

This paper (presented on the CASE internal seminar on May, 28 2003) summarizes the preliminary results of the research conducted within the frames of the project entitled ‘Strategies for joining the European Economic and Monetary Union: A Comparative Analysis of Possible Scenarios’.

Author: Anna Orlik

Real Convergence and Its Different Measures



Lessons to be learnt by EMU
applicant countries

Definition



Real convergence is the term describing the process or the certain tendency of the countries involved towards greater similarity or equality of real variables of the national economies discussed, while *nominal convergence* is about meeting certain criteria that refer to the nominal variables reflecting macroeconomic stability

Mechanisms of convergence

	Standard neoclassical growth model	New growth theory growth model	New geography literature
Authors	Barro, Sala-i-Martin (1991)	Romer (1986) Lucas (1988)	Krugman (1991) Ottavio and Puga (1998)
Sources of convergence	Exogenously given technical progress (as a public good)	R&D expenditures, human capital ('brain drain')	Cheap imitation of technology, trade and FDI as channels for technology spillovers

Testing for *sigma-convergence*



- *sigma-convergence* – decrease of the dispersion of real per capita income between economies considered.
- The testing for sigma-convergence is based on **standard deviation** of the cross-section series
- The alternative way is to use the **coefficient of variation** i.e. dividing the standard deviation by the mean of the sample.

Testing for *beta-convergence*

➤ We obtain what is known as *beta-convergence* by a regression analysis – the per capita income of a chosen (certain) period of time is estimated as a function of the initial level of per capita income.

$$\text{➤ } (1/T) * \log(Y_{it}/Y_{i0}) = \alpha + \beta * \log Y_{i0} + \gamma * X_{it} + u_{it}$$

where Y_{it} – real per capita income of country i at time t , Y_{i0} – initial per capita income, X_{it} – set of structural exogenous variables influencing the growth of per capita income T – time in which the dynamics of convergence is measured, u_{it} – stochastic error, α – constant term.

