Globalization, Job Tasks and the Occupational Structure of Firms: Implications for job polarization

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Background

- International integration has increased rapidly over the last decades
  - Trade, offshoring, FDI, multinational activity etc

- This development coincides with rapid technological advancements. Ongoing debate about a new phase in the ICT revolution where not only routine jobs are replaced by new technology but also more advanced jobs

- Recent technological developments can potentially amplify or change the way globalization impacts workers and firms. Risk of increased income inequality and the exclusion of large segments of the labor force or new opportunities for firms and workers?

Background

Labor market consequences of increased internationalization and new technologies?

Globalization:

-Footloose multinationals? Threats to domestic jobs? Increased job insecurity?

-Impact of offshoring? Jobs of unskilled labor have traditionally been seen to be in danger.

-Weaker bargaining position for employees. Downward pressure on wages?

New technology:

-Automatization of jobs. Increasing number of jobs can be automated.

-Fears of increasing inequality and decreasing job security

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Outline of my talk

- Short background on labor market effects of globalization and new technology
- Present results from two recent papers on globalization and the occupational structure of firms and job polarization.
- If time: also show results from ongoing research on digitalization and labor market outcomes

=> Focus on the impact of firms and how they shape relative labor demand

Globalization and organization of firms

- Globalization is related to the organization of firms. What is the relationship between firms' production organization and their degree of international integration?

- A new literature looks for systematic differences in the mix of occupations employed by globally-engaged firms relative to strictly domestic firms. Find new results as compared to an older literature that often use crude measures of skills.

- This line of research suggests that the relevant distinction is not between *skilled and unskilled* (or between high education and low education). Instead between different types of job tasks and occupations.

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Job tasks and relative labor demand

- Lot´s of international evidence on job polarization (see e.g. work by…)

- An increase in relative labor demand for ”high-skill, high wage” jobs and ”low-skill,low-wage” jobs, but a decrease in demand for ”middle-skill, middle-wage” jobs

- Not the same as as a corresponding wage polarization.

Prominent explainations for job polarization

- Impact of changes in job tasks incl. the impact of digitalization.

- Globalization (Offshoring, int. trade and MNEs)

- Labor market institutions

=> but explanations above interact so difficult to disentagle

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Job task view of job polarization

- Which tasks are substitute to new technology or computerization (can be replaced)?
- Which tasks are complement?
- Routine jobs can be automated/computerized. Non-routine tasks are more difficult to be automated (limits to what technology (computers) can do).

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Job task view of job polarization

- Decrease in routine-intensive jobs have probably contributed to job polarization by reducing relative demand for middle-skilled workers.
- Jobs that are intensive in abstract (high wage jobs) or manual tasks (low wage jobs) are less effected.
- =>polarization of jobs

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Impact of globalization on relative labor demand (job polarization)

- Similar arguments as for impact from new technology. E.g. many routine job tasks are also offshorable.

- Jobs that do not need personal interaction (face to face) can be outsourced.

- Quite high overlap between routine and offshoring making it difficult to separate contributions.

Globalization, job tasks and relative labor demand

- Results from two recent papers using matched employer-employee data for Sweden:

- Davidson et al.“Global Engagement and the Occupational Structure of Firms” (*EER* 2017)

  =>focus on how globalization shape relative demand and demand for different occupations within firms

- Job Polarization, Job Tasks and the Role of Firms (*Economics Letters* ,2016)

  =>focus on within-firm job polarization

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Global Engagement and the Occupational Structure of Firms

Another twist on the relationship between globalization and the organization of firms (and on relative labor demand):

What is the relationship between firms' production organization and their degree of international integration?

- Entering foreign markets requires specific knowledge and skills.
- Exporters may need to hire more employees in certain occupations such as logistics and marketing.

=>implying a relationship between globalization, and the organization of firms (as captured by the distribution of occupations) and relative labor demand.

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Question and goal of the paper

- We examine how globalization is related to the organization of firms as captured by the distribution of occupations.

- The empirical analysis uses Swedish matched employer-employee.

