How can we explain lower GDP per capita in the New Member States of EU?

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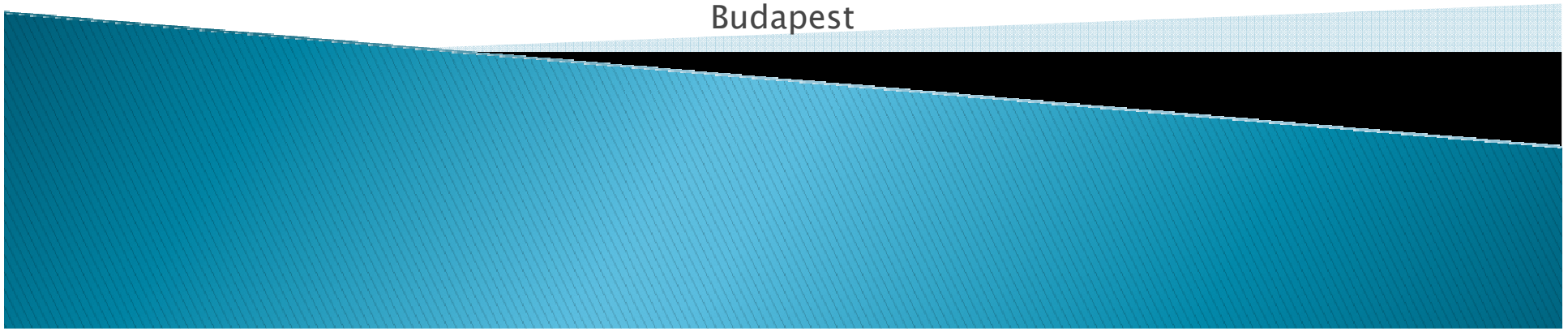
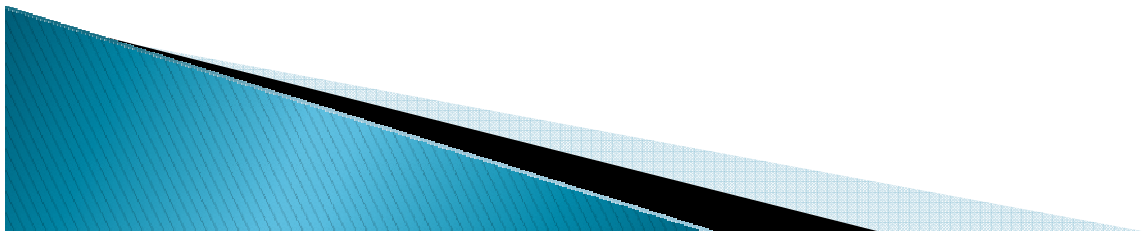


Structure of the presentation

- Motivation
- Methodology
- Results
- Concluding remarks



Motivation

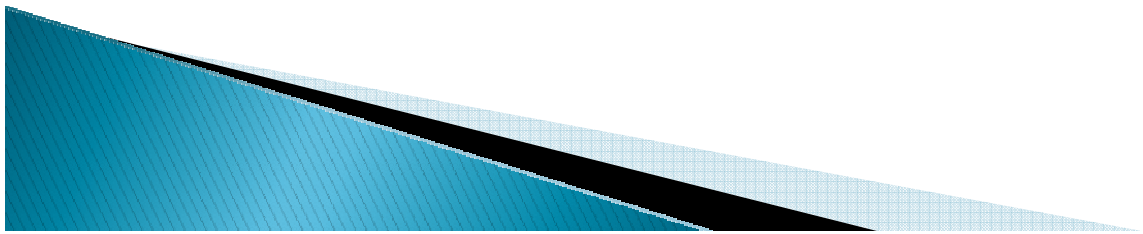
Why do some countries produce so much more output per worker than others?

(Hall-Jones,1999)

Why are some countries so rich and others so poor?

(Weil, 2009)

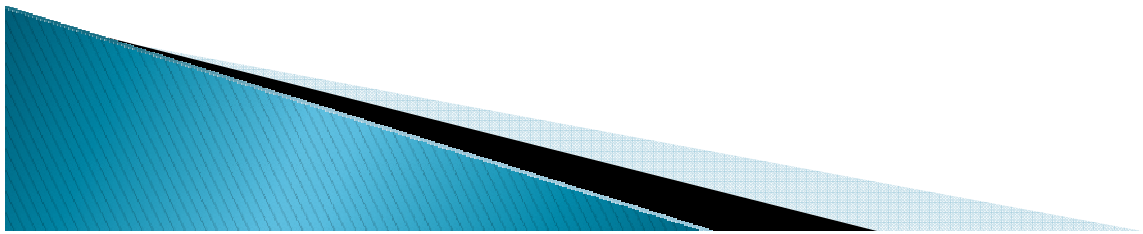
Huge differences in their *levels* of income and
In the *growth rates* of income.



- In 1988 output per worker in the United States was more than 35 times higher than output per worker in Niger (Hall–Jones, 1999)

- The key role played by **productivity**
  - capital intensity – factor of 1.5
  - education – factor of 3.1
  - **productivity** – favtor of **7.7**

- Differences in all of them **fundamentally** related to **social infrastructure** (institutions and government)



