

Non-Price Competitiveness of Exports from Emerging Countries

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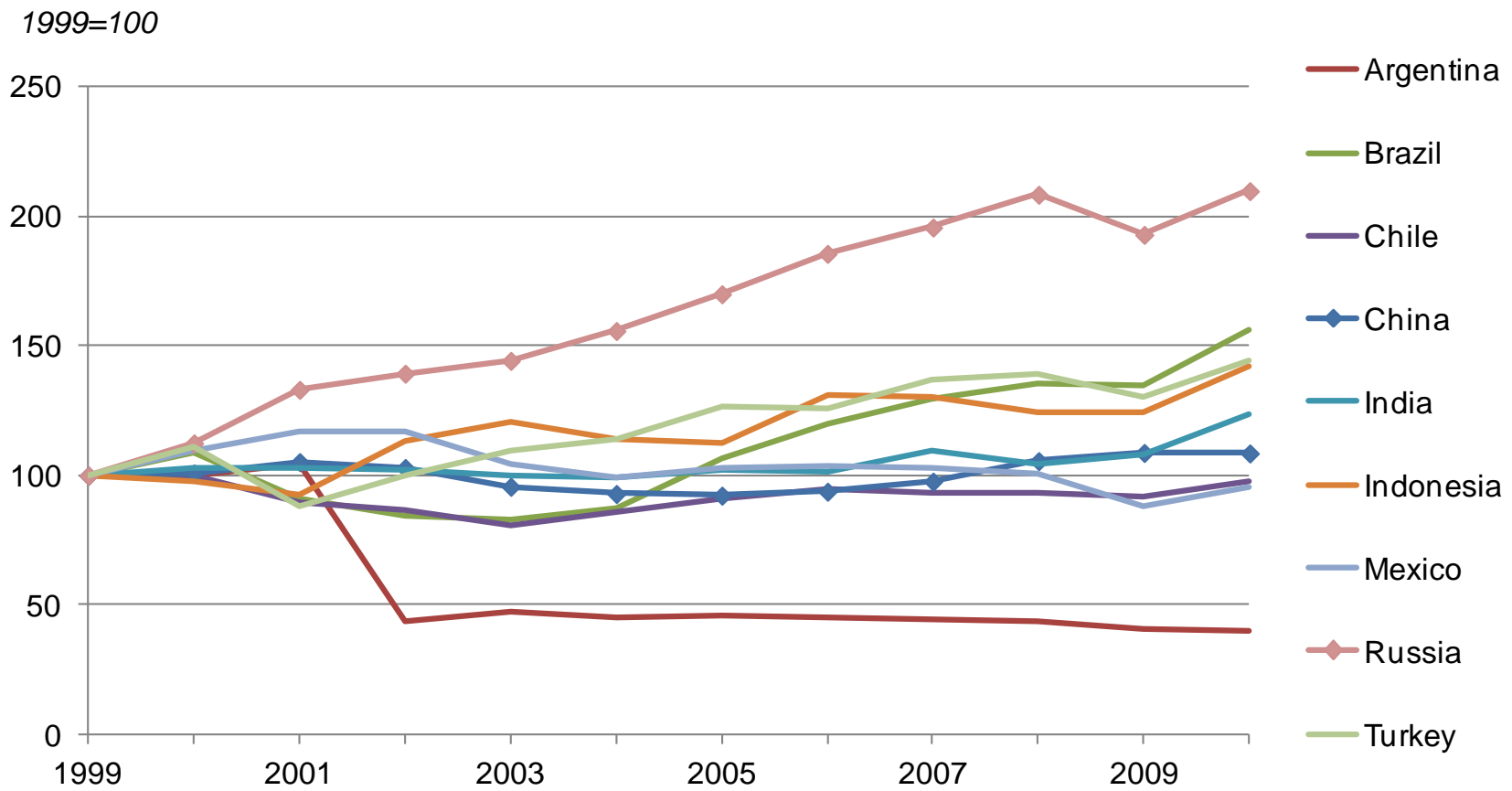
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Overview

- **Drawbacks of traditional REER indicators**
- **Theoretical framework to measure non-price factors (disaggregated approach)**
- **From import to export prices**
- **Dynamics in price and non-price competitiveness in selected EME's**
- **Contribution of non-price factors in selected product sectors (Russia and China)**
- **Conclusions**

