Indicators of ICT Impact

International Comparisons
Eurostat Network Project

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EU KLEMS

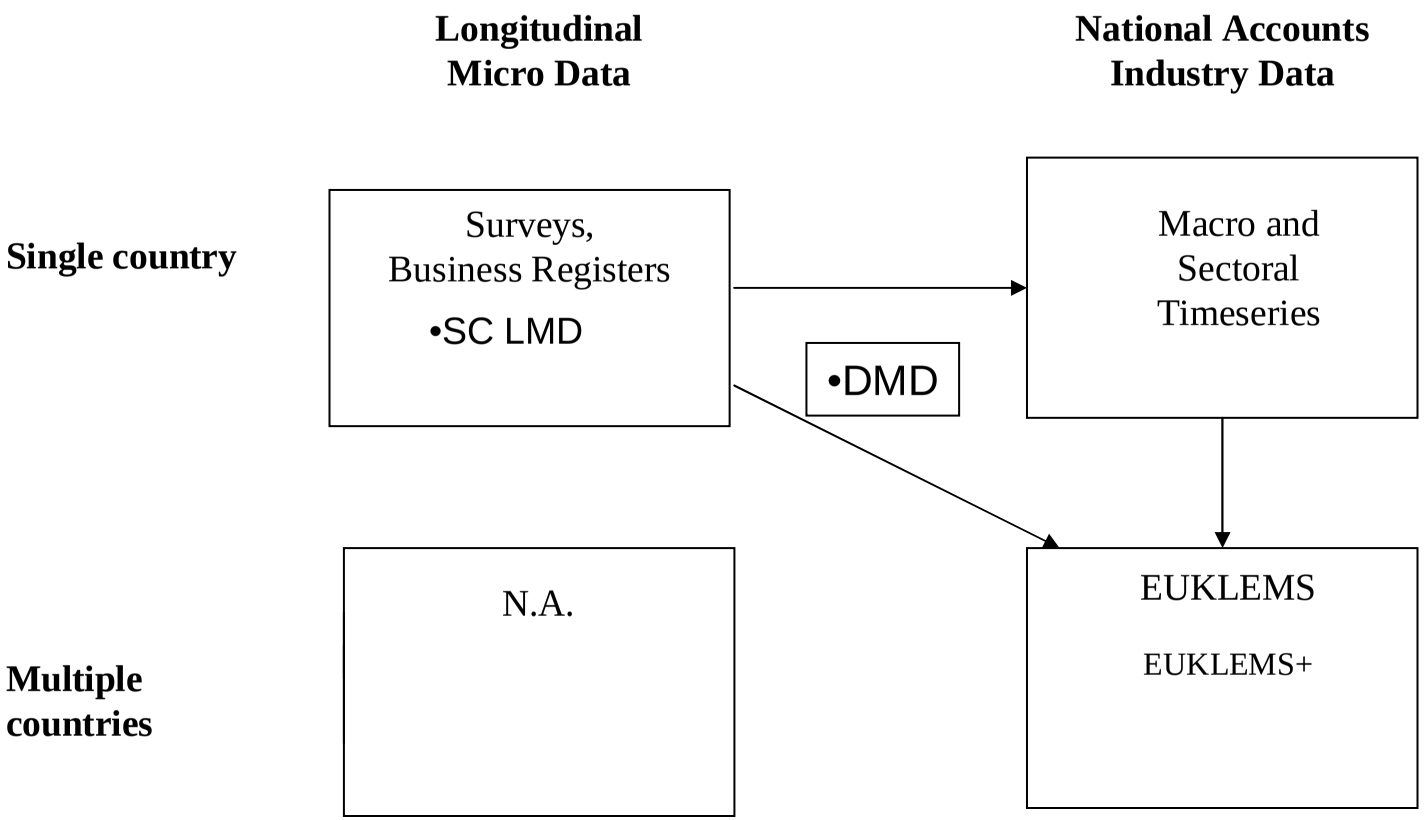
Overview of Project

- What: International comparisons of ICT impact indicators
- How: Coordination of statistical methods
  - Micro analysis: replication of single country impact studies
  - Core analysis: infrastructure for internationally comparable indicators of intensity/impact
  - Bridge from micro-level to sectoral and macro impact
- Who: Network of Stats Agencies (Phase 1 and 2), coordinated by ONS

