

# What Drives the Non-Price Competitiveness of the EU New Member States?



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# Motivation

Countries can choose various strategies how to improve their competitiveness:

=> **Real depreciation vs. improvements in quality.**

The EU New Member States: Substantial real **appreciation** associated with **increasing** export market shares after the EU accession, which wouldn't have been possible without improvements in the non-price factors of their production.

Since the Great Recession, the convergence to the EU core slowed down markedly and the countries in the region seem to need to rethink their growth models and to restart their convergence (Damijan et al., PostComEcon, 2015, IMF Regional Econ Issues, 2016).

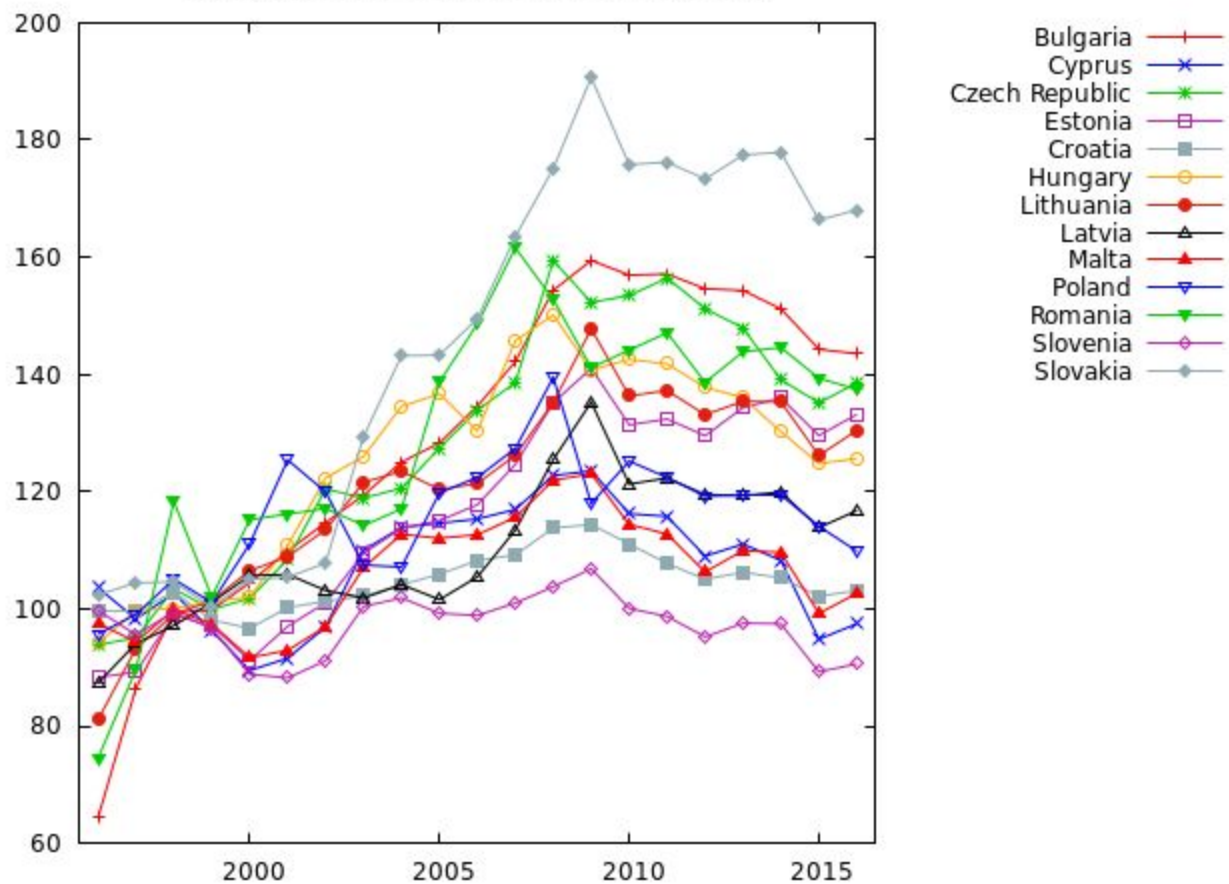
# Motivation (Cont.)