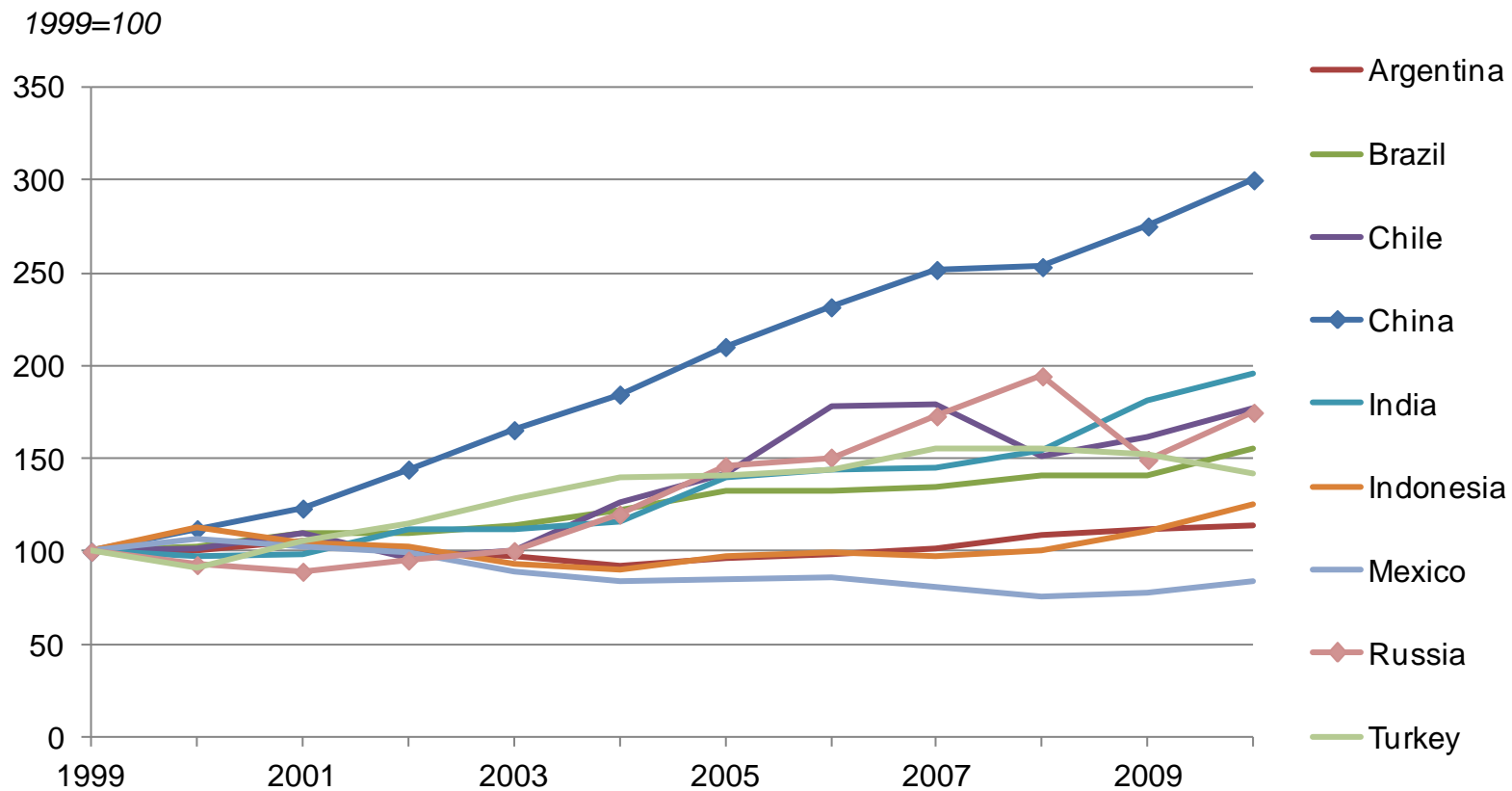
Real Effective Exchange Rates

(CPI-based, 172 trading partners)



Source: Darvas, Z. 2012. Bruegel Working Paper 2012/06.

Evolution of World Market Shares (World market = 75 countries)



Source: own calculations based on UN COMTRADE.

