



WP 5: Changes in Candidate Countries' Specialization on the EU Market

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Prepared for the first general meeting of the 5th framework project:
„Changes in Industrial Competitiveness as a Factor of Integration:
Identifying Challenges of the Enlarged Single European Market”
HPSE-CT 2002-00148



Outline

Objective of WP 5

Presentation of Deliverable 5.1.

„Critical Synthesis, review of the main findings, methodologies and current thought on evolution of specialization patterns in exports of 3 accession countries as compared to the EU countries and on the emerging division of labor in the Single Market after enlargement“

Presentation of Deliverable 5.2.

„Draft report on evolution of specialization patterns in exports of the 3 accession countries to the EU“

Plans for Future Research



Objectives of WP 5:

- Determine the role of changes in competitiveness in candidate countries on the emerging division of labor in the Single Market after enlargement
- Show patterns of inter-industry and intra-industry specialization of the accession countries in relation to the EU
- Identify winners and losers in manufacturing industries
- Formulate predictions concerning future structural adjustment after enlargement



Outline of Deliverable 5.1.

Introduction

Patterns of Restructuring the Economies in Central Europe

Analytical Perspectives on Structural Change in Eastern Europe

3.1. Analytical Categories

3.2. Specialization, Innovation and Growth

3.3. Technology Gap Approach

Adjustment in EU-15 Countries

Future Research



1. Introduction / Motivation

Aim:

To give an account of the existing theoretical and empirical literature on structural change and specialization patterns in accession countries, and to present some current thoughts on the topic.



2. Pattern of Restructuring the Economies in Central Europe (existing studies)

- Employment: de-agrarization, de-industrialization, tertiarization
- Sectoral Gross value added show similar trends as employment
- Labour productivity has risen in all countries, however with different speed (P, H > CZ, EU)
- CEECs export more labour intensive, less technology intensive goods



3. Analytical Perspectives on Structural Change

- Structural patterns to explain: mainly per capita income (dependent on technological knowledge, preferences, access to markets, accumulation of real and human capital)
- Demand side effects: income elasticity (Engel-curve)
Supply side effects: technological dynamics (spill over)
- Backward vs. forward linkages
- Schumpeter: role of entrepreneurship and innovativeness
- Macroeconomic variables e.g. interest rates



3.1. Analytical Categories

- Catching up is stimulated by:
 - endogenous domestic market dynamics (market entry)
 - policy-induced changes (infrastructure modernisation)
 - single market dynamics (rising trade and FDI)
- Technology intensive Schumpeterian vs. Non-Schumpeterian goods
 - Schumpeterian: R&D + production located together
FDI not stimulated by accession
 - Non-Schumpet: R&D + production at different places
FDI stimulated by different labor costs



3.1. Analytical Categories (continued)

- Trade as a determinant of long-term growth and adjustment
- Balassa-Samuelson Hypothesis:
Relative price of tradables to non-tradables falls with economic development.
There is a strong impulse for long-term economic catching up from rising exports of manufacturing goods!
- Theory for catching up:
 - new growth theory
 - new trade theory



3.2. Specialization, Innovation and Growth

- Min. requirement of R&D expenditure for imitation: 1%
1987-1997: many CEECs below 1%
- Poor situation in CEECs also concerning number of employees (scientists, engineers, technicians) in R&D
- Known from South-East-Asian countries that investing in imitation is extremely important before becoming innovators



3.3. Technology Gap Approach

1. “Jumping-up” or “Advantage of Backwardness”:
Backward countries can choose for their imitation processes between different technological opportunities
2. “Climbing-up-the-ladder-strategy”:
Technological catching-up first in low-tech industries, later in high-tech
3. “Continuous Convergence Scenario”:
Symmetric technological diffusion: backward countries improve their technology at such rate that gaps are reduced in all industries at the same speed



4. Adjustment in EU15 Countries

- EU15 specializes more in R&D and human capital intensive production
- EU15 effected by enlargement in 3 ways:
 1. Rising import competition in low and middle technology fields
 2. Rising exports of EU15 due to increase of income in CEECs
 3. Rising EU15 imports in low and middle technology fields
- EU15 not homogenous!
 1. Distance to CEECs (gravity equations)
 2. Size of investment goods producing sectors, which will benefit
 3. Role as source country of FDI different
 4. Real interest rates different



Outline of Deliverable 5.2.

1. Introduction
2. Theoretical Background
3. Empirical Analysis
 - 3.1. Aggregated Exports (Hun, Pol, CZ)
 - 3.2. Analysis of R&D Expenditure
 - 3.3. Specialization Patterns in Manufacturing Exports
 - 3.3.1. Trade Coverage Index
 - 3.3.2. RCA-Balassa
 - 3.3.3. Grubel-Lloyd Index of Intra-Industry Trade
4. Conclusion and Future Research



1. Introduction / Motivation

Aim:

To enlighten the evolution of specialization patterns in exports of 3 accession countries to the EU, namely Poland, Czech Republic and Hungary.



2. Theoretical Background

1. Traditional Trade Theory

emphasizes role of physical geography and endowment of natural resources

2. New Trade Theory

emphasizes *additionally* the role of the distance between economic agents

3. New Economic Geography

emphasizes the role of the distance between economic agents



Traditional Trade Theory

- Assumptions: perfect competition, product homogeneity, constant returns to scale
- Ricardo: *comparative advantage*
- Hechscher-Ohlin: *factor endowments*

Hypothesis 1:

Accession countries will mainly export labour and resource intensive goods according to their initial comparative advantage.



New Trade Theory

- Assumptions: a big central country and a small peripheral country, both with the same relative factor endowments
- Assumptions: a perfectly competitive sector (constant returns to scale) and a monopolistically competitive sector (increasing returns to scale)

Hypothesis 2:

High or low extent of intra-industry trade between CEECs and EU15 depends on country characteristics and indicates high or low extent of economic integration.



New Economic Geography

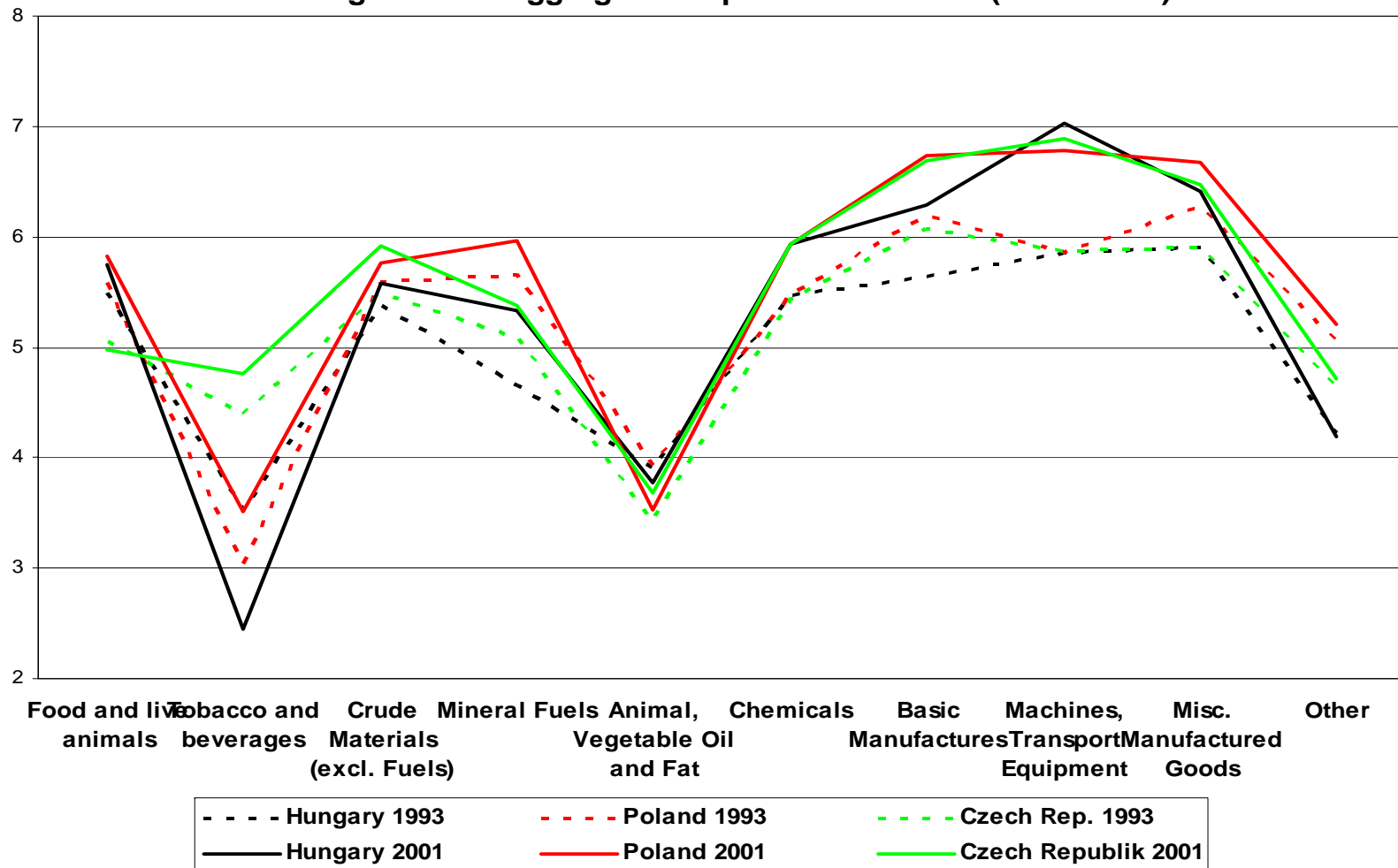
- Assumptions: interregional demand differences are themselves endogenous
- Two main agglomeration mechanisms:
 1. Interregional labour mobility
 2. Mobility of firms demanding intermediate products

