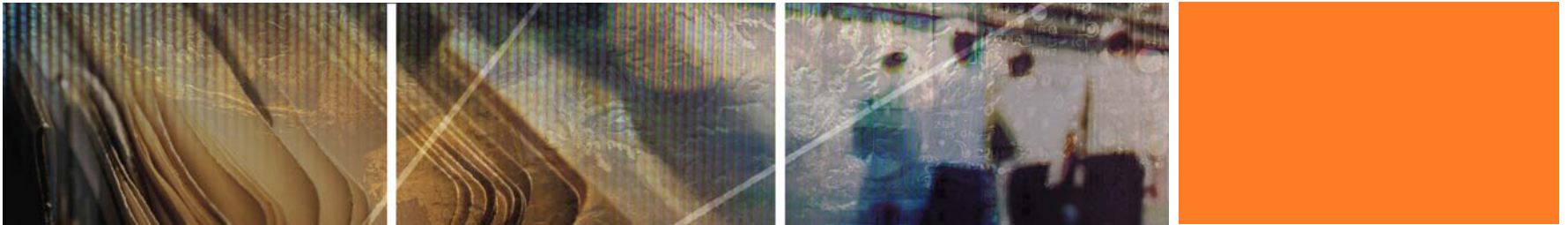

Second Workshop on Indicators in the Knowledge Economy
Maastricht, 6-7 October 2005



Session 1

Sectoral approaches to knowledge indicators

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Introduction

- Comment on knowledge and knowledge economy
- Some challenges posed by sectoral differences
- Possible ways to take the differences into account
- Integrating innovation studies with firm demography
- A register based approach to firm demography
 - See paper: **Innovation and firm demography: Two aspects of industrial renewal**, (co-authored with Tore Sandven)
- Summing up

Knowledge

- Knowledge economy: In the sense that use, search for and generation of new knowledge is consciously addressed and utilised
- Knowledge versus information:
 - Sticky, localized, costly to acquire and transfer, time consuming to acquire, hard to unlearn
 - Affects possibility of knowledge transfers across sectors
 - Makes history matter and sectors different
- Knowledge versus competence; the ability to apply relevant knowledge to solve particular problems
 - Innovation: More than theoretical knowledge
- Knowledge as formal education, but also vocational training, acquired experiences, tacit aspects, knowledge that require teamwork, embodied technology, codified/not codified, generic technologies
- Poses challenges for measurement

Industrial differences – challenges to analysis and policy

- Industries differ significantly in the way they use and develop different kinds of knowledge
- The composition of industries differ among countries
- Taken together this makes simple country comparisons useless (3 % target...)
- Industrial structures are not static, but why, how and how much do they change?
- Production and use of knowledge may occur at different places – firms, industries, countries – and time
- Simply comparing generation of knowledge gives a false picture – also use must be taken into account (diffusion)
- Effects of innovation hard to identify due to the systemic relationships
- Any given policy is not neutral; It is more relevant to some industries than others.

Taking sectoral differences into account

- The evolutionary perspective implies that it pays off to be different
- Policies must take variety into account – not push everybody in the same direction (3 % R&D, high-tech sectors, generic technologies, abandoning low-tech,..)
- Available indicators affect how the situation is perceived
- Decomposing performance into an intensity effect and a structure effect:
 - Recalculate national figures to represent a standardised industrial structure, like OECD average, then compare
 - Alternatively, use OECD average for input intensity (like R&D or innovation costs or education costs...) and apply to actual national industrial structure, then compare
- The easy way out: Do industry by industry comparisons.
 - But: Considerable delay in updating industrially disaggregated data
- Take industry differences in knowledge use into account by including measures of inter industry/firm knowledge flows:
 - Contract research
 - R&D modified input-output tables
 - Personnel mobility
 - Embodied technology in investments
 - Transactions within the value chain
- Industry studies: Fish farming, extremely advanced by adapting external technology
- Explicitly address the structural dynamics; firm demography