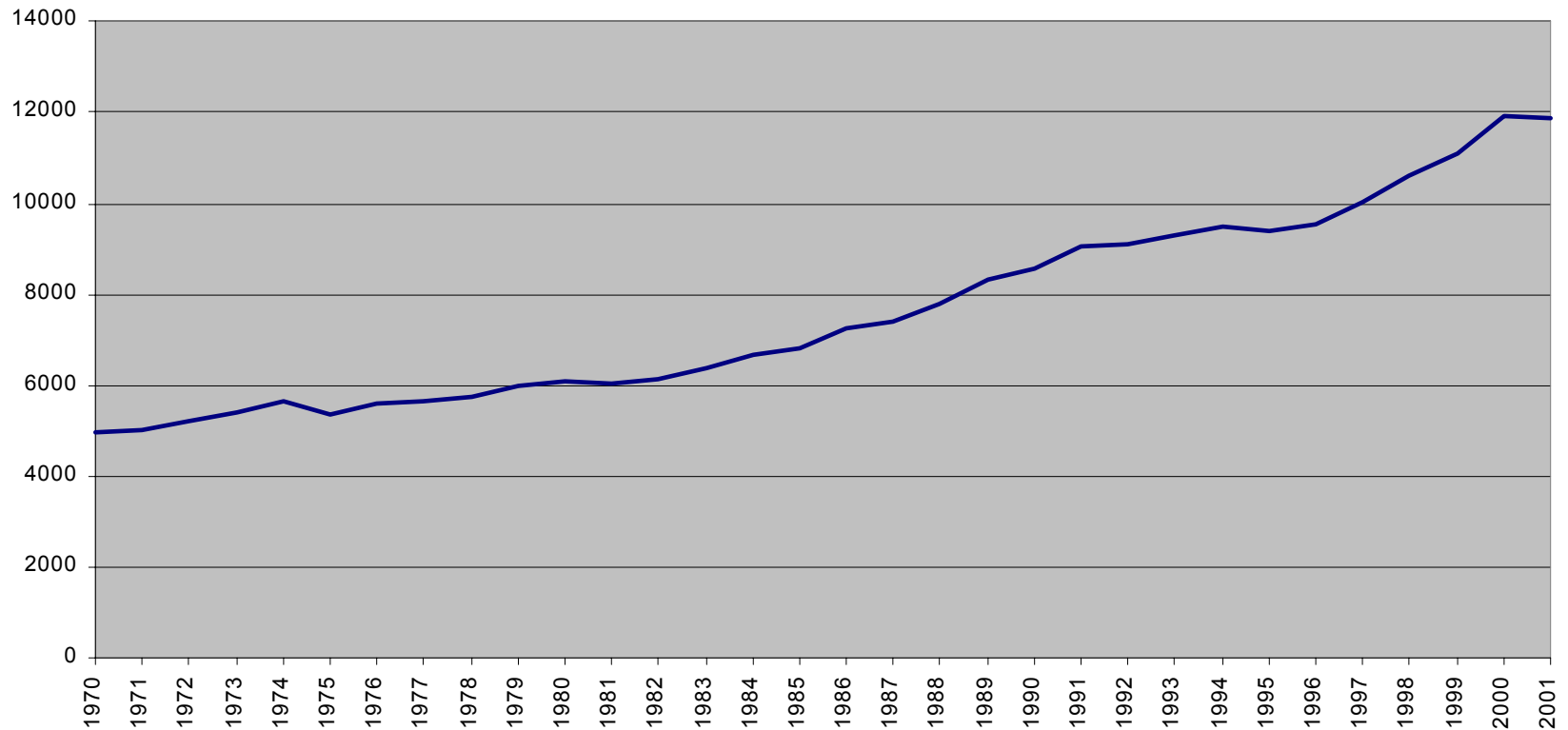
Sigma- *versus* beta-convergence



- A necessary condition for the existence of sigma-convergence is the existence of beta-convergence, not necessarily the opposite, meaning we could find the beta-convergence without finding sigma-convergence (as is the case empirically tested among EMU member states)
- The existence of beta-convergence should tend to generate sigma-convergence

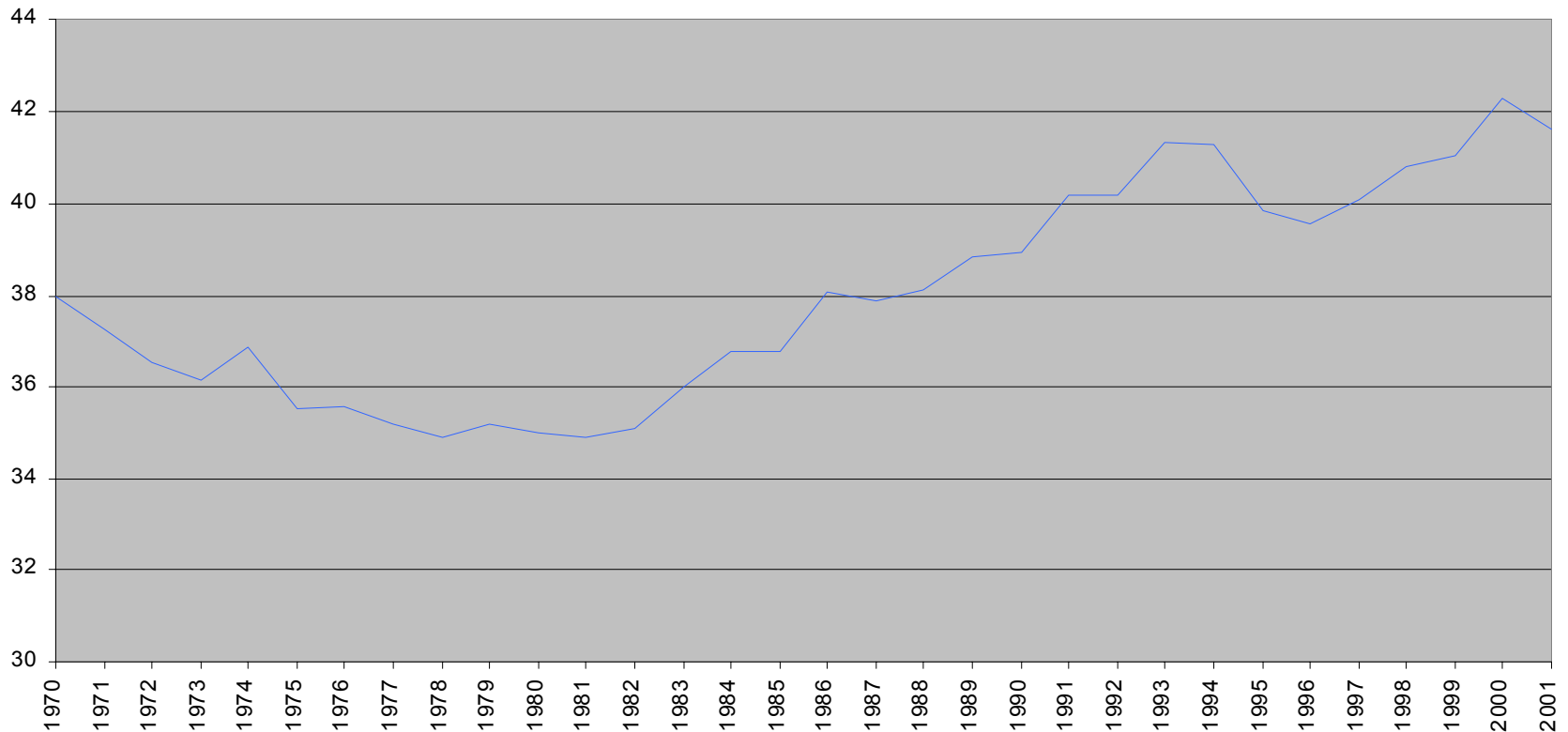
Empirical evidence – *sigma-convergence* (1)