Hypothesis 3:

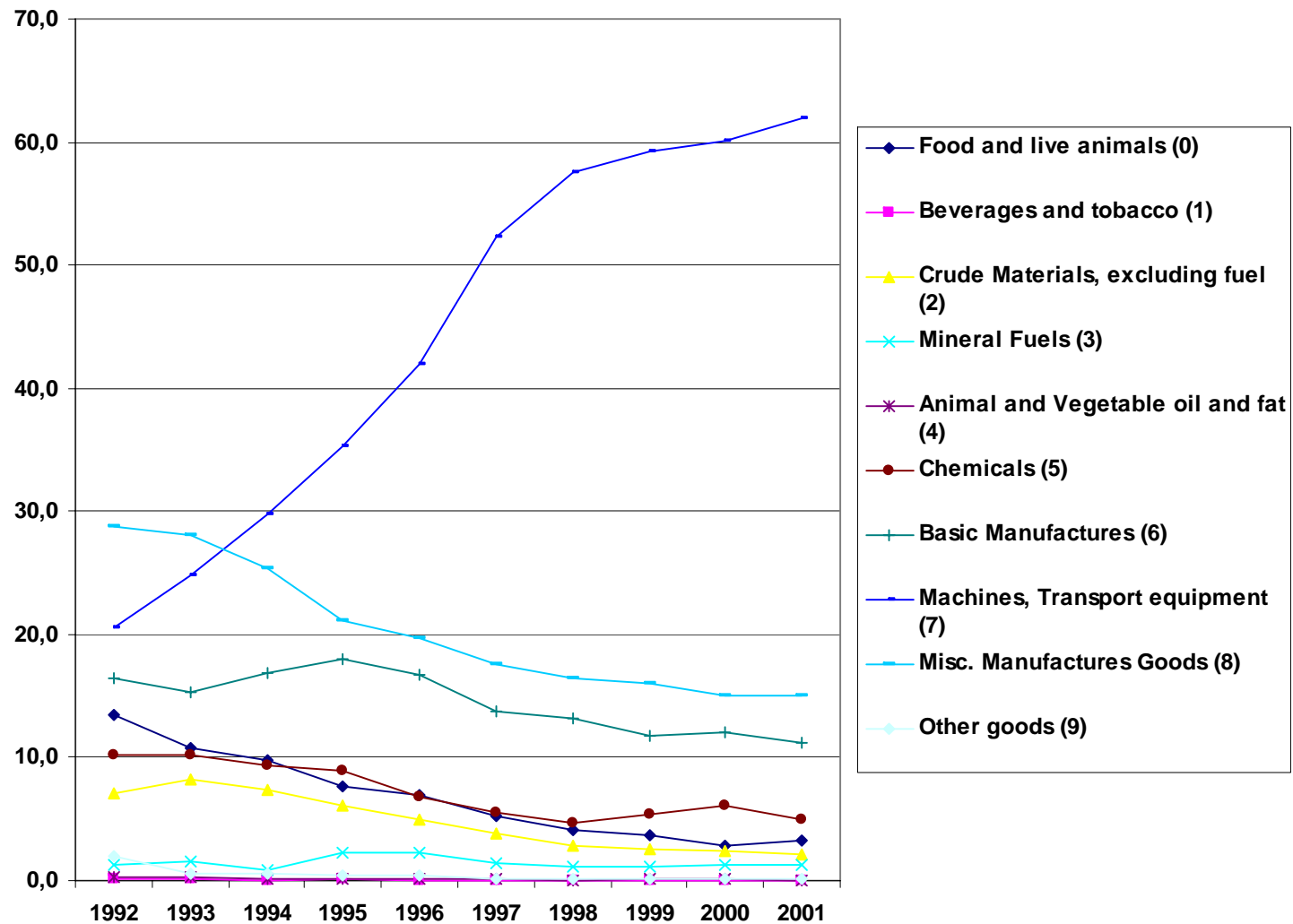
Mature products tend to be produced and exported by the EU15, old and not as innovative products rather exported by the accession countries.

3.1. Empirical Analysis, Aggregated Exports

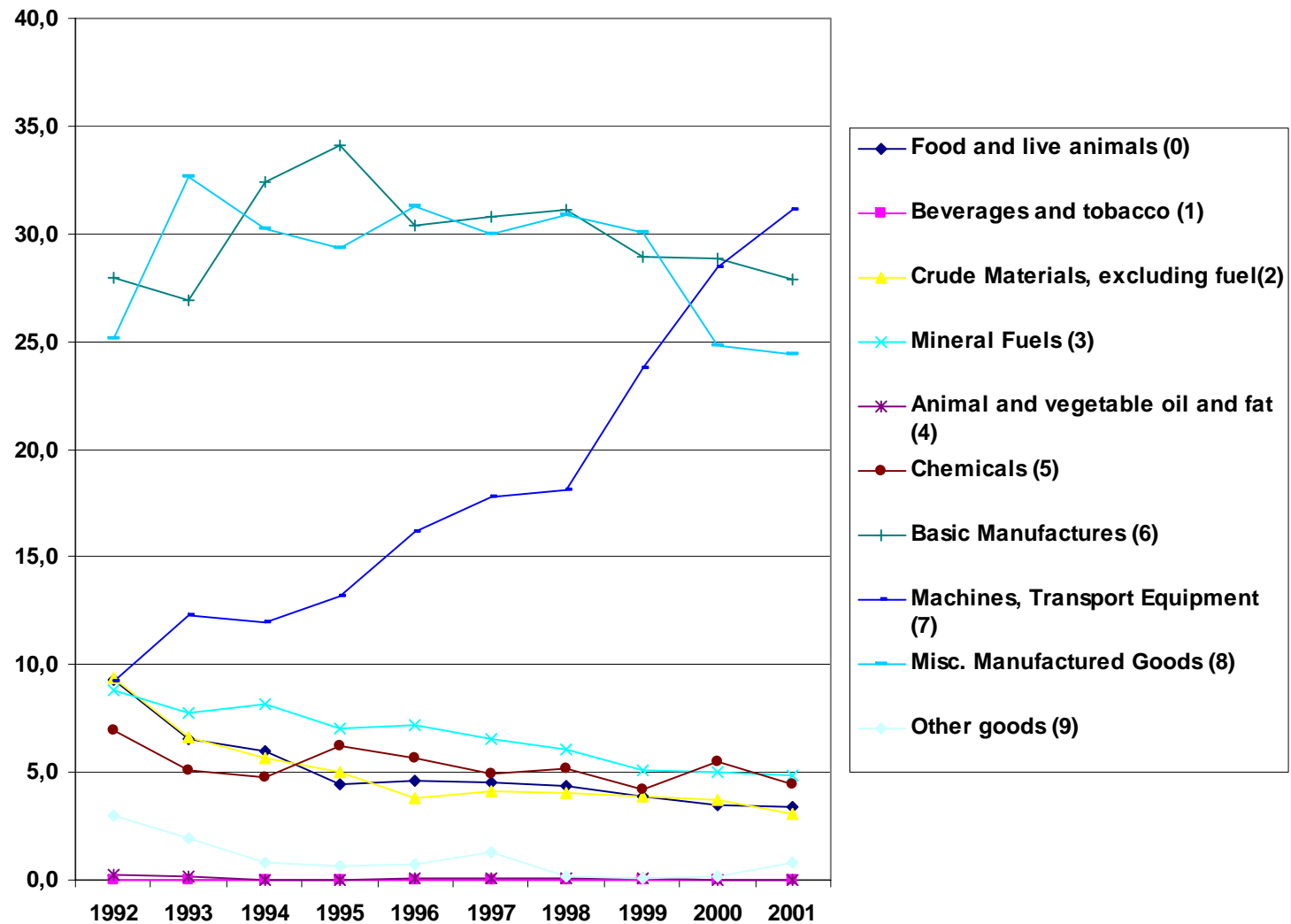
Logarithm of Aggregated Exports to the EU15 (SITC rev.3.)