**Our paper:** Evaluates changes in non-price competitiveness among the EU New Member States by using the framework of relative export prices adjusted for changes in variety, taste and quality of their production.

We follow the framework by Benkovskis and Rimgailaite (J of Economic Transition, 2011) or Benkovskis and Wörz (Focus On European Economic Integration, 2012).

Extensions: COMTRADE data up to 2016, introduction of an index of non-price competitiveness, and analysis of its determinants.

REER (CPI, 1999 = 100), EU New Member States



# Methodology: Relative export prices

Benkovskis and Wörz (2016): Relative export price index (RXP) of country  $i$  - price level of exports relative to the price levels of other countries.

Advantages over REER: Direct focus on export prices, not a deflator over the economy as a whole.

Calculated from disaggregated data, in our case from the COMTRADE database (5132 products, 188 countries, annual frequency).

Limitation: Trade in services not covered.

$$RXP(i)_{gk,t} = \prod_{c \in C_g} \left( \frac{P_{gk,t} P_{gc,t-1}}{P_{gc,t} P_{gk,t-1}} \right)^{(\sigma_g - 1) w_{gc}(C_g)}$$

# Methodology: The Non-Price Competitiveness

Feenstra (1994): Adjustment for a ratio representing a share of new and declining exporters  $\lambda$  (more competitors => lower market power of existing exporters => higher weight of a price change in a particular market).

Benkovskis and Wörz (2016): Adjustment of relative quality and tastes  $d$ : If quality improves, it creates a price discount to the customer and the overall exports increase. Hence, the overall quality decreases the price index.

$$\ln \left( \frac{d_{gc,t}}{d_{gk,t}} \right) = \sigma_g \ln \left( \frac{p_{gc,t}}{p_{gk,t}} \right) + \ln \left( \frac{x_{gc,t}}{x_{gk,t}} \right)$$
$$RXP(i)_{gk,t}^Q = \prod_{c \in C_g} \left( \frac{p_{gk,t}}{p_{gc,t}} \frac{p_{gc,t-1}}{p_{gk,t-1}} \right)^{(\alpha_g - 1) w_{gc}(C_g)} \left( \frac{\lambda_{g,t-1}}{\lambda_{g,t}} \right) \prod_{c \in C_g} \left( \frac{d_{gk,t}}{d_{gc,t}} \frac{d_{gc,t-1}}{d_{gk,t-1}} \right)^{w_{gc}(C_g)}$$