6,7 billion people – exist under a vast range of economic circumstances

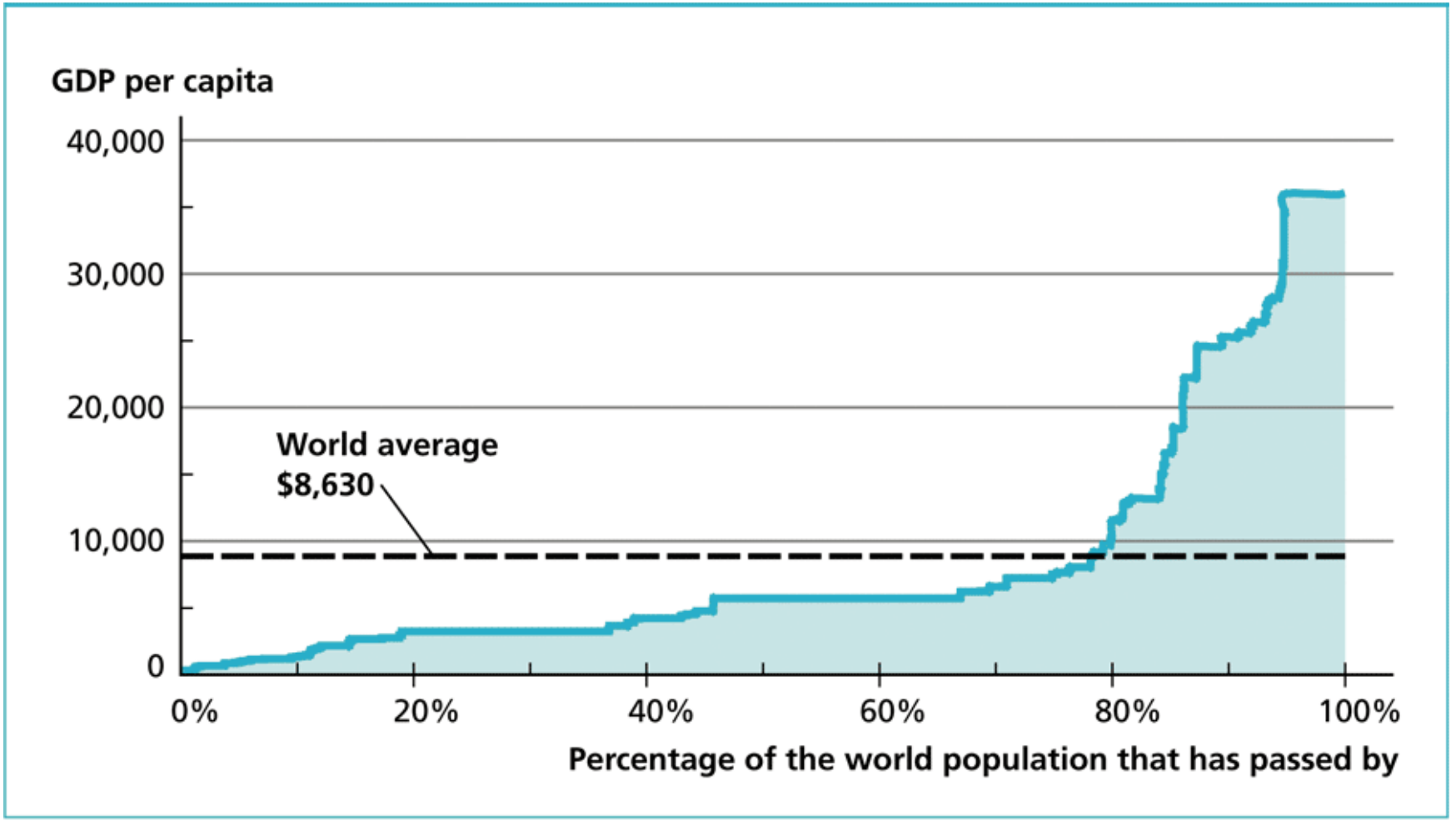
Developing countries

- 886 million people – not enough food to eat
- 1 billion people – no access to safe drinking water
- 2,7 billion people – no access to sanitation

Developed countries

- at the other extreme – diseases caused by too much food consumption in industrialized countries – one of a major health problem

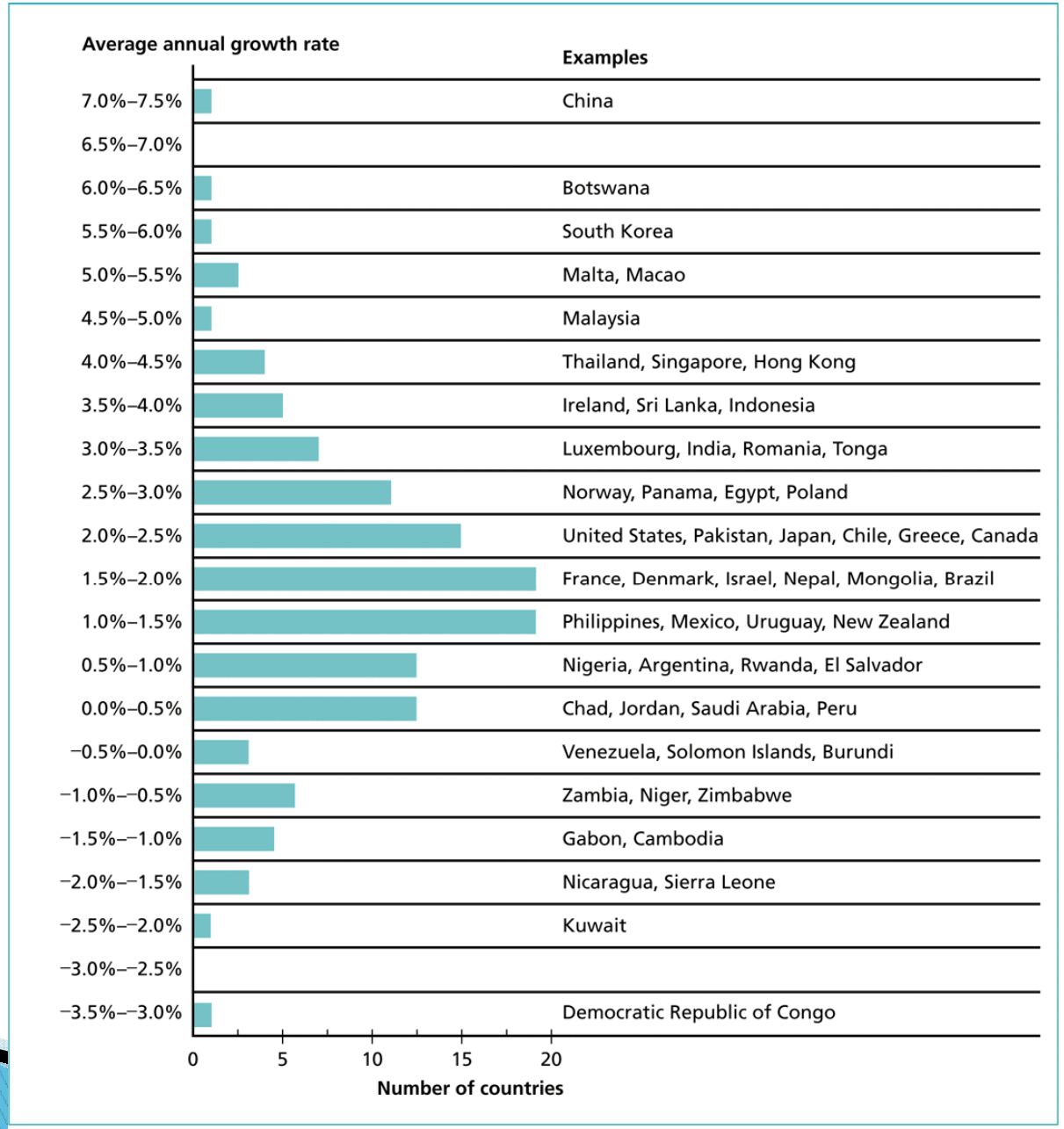
(Weil, 2009)



Sources: Heston, Summers, and Aten (2006) World Bank (2007a).

US / Slovakia 3:1, Slovakia / Morocco 3:1, Morocco / Benin 3:1

The Distribution of Growth Rates, 1970–2005



Sources: Heston, Summers, and Aten (2006), World Bank (2007a).

European Union

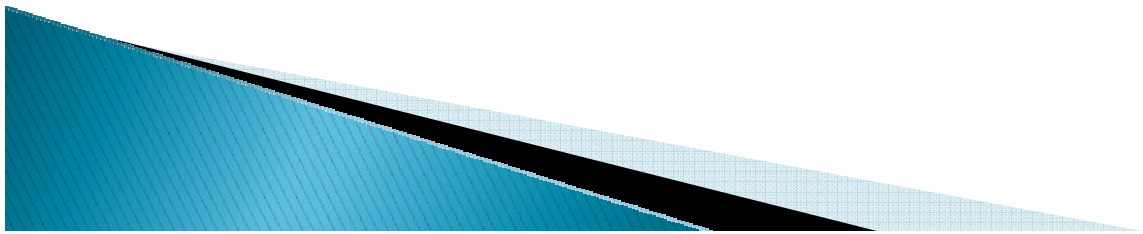
- GDP per capita in Netherlands – 3 times higher than in Bulgaria
- Average growth 1999 – 2007 in Lithuania 4,8 % and in Italy 0,68 %
- Hourly costs of labor – 5 times higher in UK comparing to Romania

Our research question

To quantify the effect of differences in **productivity** on differences in GDP per capita in New Member States of EU.