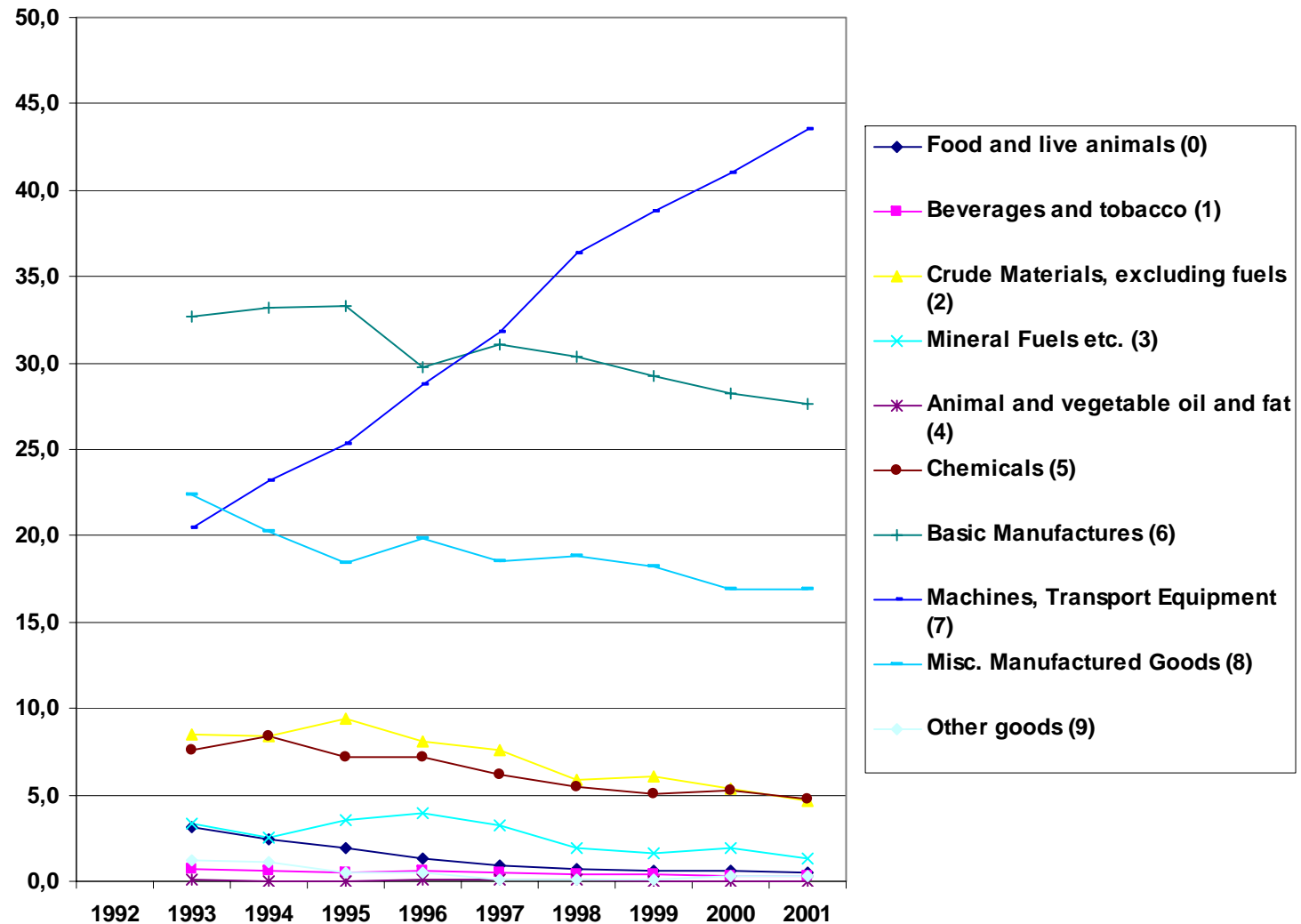
Hungary: Share of branches in exports to EU15



Poland: Share of branches in exports to EU15



Czech Republic: Share of branches in exports to EU15



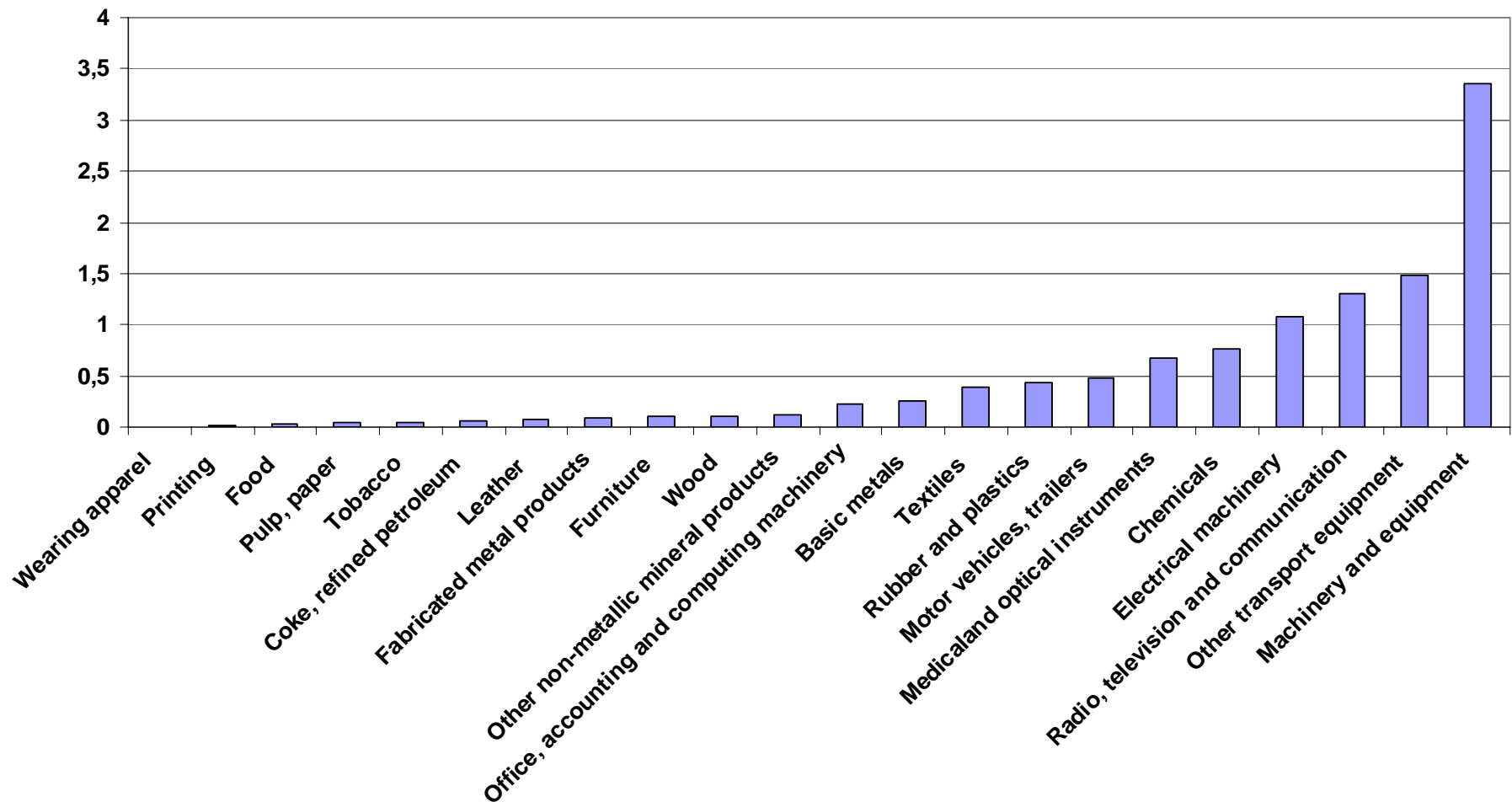


Main findings concerning export share of branches :

- In all three countries exports to EU15 are dominated by machines, followed by basic manufactures and manufactured goods
- Importance of machines is increasing, importance of basic manufactures and manufactured goods is decreasing
- All other categories accounted for less than 10% each at the initial period and for less than 5% each end of the 1990s