Sigma convergence - Standard Deviation




Empirical evidence – *sigma-convergence* (2)

Sigma convergence - Coefficient of Variation




Empirical evidence – *beta-convergence* (1). GDP growth



- Very low pace of unconditional convergence for EMU member states 1970-2001: **0.44** percent per annum
- Very low pace of unconditional convergence for EMU member states 1992-2001: **0.37** percent per annum
- Pace of convergence conditional on governments' expenditures on education 1970-1999: **0.83** percent per annum
- Pace of convergence conditioned on governments' expenditures on education and FDI inflows 1970-1999: **1.4** percent per annum

Empirical evidence – *beta-convergence*

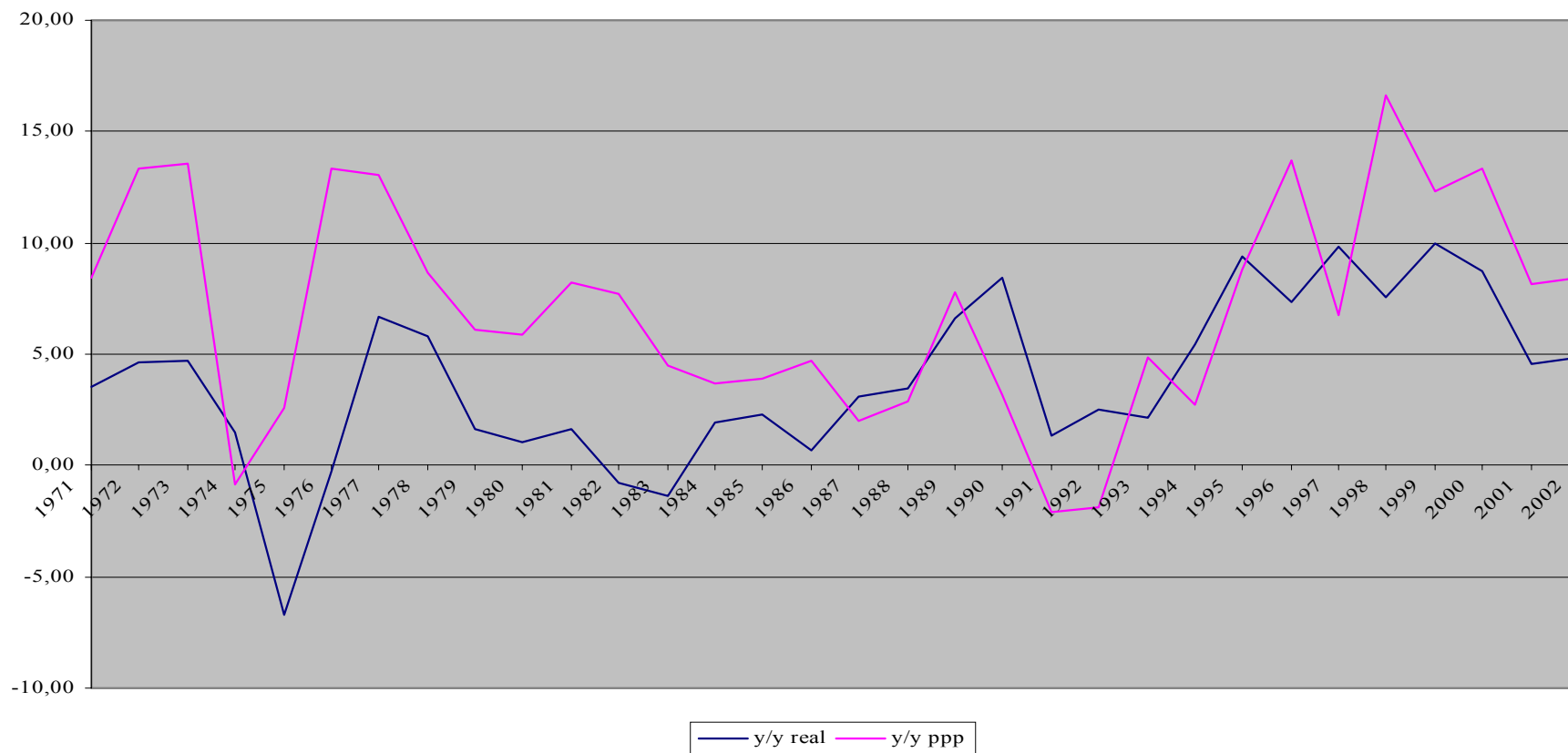
(2). Labour productivity



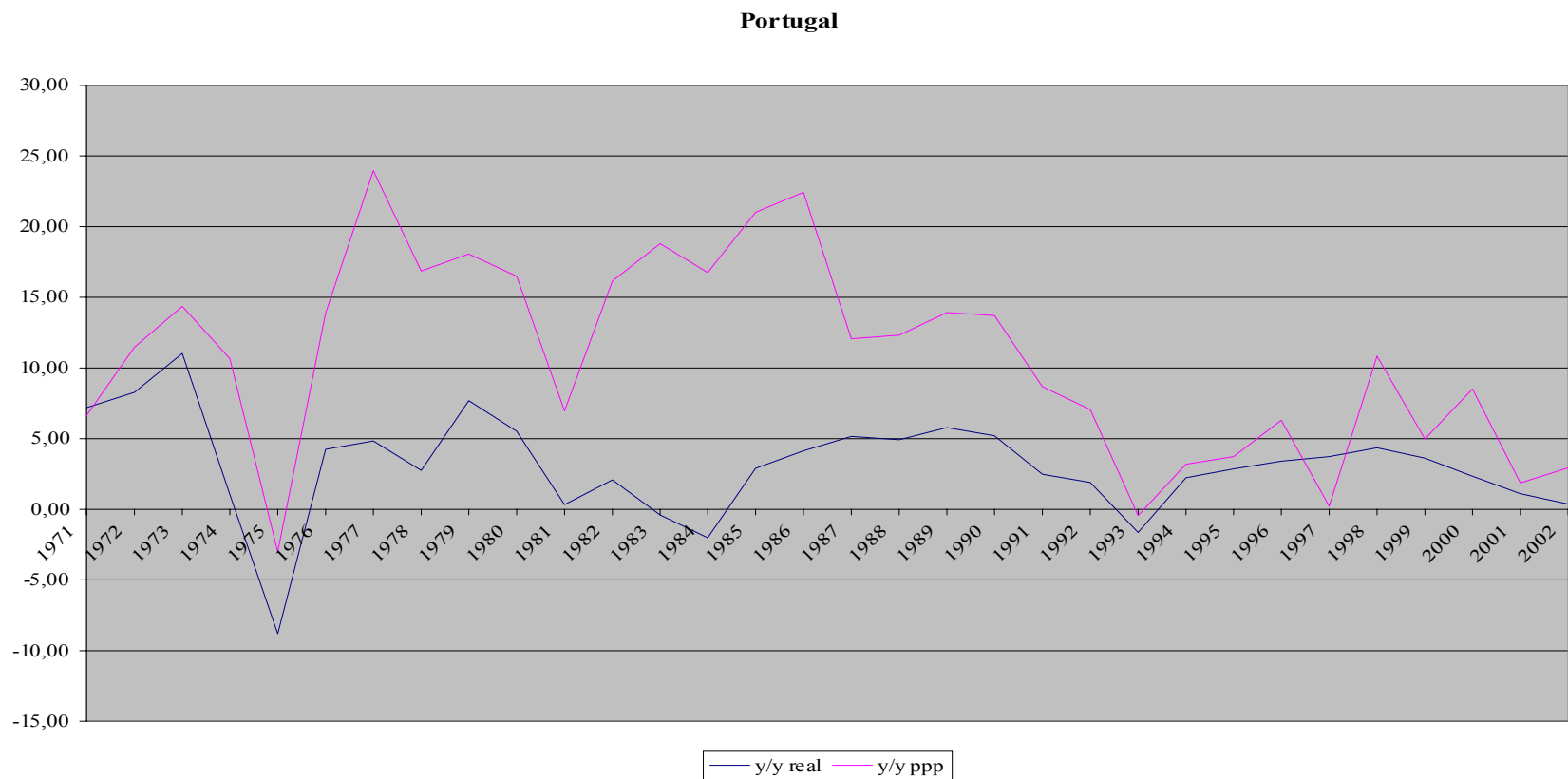
- Pace of convergence for EMU member states 1973-2002: **1.8** percent per annum