Motivation

- **REERs bad approximation for export prices:**
 - Whole economy, no distinction between domestic and external markets
 - Profit margins ignored
 - Structural issues are not captured (different export structures across countries)
 - important factors left aside (e.g. taste, image of brands)
- **Importance of prices for competitiveness is decreased by:**
 - Greater variety
 - Larger set of imported products
 - Higher valuation for / quality of traded products

Aim of the Paper

- **Evaluate the price and non-price competitiveness of important emerging countries:**
Argentina, Brazil, Chile, China, India, Indonesia, Mexico, Russia, Turkey
- **We developed an index that adjusts export prices for non-price factors.**

Literature

- **Feenstra (AER 1994) and Broda and Weinstein (QJE 2006) incorporate changes in variety into a CES aggregate of import prices**
- **Benkovskis and Wörz (2011) extend this to incorporate**
 - **Changes in the product set**
 - **Changes in other non-price factors (quality / tastes)**
- **Relative quality becomes a function of observable unit values and volumes as well as unobservable elasticities of substitution between varieties and products**
- **This paper moves further to apply this methodology to export prices**

Theoretical Framework

Consumer's Utility Function

- **First-level CES utility function (imports and domestic good)**

$$U_t = \left(D_t^{\frac{\kappa-1}{\kappa}} + M_t^{\frac{\kappa-1}{\kappa}} \right)^{\frac{\kappa}{\kappa-1}} ; \quad \kappa > 1$$

- **Second-level CES utility function (different imported goods)**

$$M_t = \left(\sum_{g \in G} M_{gt}^{\frac{\gamma-1}{\gamma}} \right)^{\frac{\gamma}{\gamma-1}} ; \quad \gamma > 1$$

set of goods \longrightarrow \longleftarrow elasticity of substitution between products

- **Third-level CES utility function (different varieties of a good)**

$$M_{gt} = \left(\sum_{c \in C} d_{gct}^{\sigma_g} m_{gct}^{\frac{\sigma_g-1}{\sigma_g}} \right)^{\frac{\sigma_g}{\sigma_g-1}} ; \quad \sigma_g > 1$$

set of countries \longrightarrow \longleftarrow quality or taste \longleftarrow elasticity of substitution between varieties

Theoretical Framework

Minimum Unit-Cost Function

- After solving the utility maximization problem

$$\phi_{gt} = \left(\sum_{c \in C} d_{gct} P_{gct}^{1-\sigma_g} \right)^{\frac{1}{1-\sigma_g}}$$

- minimum unit-cost of import good g depends on price and quality
- The import price index for good g is defined as:

$$P_g = \frac{\phi_{gt}}{\phi_{gt-1}}$$

Theoretical Framework

Adjusted Price Index

- **Conventional price index:** $P_g^{conv} = \prod_{c \in C_g} \left(\frac{P_{gct}}{P_{gct-1}} \right)^{w_{gct}}$

- **Variety adjusted price index:**

(Broda&Weinstein, 2006)

$$P_g^{var} = \prod_{c \in C_g} \left(\frac{P_{gct}}{P_{gct-1}} \right)^{w_{gct}} \left(\frac{\lambda_{gt}}{\lambda_{gt-1}} \right)^{\frac{1}{\sigma_g - 1}}$$

- **Non-price factors adjusted price index:**

(Benkovskis&Wörz, 2011)

$$P_g^{nop} = \left(\frac{\sum_{c \in C_{g,t}} d_{gc,t} P_{gc,t}^{1-\sigma_g}}{\sum_{c \in C_{g,t-1}} d_{gc,t-1} P_{gc,t-1}^{1-\sigma_g}} \right)^{\frac{1}{1-\sigma_g}} = P_g^{conv} \left(\frac{\lambda_{g,t}}{\lambda_{g,t-1}} \right)^{\frac{1}{\sigma_g - 1}} \prod_{c \in C_g} \left(\frac{d_{gc,t}}{d_{gc,t-1}} \right)^{\frac{w_{gc,t}}{1-\sigma_g}}$$

$$\lambda_{gt} = \frac{\sum_{c \in I_g} P_{gct} x_{gct}}{\sum_{c \in I_{gt}} P_{gct} x_{gct}}$$

$$\lambda_{gt-1} = \frac{\sum_{c \in I_g} P_{gct-1} x_{gct-1}}{\sum_{c \in I_{gt-1}} P_{gct-1} x_{gct-1}}$$

Theoretical Framework

How to Estimate Non-Price Factors

- Non-price parameters (i.e. quality/taste) are unobservable
- But can be decomposed into relative prices and relative quantity (= observables)
- It is possible to assess quality within the same theoretical framework – consumer maximization problem:

$$\ln\left(\frac{d_{gct}}{d_{gkt}}\right) = \sigma_g \ln\left(\frac{p_{gct}}{p_{gkt}}\right) + \ln\left(\frac{x_{gct}}{x_{gkt}}\right)$$

relative prices (UVX)
relative quantities
←
← (kg)

