

Cities, Tasks and Skills

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Introduction

Information and communication technologies enable break-up production process

Changes in structure of employment and in wage inequality (Acemoglu & Autor 2010)

Communication via computers often effective, still cities flourish with human interactions

This paper

Takes into account the task-structure of cities in explaining employment growth

Task-structure is defined as the extent to which tasks glue together in space

Empirical analyses of employment trends across 168 US cities

FRAMEWORK

Framework

Headquarters locate in large, expensive cities

Occupations consist of bundles of tasks

Each task is located in a large city but *task B* can be placed at distance in a smaller and cheaper city

Coordination-time | efficiency gain

$$w(d_a + d_b) \text{ vs. } w(\Delta_a + \Delta_b)$$

Cost advantage smaller city $c(\Delta_a + \Delta_b)$

Framework II

Trade-off between coordination costs, efficiency gains and location-cost advantage

$$w(d_a + d_b) = w(\Delta_a + \Delta_b) - c(\Delta_b)$$

Tasks that do not require to be proximate to other headquarter tasks are placed at distance

What glues tasks together?

The division of labour

Coordination costs versus efficiency

Nature of tasks

Tradable versus non-tradable

Agglomeration forces

Input sharing and knowledge transmission
versus congestion costs

DATA AND DESCRIPTIVES

Data

Division of occupations by city (MSA) for
1989-2009 (Current Population Survey)

Task importance by occupation (O*Net Skill Survey
examples: management, persuading and repairing)

Additional information on city characteristics

Data II

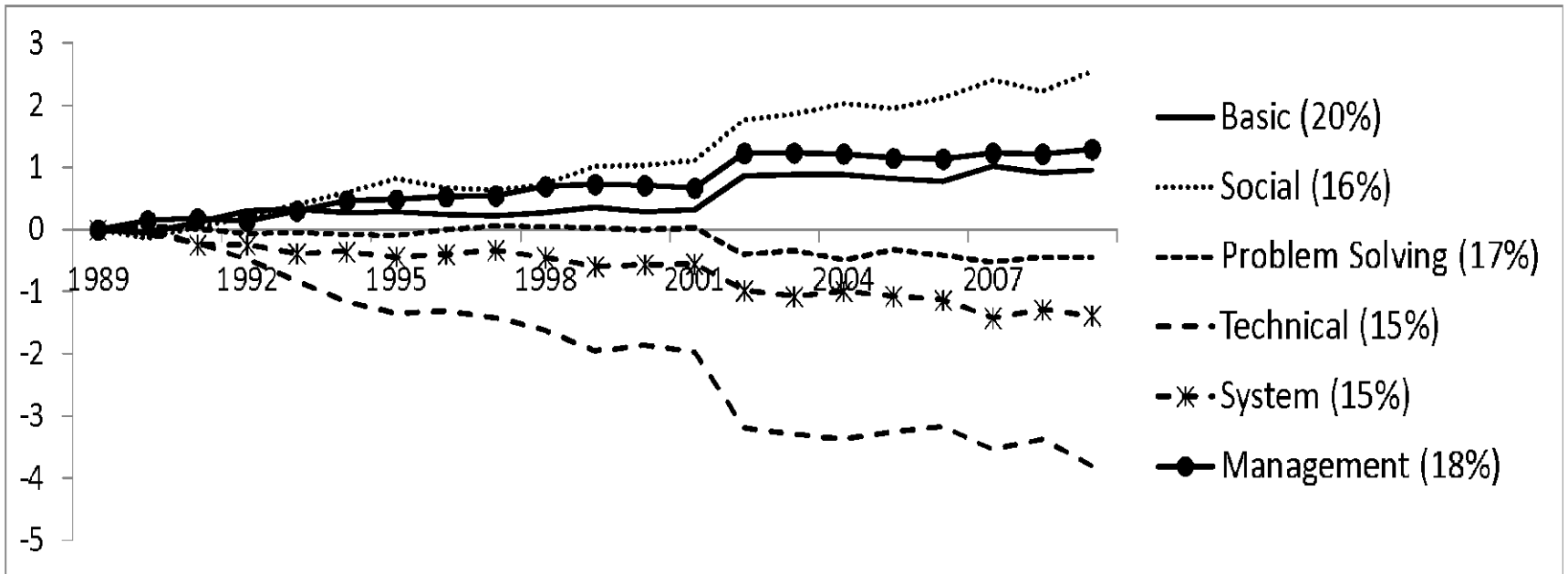
Importance (scale 0-4) of 44 tasks for 168 cities