Indicators of ICT Impact on productivity and growth

- Using micro data to help identify impacts of ICT readiness and intensity on firm-level performance
- Conduct analysis in cross-country setting. Comparability needed to aid identification and to find links to differing policy environment
- Multi-country micro-level studies are impossible, owing to confidentiality

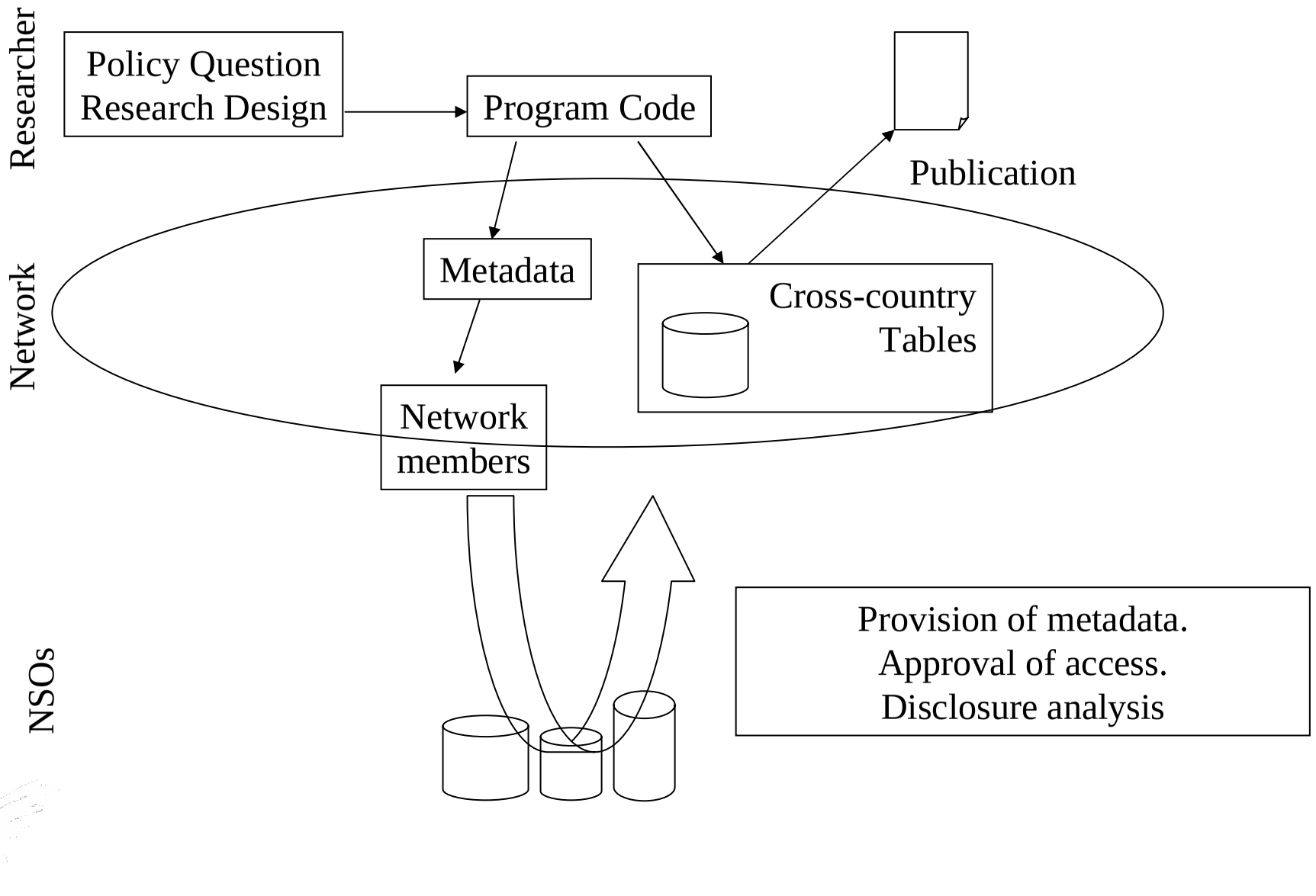
Available Data Sources



Core Analysis

- ‘Distributed micro-data analysis’
  - Heavy investments in infrastructure at Statistics Agencies
  - Low marginal costs of running and extending analysis
- Harmonized collection of indicators from longitudinal micro-level business datasets
  - Coverage statistics from linked datasets
  - E-commerce Survey tabulation: by industry, size, ownership
  - Correlations between E-commerce indicators and wages, productivity, output growth, employment growth