← benchmark country

- Relative quality of variety depends on relative prices, volumes and the elasticity of substitution between varieties

Theoretical Framework

Estimation of Elasticities

- Elasticity of substitution between products calibrated: $\gamma = 2$
- Elasticity of substitution between varieties estimated from system of equations (Broda&Weinstein, 2006):

– Relative demand equation:

$$\frac{\Delta \ln s_{gct}}{\Delta \ln s_{gkt}} = -(\sigma_g - 1) \frac{\Delta \ln p_{gct}}{\Delta \ln p_{gkt}} + \varepsilon_{gct}$$

– Relative supply equation:

$$\frac{\Delta \ln p_{gct}}{\Delta \ln p_{gkt}} = \frac{\omega_g}{1 + \omega_g} \frac{\Delta \ln s_{gct}}{\Delta \ln s_{gkt}} + \delta_{gct}$$

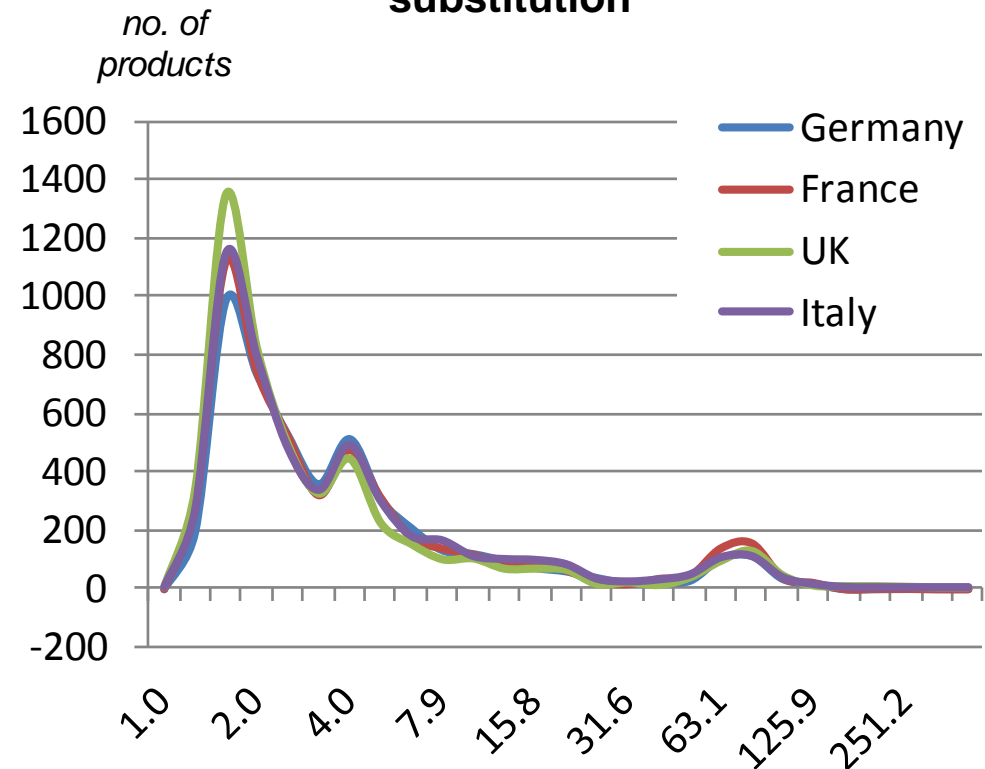
Database and Coverage

- **UN COMTRADE**
- **Import data for 75 importers and exporters:**
 - **96% of global imports in 2010**
 - **Focus on 9 EMEs**
- **6-digit HS classification level (> 5000 products)**
- **1999 to 2010, annual data**

Estimation of Elasticities

	Median elasticity	Median mark-up
USA	5.72	21.2 %
Germany	7.53	15.3 %
UK	5.72	21.2 %
Italy	6.81	17.2 %
France	7.14	16.3 %
Canada	9.64	11.6 %
Japan	6.67	17.6 %
Russia	6.35	18.7 %
China	6.67	17.6 %

Distribution of elasticities of substitution



From Import to Export Prices

- Work with mirror image trade flow: expenditure for **imports** of good $g_{c,t}$ = **exports** of good $g_{c,t}$
- Competitiveness always relative: compare price index of a particular exporter $k \in c$ to all competitors:

$$RXP_{gkt} = \frac{\phi_{gt}^k / \phi_{gt-1}^k}{\phi_{gt}^{-k} / \phi_{gt-1}^{-k}} = \frac{(p_{gkt} / p_{gkt-1}) (d_{gkt} / d_{gkt-1})^{\frac{1}{1-\sigma_g}}}{\phi_{gt}^{-k} / \phi_{gt-1}^{-k}}$$