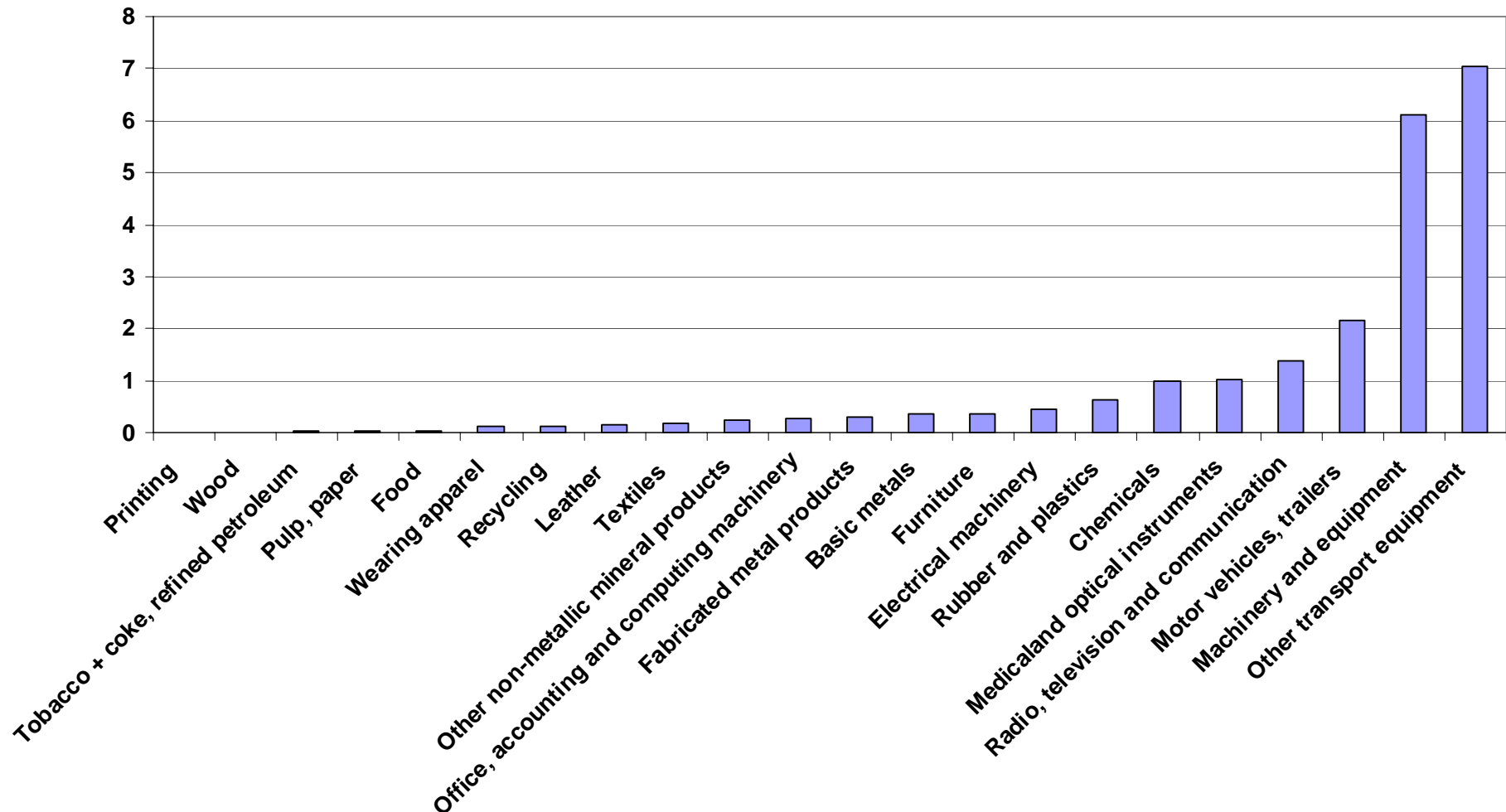
3.2. R&D Expenditure

R&D intensity in % of turnover in Poland, 1995-2000

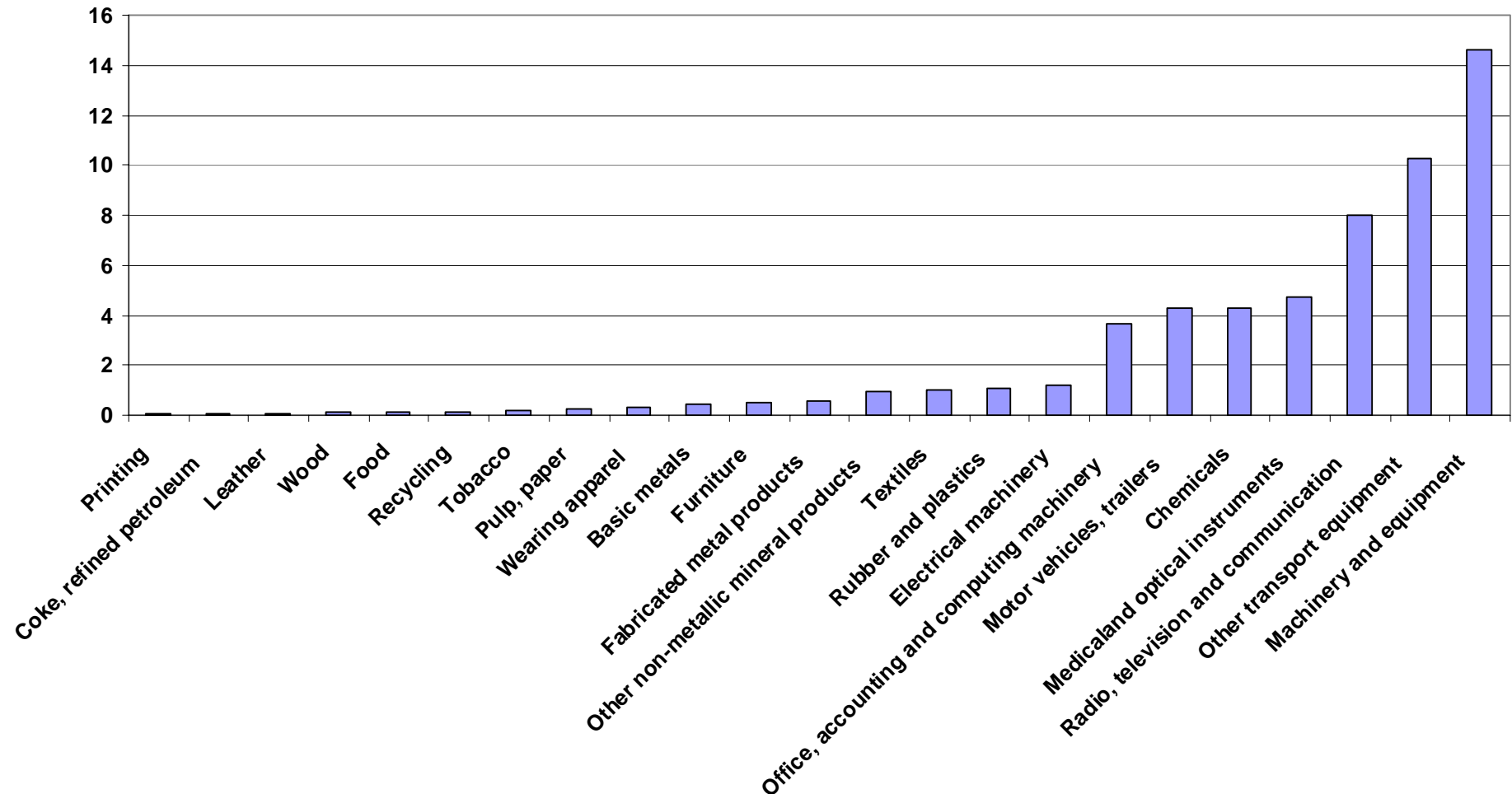




R&D intensity in % of turnover in the Czech Republic, 1997-2000



R&D intensity in % of turnover in Germany, 2000





Main findings concerning R&D intensity:

- R&D expenditure in relation to turnover is much lower in accession countries than in the EU15, e.g. Germany
- In most sectors hardly any R&D expenditure in accession countries
- Distribution of R&D across sectors is similar in accession countries and Germany

