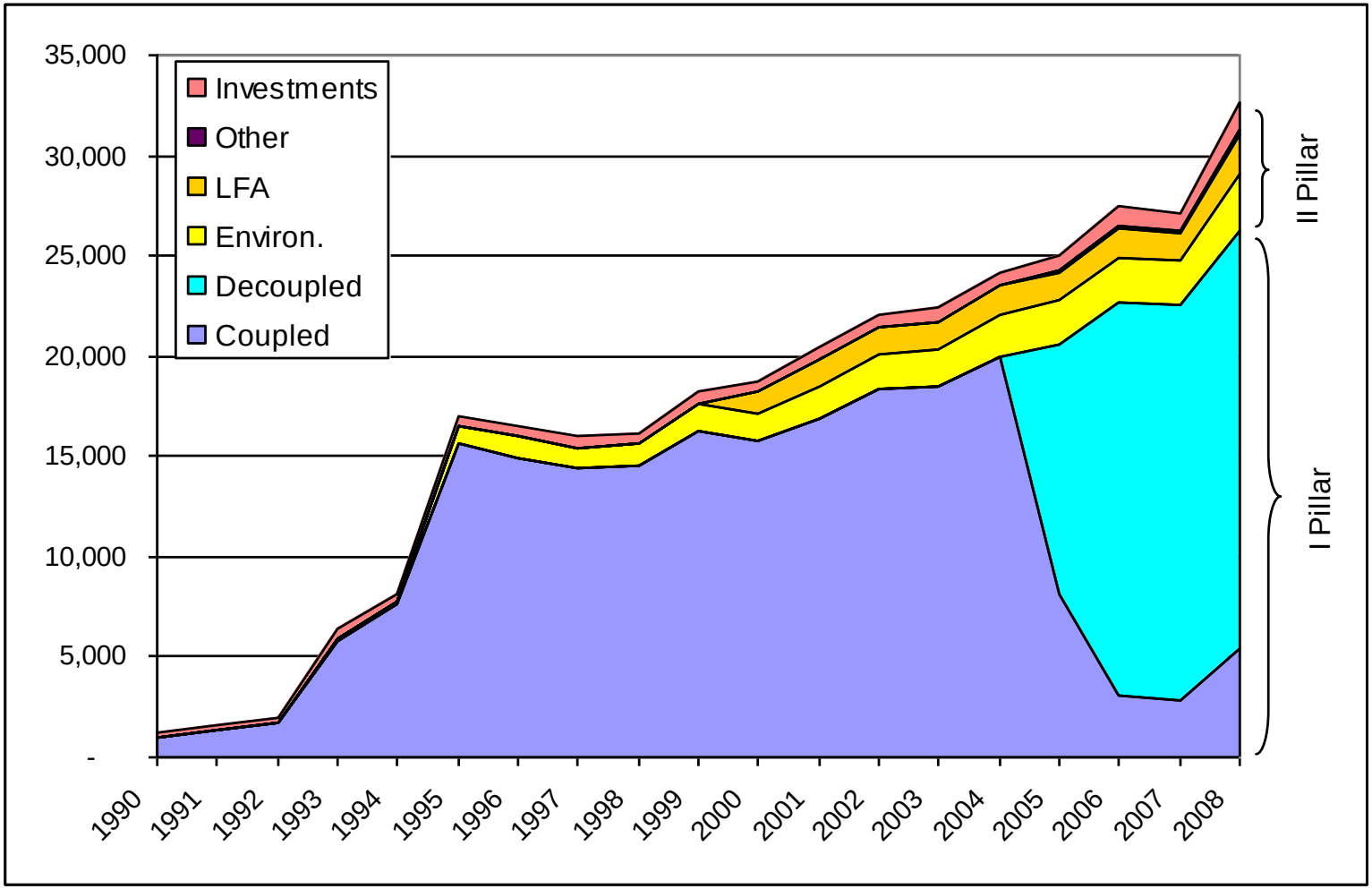
  - L is the labor force in agriculture
  - n is the rate of growth of the total labor force
- **Issues:**
  - **employment** data adding possible measurement errors in m_{it}
  - we cannot account for **part time** farming

Data description: Policy data

- Previous studies:
  - Regionalized *PSE* (Anders *et al.*, 2004)
  - Subsidies from FADN, using Eurostat data to provide them time variation (Esposti, 2007)
- Our strategy is based on FADN data **only**
  - We divide the **amount of payments** received by the 'average farm', in each region, by the respective **farm net income**
  - If the FADN is representative of the farm population, we have a consistent index of protection due to CAP policies
  - Key advantages:
    - Time variation without any manipulation
    - Full policy coverage, of both Pillar I and II payments…

Data description: Policy data

Pillar I and Pillar II payments for the EU15 average farm (€)



Source: based on FADN data

Outline

- Introduction, motivation and value added
- Econometric strategy
- Data description
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Results: static LSDV regressions

