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Age and Productivity – Sectoral Differences

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Motivation

- Ageing of workforce reduces competitiveness of enterprises if older employees are less productive
- Skills have different age-productivity patterns
- Enterprises need a different skill mixture
- It has to be taken into account that the age structure is not random

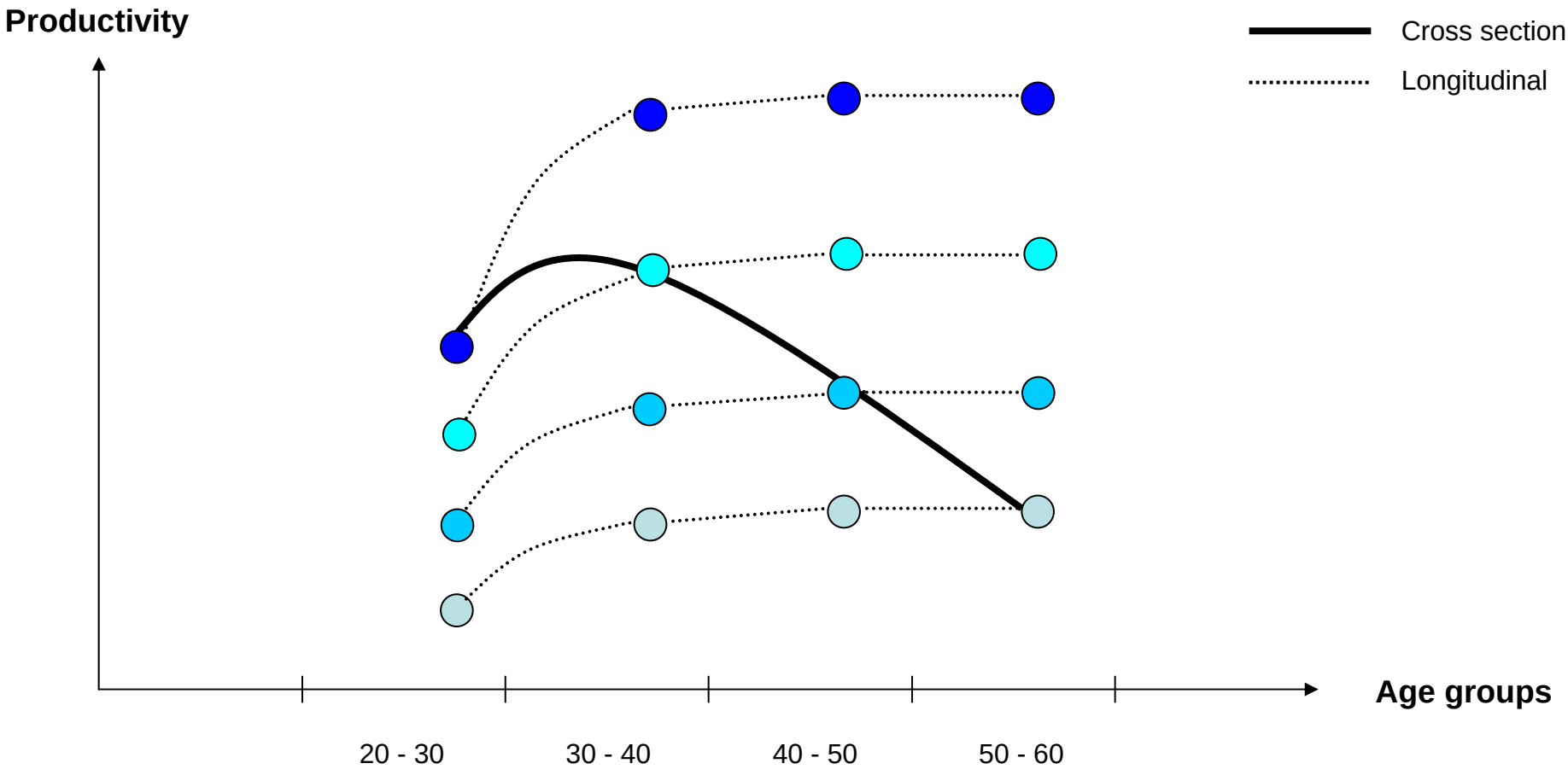
Skills of older and younger employees differ