To decompose the differences into the contribution of **technology** and **efficiency.**

Firm-size structure vs. **productivity**



Methodology

Structural decomposition of Cobb-Douglas production function into the contribution of particular factors of production

$$Y = A(uK)^{\alpha}(hvL)^{1-\alpha}$$

$$A = T \times E$$

Y – output
A – total factor productivity
u – capacity utilization
K – capital
h – human capital per worker
v – average number of hours worked
L – number of emploees
alfa – elasticity coefficient

A – total factor productivity
T – technology
E - efficiency

GDP per capita and its determinants in 2009

	Output per capita (*y*)	TFP (*A*)	Capital per capita (*K/N*)	Capacity utilization (*u*)	Employment rate (*L/N*)	Hours worked (*v*)	Human capital (*h*)
NETHERLANDS	**100,0**	**118,4**	**100,0**	**75,9%**	**52,4%**	**1 378**	**5,12**
Bulgaria	31,1	63,8	34,9	64,0%	49,0%	1 655	3,97
Czech Republic	61,7	71,3	84,6	77,2%	50,0%	1 889	4,46
Estonia	44,8	63,6	57,9	58,1%	43,2%	1 831	5,72
Cyprus	69,4	78,2	62,1	66,3%	49,3%	1 836	6,41
Latvia	38,0	59,3	46,9	53,6%	43,3%	1 949	5,49
Lithuania	42,7	68,6	42,7	61,3%	42,2%	1 863	5,49
Hungary	46,1	63,8	55,5	72,1%	39,9%	1 968	5,41
Malta	62,8	86,8	69,4	70,1%	39,5%	1 832	5,22
Poland	46,9	71,4	41,9	70,9%	41,4%	2 024	5,20
Romania	28,2	61,0	33,2	72,1%	42,8%	1 882	3,51
Slovenia	69,3	80,4	79,5	70,9%	47,7%	1 684	5,68
Slovakia	52,7	100,8	59,0	54,0%	40,4%	1 694	4,24
EU12 AVERAGE	**49,5**	**72,4**	**55,7**	**65,9%**	**44,1%**	**1 842**	**5,07**

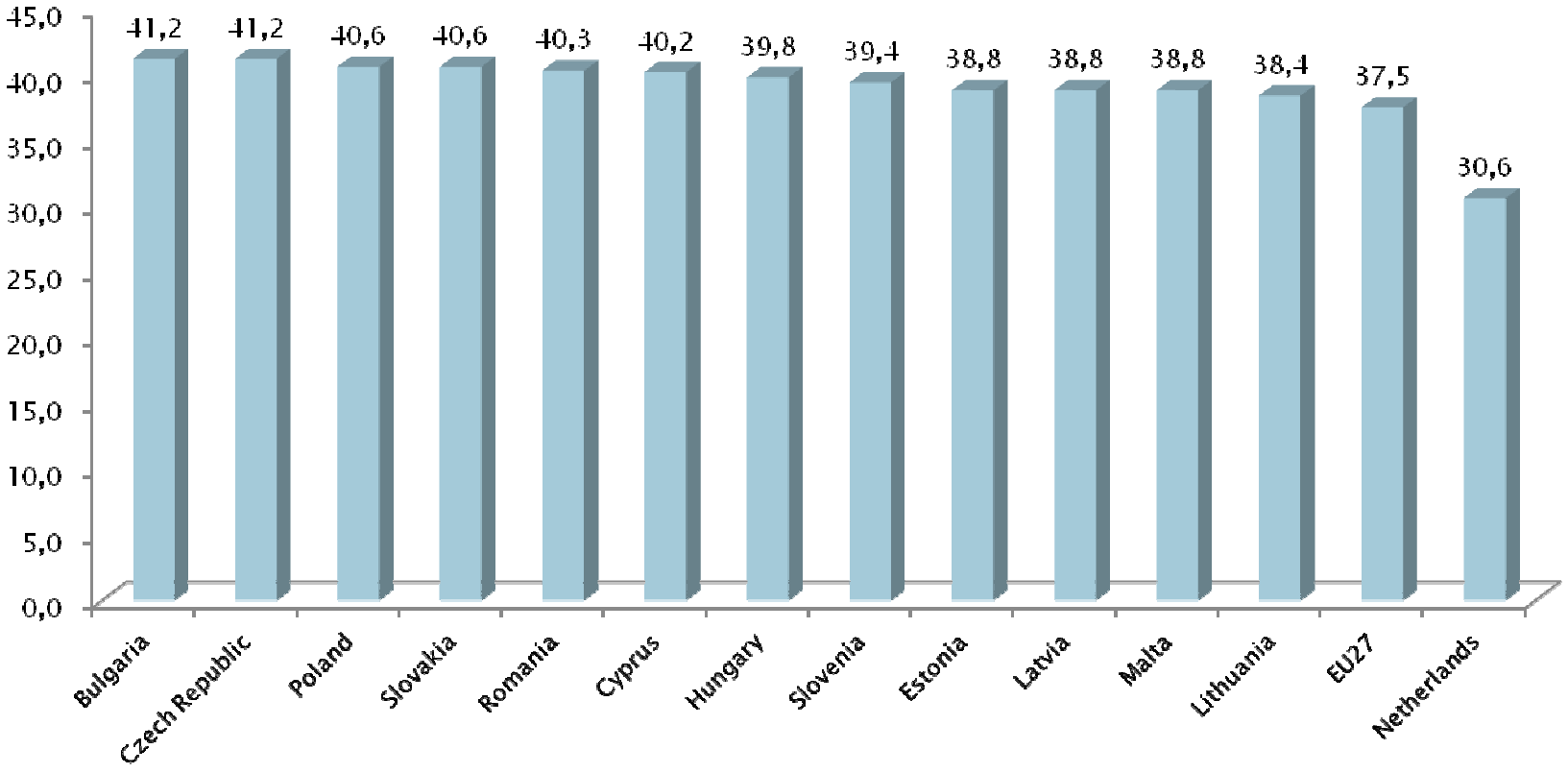
Source: Author´s comuputations, $(K/N)_{NL}=100$.