Innovation and firm demography

- Innovation means new opportunities but higher risks
 - Options for new firms, spin-outs, spin-offs,
 - More closures, take-overs, contractions – and growth
- Organisational innovation may include outsourcing and reorganisation
 - Resulting in new firms or transformed firms
- Localized /tacit/sticky knowledge can be expected to contribute to higher within-industry turbulence and less change in industrial structure
- Firm demography can contribute to tracking effects of innovation

Firm demography

- Background in Nordic study on High tech spin-offs
- Idea is to utilise matched employer-employee data to identify spin-offs and categorise other firm demographic changes
- In the current paper the methodology is presented and utilised to discuss industrial renewal
- Both employers and employees are identifiable and can be traced over time
- Unit of analysis is establishment, but utilising enterprise level to classify changes
- Comparing adjacent years in two steps:
 - Firstly, classification by use of changes in ID numbers
 - Secondly, classification by tracing employees that change workplace

Categories of change

- 1. No change
- 2. Transformation
- 3. Takeover
- 4. Move
- 5. Spin-out
- 6. Entrepreneurial new
 - 6.1 Spin-offs
 - 6.2 Greenfield births
 - 6.3 Other new
 - 6.4 Corrections
- 7. New by expansion
- 8. Complete closure
- 9. Partial closure

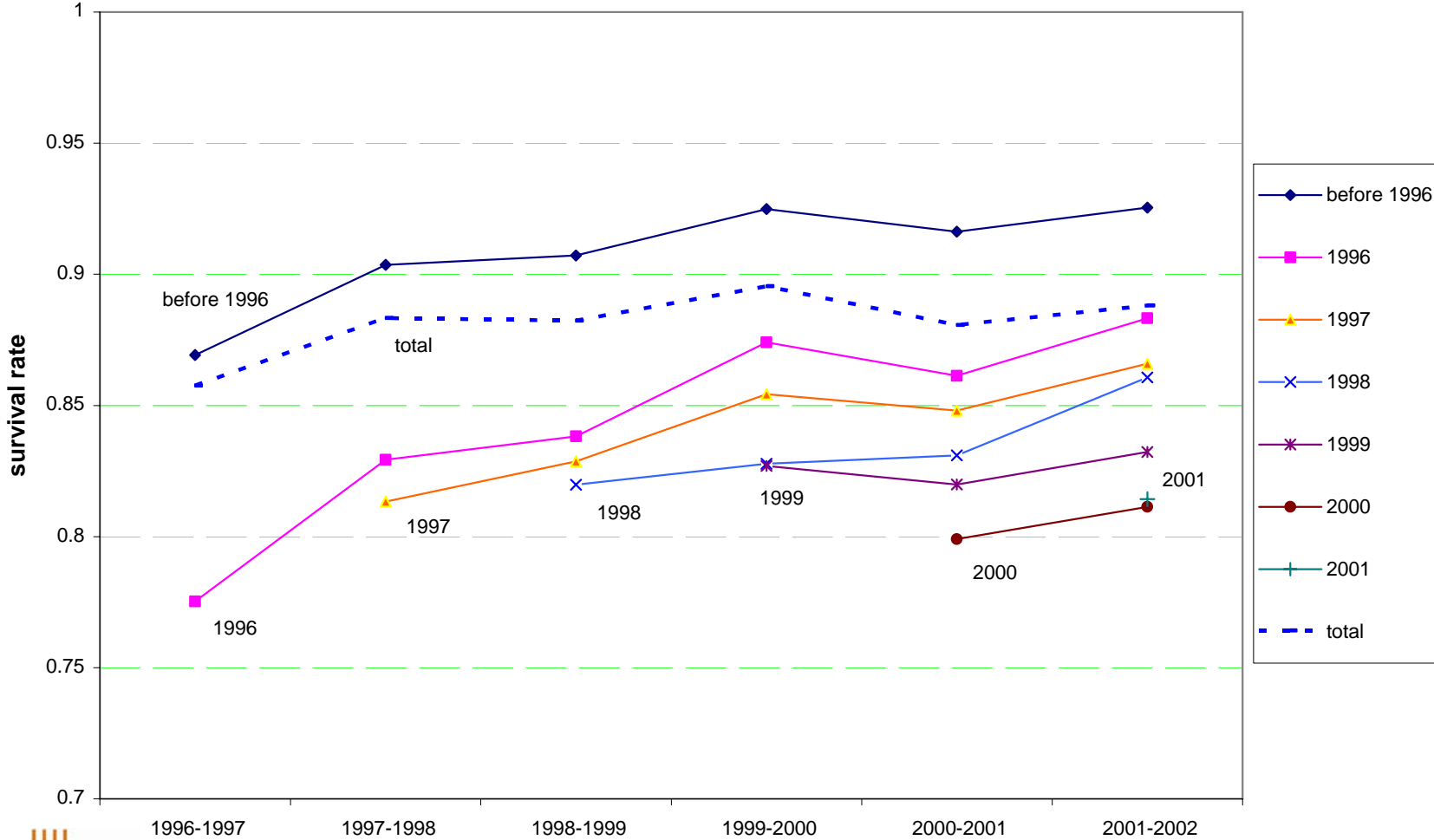
How much turbulence?