=>our data allow us to use finer classifications of occupations and to look at the variation in the occupational mix across different firms.

Preview of results

- Evidence that the occupational mix of firms is systematically related to the degree to which they are globally engaged

  => analyzing a link between globalization and relative labor demand for different occupations. Implications for job polarization. Global firms as a driver of increased demand for high-wage jobs.

- Our main finding is that the most globally engaged firms (MNEs) are relatively intensive in the use of more skilled occupations whereas local firms skew their mix toward less skilled occupations. Non-MNE exporters fall in between.

Data

- Matched employer-employee data for the period 1997-2013 (from Statistics Sweden).
  - Detailed information on all Swedish firms and a very large representative sample of workers
  - Worker data includes data on education, demographics, full-time equivalent wages, and occupations (3-digit ISCO-88)
  - Firm data includes data on size, capital intensity, productivity, ownership, profits, skill intensity…Also ownership data: MNE status & foreign ownership
- Swedish Foreign Trade Statistics contain firm-level information on imports, exports, and offshoring

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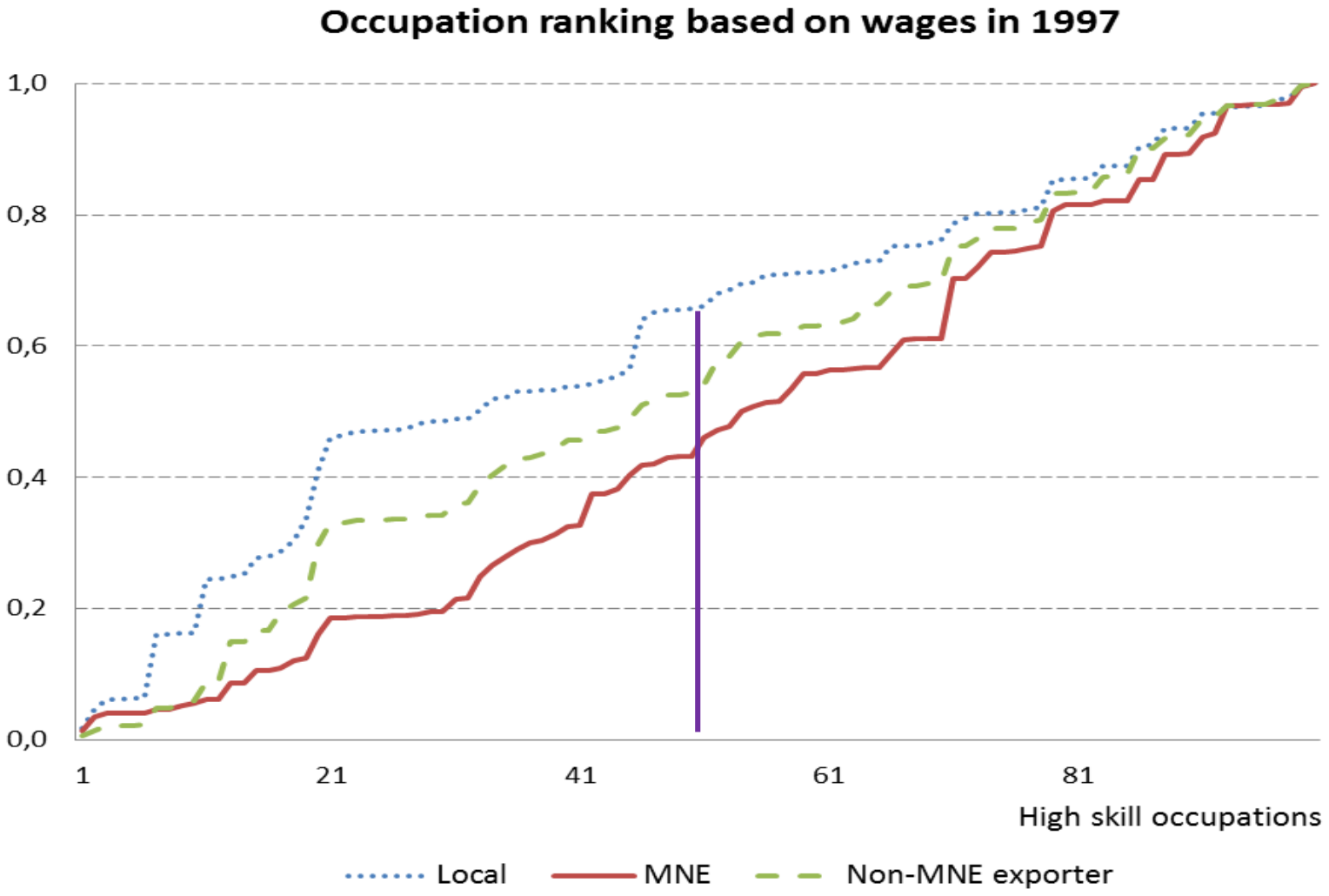
Distribution of occupations for the whole economy