PPP convergence. Ireland

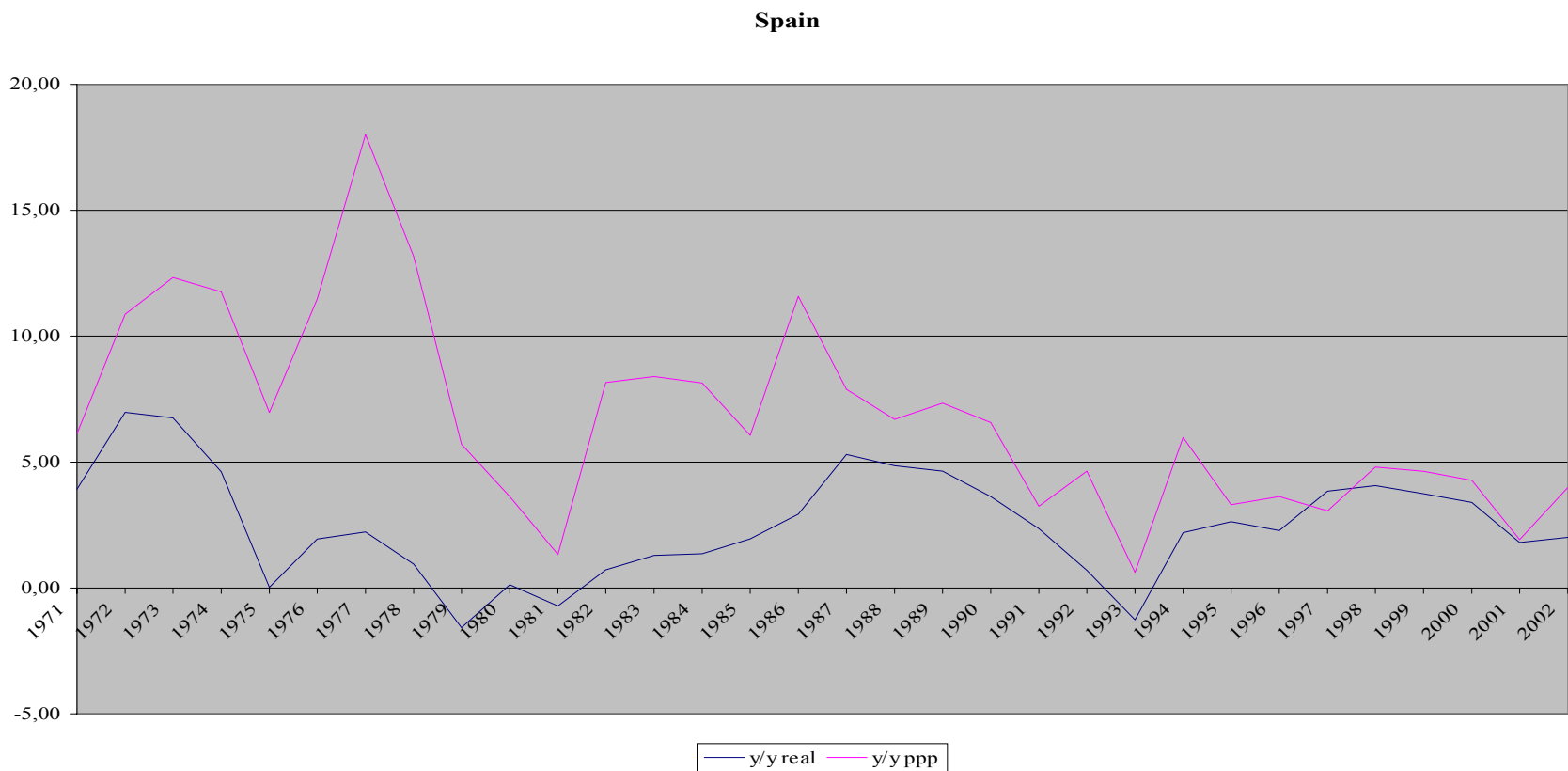
Ireland



PPP convergence. Portugal



PPP convergence. Spain



Competitiveness Indicators

	Index	best	worst
2002	GCI	2 (Finland)	39 (Italy)
	MCI	2 (Finland)	43 (Greece)
2001	GCI	1 (Finland)	26 (Italy)
	MCI	1 (Finland)	46 (Greece)

Note: GCI – Growth Competitiveness Index; MCI – Microeconomic Competitiveness Index.

