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CiRCLE

Early Career Researcher Conference

Session: Regional innovation systems in Transition

Technology shifts and reallocation of labour:

Evidence from a panel of Swedish regions

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Content

I.   Aim

II. Theoretical framework

III. Contextualising the analysis: data and methodology

IV. Empirical results

V.   Conclusions

Aim

'Creative destruction' → technology-induced structural change → differential rates of job creation and job destruction → *reallocation of workers between sectors*
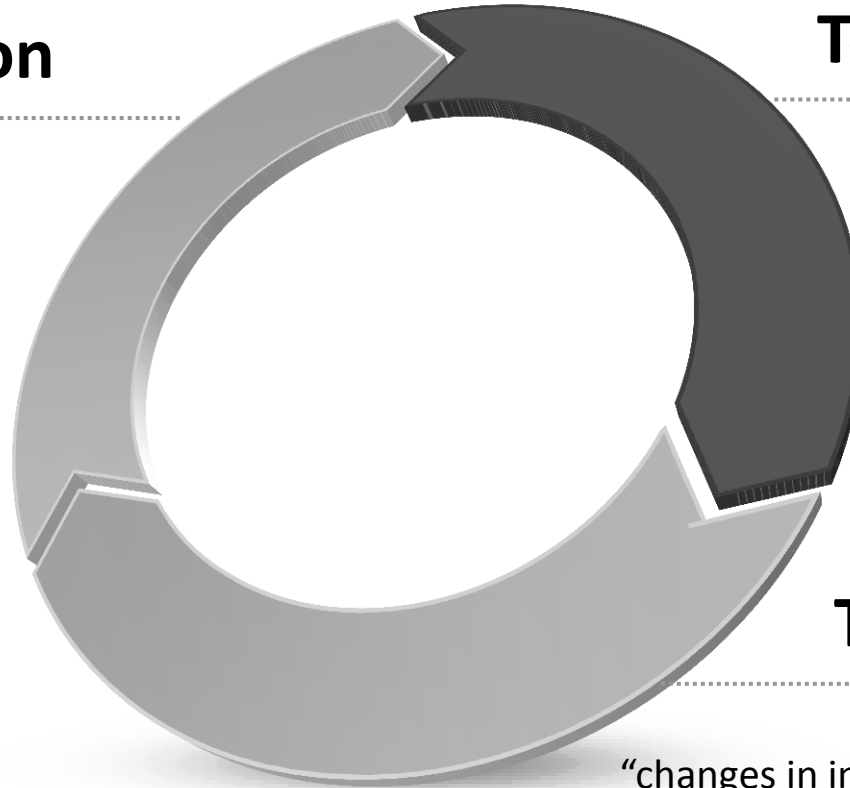
Aggregate shocks → non-neutral effects on industries → asymmetric effects across local labour markets → *reallocation of workers between regions*

Aim: interplay between changes in regional industrial structures and patterns of inter-regional labour mobility

Framing structural change: Schön (1998)

Rationalisation

"concentration of resources to the most productive units within the branches and measures to increase efficiency in the different lines of production" (Schön 1998: 399)

Technology shift

Transformation

"changes in industrial structures, where resources are reallocated between industries, and diffusion of basic innovations within industry <…> provides new bases for such reallocation" (Schön 1998: 399)

Framing structural change: Spatial aspect

Lundquist et al. (2008abc, 2010) – *geographic reference cycle model*: national cycle as an aggregate result of regional development
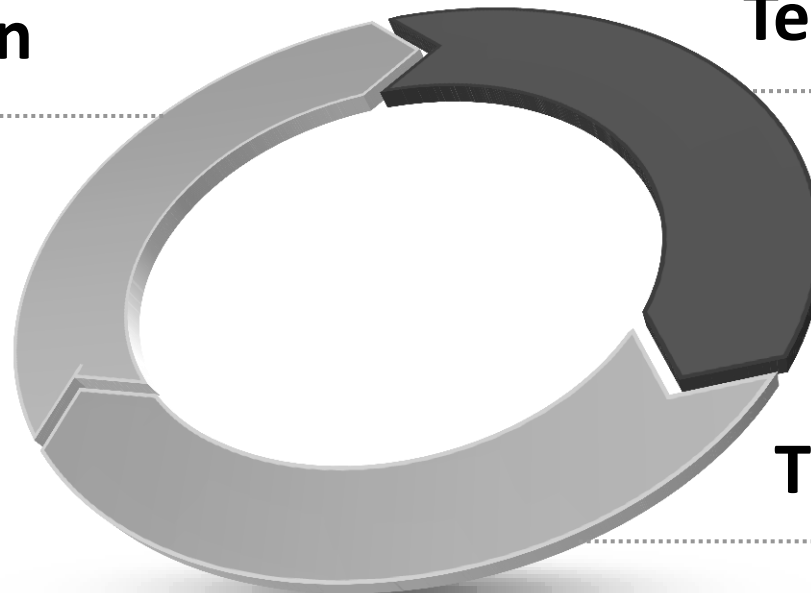
- *supply-driven* – first affected by transformation (create new demand in the economy)

- *demand-driven* – affected later (expand new demand in the economy)

Framing structural change: Spatial aspect

Lundquist et al. (2008abc, 2010) – *geographic reference cycle model*: national cycle as an aggregate result of regional development