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Create Occupational Index

- Studying individual occupations reveals high degreee of heterogeneity within the broad occupation groups

  => look at more detailed individual occupations (100)

- $S_{jt} = \sum_k \lambda_{jt}^k s^k$

- s^k is the skill-ranking of occupation k measured either from Mincer regressions ("beta ranking"), average wages, average wages from non-MNE firms, or share of collage graduates. λ is the employment share

- Index bounded between 0 to 1. Index = 0.5 if firm uses all occupations uniformly. Higher index indicates employment allocated towards higher-paid occupations

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Regression analysis

Use our different measures of occupational differences to analyze how these are related to differences in firm types

Estimate the following specification:

$$S_{ft} = \delta_M MNE_{ft} + \delta_X Exporter_{ft} + Z_{ft}\gamma + D_i + D_t + \mu_{ft}$$

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Basic firm-level estimates: skill distribution of occupations (index measure)

Firms types and the skill index of occupations

	Average log wages	% of college graduates	Beta ranking	Wage ranking	Non-MNE wage ranking
	(1)	(2)	(3)	(4)	(5)
MNE	0.078***	0.040***	0.106***	0.112***	0.099***
	(0.004)	(0.003)	(0.006)	(0.006)	(0.006)
Exporter	0.060***	0.030***	0.079***	0.086***	0.077***
	(0.003)	(0.003)	(0.005)	(0.005)	(0.005)
Log firm size	-0.007***	-0.000	-0.004**	-0.007***	-0.006***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Capital-labor ratio	-0.004***	-0.004***	-0.005***	-0.004***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Value added per employee	0.030***	0.017***	0.043***	0.046***	0.044***
	(0.005)	(0.005)	(0.007)	(0.007)	(0.007)
Firm age	0.005	-0.010	0.007	0.021	0.018
	(0.016)	(0.013)	(0.024)	(0.024)	(0.025)
Observations	25 871	25 871	25,871	25,871	25,871
R-squared	0,356	0,371	0.359	0.402	0.395

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Causal impact of global engagement – analyze exporters (export shares)

- Hummels et al. (2014) instrument for export shares:

$$WID_{jt} = \sum_{kc} ts_{jcg} * WID_{cgt}$$

where WID_{cgt} (World Import Demand) is country c's total purchases of product *g* (at the 6-digit HS level) from the world market in year *t* and ts_{jcg} is the share of firm *j*'s export of product *g* to country *c* in firm *j*'s total export.

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Causal impact of global engagement – export shares

Export Shares

	All firms		Exporters							
	OLS	OLS	OLS	OLS	IV	OLS	IV	IV	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(9)	(11)	(13)
MNE	0.106***	0.102***	0.032***							
	(0.006)	(0.006)	(0.004)							
Exporter	0.079***	0.078***								
	(0.005)	(0.005)								
Export share		0.034***	0.035***	0.046***	0.171***	0.037***	0.164***	0.244***	0.216***	0.200***
		(0.007)	(0.007)	(0.007)	(0.034)	(0.008)	(0.033)	(0.035)	(0.033)	(0.031)
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0,359	0.363	0.337	0.328	0.276	0.337	0.277	0.189	0.195	0.204
First stage estimates for the instruments										
Log WID_{97}					0.032***					
					(0.002)					
Log WID_{98}							0.033***			
							(0.002)			
Log WID_{t-1}								0.029***		
								(0.002)		
Log WID_{t-2}									0.030***	
									(0.002)	
Log WID_{t-3}										0.033***
F-statistic					186.1		199.1	228.8	231.3	246.6
Observations	25 871	25,790	16,018	16,018	9,290	9,290	8,682	11,643	9,699	8,084