# Methodology: The Non-Price Competitiveness (Cont.)

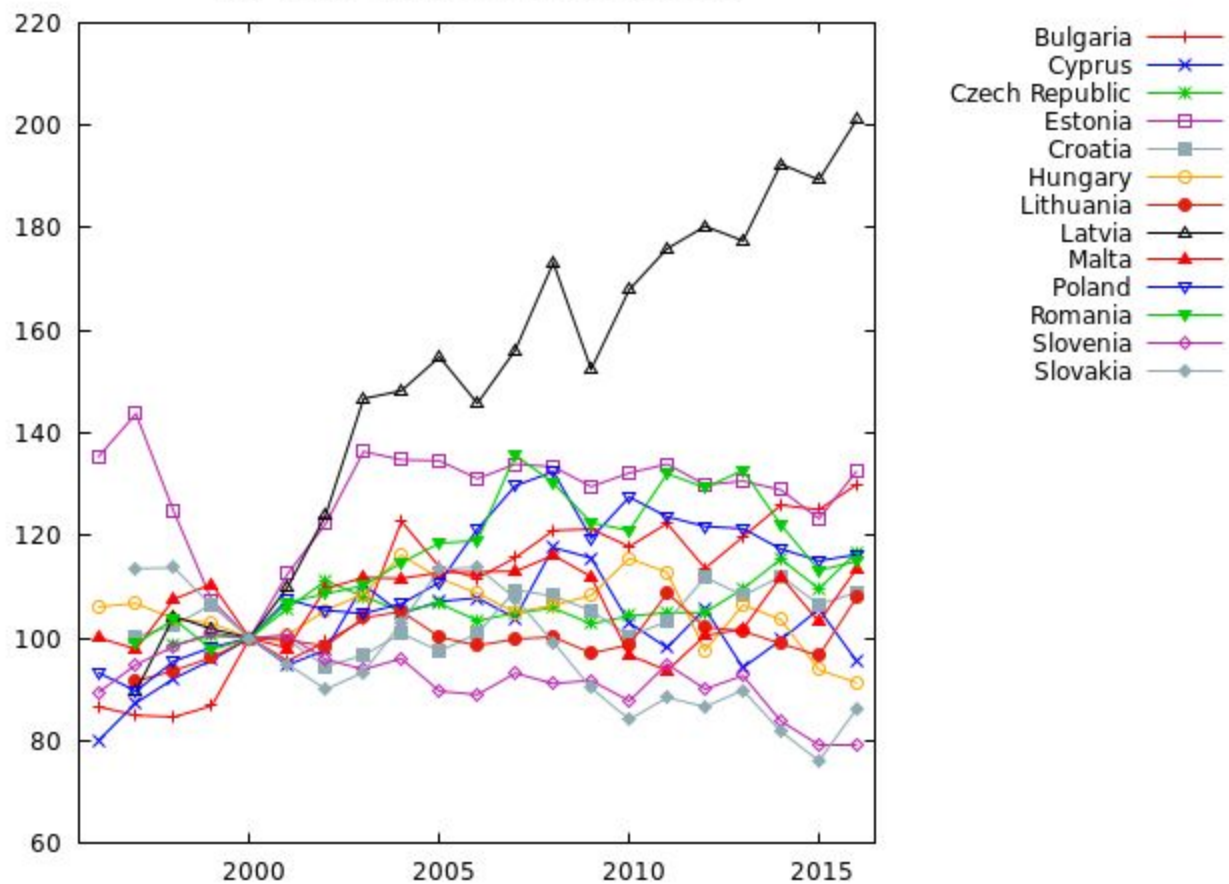
Both indices,  $RXP(i)$  and  $RXP^Q(i)$  are then aggregated over different goods.

Then, the non-price competitiveness is derived as a ratio between the two indices, and inverted so that an increase in index implies an increase of non-price competitiveness.

$$RXP_{k,t}^Q = \prod_{i \in I} \prod_{g \in G} \left( RXP(i)_{g,k,t}^Q \right)^{w(i)_{k,t}}$$