Contribution of particular determinants to the differences in output per capita between New Member States of EU and Netherlands

	Difference in y with respect to NL	Contri. of TFP (D_A)	Contribution of capital ($D_{K/N}$)	Contribution of capacity utilization (D_u)	Contribution of employment rate ($D_{L/N}$)	Contribution of hours worked(D_v)	Contribution of human capital (D_h)
Bulgaria	-68,9%	-36,5%	-23,6%	-3,8%	-2,5%	6,7%	-9,4%
Czech Republic	-38,3%	-40,2%	-5,2%	0,5%	-2,3%	15,5%	-6,9%
Estonia	-55,2%	-42,8%	-14,3%	-6,9%	-8,2%	12,1%	4,8%
Cyprus	-30,6%	-34,8%	-15,3%	-4,3%	-3,1%	14,9%	11,7%
Latvia	-62,0%	-44,3%	-18,5%	-8,4%	-7,6%	13,8%	2,8%
Lithuania	-57,3%	-36,8%	-21,8%	-5,4%	-9,0%	12,6%	2,9%
Hungary	-53,9%	-43,0%	-15,6%	-1,4%	-11,8%	15,4%	2,4%
Malta	-37,2%	-24,8%	-11,2%	-2,4%	-14,0%	14,1%	1,0%
Poland	-53,1%	-35,5%	-23,2%	-1,8%	-10,2%	16,8%	0,7%
Romania	-71,8%	-37,6%	-23,7%	-1,1%	-7,1%	11,0%	-13,3%
Slovenia	-30,7%	-32,4%	-7,4%	-2,2%	-4,8%	10,4%	5,4%
Slovakia	-47,3%	-11,9%	-14,9%	-9,5%	-12,0%	9,5%	-8,7%
EU12 AVERAGE	**-50,5%**	**-35,0%**	**-16,2%**	**-3,9%**	**-7,7%**	**12,7%**	**-0,6%**

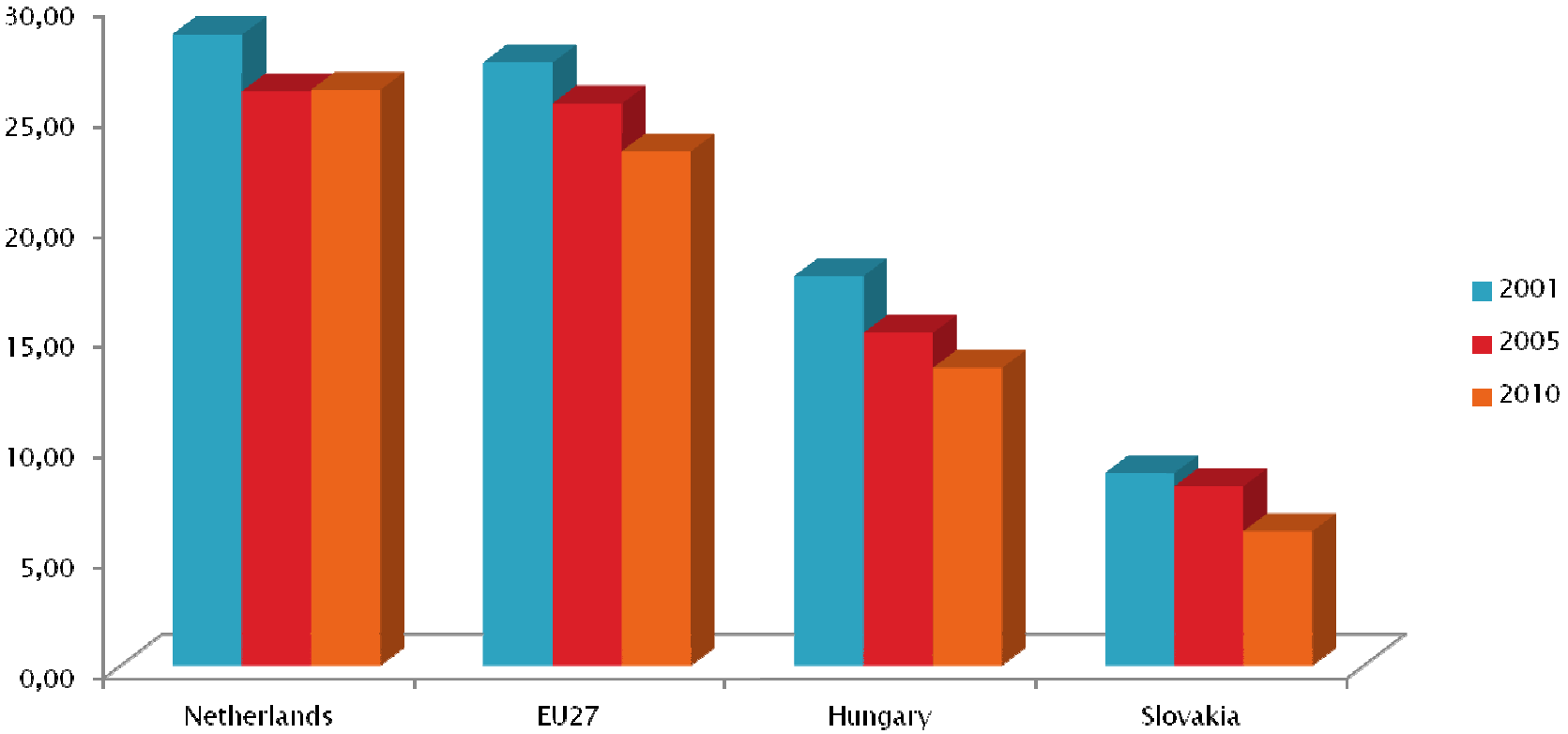
Source: Author´s comuputations.