Tasks grouped into 6 groups: basic, social, problem solving, technical, system and management

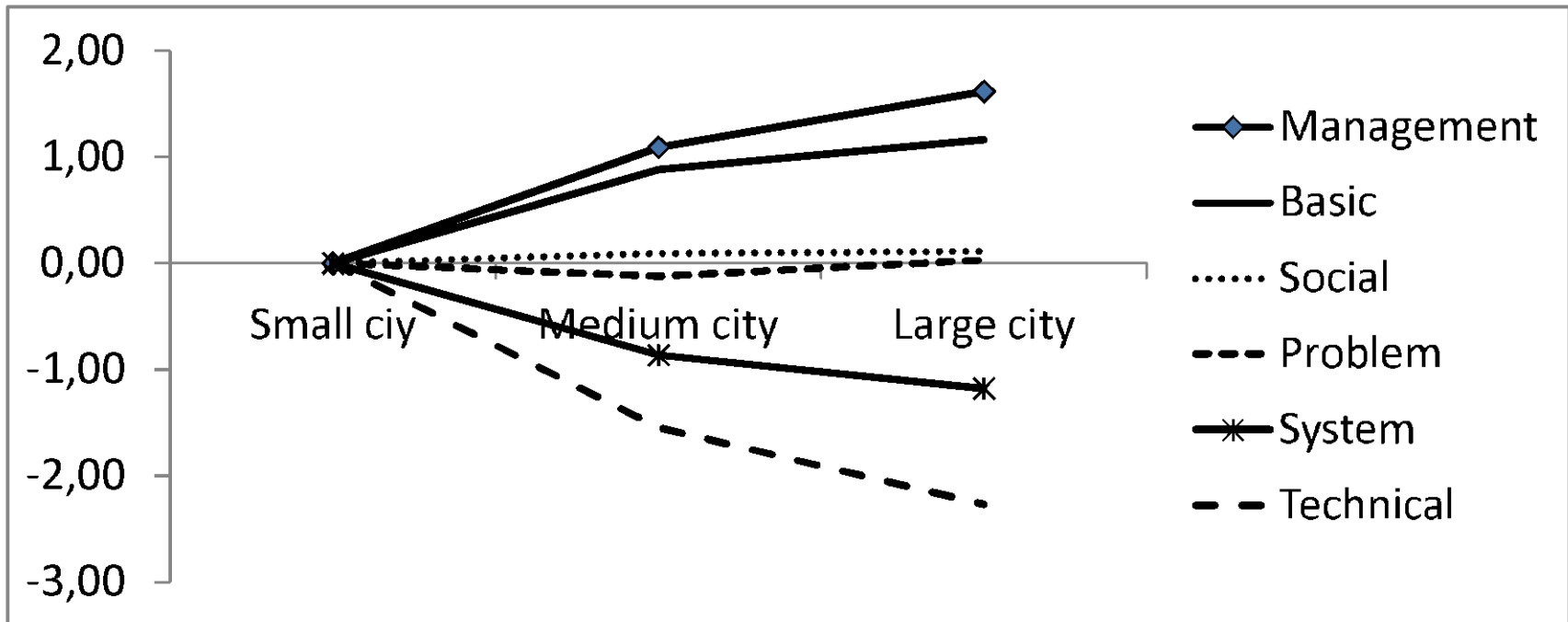
Employment by task is measured as share in overall importance of tasks in the city in 1989

OBSERVATIONS

Division of tasks over time



Division of tasks across city sizes



Measuring connectivity

Probability of the presence of a task if another tasks is also present

$$tc_{\varphi} = \sum_{\varphi'=1}^{\varphi'=43} \text{corr } \tilde{E}_{\varphi} | \tilde{E}_{\varphi'}$$