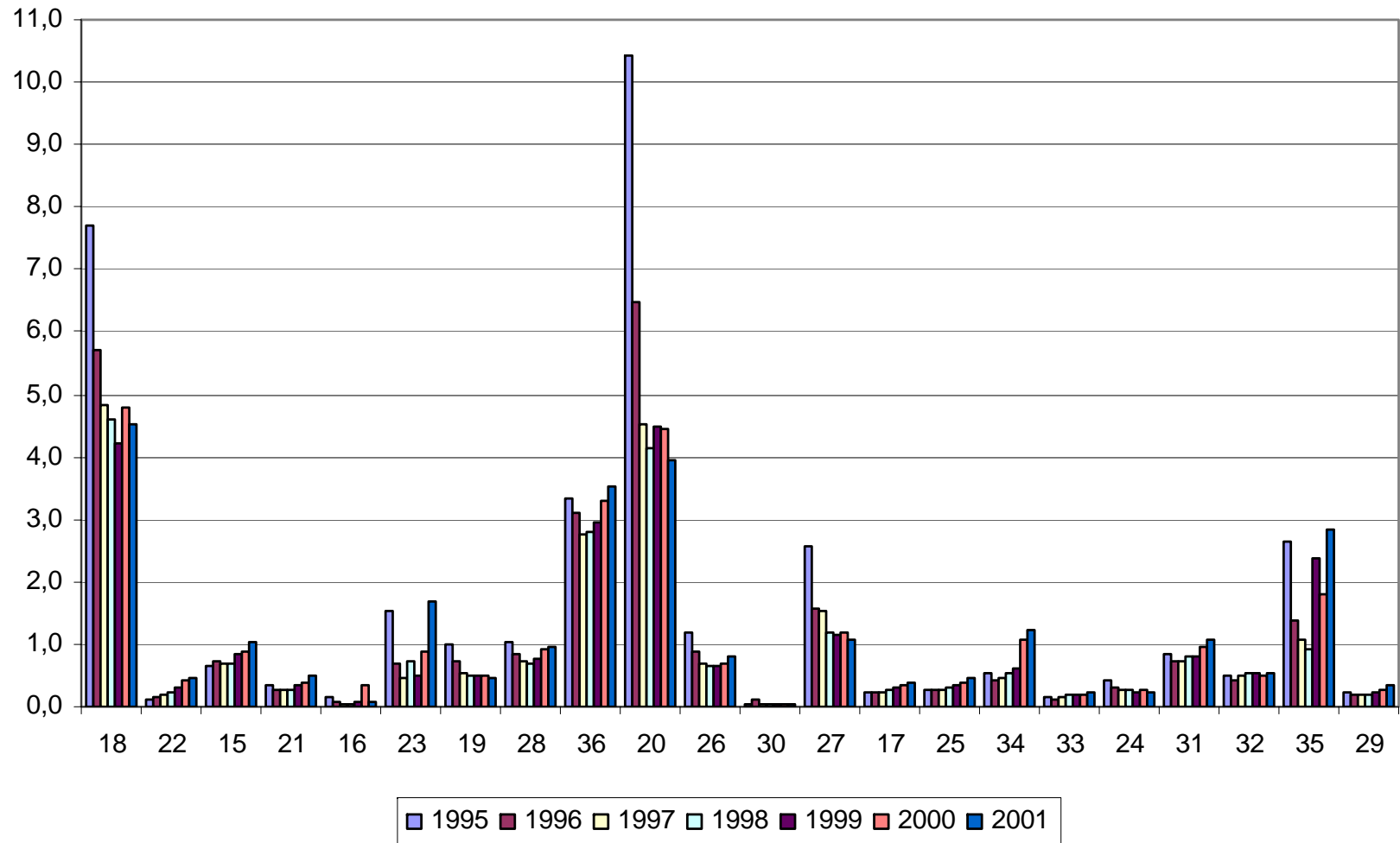


3.3.1. Trade Coverage Index (TCI)

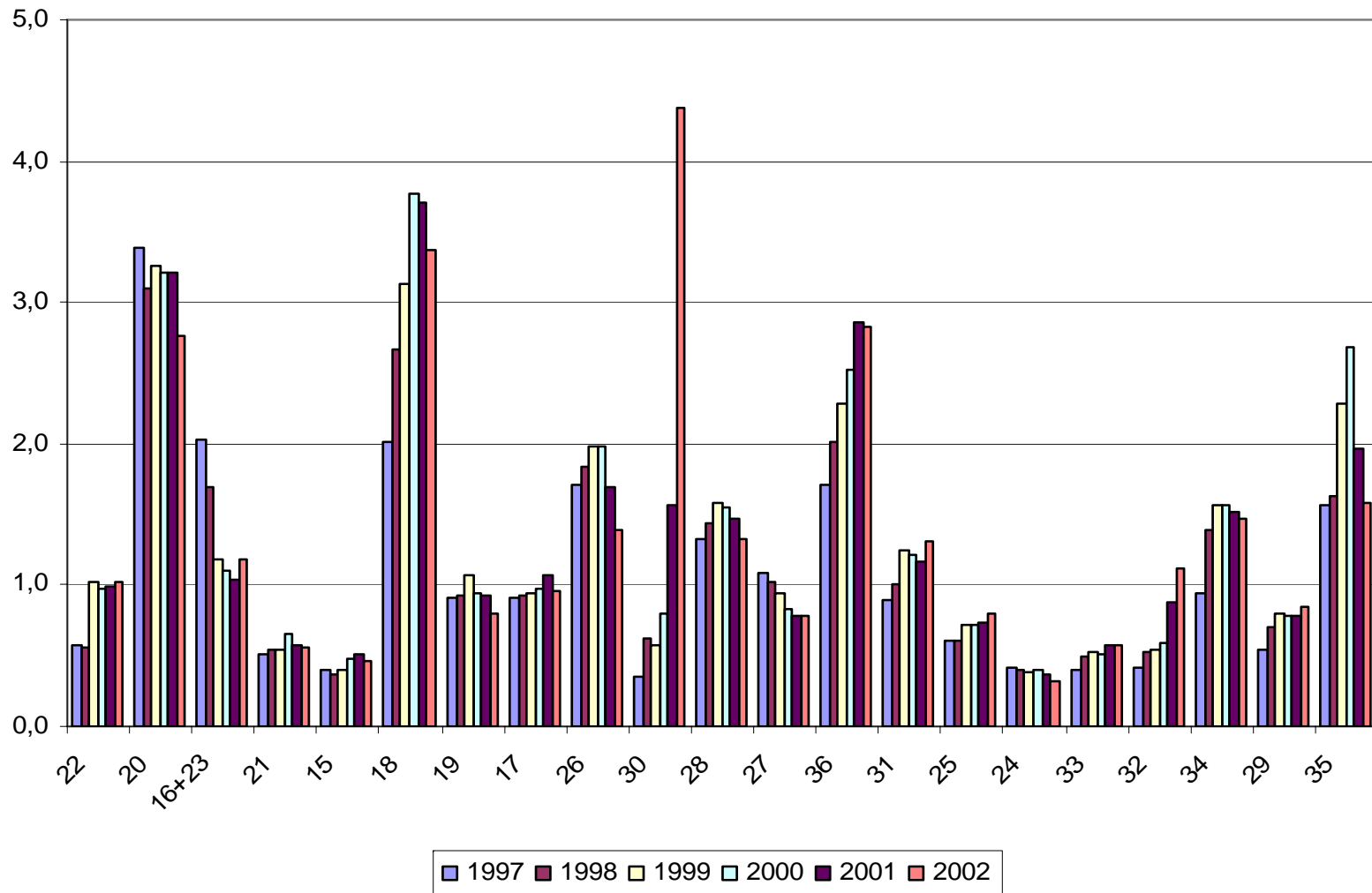
$$TCI_i^t = \frac{EXPORTS_i^t}{IMPORTS_i^t}$$

TCI, total manufacturing	1997	1998	1999	2000	2001	2002
Poland	0.57	0.59	0.63	0.74	0.80	
Czech Republic	0.78	0.91	1.00	0.99	1.01	1.07
Hungary			1.42	1.50	1.58	

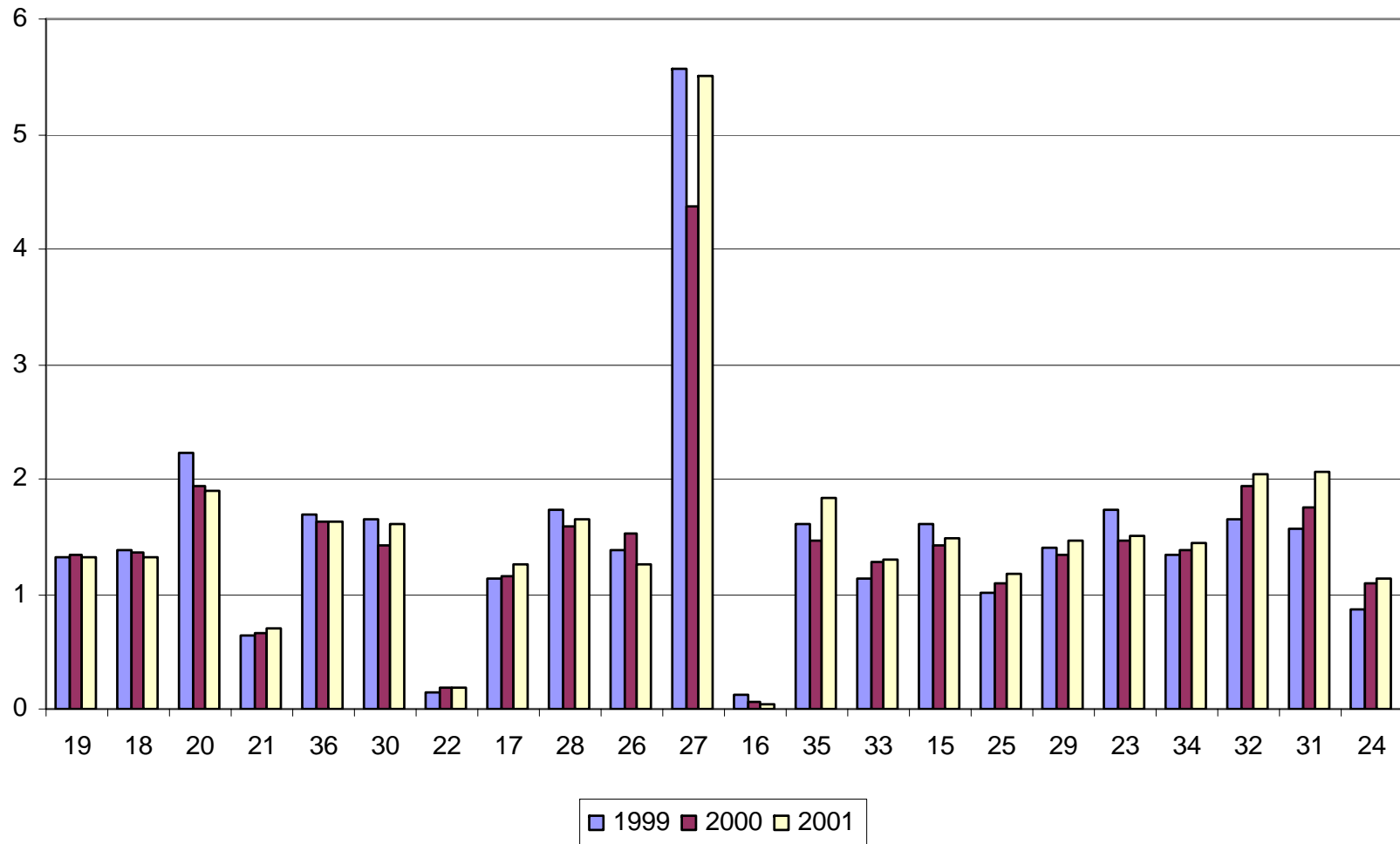
Trade Coverage Index in Poland, according to R&D intensity