Average number of weekly hours worked



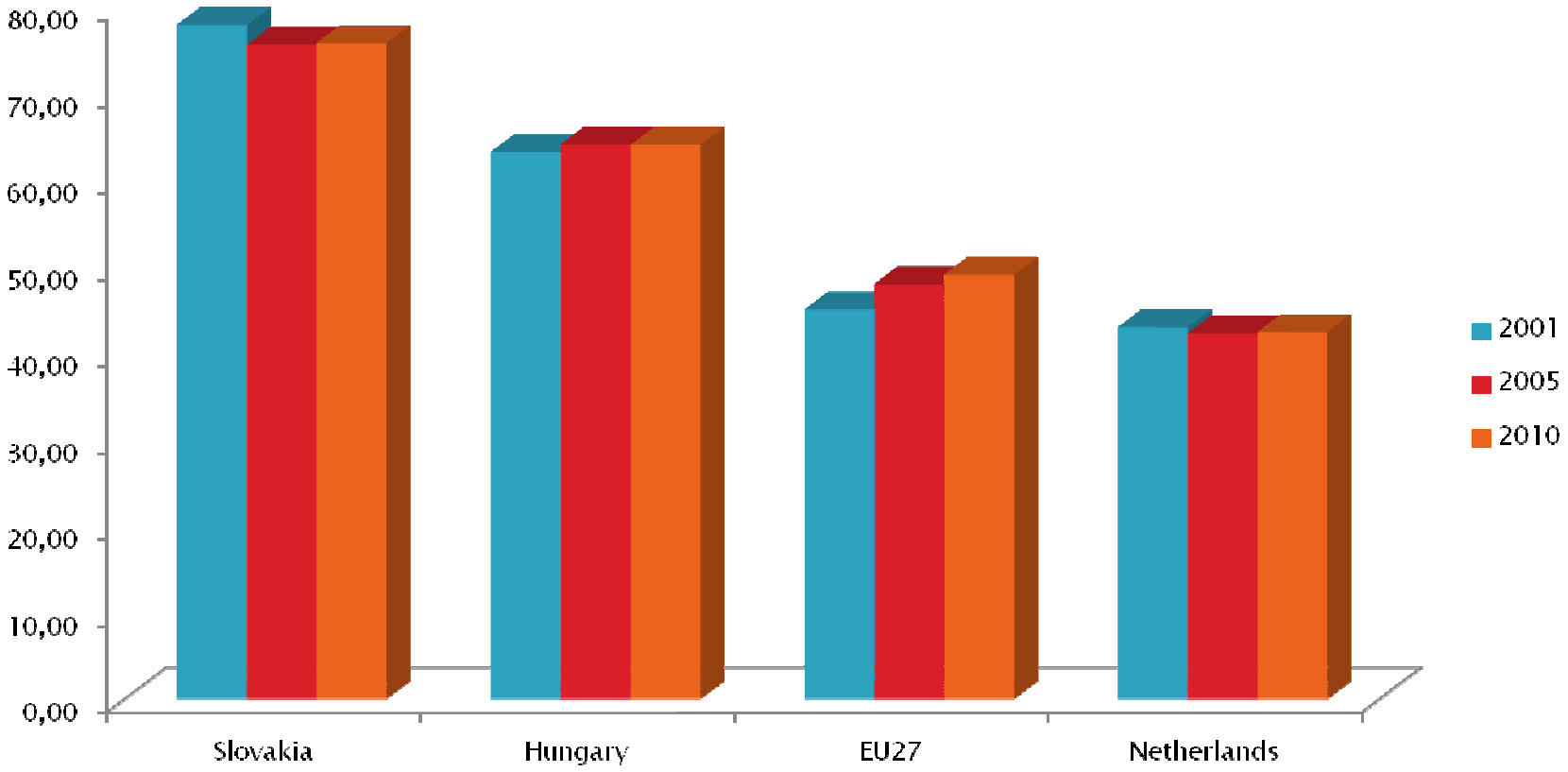
Source: Eurostat Database

Active population by highest level of education attained (ISCED 0-2)



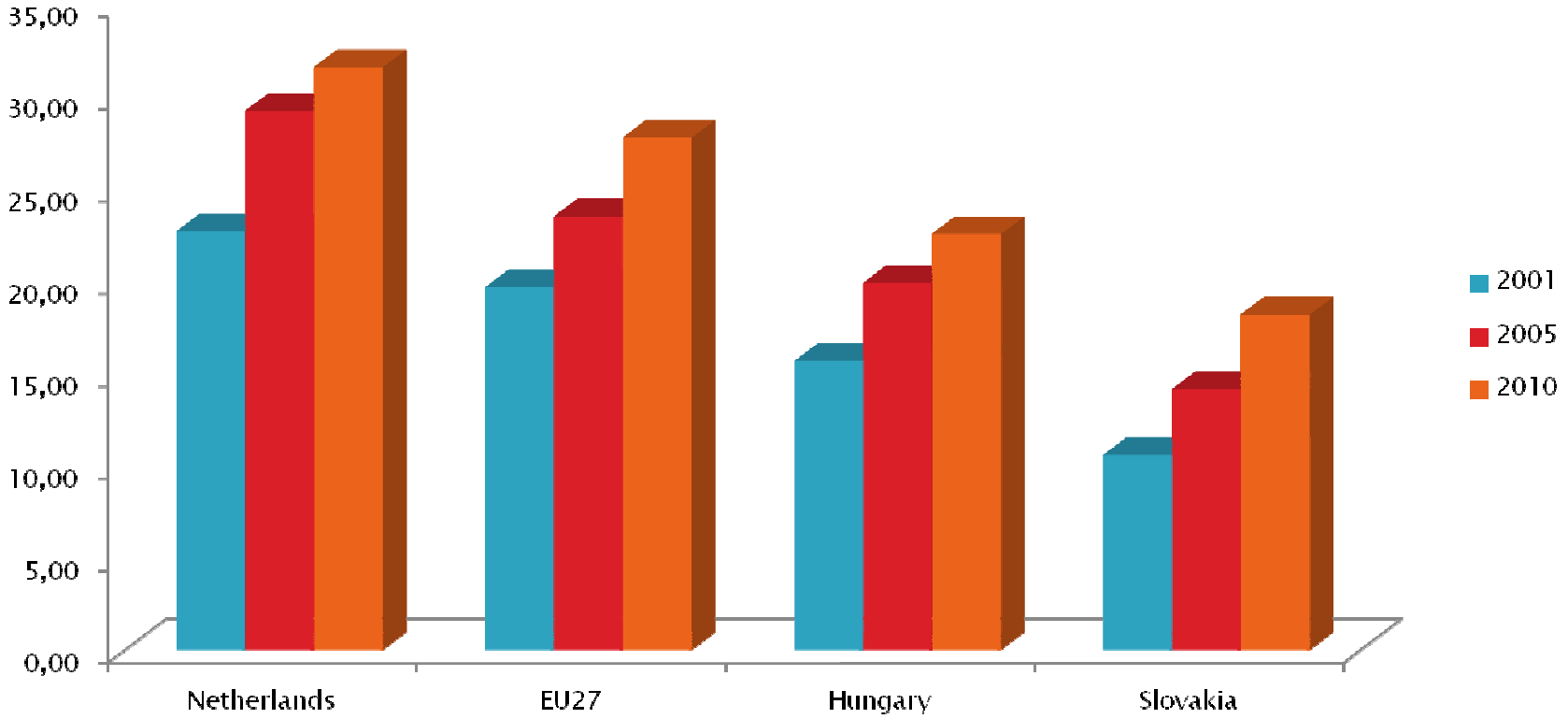
Source: Eurostat Database

Active population by highest level of education attained (ISCED 3-4)