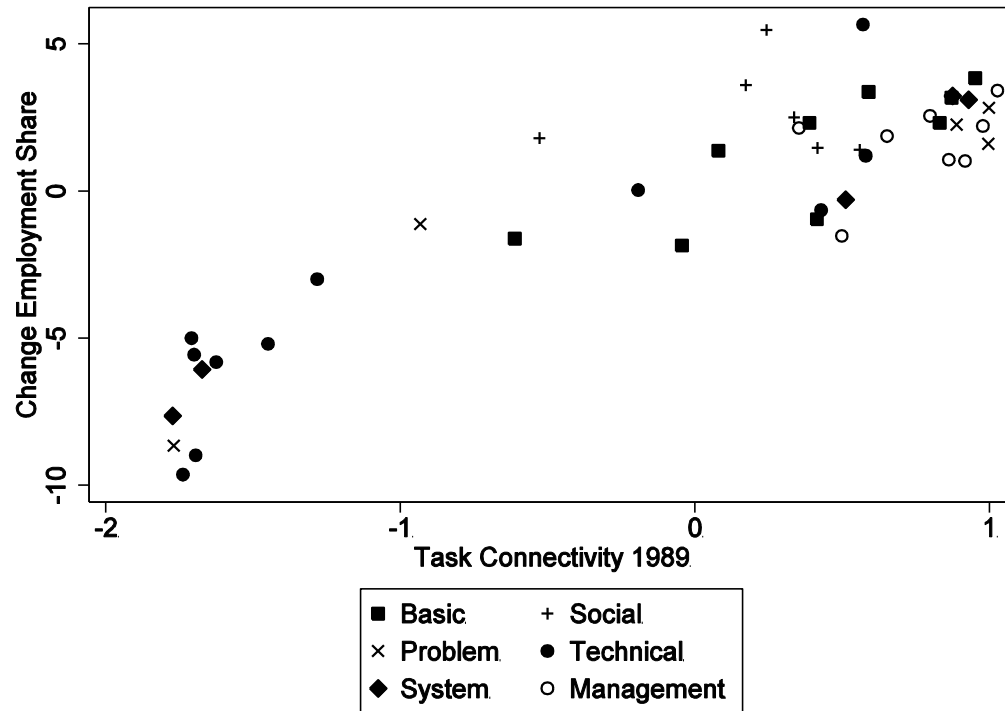
Higher task-connectivity

the more the task is glued together in space
the more expensive to place the task at distance