Source: Global Competitiveness Report 2001, 2002. World Economic Forum.

Conclusions



- **Convergence is not a rule.** It is conditional depending on the ability of the economies to become more competitive. The main sources of competitiveness are to be found in technical progress, innovation ability, capital accumulation and human capital formation.

Conclusions



- Countries with the initially lower per capita income tend to **grow faster**, thus experiencing **real appreciation** of their currencies. The empirical results, however, are less than conclusive...

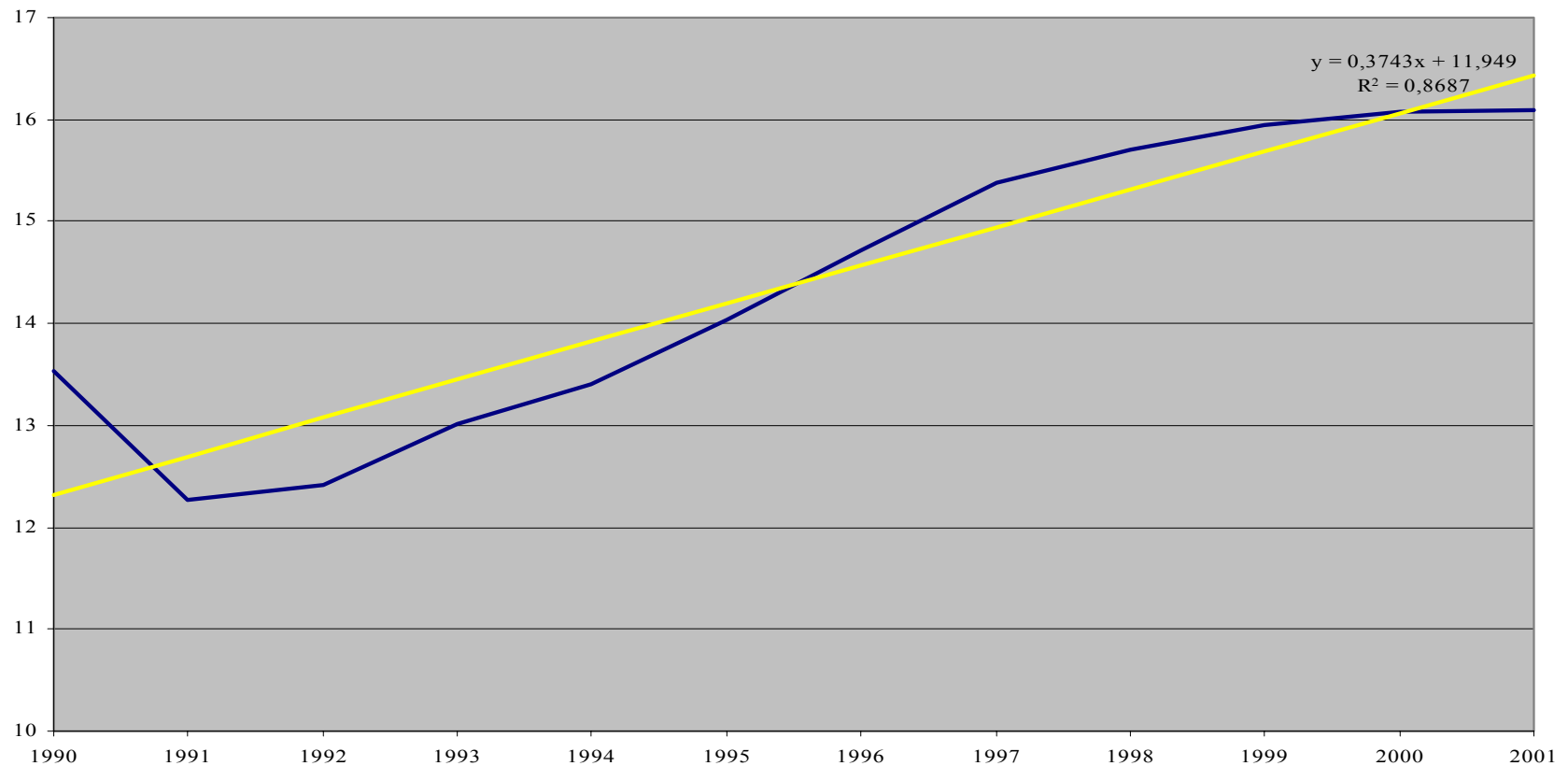
Selected empirical studies on the Balassa-Samuelson effect in Central and Eastern European economies