**Changes in establishments and enterprises 1999-2000.
Percent of number of establishments.**

	No Change	Transformation	Take-over	Move	Spin-out	Entrepreneurial New	New by expansion	Complete Closure	Closure in survivor	Total Year 0	Total Year 1 (=100 %)
Sweden	89,5	0,6	0,4	0,2	0,5	6,9	1,9	5,3	1,7	167539	170924
Finland	89,1	0,9	0,5	0,3	0,5	6,7	2,1	6,5	1,7	85911	86392
Denmark	89,3	2,3	0,3	0,3	1,0	5,3	1,6	2,8	1,6	97519	100055
Norway	88,6	2,1	0,9	0,2	0,4	6,2	1,5	5,4	1,7	103301	104053

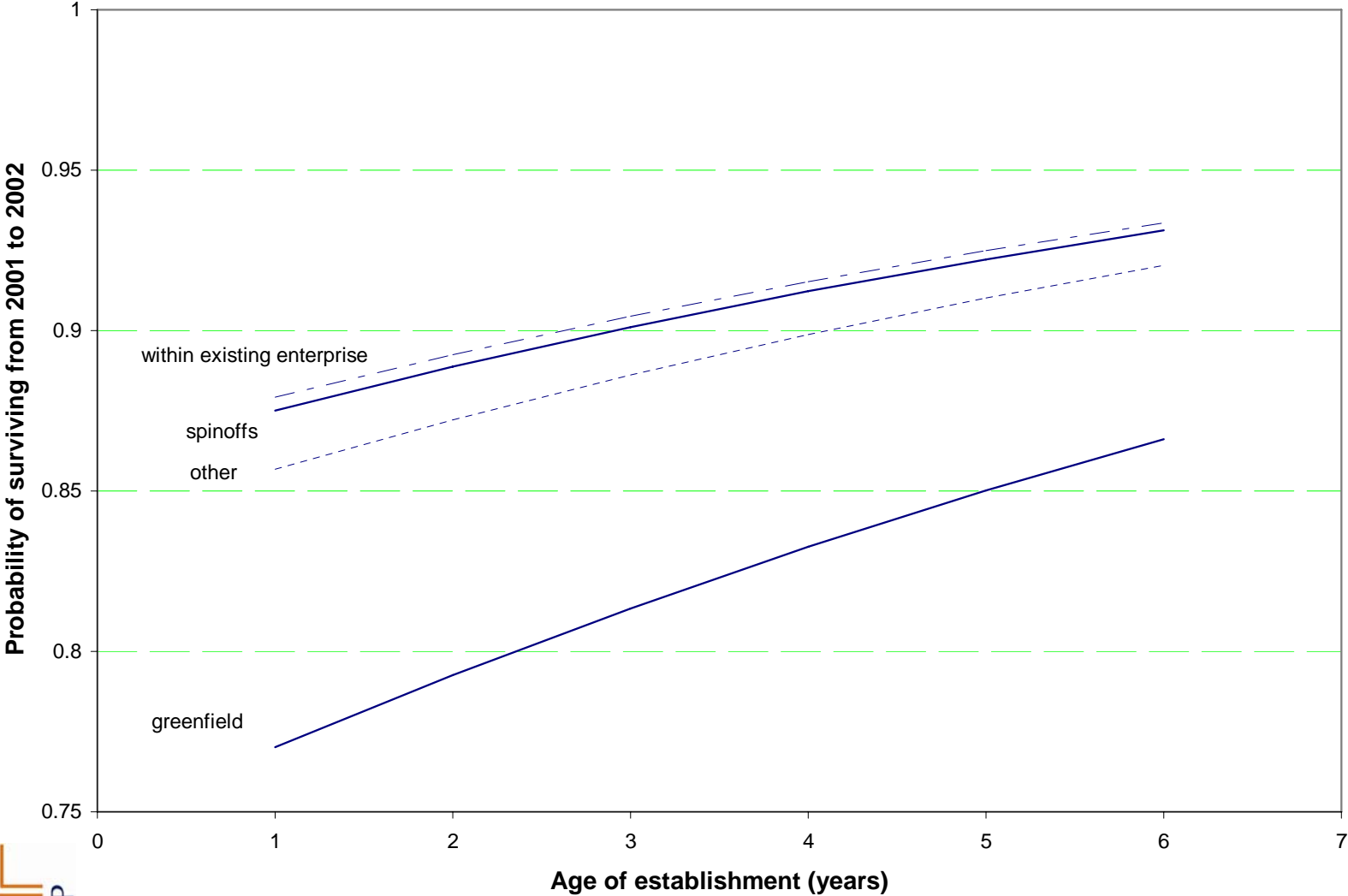
Survival for new entries

Survival rates by cohort. Norway, 1996-2001



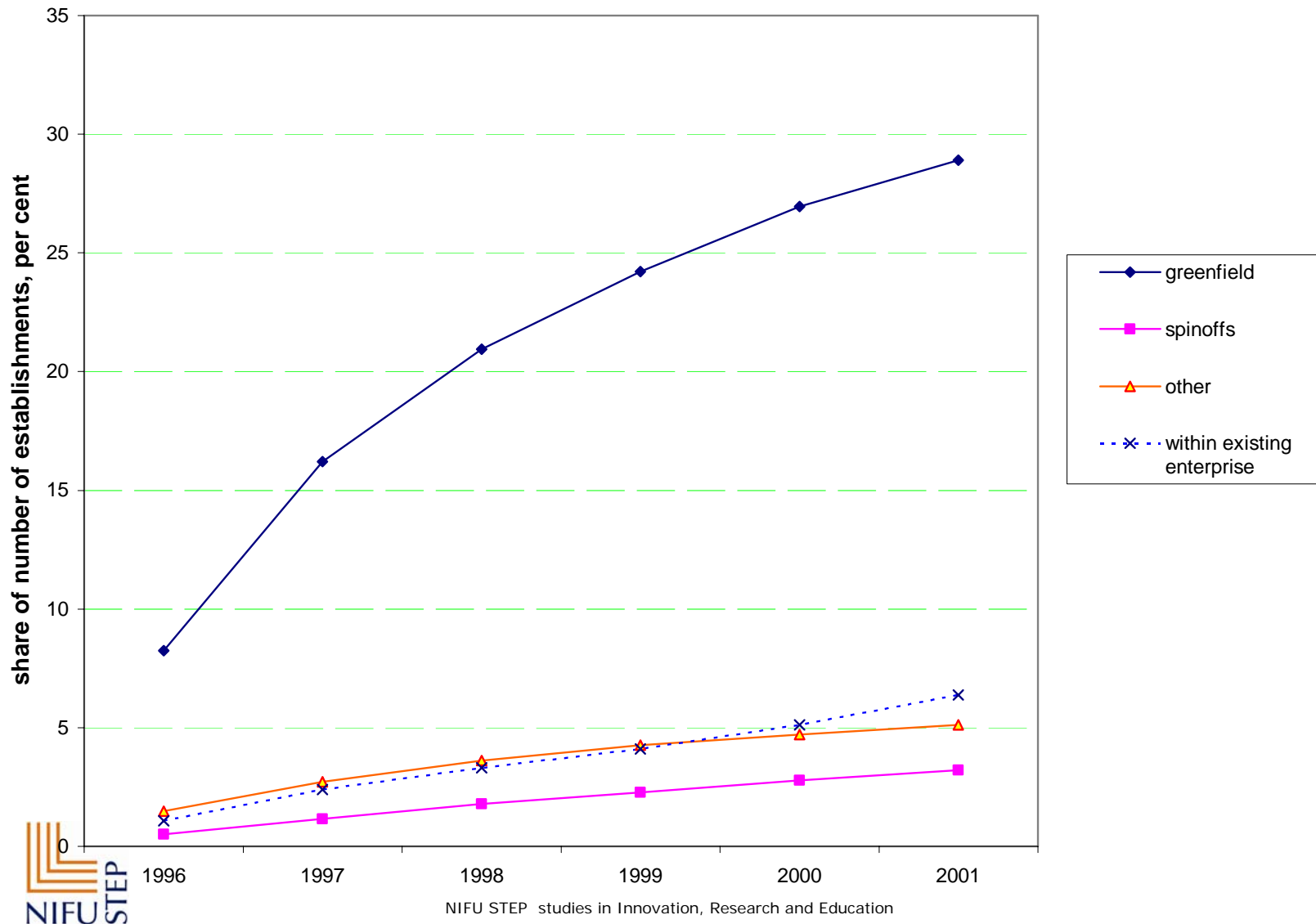
Survival by type of entry

Probability of surviving from 2001 to 2002, by age and change category.
For initial size of 10 employees