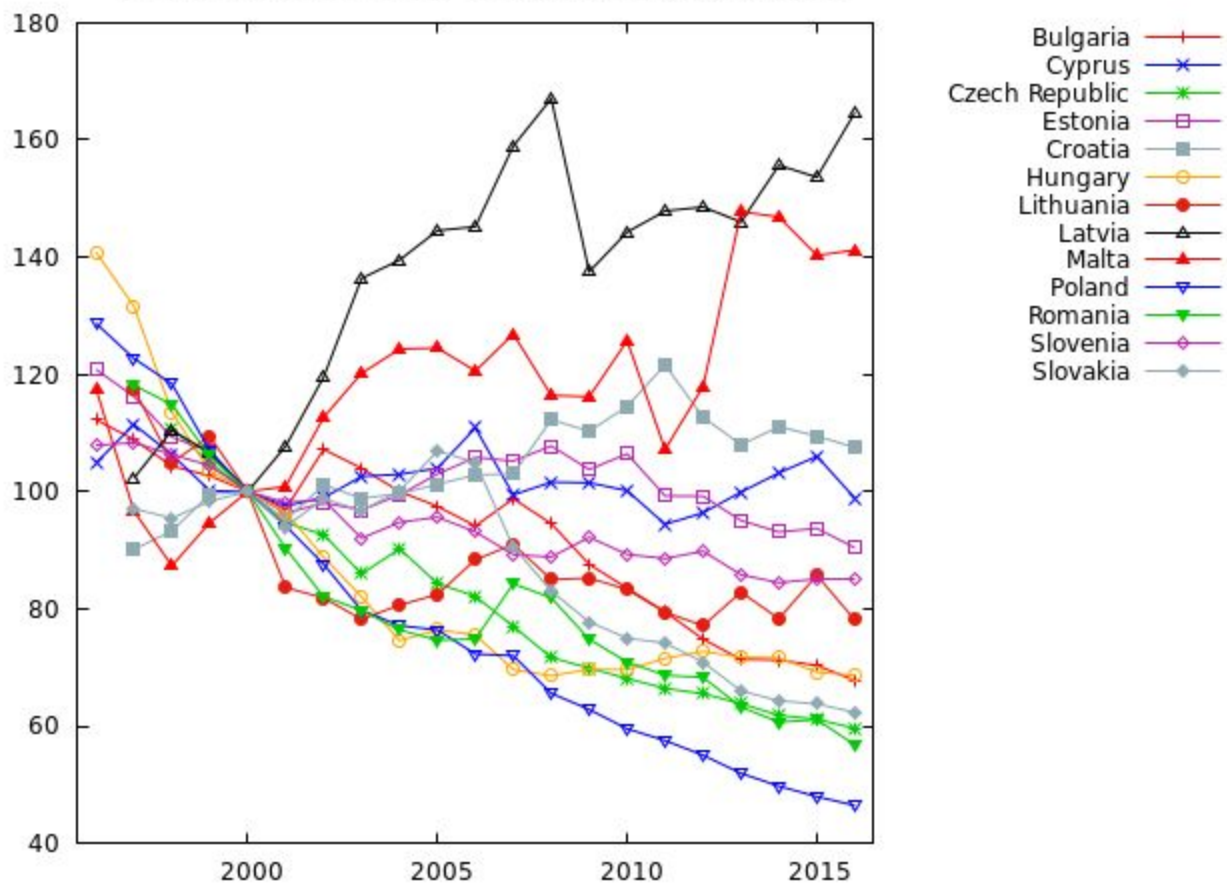
$$NPC_{k,t} = \frac{100 \times RXP_{k,t}}{RXP_{k,t}^Q}$$