- ϕ_{gt}^k minimum unit-cost of g , exported only by country k
- ϕ_{gt}^{-k} minimum unit-cost of g , exported by all countries except k

From Import to Export Prices

- Plugging our non-price adjusted import price index P_{gt}^{nop} into the relative export price index, we get:

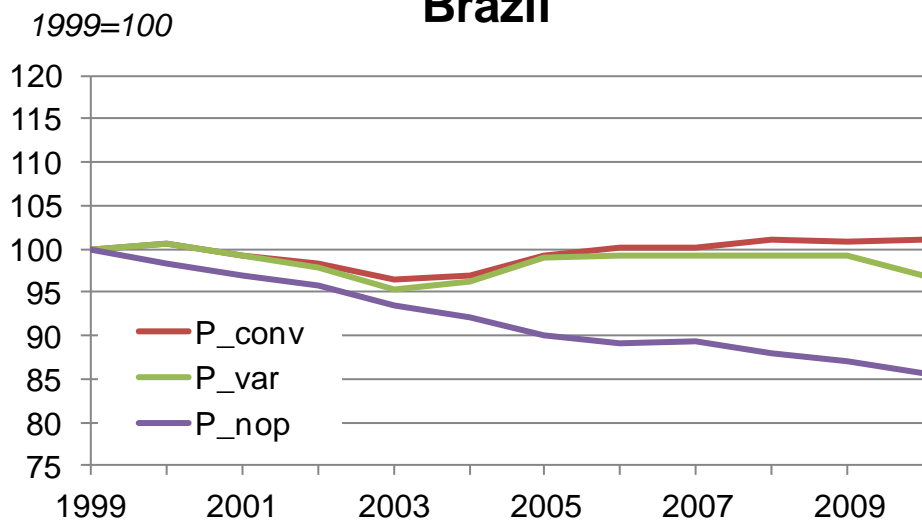
$$RXP_{gct} = \underbrace{\prod_{c \in C_g^{-k}} \left(\frac{p_{gkt}}{p_{gct}} \frac{p_{gct-1}}{p_{gkt-1}} \right)^{w_{gct}^{-k}}}_{1} \underbrace{\left(\frac{\lambda_{gt}^{-k}}{\lambda_{gt-1}^{-k}} \right)^{\frac{1}{1-\sigma_g}}}_{2} \underbrace{\prod_{c \in C_g^{-k}} \left(\frac{d_{gkt}}{d_{gct}} \frac{d_{gct-1}}{d_{gkt-1}} \right)^{\frac{w_{gct}^{-k}}{1-\sigma_g}}}_{3}$$

1. Traditional relative price index, *increase = worsening price competitiveness*
2. Changes in monopoly power of exporters ('variety'), *increase = more partner countries*
3. Changes in non-price factors (quality/taste), *increase = fall in relative quality/taste*