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Additional estimations and robustness checks

- Studying Manufacturing and Non-manufacturing separately.
- Impact of operating in more distant markets (literally or in soci-economic terms)
- Analyzing different export goods (homogeneous vs. differentiated
- Analyzing changes in firm types
- Examine impact of offshoring (Firms that offshore have a more skilled labor mix as compared to local firms)
- Analyzing MNEs from different countries and regions and also comparing foreign MNEs with Swedish MNEs
- Using wage shares instead of employment shares

Job Polarization, Job Tasks and the Role of Firms

- Depart from a recent debate on the impact of new technology on labor market outcomes. worries that new technology will replace not only manual routine jobs but also more advanced jobs with cognitive content.

- Frey and Osborne (2013): around half of total employment in the US is at risk of being automated within one to two decades.

- Several studies have showed that new technology is complement to hiring employees for non-routine jobs and substitute for hiring workers to perform routine jobs (heterogeneous effects)

  =>related to job polarization

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Question and goal of the paper

- Focus in the job polarization literature is on aggregate (country evidence).
- The influence of firms in the observed job polarization patterns is more or less absent in the empirical literature.

=> this paper looks at the role played by firms in the recent job polarization process. Is the polarization pattern also traceable within firms over time so that we also have within-firm job polarization? Also looks at the contribution of different explanations (automatization, offshoring, routineness of jobs).

Data

- Same detailed Swedish matched worker-firm data as above paper. Analyze the period 1996-2013
- Measure of routineness of occupations and offshorability: same as in e.g. Goos et al. (2014)
- Job automation risks: based on Frey & Osborne. Translated to the ISCO-88 (2- and 3-digit levels)