Study author(s) Country sample	Estimate of the Balassa-Samuelson effect*
Simon and Kovacs (1998) Hungary (1991-96)	2.9
De Broeck and Slok (2001) 25 transition economies (1993-2001, quarterly)	0.2-0.6
Fischer (2002) 10 accession candidates (1993-1999)	0.7-2.2

* effect on REER, percentage points per annum

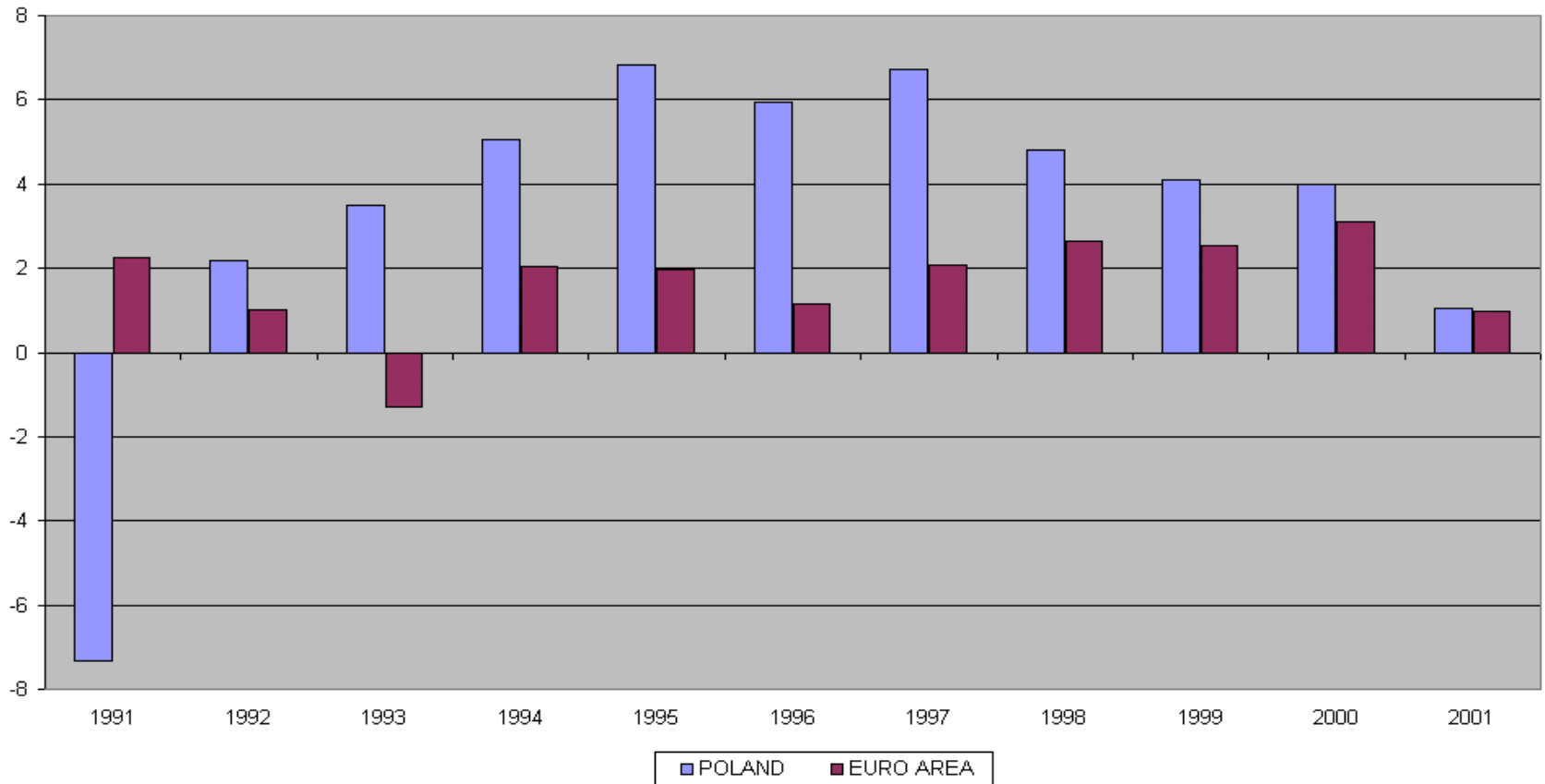
Poland. Per capita GDP convergence to EMU

