

Firm trends in job polarization: Role of globalization and technology

Education, Employment and Productivity Evidence from the North

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Introduction

- Polarization of the labor markets is a "universal" phenomenon (e.g., Autor et al. 2003, Autor 2010, Goos, Manning & Salomons 2009, 2014)
 - Mid-skill routine jobs are disappearing, while high-skill abstract and low-skill service jobs gain share
- Job market polarization also in Nordic countries (e.g., Asplund et al. 2011, Maliranta 2013, Böckerman et al. 2016)
- Influential studies started a new literature trying to understand the extent, mechanisms and causes of the polarization

Causes of job market polarization – empirical evidence

- R&D (Böckerman et al. 2012)
- ICT (e.g., Böckerman et al. 2016, Michaels et al. 2014, Harrigan et al. 2016)
- International trade (e.g., Harrigan et al. 2016, Autor 2006 for discussion)
 - Michaels et al. (2014) found that the result is not robust to controlling for related factors such as R&D
 - Van reenen (2011) argues that international trade does have a role, but it acts via ICT
- Outsourcing (Nilsson Hakkala & Huttunen 2016)
- Chinese import shocks (Autor et al. 2014, Keller and Utar 2016)

Where are the firms?

Question: Where does polarization stem from? Answer: Individual firms' decisions to hire & fire workers and/or open & close establishments

- Firm data could tell us, e.g.:
 - Are mid-level jobs disappearing because certain firms exit?
 - Are service jobs increasing due to entry and/or expansion?
 - Are existing firms outsourcing / offshoring mid-level jobs while keeping managers and professionals?
- Harrigan, Reshef & Toubal (2016) find that job polarization happens mainly via within firms in France
- Cortes and Salvatori (2015) find that the increase in the number of establishments specializing in non-routine tasks seem to explain much of the polarization in the UK
- Heyman (2016) find that both within-firm and between-firm components are important in explaining overall job polarization in Sweden

What do we do?

- We examine the occupational polarization within and across firms
 - What is the role of establishment level restructuring...
 - ..or the role of entry-exit dynamics?
- We also examine the relation of globalization and technology on job polarization for continuing firms
- We also use international trade shocks as instruments for trade and outsourcing