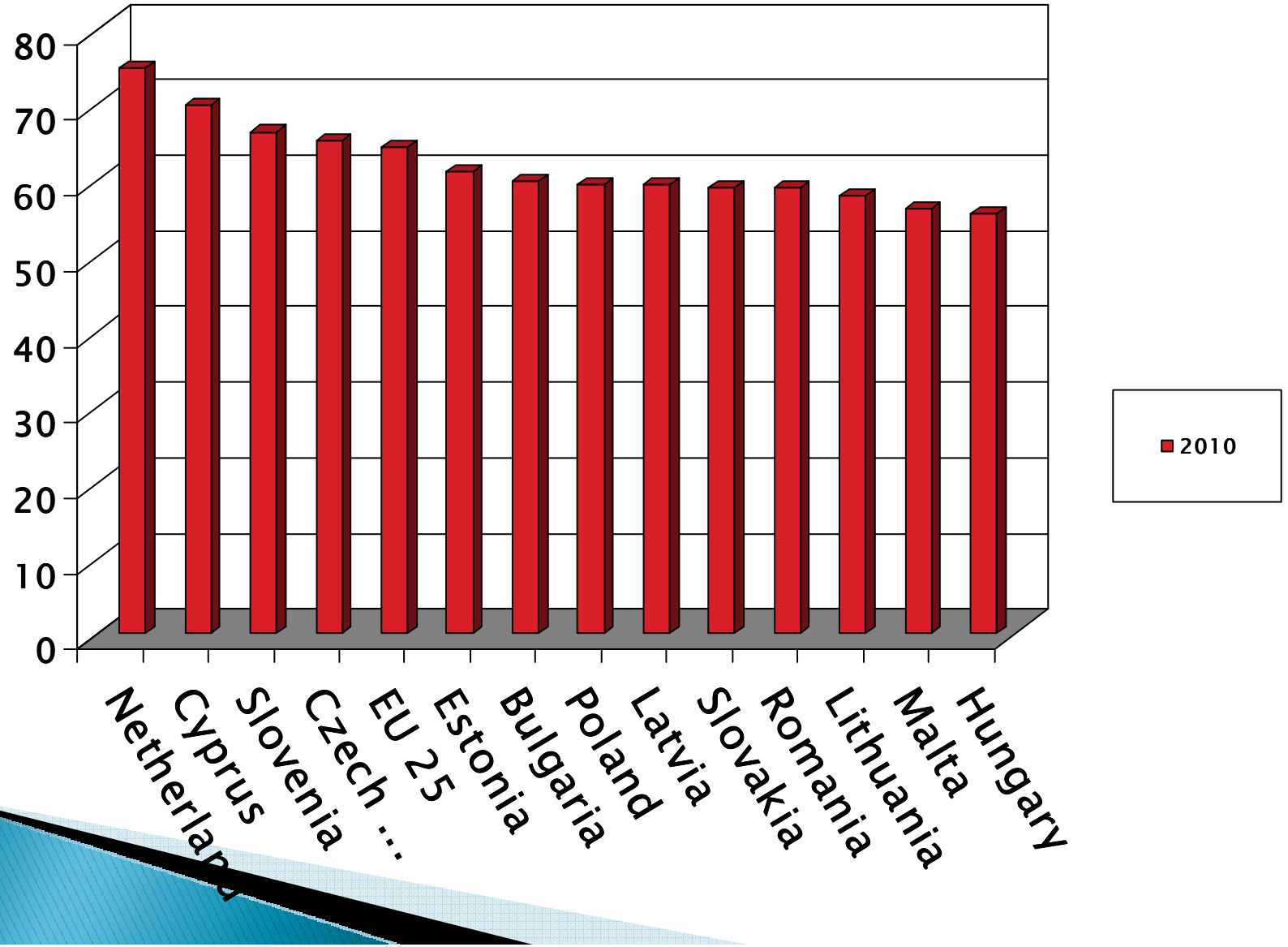
Source: Eurostat Database

Active population by highest level of education attained (ISCED 5-6)