A connected tasks has a task connectivity $>$ mean

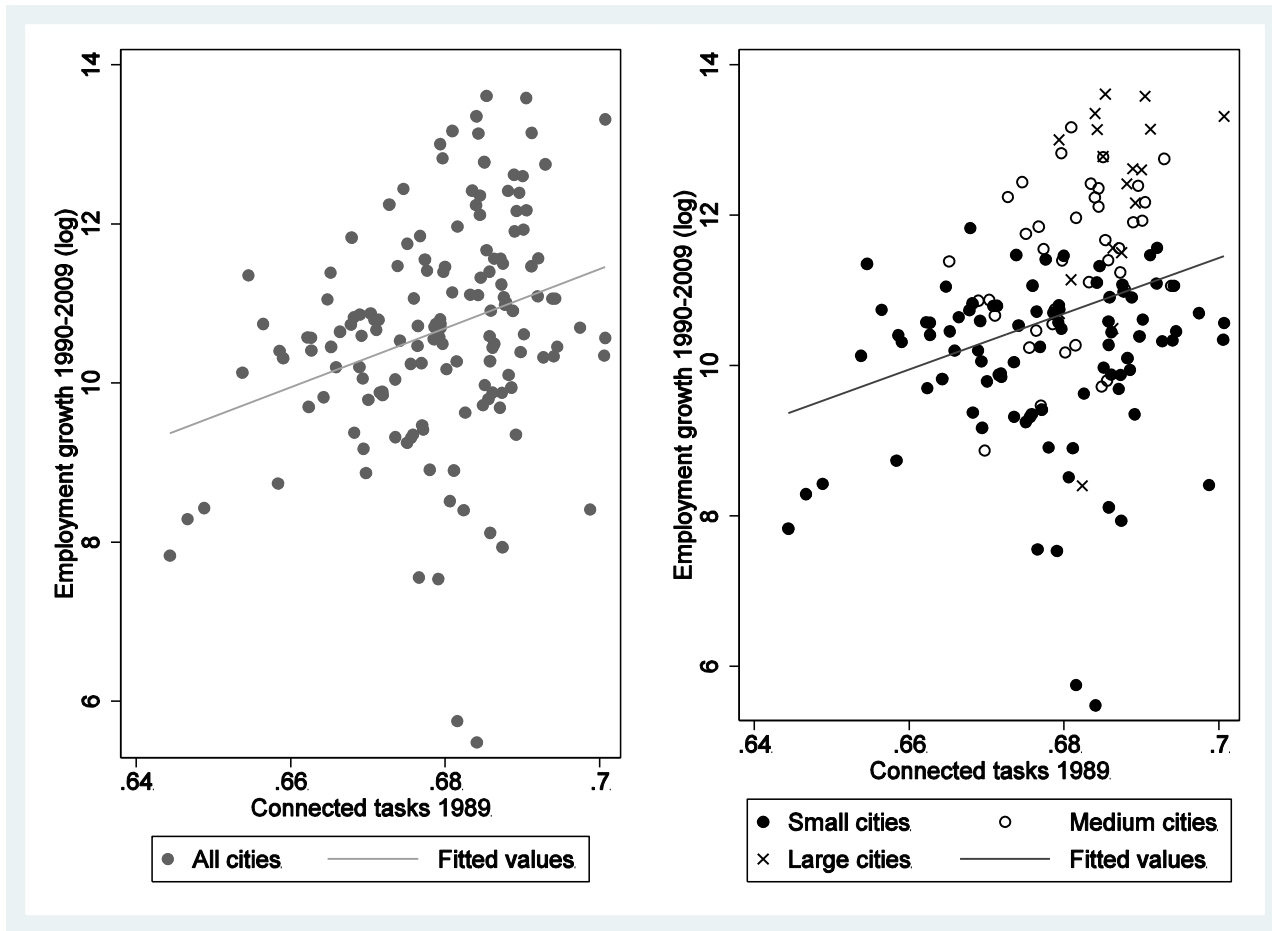
RESULTS

Connected tasks become more important



And are often performed by high-skilled workers
And are complements to computer use at work

Cities with connected tasks grow



Regressions

Growth in national employment share 1989-2009:
distribution of employment across US cities

	Change employment share
Employment share 1989	-0.068** (0.027)
Connected tasks 1989	1.991*** (0.637)
R ²	0.150
Observations	168

1 standard deviation higher share connected tasks -> 10-20% of
a standard deviation more growth

Other factors?

Regions (Glaeser and Tobio, 2007)

Industry structure (Glaeser e.a. 1992)

Skill-level (Glaeser and Maré, 2001)

Social | cognitive tasks (Bacolod e.a., 2009)

Computer use at work (Autor e.a., 2003)

Does not change the effect of connected tasks

Robustness

Routine and non-routine tasks

Shifts within occupations

Only most important task

Least intensive computer use

Sunbelt states

January temperatures

Conclusion

Tasks that require many face-to-face interactions are expected to glue together in cities

Cities with a large employment share of these tasks grow faster

More analyses on the spatial connectivity of tasks and its economic value is relevant

	Change in Employment Share 1989-2009				
Employment share 1989	-0.077** (0.027)	-0.065** (0.027)	-0.070*** (0.027)	-0.066** (0.028)	-0.059* (0.031)
Connected tasks 1989	1.690*** (0.631)	1.529** (0.774)	1.301* (0.765)	2.486*** (0.868)	1.502** (0.686)
RSI 1989	-0.015* (0.009)				
Social tasks 1989		0.033 (0.025)			
High Skilled 1989			0.013 (0.014)		
Computer use				-0.007 (0.012)	
Northeast					-0.083*** (0.024)
Midwest					-0.066*** (0.017)
West					0.008 (0.027)
Constant	-1.108** (0.423)	-1.439** (0.430)	-0.846 (0.516)	-1.652*** (0.586)	-0.964** (0.456)
R2	0.157	0.151	0.150	0.146	0.236
# obs	168	168	168	168	168

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