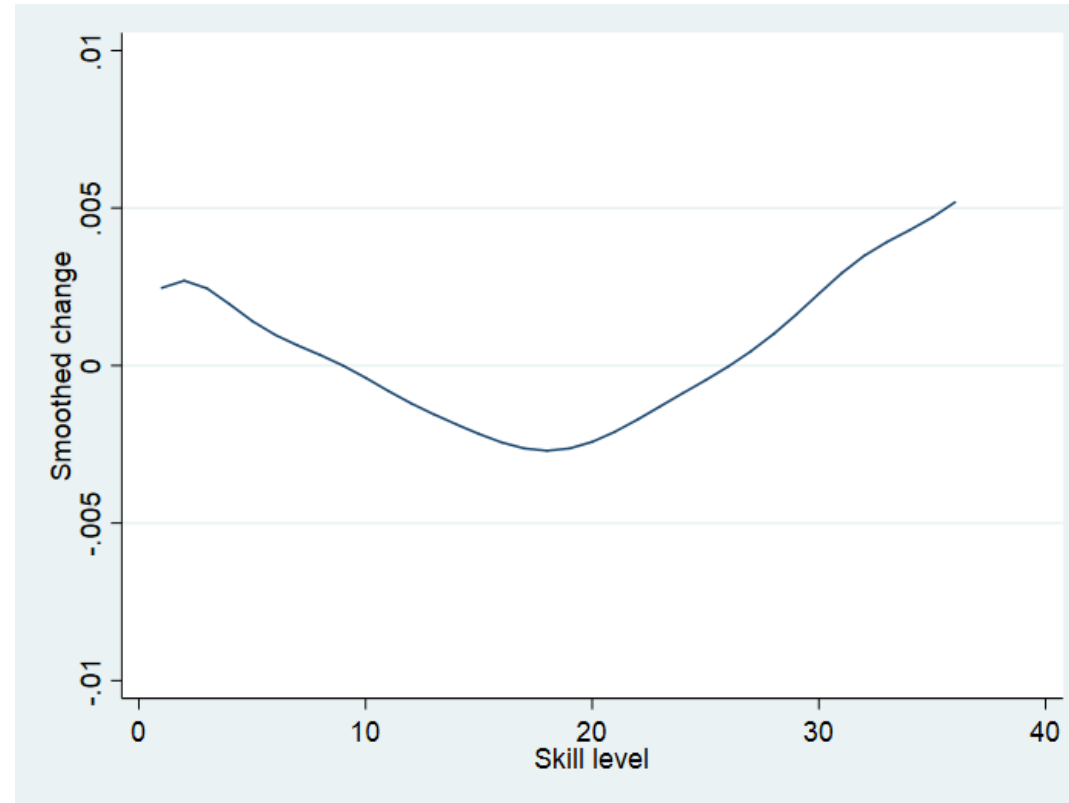
Data

- FLEED (Total):
 - Firm – worker panel data 2000-14, incl. all firms & workers
 - Combines employment & wage statistics, education registers, tax records, business register, financial statement statistics
 - Occupation based on ISCO-08 classification, then grouped into Abstract, Routine and Services (GMS). We also distinguish routine cognitive and routine manual workers
- Auxiliary firm level data sources
 - Customs data on goods & service exports and imports
 - ICT surveys
 - R&D surveys
 - International sourcing survey (outsourcing & offshoring)
- Other data sources
 - UN Comtrade data on imports and exports by country pair and detailed goods classification

Data restrictions

- Workers
 - Working at least 6 months in the calendar year
 - Known occupation and earnings
 - No farmers / agricultural workers / teachers or other teaching professionals
- Firms
 - At least 10 employees

Overall Pattern 2000-2014



Percent change in the occupation employment share, 2000 to 2014

Decomposition of job polarization at the firm level

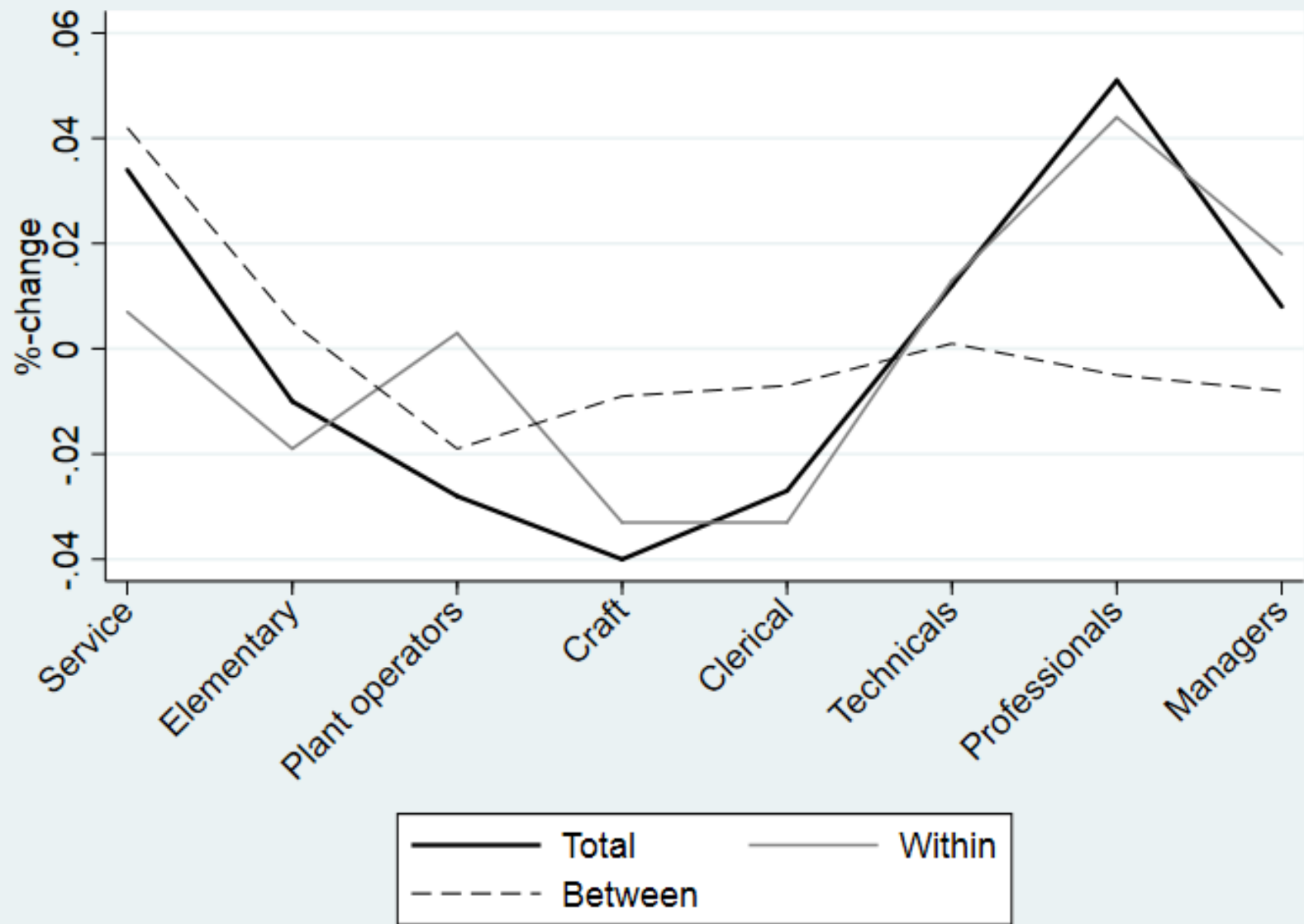
- We follow Vainiomäki (1999) and decompose the change in share of occupation group j into four components
- Three types of firms in the market:
 1. Continuing firms: were in the market both in years t and $t-1$ (here 2000 and 2014)
 2. Entering firms: were in the market in year t but not in year $t-1$
 3. Exiting firms: were in the market in year $t-1$ but not in year t
- Continuing firms: within and between firms