Trade Coverage Index in the Czech Rep. according to R&D intensity



Trade Coverage Index in Hungary, according to R&D intensity





Main findings concerning the Trade Coverage Index:

- Poland imports more from the EU15 in most manufacturing sectors than it exports
- Positive net exports play a more important role in the Czech Republic, where high TCIs can be found in all technology sectors
- In Hungary most sectoral TCIs exceed unity and are rather evenly distributed



3.3.2. RCA-Balassa (sectoral)

Modified: Relative Export Share, revealing comparative advantage to the EU15

$$RCA_i^t = \frac{\left(\frac{x_i}{\sum_k x_{ik}} \right)}{\left(\frac{x_j}{\sum_k x_{jk}} \right)}$$

i = Accession Country

j = EU 15

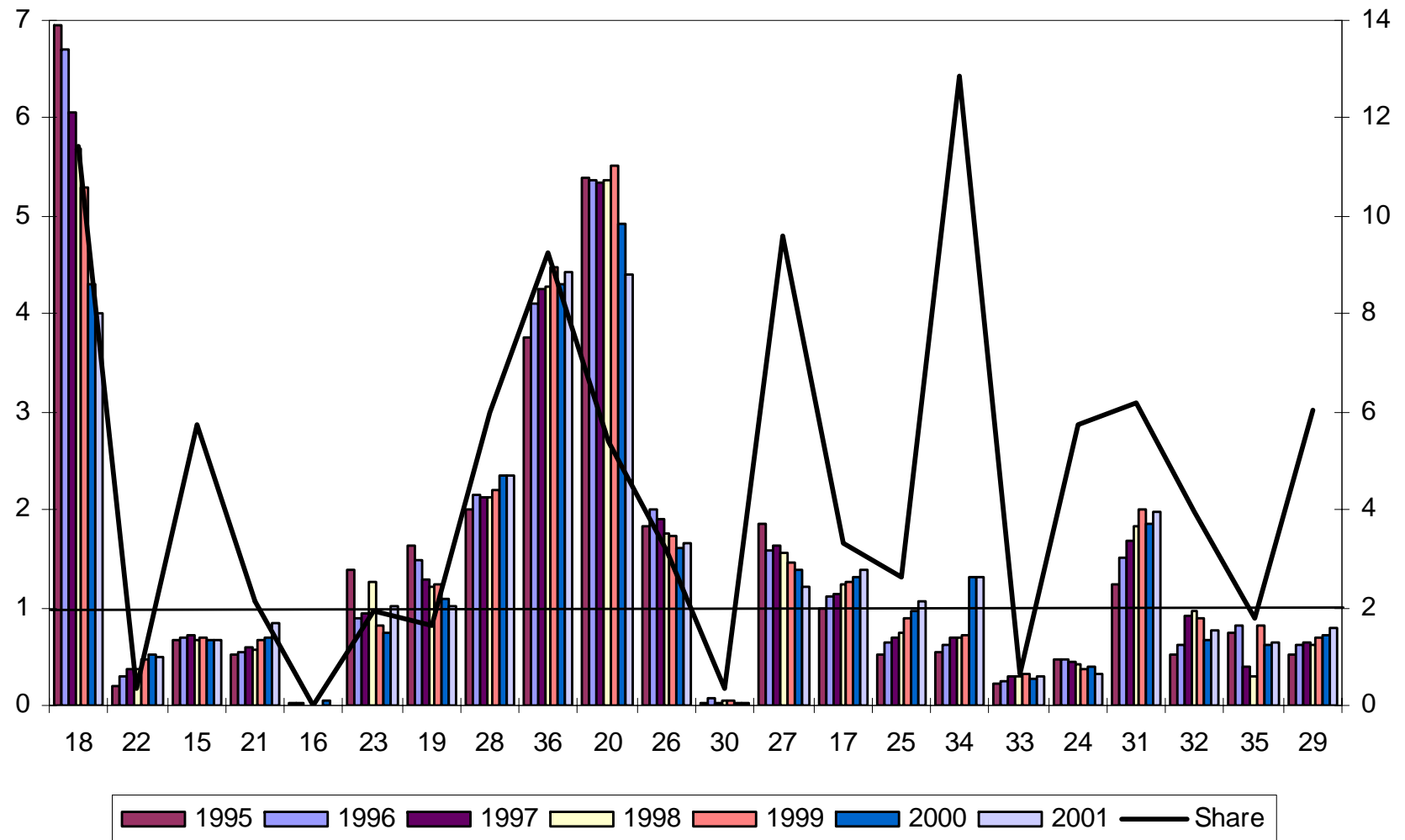
k = Number of commodities

x = Export

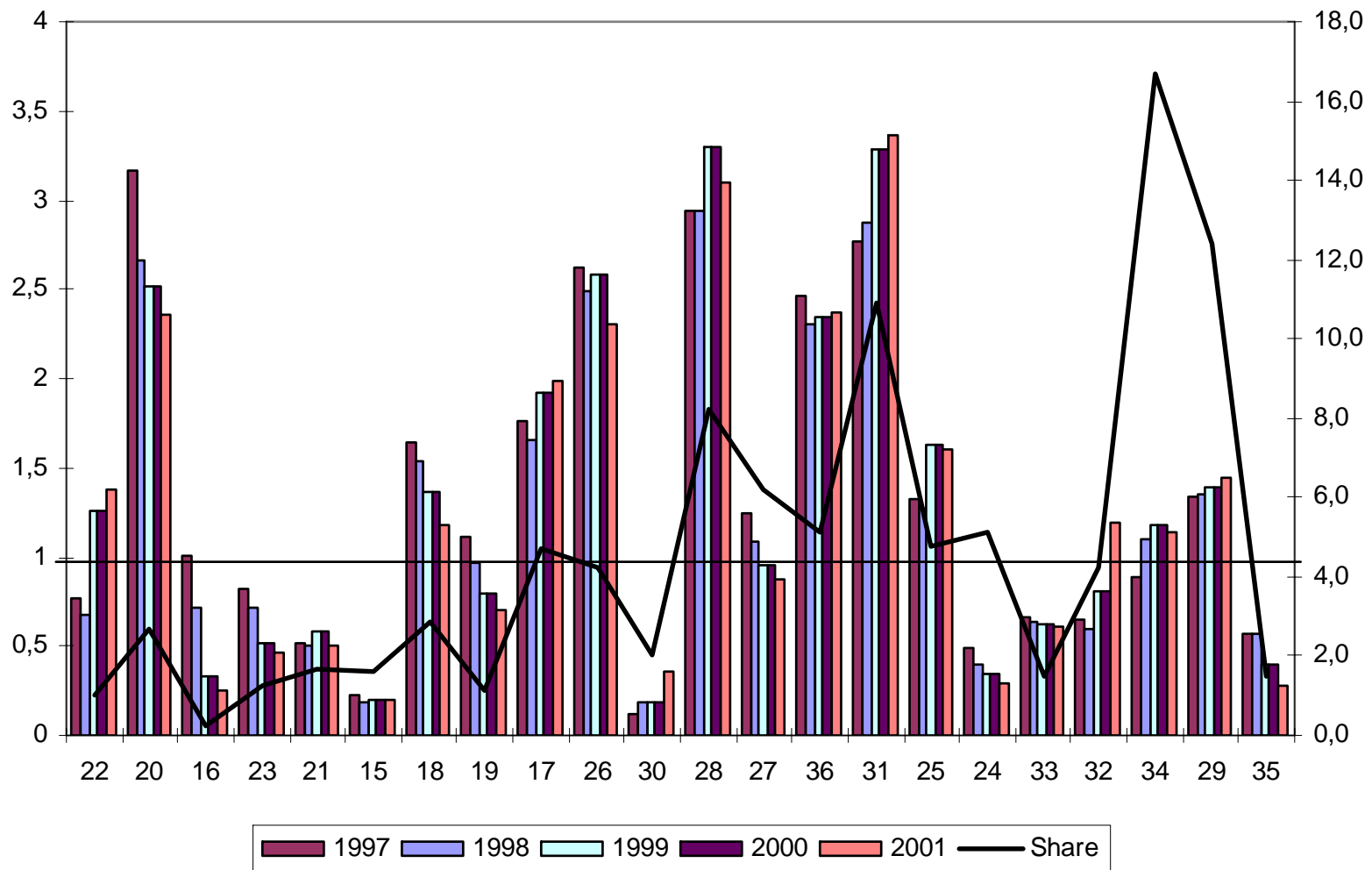
$RCA_i > 1 \Rightarrow$ Accession country has comparative advantage