RXP (2000=100), EU New Member States

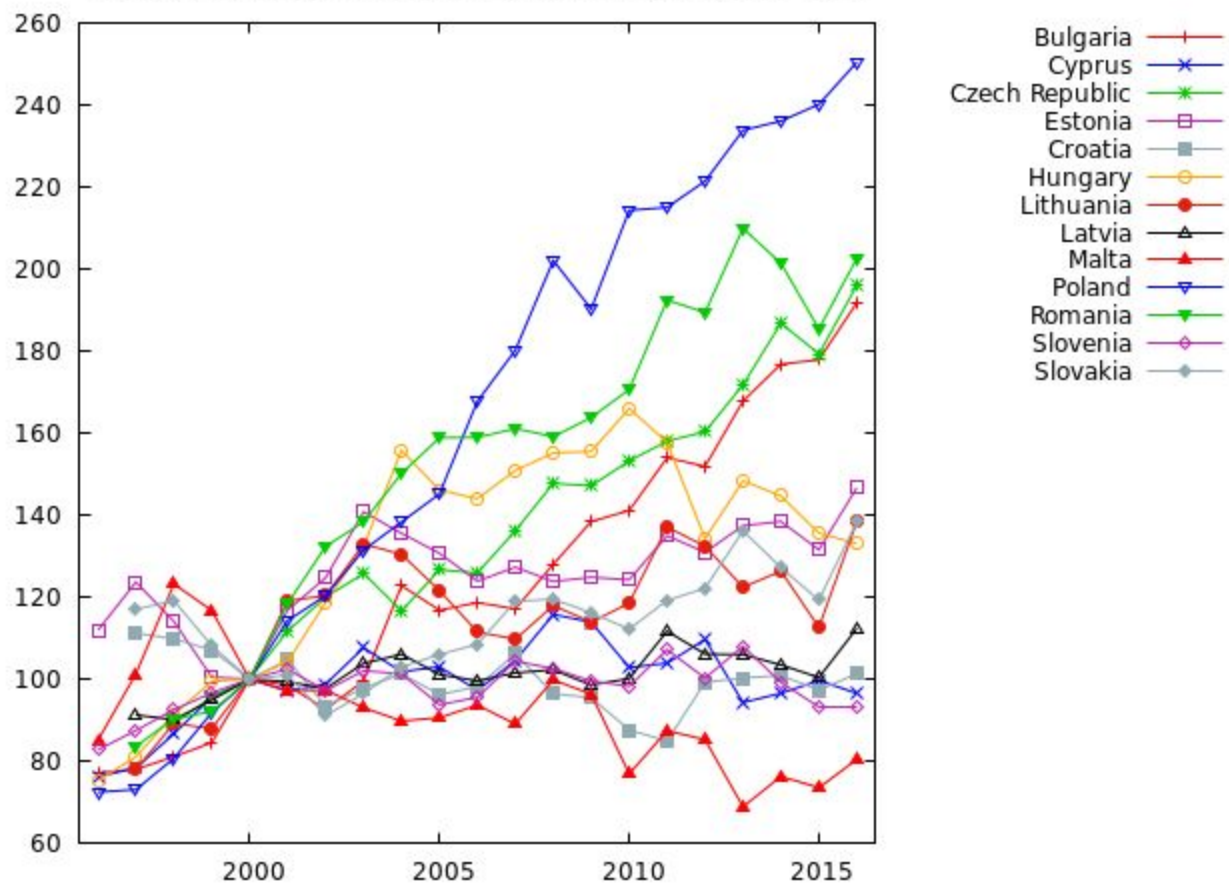




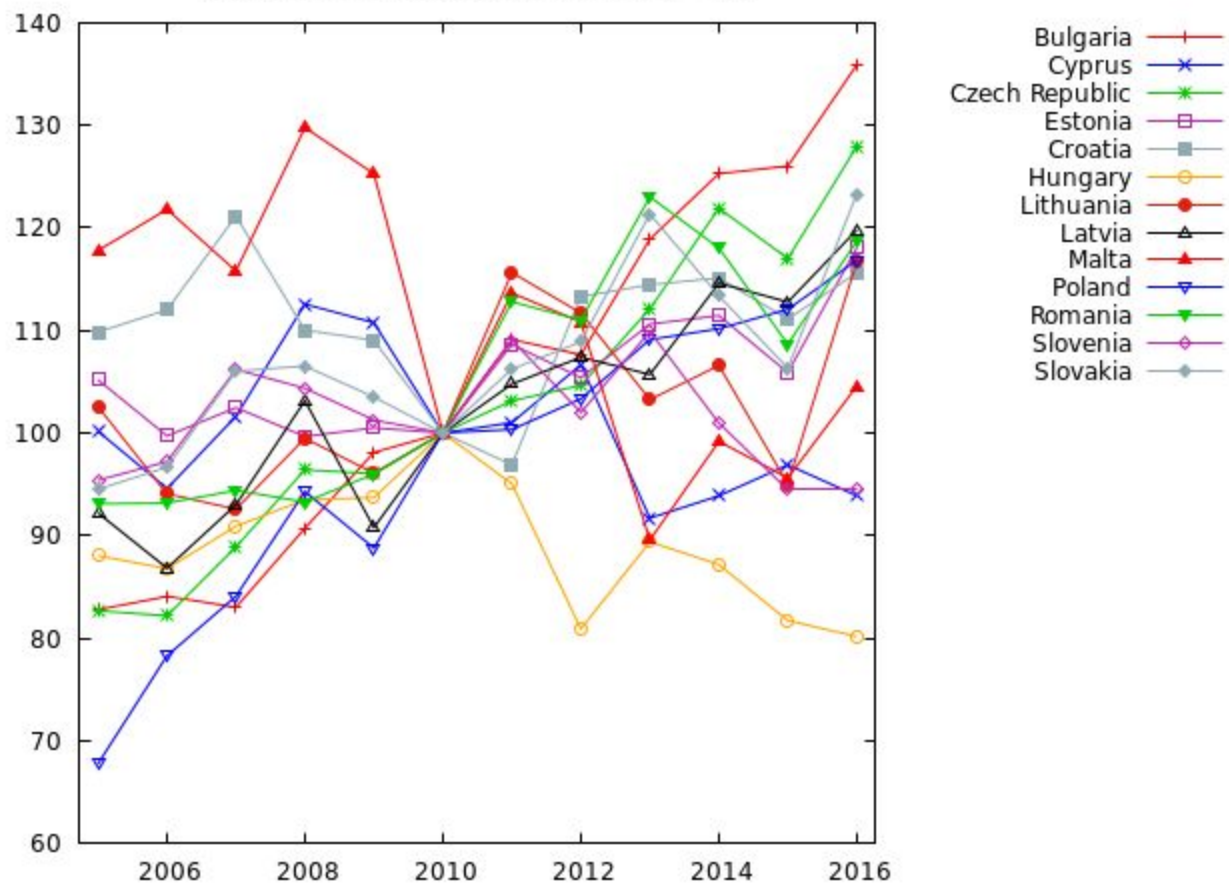
RXP quality adjusted (1999 = 100), EU New Member States