Dependent variable: Out-farm migration							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Total payments	-0.0100***	-0.0129***	-0.0129***	-0.0129***	-0.0132***	-0.0127***	-0.0127***
	0.0037	0.0038	0.0038	0.0038	0.0041	0.0038	0.0038
Relative income	0.0128***	0.0128***	0.0128***	0.0127***	0.0129***	0.0133***	0.0133***
	0.0038	0.0038	0.0038	0.0038	0.0039	0.0039	0.0039
Relative labour (diff)	0.0113***	0.0113***	0.0113***	0.0113***	0.0113***	0.0113***	0.0113***
	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018	0.0018
Population density			0.0031	0.0013	0.0121	0.0129	0.0129
			0.0713	0.0708	0.0738	0.0744	0.0744
Unemployment (diff)				0.0884	0.0998	0.1025	0.1025
				0.1159	0.1179	0.1189	0.1189
Family work					-0.0113	-0.0098	-0.0098
					0.0074	0.0076	0.0076
Labour protection						-0.0038	-0.0038
						0.0034	0.0034
Decoupling dummy							-0.0133***
							0.0040
Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-square	0.526	0.526	0.526	0.526	0.527	0.527	0.527
No. of obs.	2636	2636	2636	2636	2636	2636	2636

Results: static LSDV regressions

Dependent variable: Out-farm migration							
Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Total payments	-0.0127***						
	0.0038						
Pillar I payments		-0.0356**		-0.0235***			
		(0.0136)		(0.0058)			
Coupled payments			-0.0385**		-0.0237***		
			(0.0152)		(0.0056)		
Decoupled payments			-0.0622***		-0.0476***		
			(0.0195)		(0.0133)		
Pillar II payments		0.0187				-0.0207***	
		(0.0189)				(0.0074)	
Agrienvironment			0.0433*				-0.0137*
			(0.0242)				(0.0072)
Less favoured areas			-0.0492**				-0.0770***
			(0.0234)				(0.0262)
Other pillar II payments			-0.1060				-0.1678
			(0.1278)				(0.1167)
Investment aids			0.1017**				0.0921*
			(0.0473)				(0.0477)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Regions and Time F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-square	0.53	0.53	0.53	0.53	0.53	0.53	0.53
No. of obs.	2636	2636	2636	2636	2636	2636	2636

Results: dynamic DIFF-GMM results

Dependent variable: Out-farm migration	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	**Exogen.**	**Endogen.**	**Exogen.**	**Endogen.**	**Exogen.**	**Endogen.**	**Exogen.**	**Endogen.**
Lagged migration	-0.0818**	-0.0753**	-0.0815**	-0.0431	-0.0819**	-0.0847**	-0.1058***	-0.0775*
Total payments	-0.0129***	-0.0168***						
Pillar I payments								
Coupled payments			-0.0233***	-0.0294***				
Decoupled payments			-0.0393***	-0.0180				
Pillar II payments					-0.0249**	-0.0286***		
Agrienvironment							-0.0239	-0.0217**
Less favoured areas							-0.0778*	-0.0634
Other pillar II payments							-0.0925	-0.4549
Investment aids							0.1399**	0.0955**
Relative income	0.0151***	0.0147***	0.0153***	0.0155***	0.0151***	0.0152***	0.0141***	0.0160***
Relative labour	-0.0028***	-0.0027***	-0.0028***	-0.0025***	-0.0028***	-0.0028***	-0.0028***	-0.0028***
Population density	0.7276***	0.7089***	0.7025***	0.6983***	0.7287***	0.6959***	0.7207***	0.6867***
Unemployment	-0.1895**	-0.1951**	-0.1799**	-0.1847**	-0.1911**	-0.1539	-0.1728*	-0.1864**
Family work	0.0072	0.0069	0.0065	0.0120	0.0069	0.0070	0.0075	0.0083
Labour protection	-0.0040	-0.0035	-0.0036	-0.0039	-0.0040	-0.0019	-0.0041	-0.0031
Decoupling dummy	-0.0163***	-0.0165***	-0.0110*	-0.0231***	-0.0164***	-0.0169***	-0.0142**	-0.0169**

Results: dynamic DIFF-GMM results

Dependent variable: Out-farm migration								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
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Total payments	-0.0129***	-0.0168***						
Pillar I payments								
Coupled payments			-0.0233***	-0.0294***				
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Discussion

Out-farm migration elasticity to CAP payments

	Static model	Difference GMM			
		Long-run		Short-run	
		Exogen.	Endogen.	Exogen.	Endogen.
Total payments	-0.179	-0.198	-0.256	-0.182	-0.236
Pillar I payments	-0.259	-0.272	-0.284	-0.250	-0.262
Coupled payments	-0.200	-0.214	-0.259	-0.196	-0.248
Decoupled payments	-0.123	-0.110	_	-0.101	_
Pillar II payments	-0.064	-0.083	-0.096	-0.076	-0.088
Agrienvironment	-0.021	_	-0.037	_	-0.034
Less favoured areas	-0.059	-0.067	_	-0.060	_
Investment	0.062	0.106	0.070	0.095	0.065
Other pillar II payments	_	_	_	_	_

- The elasticity increase from LSDV, to GMM-exogen and GMM-endog.
- Pillar I elasticity about 3 times than Pillar II elasticity
- Coupled sub. elasticity higher than decoupled one

Discussion

- Another way of looking the results:
  - Our results can be translated in the number of job maintained in farming by CAP subsidy
  - 25,000 agricultural workers ‘saved’ every year
  - 11% reduction of *m* (from 2.95% to 2.55%)
    - Considering the CI of our estimates, the reduction in the out-migration rate range from 6% to 19%
- CAP subsidies might generate a reduction of farm out-migration, but the effect can be moderate

Conclusions

- Understanding the CAP effects is important to design better policy
- Results show that the CAP contributed to job creation in agriculture
  - Particularly Pillar I (coupled) instruments !
- A result at odds with the documented inefficiency of coupled farm payments
  - Yet not inconsistent with recent evidence from Michalek et al. 2012 … CDP ≅ SPS
- Future research is needed to better understand these points