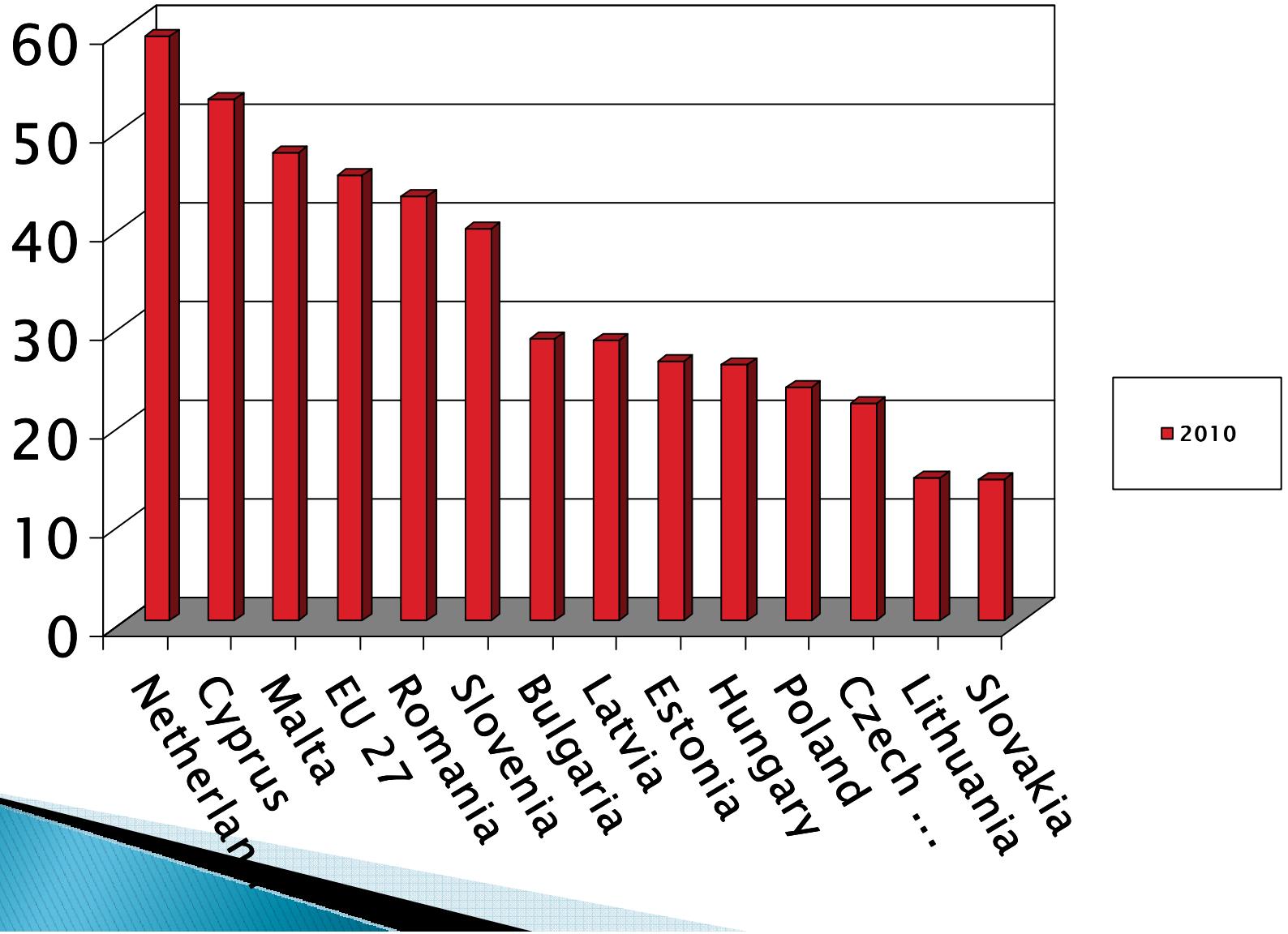


Source: Eurostat Database

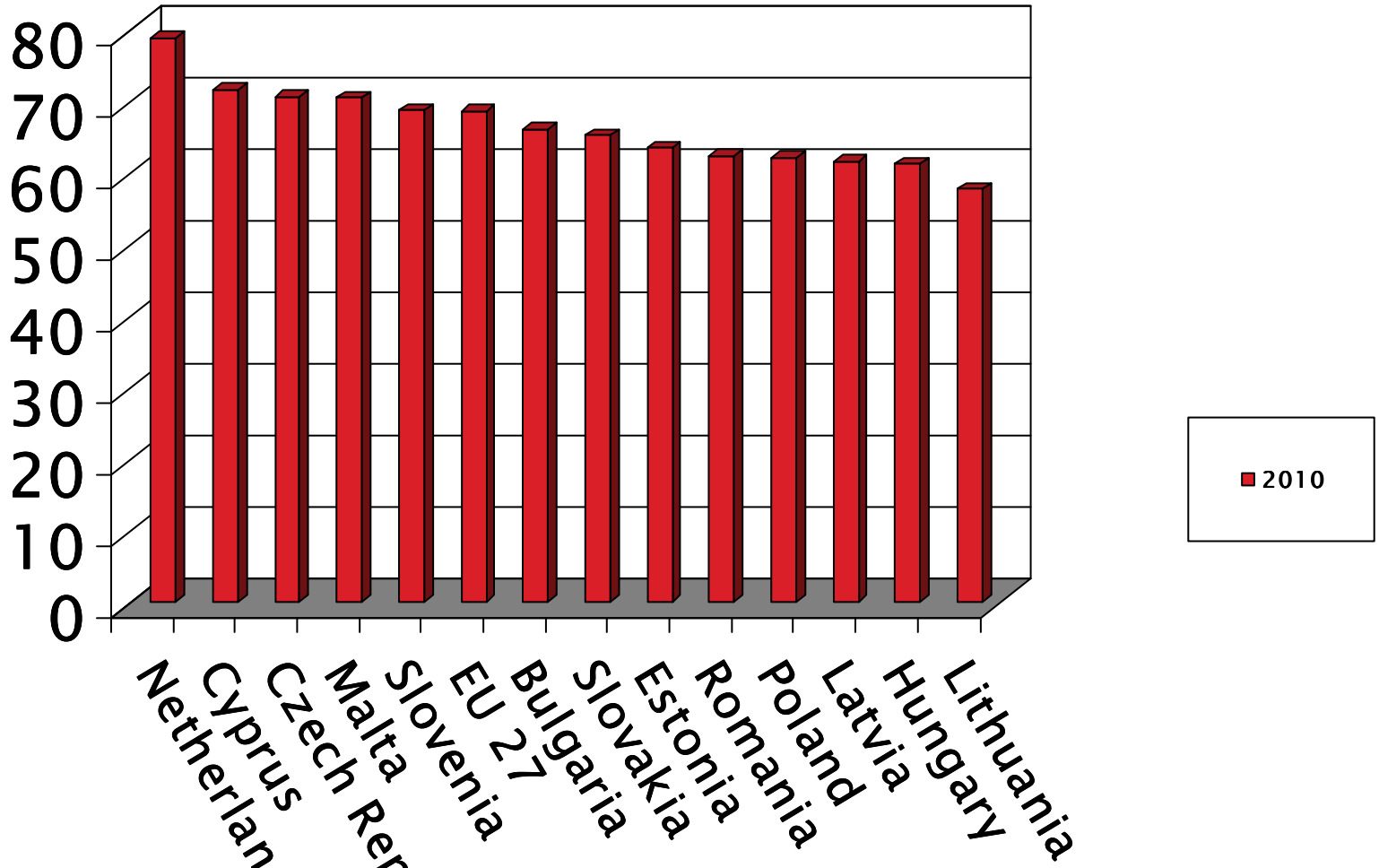
Employment rates by age groups 15 – 64 (%)



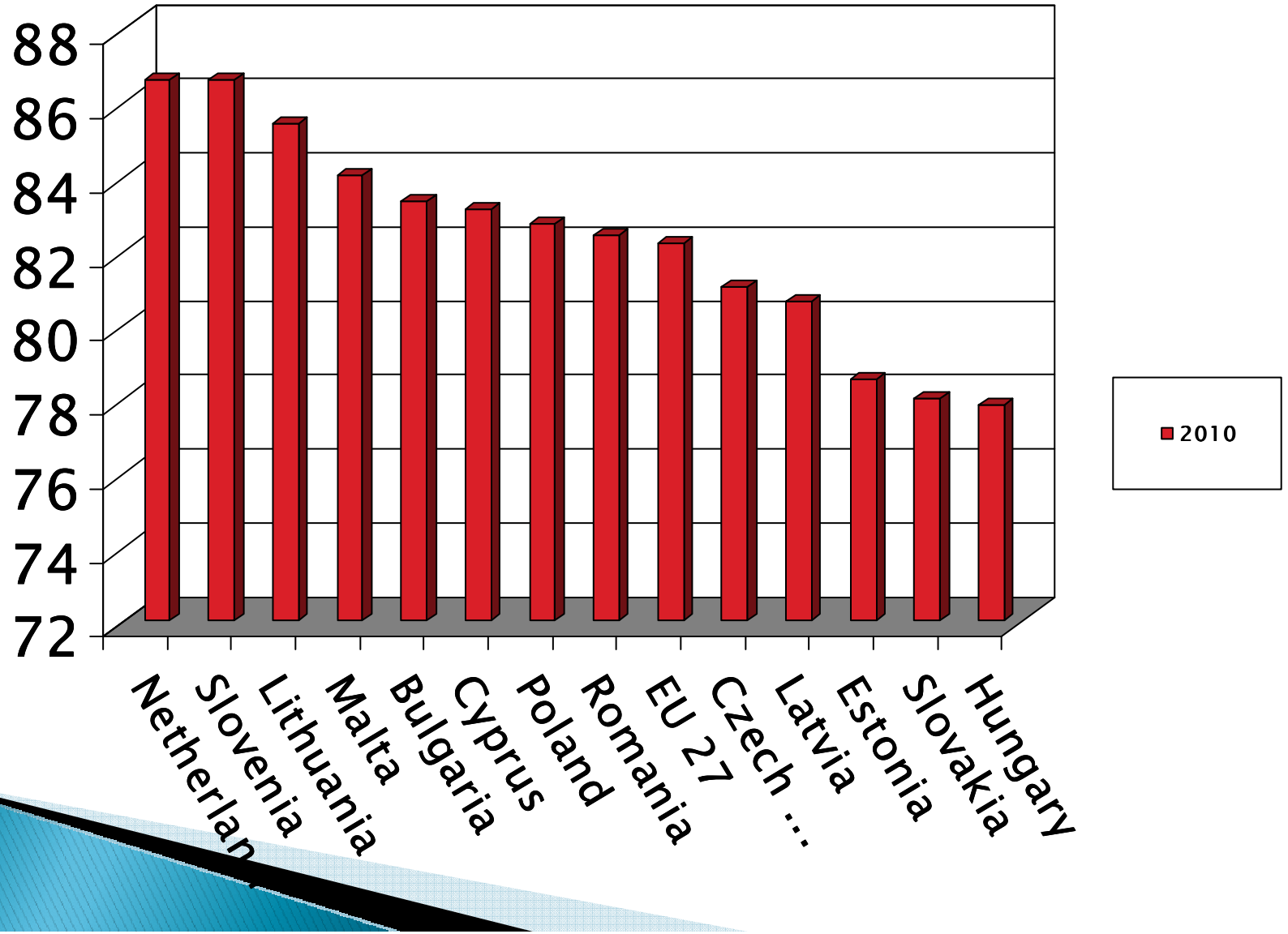
Employment rates by highest level of education attained - % of age group 25 – 64 years (pre-primary, primary and lower secondary education – levels 0-2)



Employment rates by highest level of education attained - % of age group 25 – 64 years (upper secondary and post-secondary non-tertiary education – levels 3 and 4)



Employment rates by highest level of education attained - % of age group 25 – 64 years (first and second stage of tertiary education – levels 5 and 6)



Efficiency level with respect to Netherlands – different hypotheses about technology lag

				Efficiency with respect to NL (E/E_{NL})			
	$\Lambda_{e=1}$	$\Lambda_{e=t}$	$D_E(\Lambda_{e=t})$	Λ=5	Λ=10	Λ=15	Λ=20
$T/T_{NL} = (1+g_{TECH})^{-\Lambda}$				**94%**	**89%**	**83%**	**79%**
Bulgaria	43	26	-18%	57%	61%	65%	69%
Czech Republic	38	21	-20%	64%	68%	72%	77%
Estonia	43	26	-21%	57%	61%	64%	68%
Cyprus	34	17	-17%	70%	75%	79%	84%
Latvia	46	29	-22%	53%	57%	60%	64%
Lithuania	40	23	-18%	62%	65%	69%	74%
Hungary	43	26	-22%	57%	61%	65%	69%
Malta	26	13	-12%	78%	83%	88%	93%
Poland	38	21	-18%	64%	68%	72%	77%
Romania	45	27	-19%	55%	58%	62%	66%
Slovenia	32	16	-16%	72%	77%	81%	86%
Slovakia	13	7	-6%	90%	96%		
EU12 AVERAGE	**37**	**21**	**-18%**				

Source: Author´s comuputations.