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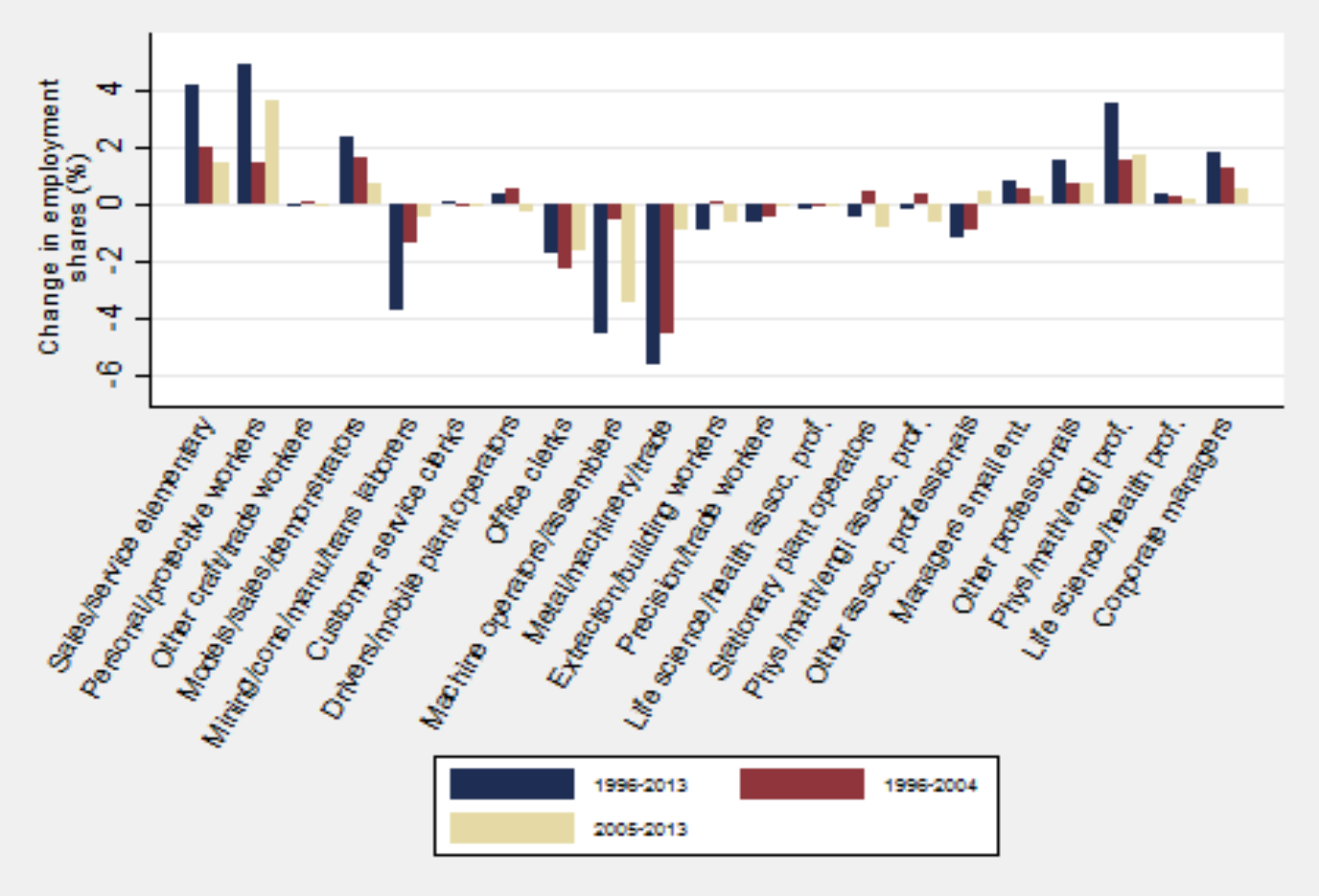
Job Polarization in Sweden 1996–2013 (entire private sector)