- Older employees are perceived to be more quality conscious, have a higher working morale and have more experience
- Younger employees have advantages in innovativeness, physical and psychological resilience, technical knowledge, and flexibility (Boockmann and Zwick, 2004; Staudinger et al, 2007)
- Psychological and medical studies have shown that fluid cognitive abilities (or the mechanics of the brain) such as problem solving related to new material tend to deteriorate with age
- Crystallised abilities or pragmatics such as verbal meaning and word fluency improve however (Staudinger et al., 2007, Skirbekk, 2008)
- These differences are not important in enterprises that can adapt production to the needs of older employees
- In manufacturing firms however many firms use a rigid and monotonous production pace dictated by the conveyor belt that puts older employees at a disadvantage (Berg, 1994, Weichel et al., 2008)

Studies discriminating between sectors

- Several studies split their sample before calculating age productivity profiles
- Most of them do not motivate their choice of sectors (exceptions: Daveri and Maliranta, 2007 and Lallemand and Rycx, 2009)
- No differences between manufacturing and services: Crépon et al. (2003); Schneider (2007)
- Age productivity profile flatter in manufacturing than in services: Aubert and Crépon (2006)
- Age productivity profile steeper in manufacturing than in services: Van Ours and Stoeldraijer (2010)

Age productivity patterns in between and within estimations



Endogenity of age groups in production function

- Unobservable factors have impact on age share and productivity of enterprises
- Examples: Innovation or establishment specific shock
- Consequence: shares of different age groups should be instrumented (for example by internal instruments)
- Compare estimation methods (OLS vs. GMM)

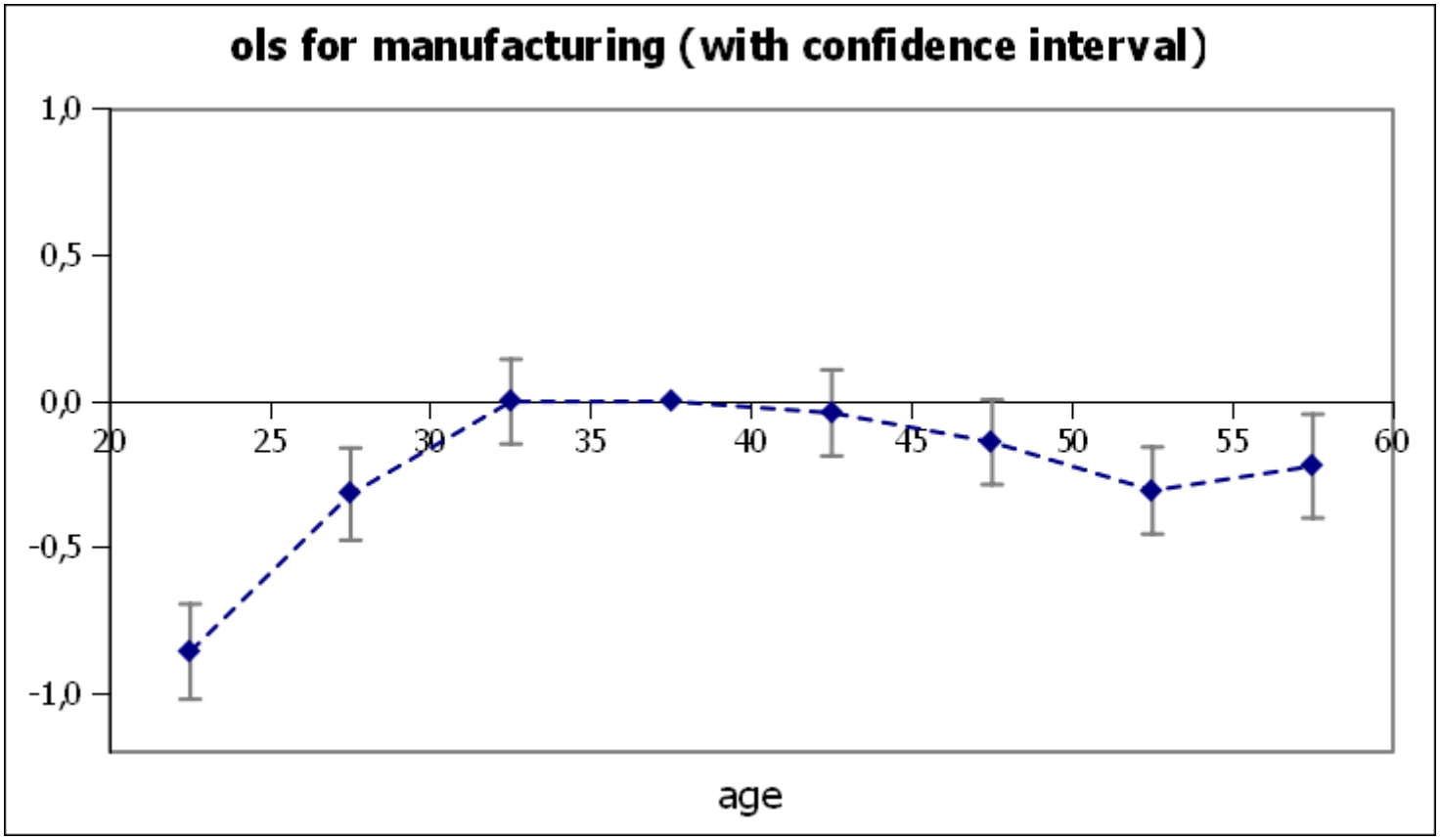
Our estimation approach for age productivity profiles