Non-price competitiveness, EU New Member States (2000=100)



Non-price competitiveness index, 2010 = 100



## Growth rates of non-price competitiveness

	<b>1999-2008</b>	<b>2008-2016</b>	<b>1999-2016</b>	<b>Difference</b>
<b>Czech Republic</b>	4,83	4,71	4,78	-0,12
<b>Hungary</b>	4,94	-2,56	1,94	-7,51
<b>Poland</b>	8,76	3,58	6,69	-5,19
<b>Slovakia</b>	1,12	2,44	1,64	1,32
<b>Slovenia</b>	0,66	-1,63	-0,26	-2,29
<b>Estonia</b>	2,32	2,82	2,52	0,50
<b>Latvia</b>	5,91	2,50	4,54	-3,41
<b>Lithuania</b>	3,26	2,66	3,02	-0,60
<b>Cyprus</b>	2,12	-3,03	0,06	-5,15
<b>Malta</b>	-1,74	-3,60	-2,48	-1,86
<b>Bulgaria</b>	4,61	6,74	5,46	2,13
<b>Romania</b>	6,07	4,02	5,25	-2,05
<b>Croatia</b>	-1,17	0,83	-0,37	2,00

# What drives the evolution of the non-price competitiveness?

Motivation straightforward: We'd wish to know, what's behind. More precisely, which of the non-price factors of competitiveness that are frequently mentioned in the literature, i.e. education, institutions, innovations, infrastructure etc. are the most important for the non-price competitiveness in the EU New Member States.

... and we wanted to verify whether the NPC index is actually related to the non-price factors.

Methodology: Panel fixed effects model and Bayesian Model Averaging

Sample 2006-2016

# Data

Factors of non-price competitiveness: Global Competitiveness Report (World Economic Forum) - 160 variables under 12 pillars, with several subcategories.

Fixed-effects: 12 pillars / BMA: 28 subcategories.

The 12 pillars include: Institutions, Infrastructure, Macroeconomic Environment, Health and primary education, Higher education and training, Goods market efficiency, Labour market efficiency, Financial market development, Technological readiness, Market size, Business sophistication and Innovation.

Additionally, several macro variables to control for possible omitted variable bias: Real GDP, GDP growth, ULC, REER, FDI inflows/outflows, long-term currency misalignment in the spirit of Rodrik (2008).

# Results I: Fixed effects

Fixed effects significantly different from the pooled model.

Also model with time-fixed effects used

Most robust finding across several alternative specification: primary role of institutions.