Distributed micro data research



Linked micro data

- Business register: backbone of infrastructure
  - Links to production survey, e-commerce survey, (or other business surveys: Investment, R&D, CIS)
- Coverage varies by country: comparability in sub-aggregates requires attention to weighting
- Weighted Tabulations
  - Sample weights, size weights, sample&size
  - Sample reweighting based on observables in register

Example: Tabulation from Ecommerce Survey (cross-country comparisons)

		country								
		AUT	DNK	FIN	FRA	GBR	ITA	NLD	SLO	SWE
Ind	Variable (2004)									
15t37	PC	98	99	100	100	100	99	99	98	98
	Epurch	48	71	82	33	70	25	43	26	77
	Esales	26	28	30	42	28	19	33	9	25
	Inter	99	100	99	99	100	96	97	98	98
	Intra	59	43	50	60	75	55	53	33	.
	Web	88	91	88	77	93	68	85	67	91
	DSL	.	69	87	84	90	71	84	.	68
	PCpct	42	51	57	.	50	34	50	41	62
	Epurchpct	3	2	6	7	3	1	2	3	4
	Esalespct	5	9	7	15	5	3	6	9	3
	Interpct	26	40	46	.	37	20	32	32	47
	Intrapct	51	.	.	.	.	22	.	.	.
	DSLPCT	.	26	42	.	35	16	29	.	37

Ex.: Tabulation from Ecommerce

(changes over time)

		Sector/year							
		Mfg				Svc			
		2001	2002	2003	2004	2001	2002	2003	2004
country	variable	.	.	.	.	.	.	.	.
SWE	DSL	54	69	58	68	61	67	59	68
	DSLPCT	29	30	32	37	49	43	45	52
	PCpct	65	60	62	62	74	71	70	72
	Esalespct	1	1	2	3	3	2	3	4
	Epurchpct	0	1	3	4	0	1	6	7

DSL: % firms with broadband; DSLPct: % workers with access to broadband;
PCpct: %workers with PC; Esalespct: % of sales through E-commercec;
Epurchpct: %of purchases through E-commerce

Ex.: DSL-intense industries

(customized industry groupings)

		Sector						
		221	**32**	**33**	**40a1**	**65t7**	**71t4**	**921t2**
variable	**country**	2004						
DSL	**AUT**	.	.	.	.	.	.	.
	DNK	57	.	.	.	.	.	.
	FIN	97	97	94	90	100	87	97
	FRA	88	92	91	96	67	90	88
	GBR	98	93	96	92	96	90	.
	ITA	90	78	82	100	100	79	86
	NLD	94	92	82	.	.	86	.
	SLO	.	.	.	.	.	.	.
	SWE	83	75	100	89	80	84	81

Definition of ‘DSL-intense’ industry based on average DSL-intensity across countries