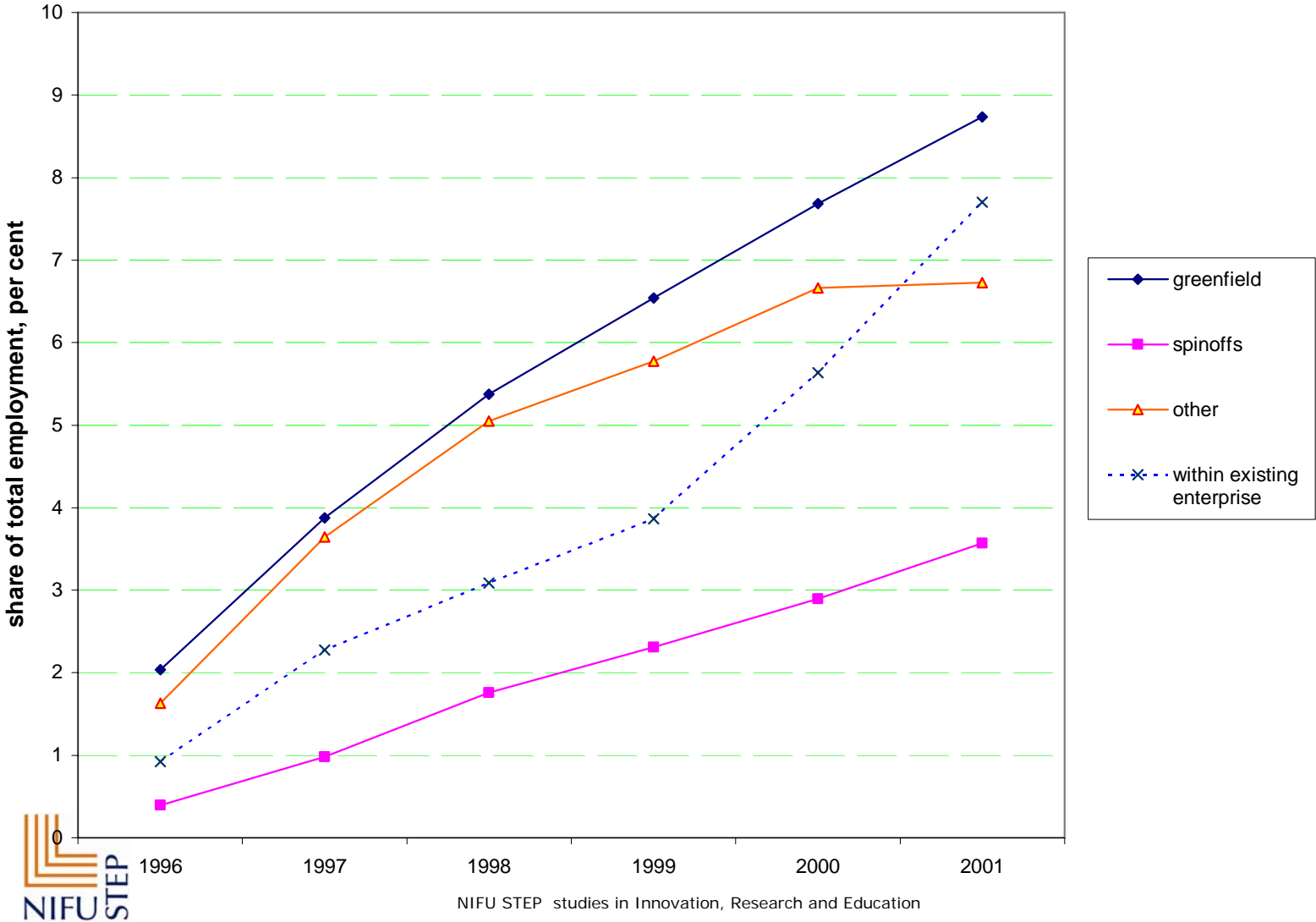
Resulting share of establishments

Entrants' cumulative share of total number of establishments from 1996 to 2001, by category of entrants



Resulting share of employment

Entrants' cumulative share of total number of employees from 1996 to 2001, by category of entrants



Resulting changes in industries

Industry	% of employees 1995	% of employees 2001	Change in share of employees
Fish farming	0,5	0,5	0,0
Mining	0,4	0,3	-0,1
Oil and gas	2,0	2,3	0,2
Food and beverages	5,0	4,4	-0,6
Textiles, leather, wood products	2,2	1,8	-0,5
Printing and publishing	2,6	2,4	-0,2
Chemicals and products, pulp and paper	2,5	2,2	-0,3
Prubber and plastic prods	1,5	1,3	-0,2
Metals	1,3	1,2	-0,1
Metal prods, machinery and equip	3,7	3,6	-0,1
Electronics and optics, instruments	1,9	1,8	-0,1
Transportation equipm	3,7	3,3	-0,5
Furniture and nec	1,2	1,1	-0,1
Electricity, water, gas	1,7	1,3	-0,4
Construction	8,7	9,5	0,8
Trade	31,1	30,8	-0,3
Transport, communications	13,5	12,1	-1,4
Financial services	4,2	3,7	-0,4
Business services and computing	12,1	16,3	4,2
Total	100,0	100,0	0,0

Summary

- Countries differ in terms of industrial structures, and it must be taken into account in comparative work – for instance using a common benchmark industry structure
- Industries differ in terms of how knowledge and competences are developed and applied – must include indirect access to knowledge
- Also “low-tech” industries utilises “high-tech” knowledge
- Localized/sticky knowledge limits the ability to restructure economies
- Innovation interacts with firm demography, slowly renewing/changing industrial structure
- It is possible to define spin-offs and other types of changes in a meaningful way by use of matched employer-employee registers
- The different change categories are significantly different in terms of growth patterns and survival
- Dynamics take part in service sectors more than in manufacturing contributing to industrial renewal
- Resulting changes in the composition of industries are moderate, and turbulence to a larger extent internal to the industries