Dependent variable: npc\_2010index

	coefficient	std. error	t-ratio	p-value	
const	-123.996	81.5082	-1.521	0.1314	
Institutions	28.7681	9.83738	2.924	0.0043	***
Infrastructure	11.6623	6.34863	1.837	0.0692	*
HealthPrimaryEdu	6.72660	7.86673	0.8551	0.3946	
HigherEducation	-10.5755	12.7394	-0.8301	0.4085	
GoodsMarketEffic~	-28.4227	13.0789	-2.173	0.0322	**
LabourMarketEffi~	-26.6710	7.95317	-3.354	0.0011	***
FinMarketDevelop~	14.8139	6.07925	2.437	0.0166	**
Technology	9.41096	4.75681	1.978	0.0507	*
Market_size	12.1959	9.78521	1.246	0.2156	
Business_sophist~	14.7350	11.7284	1.256	0.2120	
Innovation	-3.30581	10.3089	-0.3207	0.7491	
budgetbalance_pct	-0.198574	0.557950	-0.3559	0.7227	
gross_savings_pct	1.20246	0.309494	3.885	0.0002	***
inflation_pct	0.413600	0.614547	0.6730	0.5025	
gov_debt	0.429923	0.152449	2.820	0.0058	***
GDPgrowth	0.907224	0.385091	2.356	0.0205	**
ULC_nominal	0.802210	0.219439	3.656	0.0004	***
ULC_real	-0.542976	0.341396	-1.590	0.1150	
REER_ulc	0.0791627	0.167436	0.4728	0.6374	
REER_cpi	0.369625	0.242631	1.523	0.1309	
FDI_inward	0.0159761	0.0494658	0.3230	0.7474	
FDI_outward	0.0504046	0.0618089	0.8155	0.4168	
creditGDP	0.133225	0.103692	1.285	0.2019	
undervaluation	-9.48112	13.6558	-0.6943	0.4891	

# Results II: Growth regressions

Is the NPC index significant in growth regressions?

Yes, if we control for other macro variables.

However, it's significance disappears when REER included in the regression

Inclusion of additional variables from the GCR - similar results as baseline.

Dependent variable: GDPgrowth

	coefficient	std. error	t-ratio	p-value	
const	20.0172	8.72468	2.294	0.0236	**
GDPreal_perhead_1	-0.00195424	0.000385303	-5.072	1.49e-06	***
npc_index	0.0512682	0.0282513	1.815	0.0721	*
creditGDP	-0.130268	0.0259782	-5.014	1.91e-06	***
undervaluation	5.85853	2.86951	2.042	0.0434	**
RXP_qadj	0.137641	0.0482705	2.851	0.0051	***