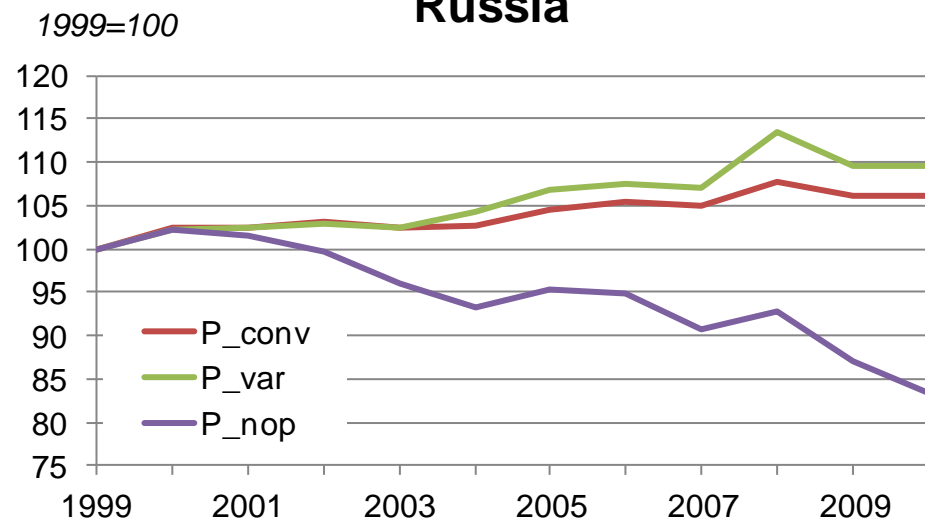
Non-Price Competitiveness

BRICs

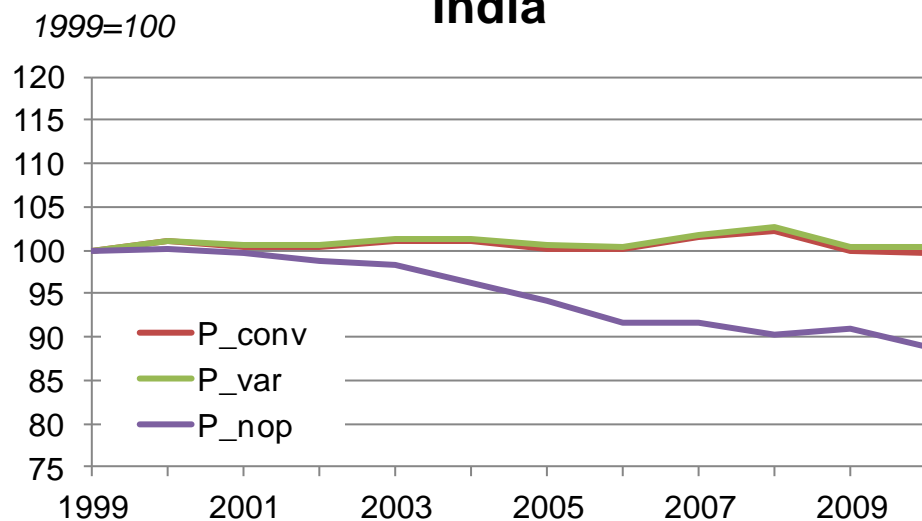
Brazil



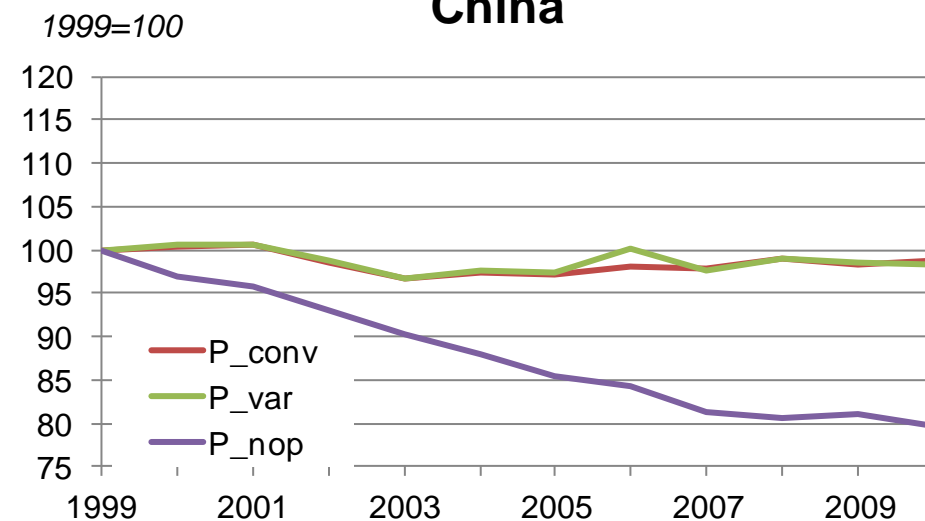
Russia