Ex: tabulation from Ecommerce

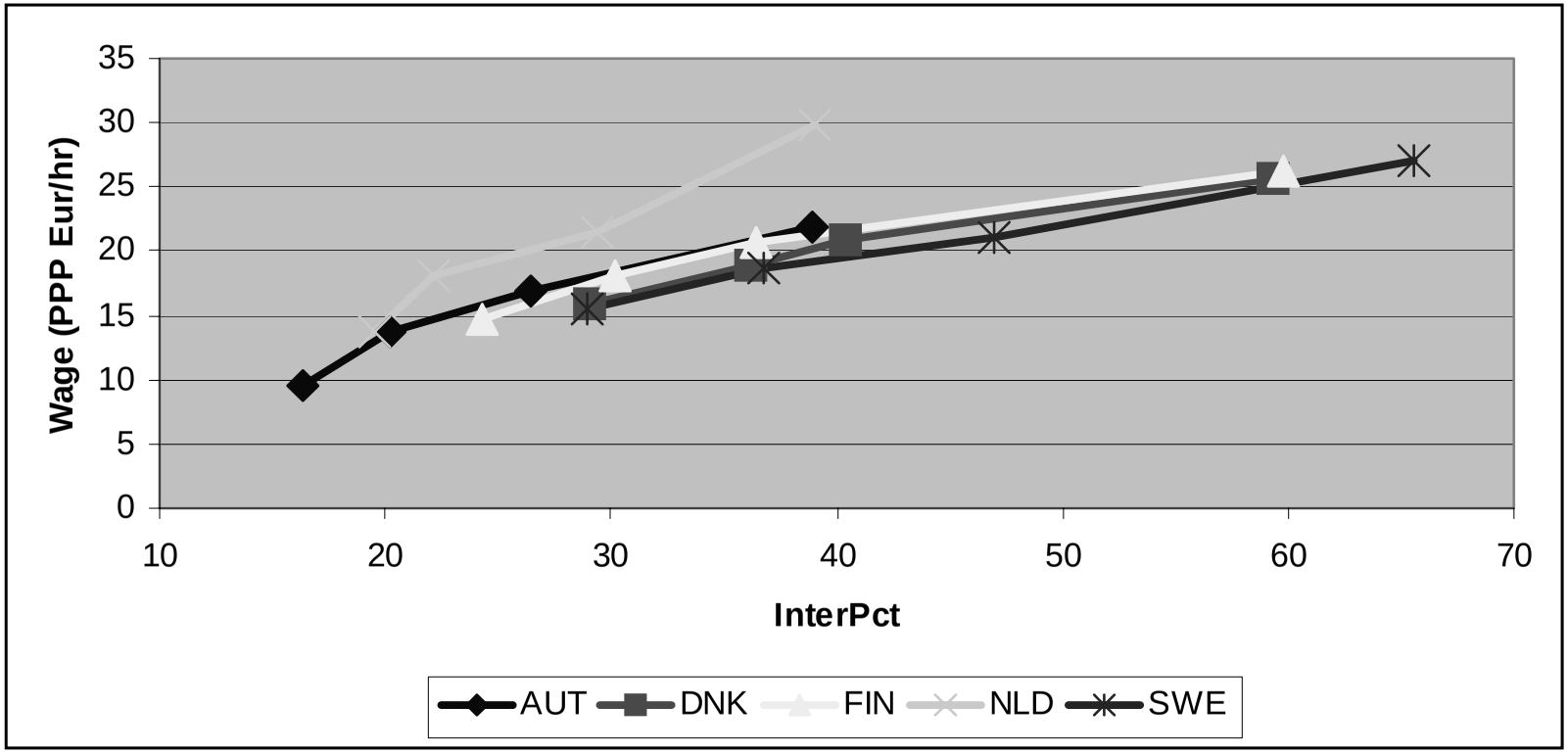
		50t74						
		Size Class						
		1	2	3	4	5	6	7
variable	country							
Esalespct	AUT	2	2	3	5	5	5	3
	DNK	10	10	11	9	9	11	9
	FIN	2	3	3	5	8	5	15
	FRA	4	4	5	7	8	10	10
	GBR	.	.	.	2	3	3	.
	ITA	0	1	1	2	1	1	2
	NLD	3	3	3	8	7	12	9
	SLO	27	12	12	11	8	1	.
	SWE	3	2	4	5	5	5	8

Most ICT indicators rise with firm-size. In trade and services (50t74), size does not seem to be crucial for percentage of sales through E-commerce