- Take individual age of all employees
- Aggregate this to age share in enterprises
- Use linked employer employee data
- Include broad list of individual and establishment characteristics (especially those that might be related to age structure)
- Use average productivity per head
- Net values = f(capital, share age groups, covariates)
- Capital-stock obtainde by investments and perpetual inventory method
- Concentrate on within changes over time
- Take into consideration endogeneity of age structure
- Test dynamic structure of the model

Data

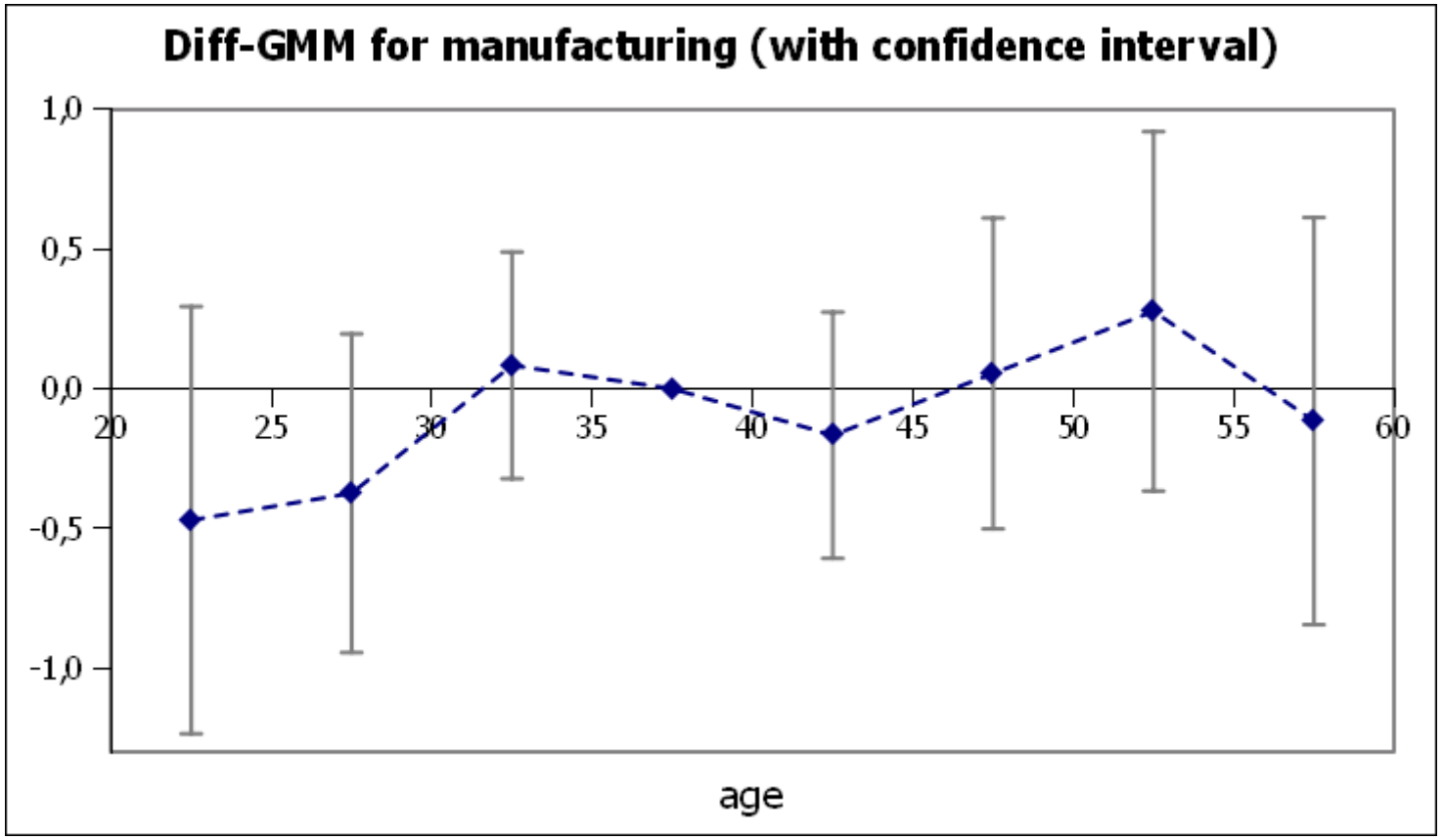
- Linked employer employee data of the IAB (LIAB)
- Cross section version (1 observation per year on June 30th)
- Waves 1997-2005
- Only establishments with more than five employees
- Without public sector, banks and insurances and non-profit oriented establishments
- About 15,000 establishments with 1.3 million employees
- Covariates: gender, nationality, qualification, tenure, exports, share parttime employees, professional status, technical equipment, age of establishment, sector, size

Cross section (pooled OLS) regression with workforce and establishment characteristics for manufacturing