India

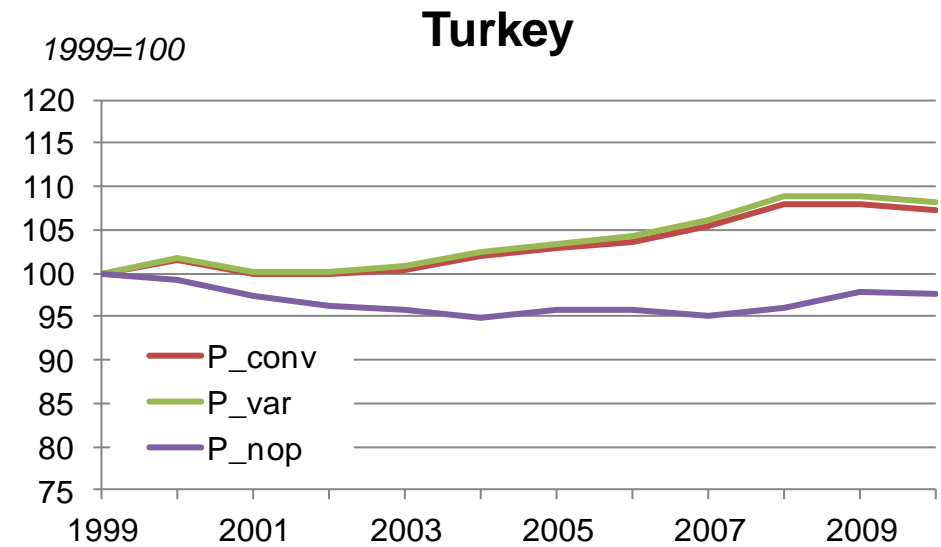
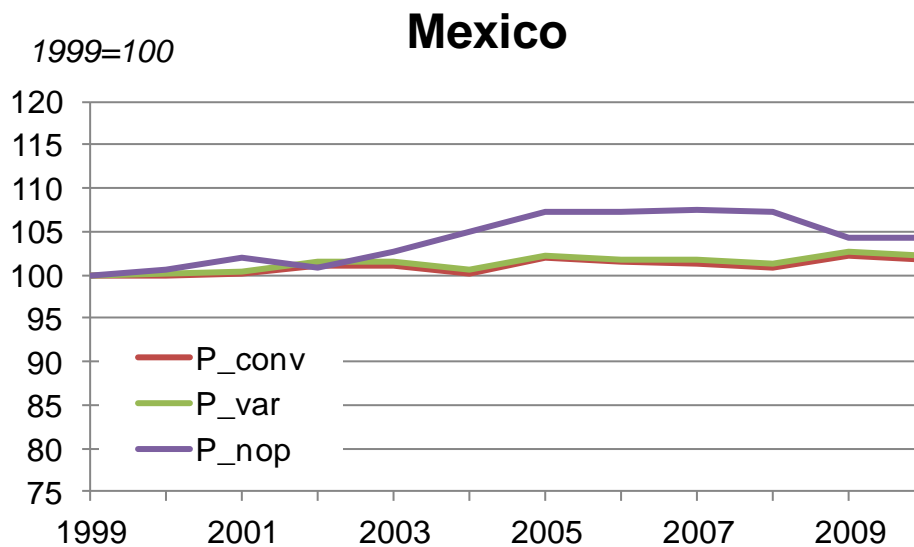
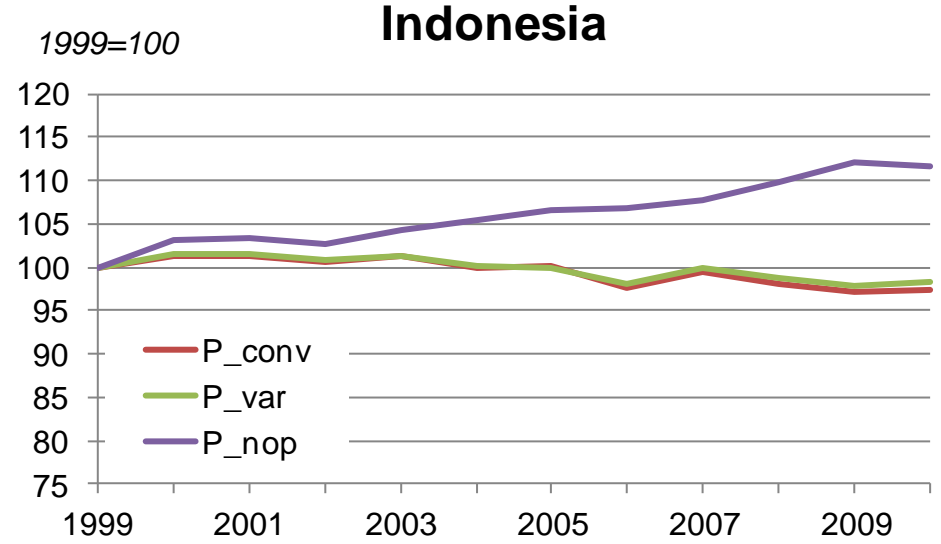
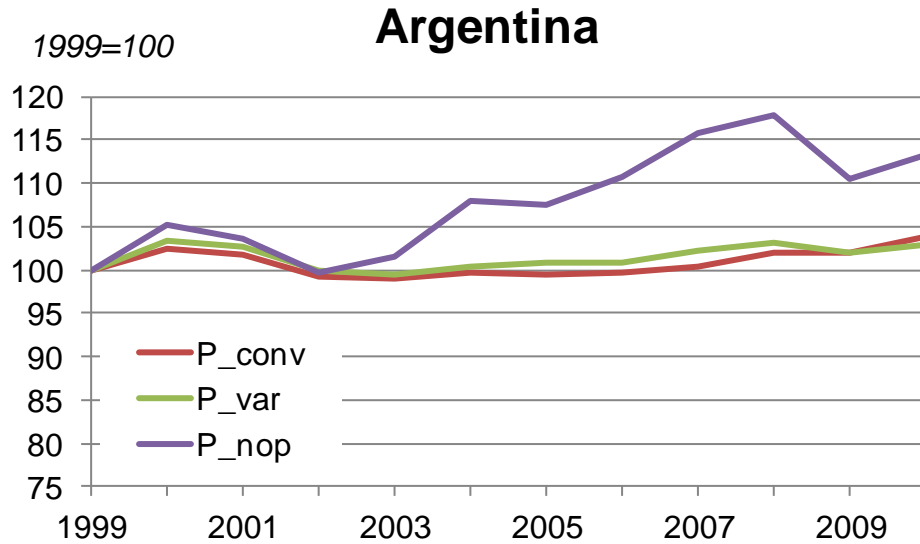