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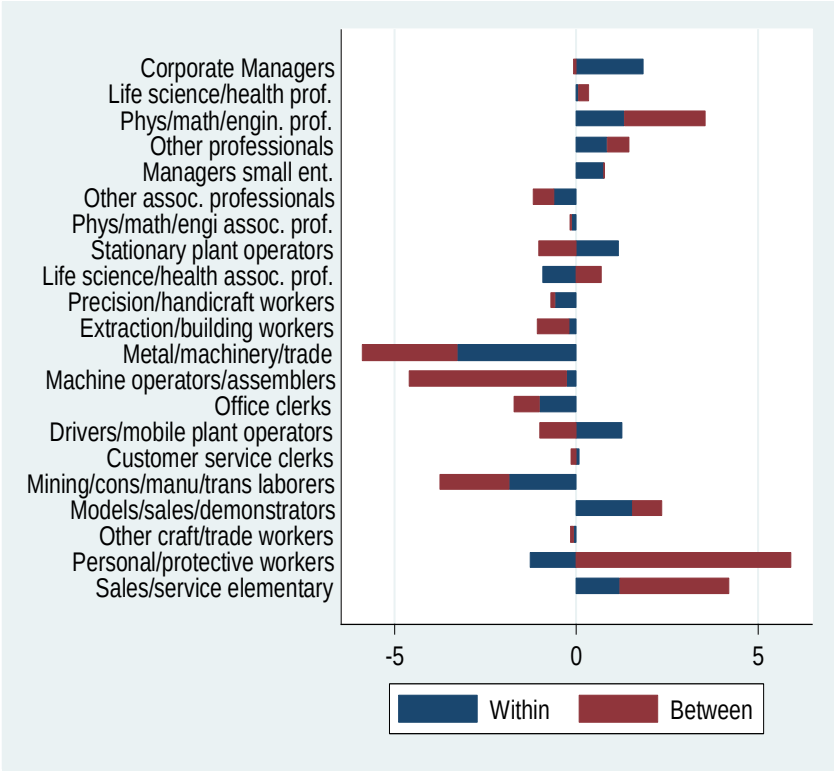
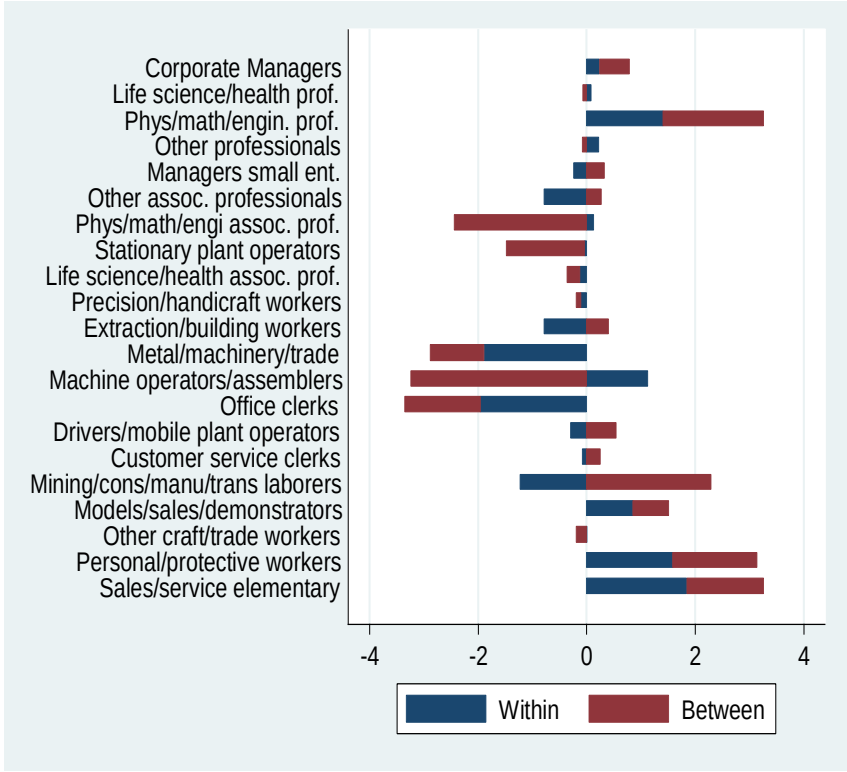
Changes in employment shares 1996-2013

Within/between industries



Within/between firms



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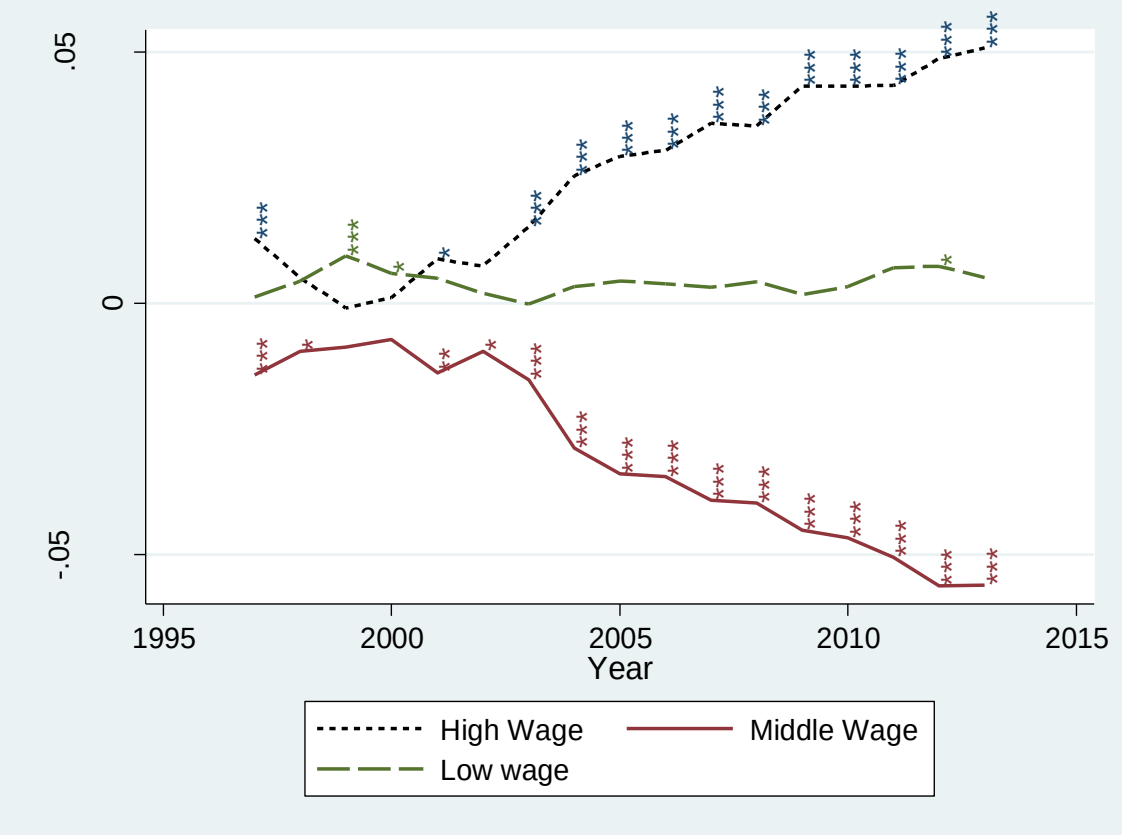
Within-firm job polarization in Sweden 1996-2013 (estimated coefficients on occupation group-year dummies)