$RCA_i < 1 \Rightarrow$ Accession country has comparative disadvantage

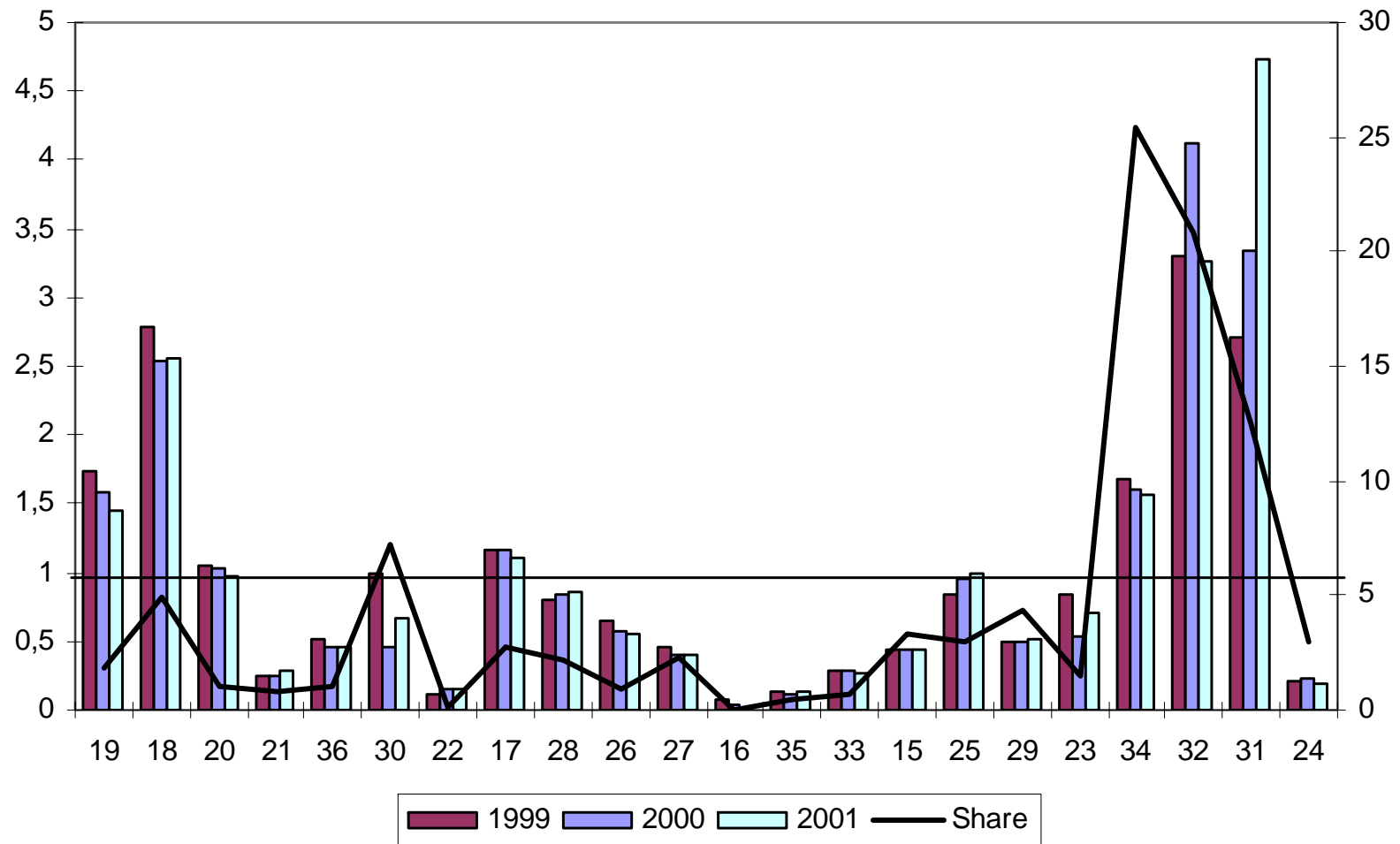
Poland, RCA of exports according to R&D intensity



Czech Republic, RCA of exports according to R&D intensity



Hungary, RCA of exports according to R&D intensity





Main findings concerning RCA-Balassa:

- Poland specializes mainly in low and some middle technology sectors
- Czech Republic gains comparative advantages in the middle and higher R&D intensive sectors
- Hungary with a strong tendency to specialize in very high – and some very low – technology intensive sectors



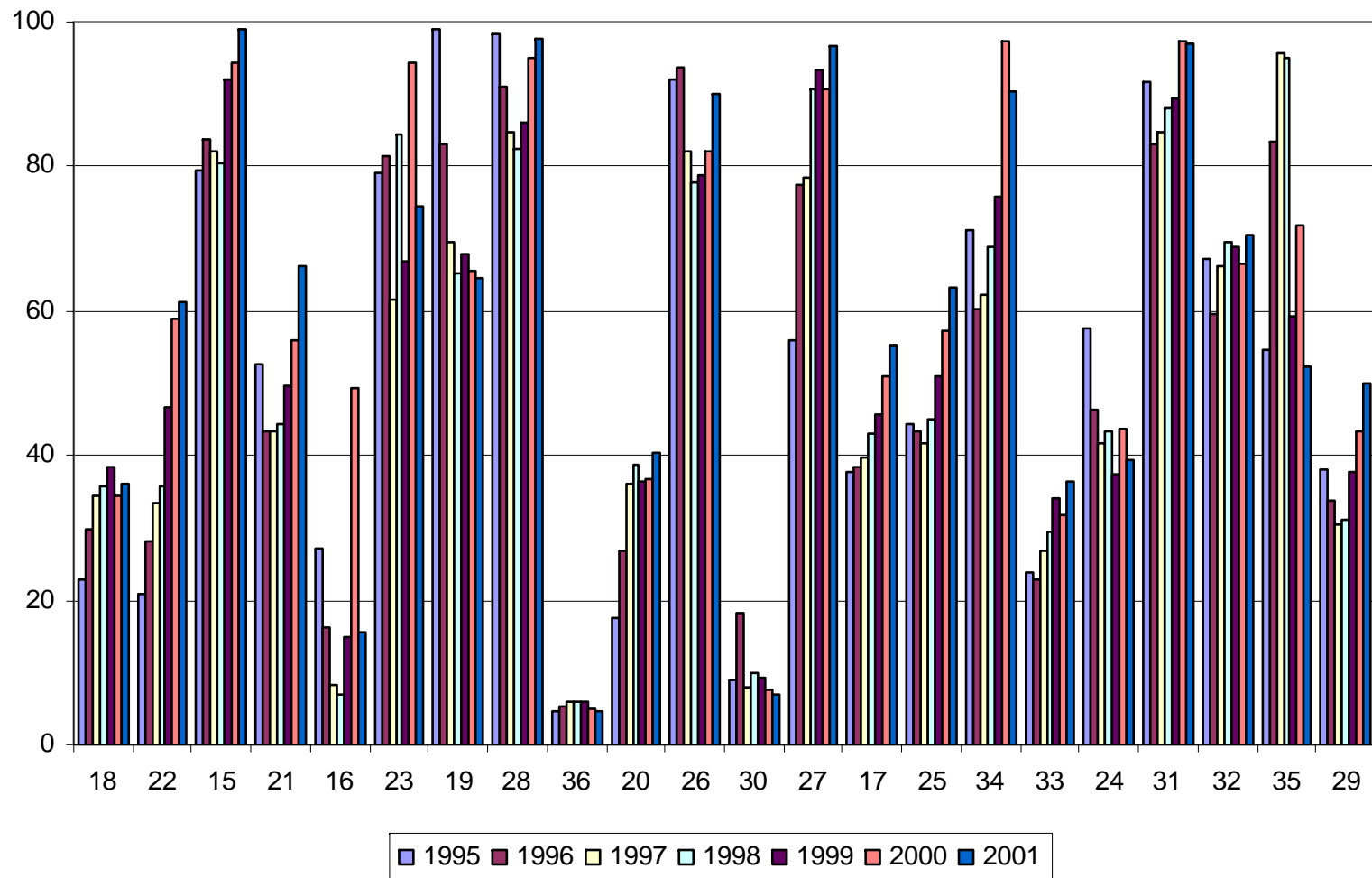
3.3.3. Grubel-Lloyd Index of Intra-Industry Trade