Rationalisation

- shift towards demand-driven growth

- broader set of regions

Technology shift

Transformation

- supply-driven process

- top-hierarchy regions

LM as an adjustment mechanism: sectors

Structural change →

changes in profitable opportunities across sectors→

differential rates of job creation and job
destruction (Greenaway et al. 2000) →

reallocation of workers

LM as an adjustment mechanism: regions

Hauser (2012): inter-regional LM exhibits substantial dynamics in times of structural change

Three sources (Robson 2009):

- concentration of employment in 'cyclically sensitive' industries

- higher concentration of declining industries

- degree of specialisation/diversification

Putting it all together

Technology shift
- launch of a new GPT and its complementarities

Industrial restructuring
- emergence of new industries
- dying out of obsolescent industries
- changes in profitable opportunities across all industries

Changing demand for labour
- shock generated by technology shift → asymmetrical effect on labour demand patterns in different industries → differential rates of job creation and job destruction

Adjustment
- mobility of labour is enhanced as a mechanism for smoothing imbalances arising between declining and growing sectors
- uneven spatial patterns in allocation of declining and growing sectors → inter-sectoral mobility is coupled by inter-regional mobility

Data

LISA – employer-employee linked data for persons aged 16 and above registered in Sweden (1985–2010)

- age, education, annual earnings, municipality of residence and main employment, industry of employment, etc.

DEVIL – longitudinal database covering all establishments registered in Sweden (1968–2008)

- data on municipality of registration, total number of employees, costs and value-added, etc.

Publicly available data from Statistics Sweden

Variables

Dependent: worker flow rates (in-, out- and net flows)

Independent: regional industry structures, regional macroeconomic performance, regional demographics

Spatial attachment for variables performed in two steps:

1. municipality

2. aggregation into local labour market areas (76 regions)

Estimation strategy

Dynamic time-series model:

$$WF_{jt} = \alpha_0 + \sum_{k=1}^{P} \alpha_k WF_{jt-k} + \sum_{k=1}^{P} \beta_k \, IS_{jt-k} + \sum_{k=1}^{P} \mu_k \, X_{jt-k} + \delta_j + \theta_t + u_{jt}$$

Arellano and Bover (1995) instrumental system GMM estimator

Results (1)

year	inrate	outrate	netrate
1987	9.102086***	9.931352***	
1988	8.763937***	9.476487***	-5.609006*
1989	7.894096***	8.149866***	-4.939359*
1990	4.820699***	4.893433**	-4.189319
1991	-1.37333	-1.704957	-2.879506
1992	3.341032**	.4518654	-.8321056
1993	-1.21098	-1.790855	-.6931131
1994	2.747513**	1.982426	-1.320445
1995	2.369955**	2.345979*	-1.520246
1996	.5566759	-1.007732	.1609629
1997	2.239869**	1.719314	.5148211
1998	1.451132	1.93547*	-1.103132
1999	2.419***	2.246412**	-.9630305
2000	2.057978**	3.572897***	-2.223452*
2001	.5390861	1.190685	-2.072449*
2002	1.100995*	-.2108285	.4740579
2003	-1.227142**	-2.25131***	1.127558
2004	-1.560592***	-2.073798***	1.071561
2005	-.4965963	-.5219272	.2668119

Results (2)

	inrate	outrate	netrate
NEW/RENEWED$_{t-1}$	**6.875889***	**-8.581031***	**11.3556***
NEW/RENEWED$_{t-2}$	-3.299217	7.985056*	-6.099752
OTHER_SD$_{t-1}$	**6.673987****	**-10.57949*****	**12.45662****
OTHER_SD$_{t-2}$	-4.899444	**10.25413*****	**-12.00836****
INDUCED_I$_{t-1}$	8.700843	-6.844554	12.16691
INDUCED_I$_{t-2}$	-5.529287	8.622053	-12.56576
INDUCED_II$_{t-1}$	4.358508	**-11.38965*****	**16.08704*****
INDUCED_II$_{t-2}$	-4.968175	**8.318805****	**-12.70232*****
OBSOLETE$_{t-1}$	7.510504	**15.0276*****	**-14.11386***
OBSOLETE$_{t-2}$	**-7.652876***	**-13.33089*****	5.176191
PRODSERVA$_{t-1}$	-6.277646	-8.067631	-6.058493
PRODSERVA$_{t-2}$	10.01229	14.5661	-6.071942
PRODSERVB$_{t-1}$	3.767624	**-27.31611****	**40.60314****
PRODSERVB$_{t-2}$	-4.442968	**25.36061***	**-46.54679****
GENSERV$_{t-1}$	6.20134	-11.20581	**22.13156****
GENSERV$_{t-2}$	3.008932	**20.70688*****	**-26.01742****
STRONG_CONSUMER$_{t-1}$	**28.43804*****	-4.749001	**46.77115*****
STRONG_CONSUMER$_{t-2}$	-6.201622	**26.63338****	-24.26335
OTHER_CONSUMER$_{t-1}$	18.8108	16.13433	3.160495

Conclusions

- qualitative change within manufacturing and services matters for explanation of labour market dynamics;

- reallocation of workers across regions is more intensive in transformation period

Thank you!
Questions?