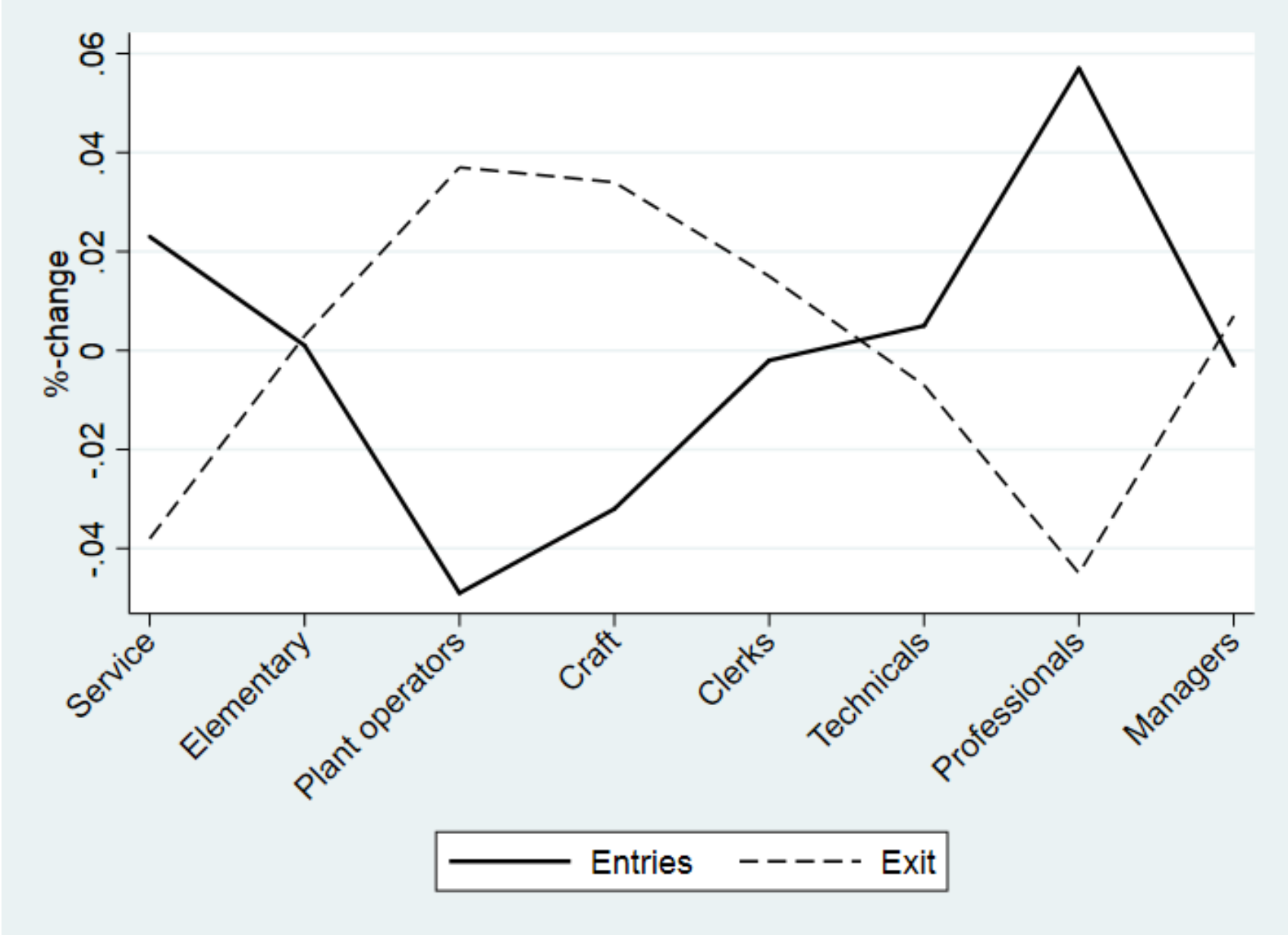
$$\Delta S_j = \sum_{i \in C} \Delta S_{ij}^C \bar{W}_i^C + \sum_{i \in C} \bar{S}_{ij}^C \Delta W_i^C + W^N (S_{jt}^N - S_{jt}^C) + W^D (S_{j,t-1}^C - S_{j,t-1}^D),$$