$$Share_{ijt} = \alpha + \sum_{t=1997}^{2013} \delta_t Year_t + X'_{it}\beta + \mu_i + \varepsilon_{it},$$



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Within-firm job polarization

- Alternative specifications all show (increasing) within-firm job polarization

- What is the impact of routine-based technological change, offshorability of occupations and automation.

Routineness, automation, offshoring and job polarization at the firm level. Firm-level regressions 1996-2013.

	(1) High wage group	(2) High wage group	(3) Middle wage group	(4) Middle wage group	(5) Low wage group	(6) Low wage group
	Low:	High:	Low:	High:	Low:	High:
Panel a: Routineness						
D_1999-2003	-0.012***	0.006	0.014***	-0.011***	-0.002	0.006*
	(0.005)	(0.004)	(0.005)	(0.004)	(0.004)	(0.003)
D_2004-2008	-0.010*	0.042***	0.023***	-0.056***	-0.013**	0.014***
	(0.006)	(0.005)	(0.006)	(0.006)	(0.005)	(0.004)
D_2009-2013	-0.007	0.064***	0.020***	-0.078***	-0.013**	0.014***
	(0.007)	(0.006)	(0.007)	(0.006)	(0.006)	(0.004)
Panel b: Offshoring						
D_1999-2003	0.008**	-0.008*	-0.008*	0.004	0.000	0.005**
	(0.004)	(0.004)	(0.005)	(0.005)	(0.004)	(0.002)
D_2004-2008	0.020***	0.023***	-0.013**	-0.034***	-0.007	0.011***
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.003)
D_2009-2013	0.033***	0.036***	-0.024***	-0.049***	-0.009	0.012***
	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)	(0.003)
Panel c: Automation						
D_1999-2003	0.003	-0.004	-0.006	0.002	0.004	0.002
	(0.005)	(0.004)	(0.005)	(0.005)	(0.003)	(0.003)
D_2004-2008	0.021***	0.023***	-0.025***	-0.026***	0.004	0.003
	(0.006)	(0.005)	(0.006)	(0.006)	(0.003)	(0.005)
D_2009-2013	0.031***	0.039***	-0.035***	-0.043***	0.004	0.003
	(0.007)	(0.006)	(0.006)	(0.007)	(0.004)	(0.006)
Firm controls	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

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Concluding remarks

- Evidence on how firms shape occupational restructuring
- Globalized firms have a mix of occupations more skewed toward skilled occupations
- New evidence on within-firm job polarization
- Both within-firm components and between-firm components are important for overall job polarization

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