$$GLI_i^t = \frac{\left((X_i + M_i) - |X_i - M_i| \right)}{(X_i + M_i)} * 100$$

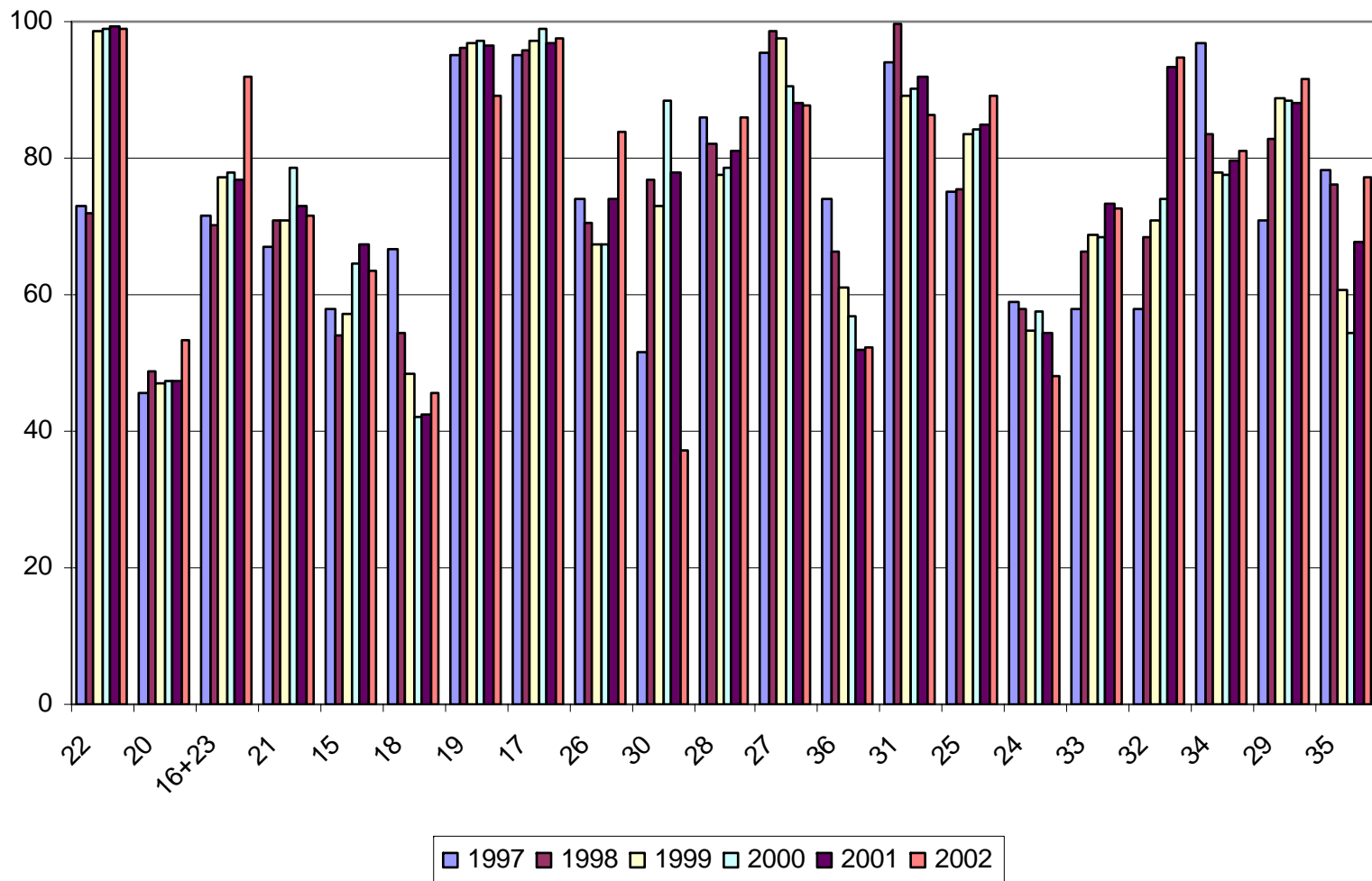
$$0 < GLI < 100$$

The higher the value of GLI, the greater the extent of intra-industry trade the greater the degree of economic integration between the CEECs and the EU15.

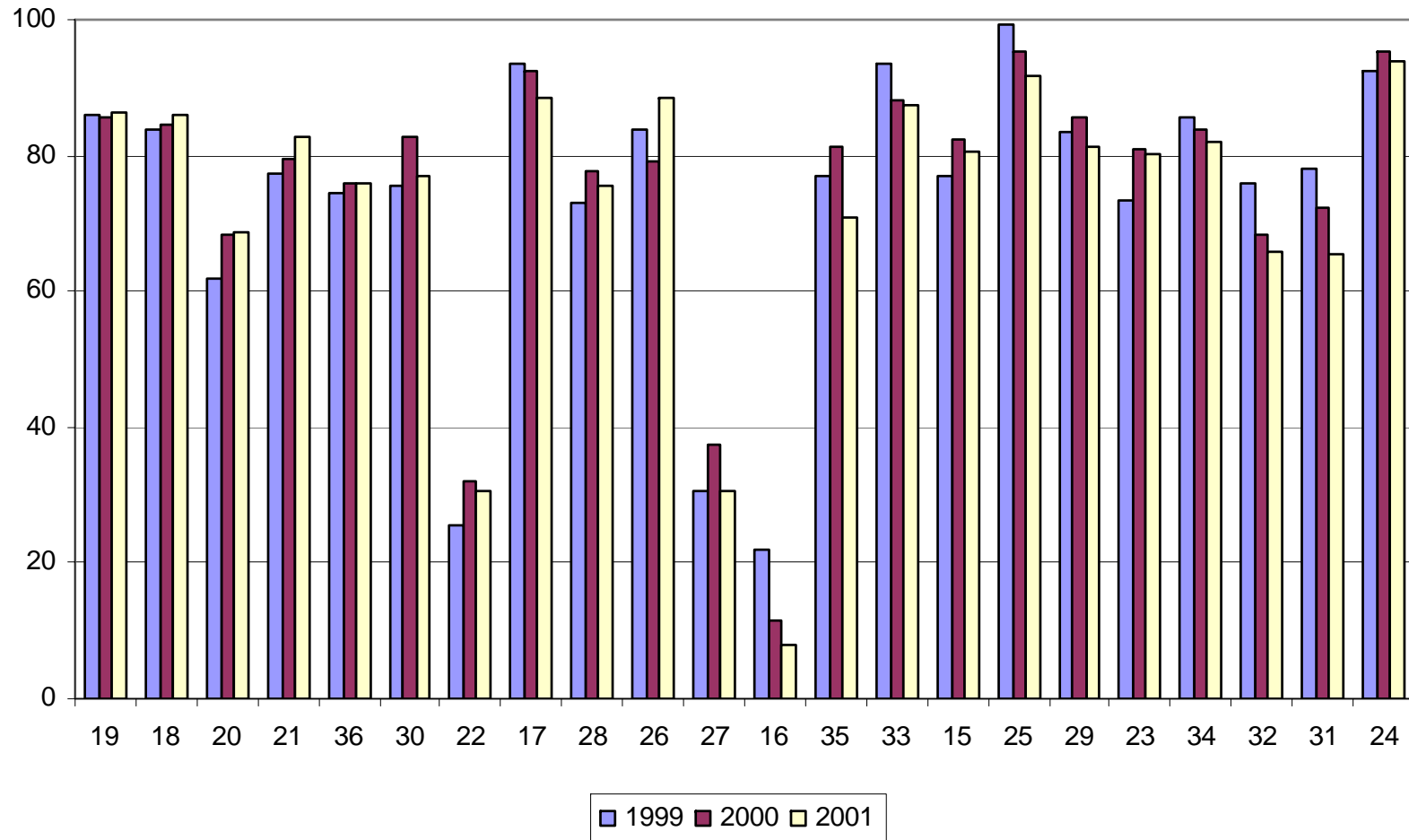
Poland, Grubel-Lloyd Index of IIT, according to R&D intensity



Czech Republic, Grubel-Lloyd Index of IIT, according to R&D intensity



Hungary, Grubel-Lloyd Index of IIT, according to R&D intensity





Main findings concerning the Grubel-Lloyd Index:

- Czech Republic and Hungary rather intensively integrated with the EU15 in most product groups
- Economic integration between Poland and the EU15 not as intensive
- For some product groups – especially in Poland and Hungary – still high potential for increasing integration



4. Conclusion

- Czech Republic shows patterns of specialization in middle and high technology product groups, Hungary mainly in high technology groups, Poland rather in low and middle technologies
- IIT is high in some product groups in all three countries, however also some groups with low integration especially in Poland and Hungary
- Specialization of Hungary and the Czech Republic also in the exportation of mature products



Plans for Future Research (Year 2)

- Del. 5.3. due May 1, 2004:
“Comparative analysis of changes in specialization within the EU market and conclusion”
- Del. 5.4. due October 1, 2004:
“Comparative analysis of 3 accession countries on potential and direction of future structural adjustment after integration with the EU and factors determining those adjustment”
- Del. 5.5. due February 1, 2005:
Publication of research results



Plans for Future Research (Year 2) continued

- Calculate the same indicators for trade performance (TCI, RCA, GLI) as in Del. 5.2. for the current EU15 members (Del. 5.3.)
- Include measures for regional specialization and geographic concentration of industries e.g. Herfindahl index, Disimilarity index, Krugman Specialization Index, Gini coefficients (Del. 5.3. and 5.4.)
- Include other variables e.g. employment, wages, patents, value added, FDI (Del. 5.3. and 5.4.)
- Using convergence measures: β - convergence
(Del. 5.4.) σ - convergence



Thank you
for
your attention!

EIIW



Nace 3-digit-level data available for Germany:

- number of firms
- number of employees
- gross wage
- turnover (foreign and domestic)
- investment
- incoming orders
- labour costs
- value added