Poland. Growth convergence (EMU=100)



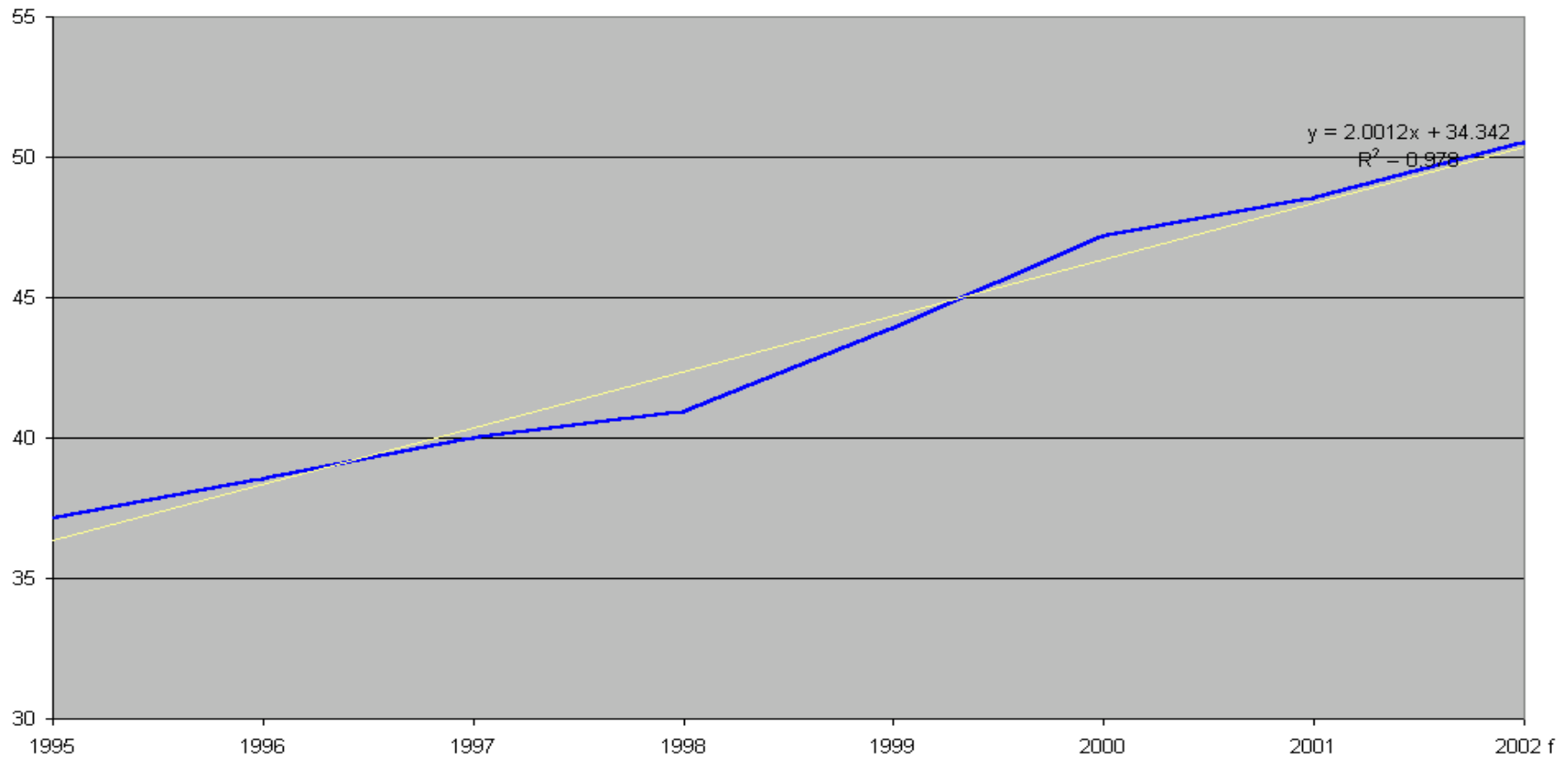
Poland. Per capita GDP growth convergence to EMU

Per capita real GDP growth convergence



Poland. Labour productivity convergence to EU

Convergence of Labour Productivity. Poland (EU=100)



Poland. Labour productivity convergence to EMU

Convergence of Labour Productivity. Poland (EMU=100)