Firm size and economic growth

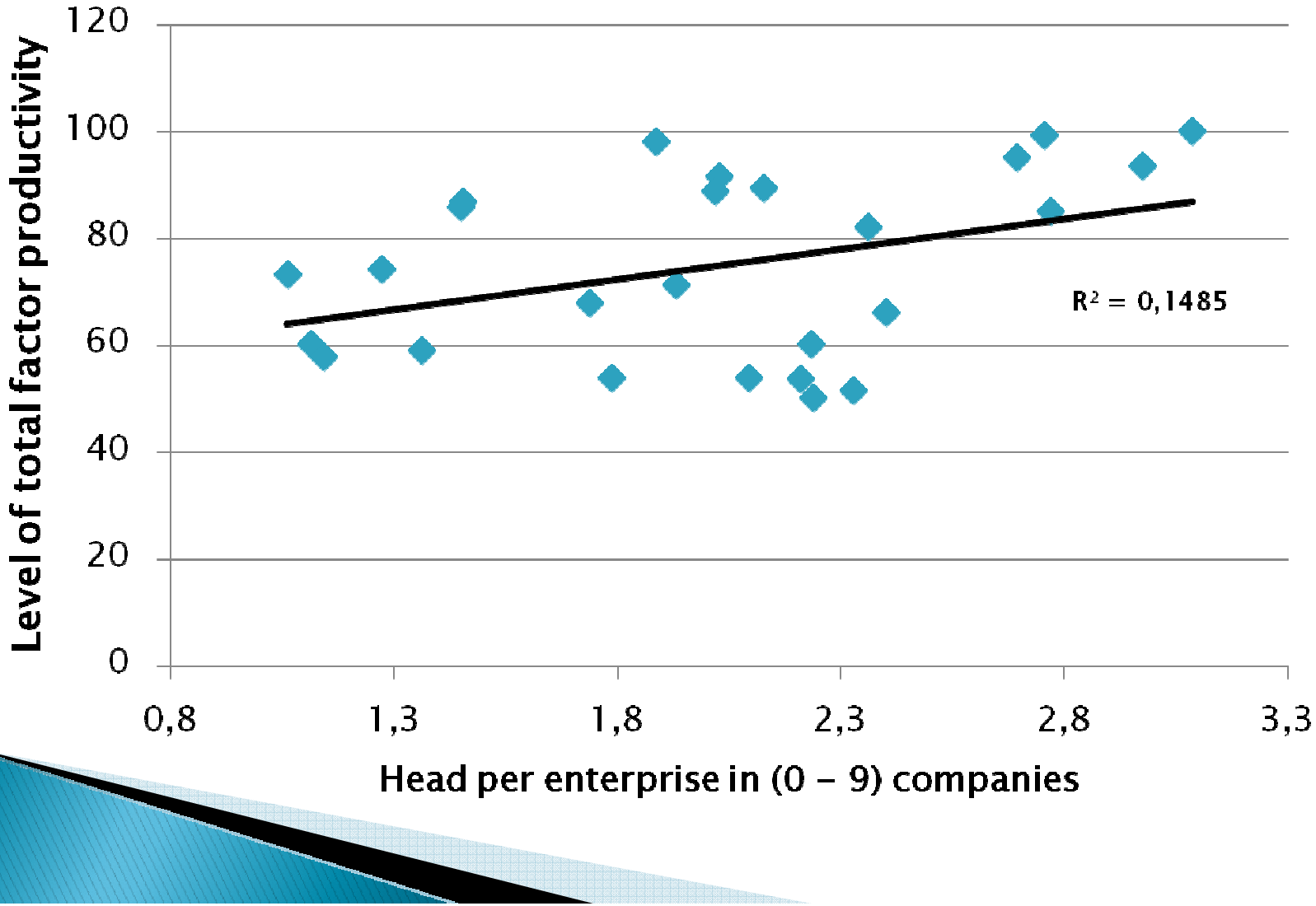
The net impact of firm size on macroeconomic performance is an important unresolved empirical question

(Shaffer, 2002)

- smaller firms have created the majority of new jobs, those jobs are typically less permanent than at larger firms
- from Schumpeter onward – an association between firm size and the rate of technological innovation
- mixed results concerning any association between firm growth and firm size

Their findings (700 US cities): An average size of manufacturing and retail firms is strongly and negatively associated with growth rates in median household income. (Shaffer, 2002)

Relationship between the level of TFP and head per enterprise in small companies



Relationship between the share of employment in 50-249 size enterprises and TFP growth

Concluding remarks

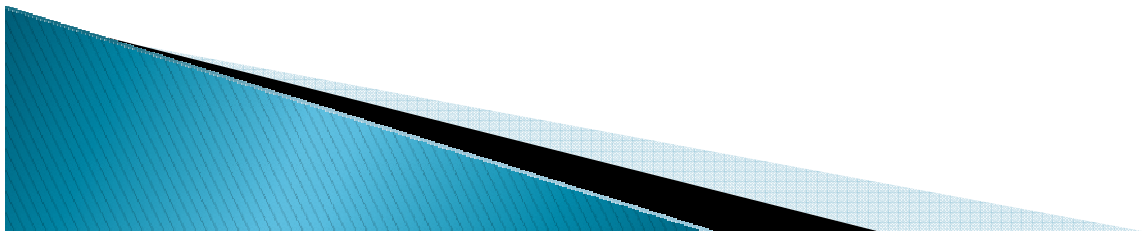
- We decomposed differences in output per capita in New Member States of EU into the differences in TFP, capital per worker, rate of capacity utilization, employment rate, average number of hours worked and human capital

- We find that in average TFP reached only 60 % of TFP in Netherlands

- It explains almost 4/5 of differences in product per capita

- Lower capital per worker and lower employment is usually compensated by higher number of hours worked

- Unless a lag in technology is longer than 20 years, most part of lower TFP is due to inferior allocative efficiency and not due to technology



- Better efficiency could lead to an increase in GDP per capita at least about 18 % in average
- We find that the **level** of productivity is positivelly correlated with the share of employment in 50 – 249 companies
- And that the **growth rate** of productivity is positivelly correlated with the average number of employees per enterprise in 0-9 companies
- It seems that some of the differences in productivity could be explained by differences in firm structure – but the **size** of the effect is a matter for future research

Thank you for your attention …