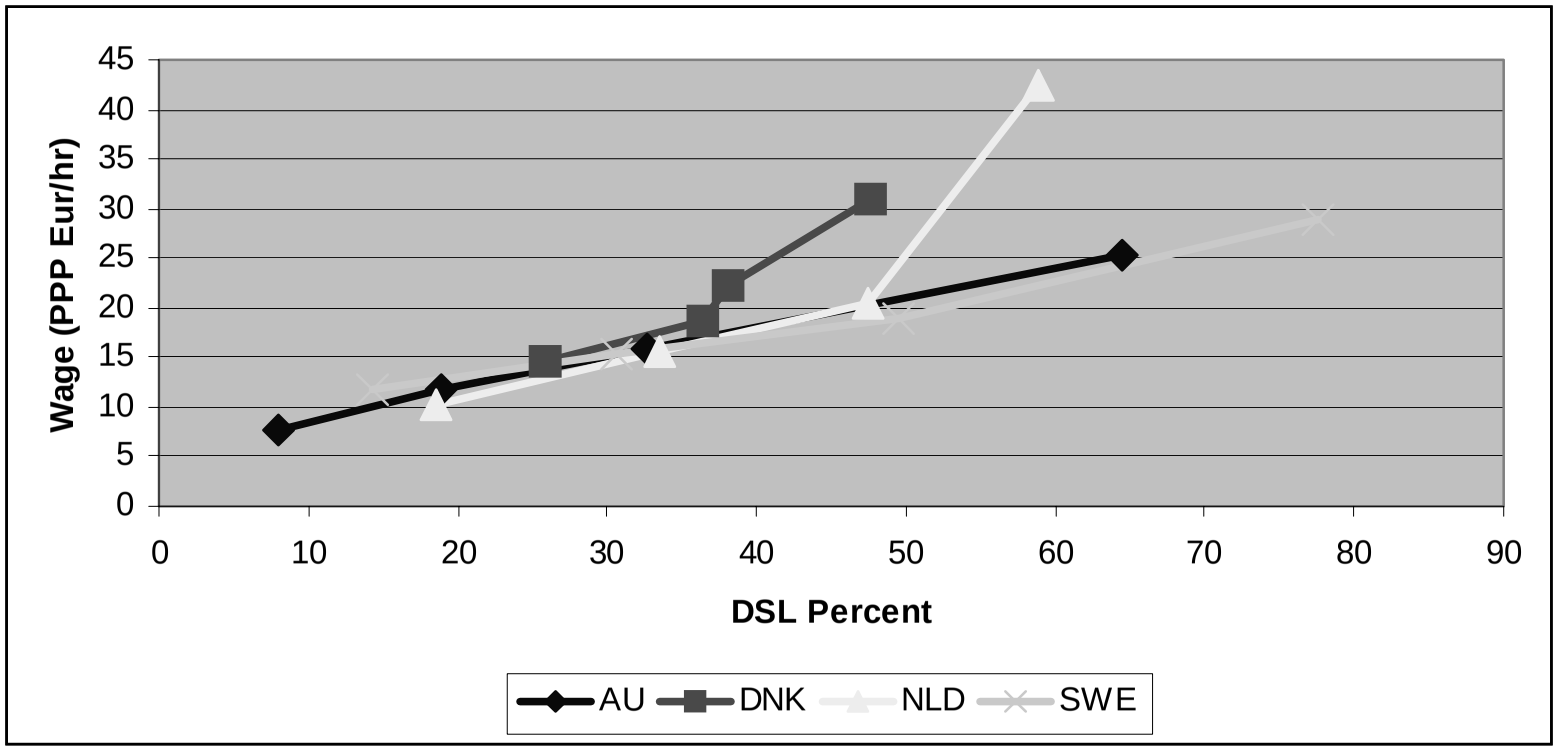
ICT and worker wages/quality

- Evidence from single-country studies: computer use and other ICT indicators are correlated with wage
- Question: Is correlation based on labor cost, worker skill, or unobserved common factor?
- Cross-country evidence: wage-ICT correlation holds, regardless of country. Thin evidence: it is likely a common factor.

Pct Internet by firm-wage quartile (Mfg, 15t37)



Pct DSL by firm-wage quartile (Trade&Svc, 50t74)



Steps to bridge from micro to sectoral and macro impact

- Merge indicators and correlations into EUKLEMS, by industry/country/year
- Relate ICT invest and capital stock from EUKLEMS to comparable ICT indicators
- Test hypotheses: e.g. the impact of ICT capital is higher in industries/countries with higher DSL use

Conclusions

- Investment in infrastructure for cross-country analysis has pay-offs beyond currently displayed use and impact indicators
- The framework allows controlling for structural differences across countries
- The framework allows linking micro results to analysis at sectoral and macro level
- New survey variables easily may be linked into analysis

Work to be done

- The core analysis is operational for 8/9 Phase 1 countries
- Some additional work needed on comparability
  - Further work on weighting
  - Further analysis of impact indicators
- Phase 2 countries may start their work
- Coordinate replication of single-country studies across countries

Further Information

Phase 1 (April 06-April 07):

UK, France, Italy, Sweden, Finland, Austria, Netherlands, Denmark, Slovenia

Phase 2 (May 07-April 08):

Germany, Czech Republic, Ireland, Norway

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