- ΔS_j is the change in share of occupation j , $j = 1, \dots, 8$
- C denotes continuing establishments, N the entrants, D the exiting establishments
- ΔS_{ij}^C is the change of employment share of occupation j in continuing establishment i from year $t-1$ to t
- \bar{S}_{ij}^C is the average employment share of occupation j in continuing establishment i in years t and $t-1$
- S_{jt}^N and S_{jt}^C are the shares of occupation j among new and continuing establishments in year t
- $S_{j,t-1}^C$ and $S_{j,t-1}^D$ are the shares of occupation j among exiting and continuing establishments in year $t-1$
- \bar{W}_i^C is the average employment share of continuing establishment i in years t and $t-1$
- ΔW_i^C is the change of employment share of continuing establishment i from year $t-1$ to t
- W^N and W^D are the employment shares of entering establishments in years t and exiting establishments in year $t-1$, respectively

Decompositions of employment share change by occupation group (2000 and 2014)

Occupational group	Δ Emp. share	Within	Between	Entry	Exit
Abstract	0.049	0.070	-0.009	0.008	-0.020
Routine cognitive	-0.005	-0.014	0.016	-0.028	0.021
Routine manual	-0.068	-0.033	-0.027	-0.086	0.078
Services	0.024	-0.022	0.020	0.106	-0.080





The role of globalization and technology

- Are occupation share changes (2000-2014) related to:
 - $\Delta(\text{goods exports})$, $\Delta(\text{goods imports})$
 - $\Delta(\text{service exports})$, $\Delta(\text{service imports})$
 - Outsourcing/Offshoring
 - and initial level of %ICT use and R&D

Dealing with Endogeneity

- Firm level decisions to outsource and to import /export are likely endogenous
- IV approach (Hummels et al., AER 2013)
 - Firm-product-country level measure of exposure to increased world supply
 - Shocks in trading environment (e.g. China WTO in 2001) have firm-specific impact depending on how engaged the firm is in trade within a specific affected goods category