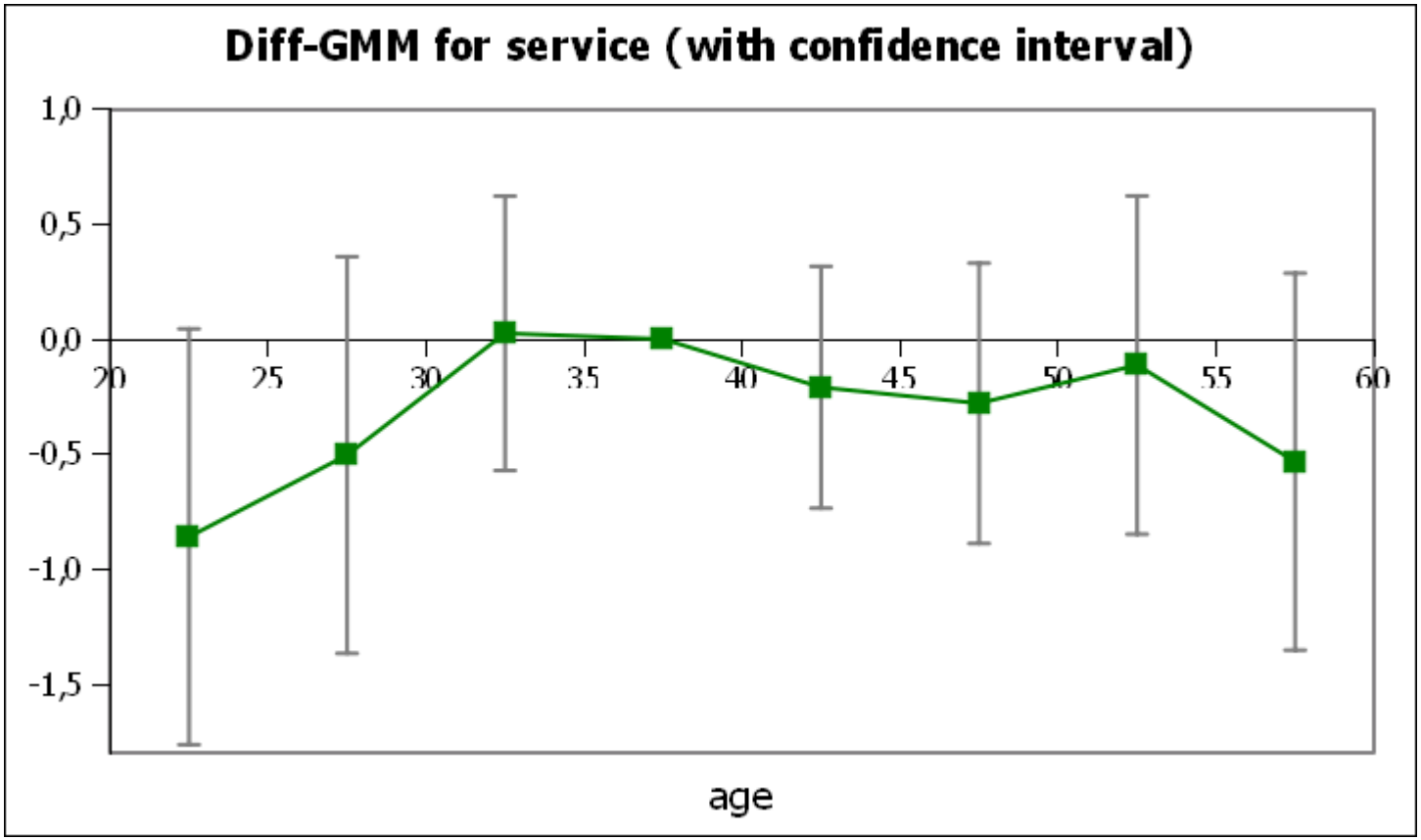


Cross section regression with workforce and establishment characteristics for services

Longitudinal estimation plus endogeneity correction in manufacturing



Longitudinal estimation plus endogeneity correction in services



Sectors similar because of systematic age management?

- Personnel measures might increase relative productivity of older employees
- Sectors with a stronger disadvantage of older employees might be more selective in keeping older employees and invest more in measures that increase productivity of older employees
- Not all measures are effective – mixed age working groups, reduced working requirements, and specific equipment of working places of older employees (Göbel and Zwick, 2010)
- Reduced working time of older employees, training measures for older employees do not have a productivity effect

Share of establishments using personnel measures by sector

	manufacturing		services	
Variable	**mean**	**sd**	**mean**	**sd**
part-time work	**0.38**	0.49	**0.36**	0.48
specific equipment of work places	**0.06**	0.25	**0.03**	0.18
reduced working requirements	**0.07**	0.25	**0.05**	0.23
mixed age working teams	**0.21**	0.41	**0.20**	0.40
older employees included in training	**0.18**	0.39	**0.19**	0.39
N	19580		16414	

Results

- Establishments with high share of older employees on average do not have a lower productivity
- Variance between age productivity profiles is large
- Estimation method matters: include relevant individual and establishment characteristics, take into account endogeneity of age structure and dynamic specification of the model
- No clear differences between manufacturing and services sectors
- Manufacturing firms use personnel measures that increase relative productivity of older employees slightly more often
- It remains to be seen whether flat productivity effects are the result of higher selectivity, effective personnel measures or genuinely high productivity of older employees