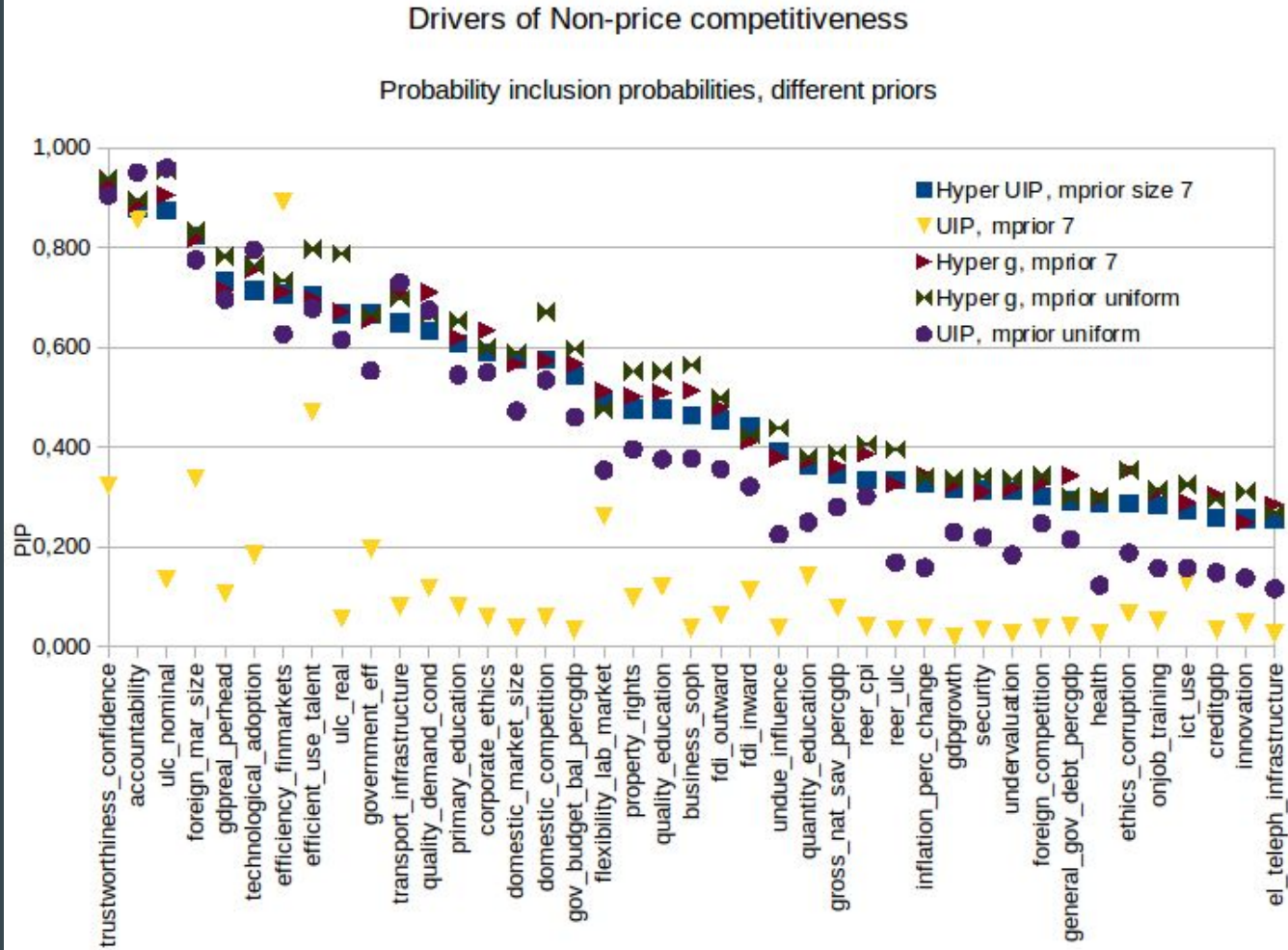
# Results III: BMA

BMA allows us to handle more variables than traditional regression; to see which parts of pillars from the GVC are the most important ones.

Key outcome: PIP (Posterior inclusion probability that a particular variable shall be included in a regression).

Several combinations of model and parameter priors.

BMS package in R was used.



# Results III: BMA (Cont.)

## Variables with highest PIP

Trustworthiness and confidence (Financial markets)

Accountability (Institutions - private)

ULC nominal

Foreign market size (Market size)

Technological adoption (Technological Readiness)  
(-)

Efficiency of financial markets (Fin markets) (-)

Efficient use of talent (Labour market efficiency) (-)

## Variables with lowest PIP (selection)

Credit/GDP ratio,

Innovations,

On the job training,

ICT use,

Ethics/corruption,

Health.

# Summary and conclusions

The REERs do not provide complete picture about evolution of competitiveness of the EU New Member States, in some cases different indicators based on relative export prices lead to much different result (more consistent with emerging CA surpluses and rising export shares).

The improvements in non-price competitiveness (relatively to trading partners!) as a convergence strategy slowed down after 2008 - in most countries.

The non-price competitiveness component in relative prices is driven mainly by improvements in institutions, financial markets, to some extent in infrastructure. On the other hand, goods and labour market efficiency are negatively correlated with the non-price competitiveness index.

Similar results are obtained using BMA: Highest PIPs of Trustworthiness and confidence (fin markets) and accountability, along with the ULC's. On the other hand, variables representing education and innovations are rarely included in the regression or are significant rarely: Educational variables and innovations, suggesting limited contribution of those factors to exports.