Instuments

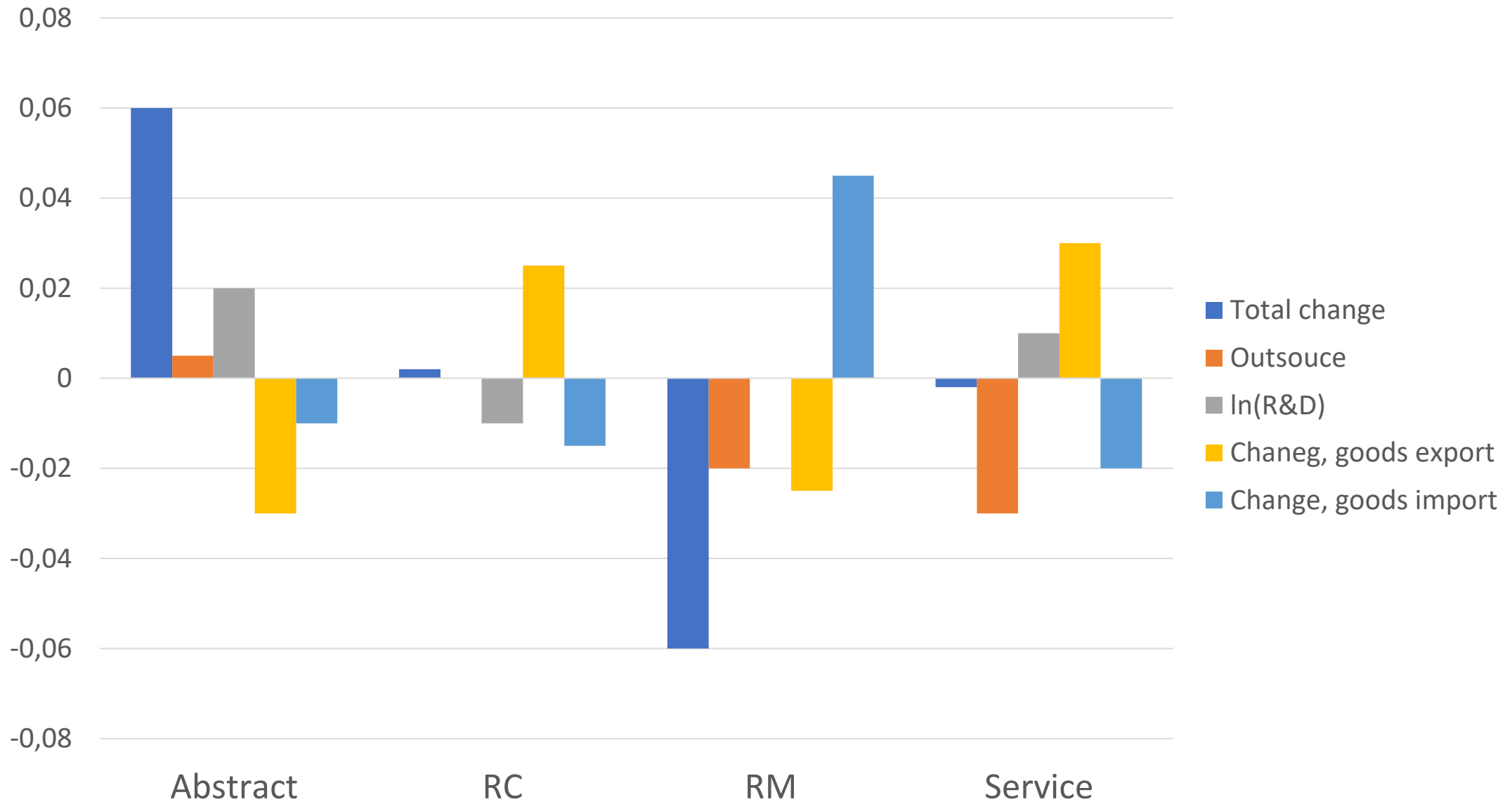
- $IV_{it}^I = \sum S_{ick} WES_{ckt}$ for import
- $IV_{it}^E = \sum S_{ick} WID_{ckt}$ for export
- IV_{it}^I and IV_{it}^E for outsourcing

WES_{ckt} is the country c 's total supply of product k to the world market in year t , excluding the supply to Finland. WID_{ckt} is the country c 's total purchases of product k from the world market, excluding any demand from Finland. These are weighted by the each c-k combination with its share in firm's imports/exports

- We use the 2000-2009 change in the IV_{it}^I/IV_{it}^E as our instrumental variable for import and export
- Creating WID_{ckt} and WES_{ckt} we use Comtrade data

Direction of relations between different factors and change in occupation share (2000 and 2014)

Factor	Abstract	RC	RM	Service
IV-results:				
$\Delta(\text{Export of goods})$	-	+	(-)	+
$\Delta(\text{Import of goods})$		-	+	-
OLS results:				
Outsource, domestic		(-)	+	-
Outsource, foreign		+	-	+
$\Delta(\text{Export of services})$	+			-
$\Delta(\text{Import of services})$	-	+	-	+
ICT use	-			+
R&D	+	-		-



Results, summary

- The share of high-level occupations increases largely within continuing firms
- Routine jobs are being destroyed both among continuing firms and at the entry-exit margin
- New firms tend to hire more service workers, but the service jobs are increasing also via establishment level restructuring among continuing firms
- R&D and outsourcing are related to a decrease in routine occupations in continuing firms.
- International trade affects the restructuring of occupations