China



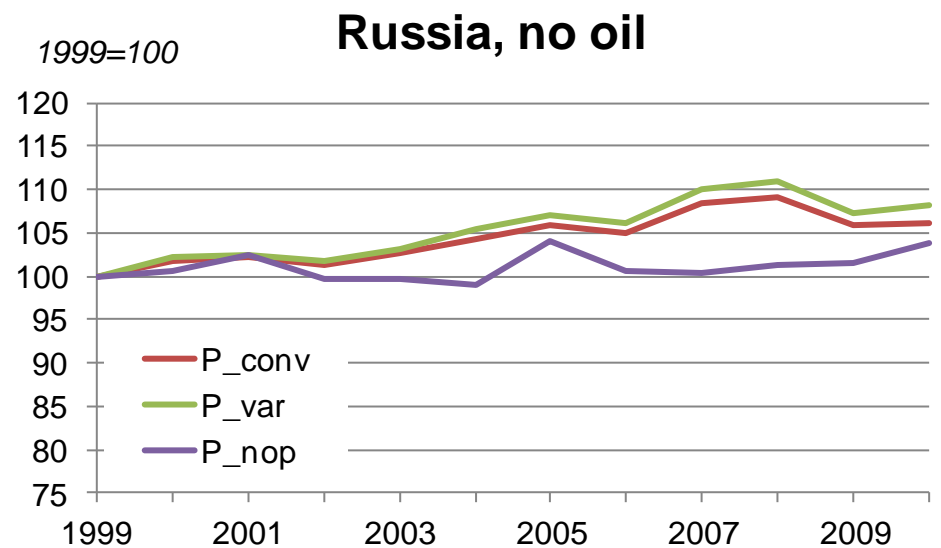
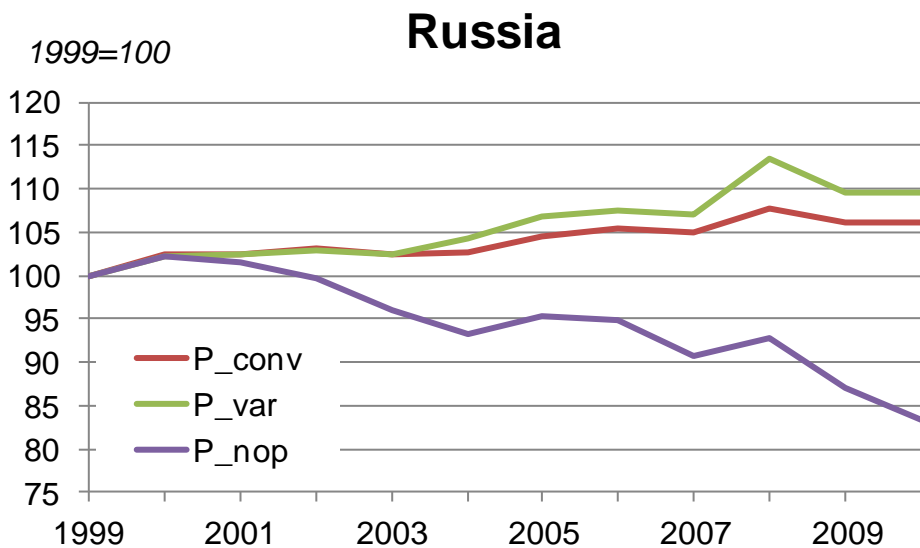
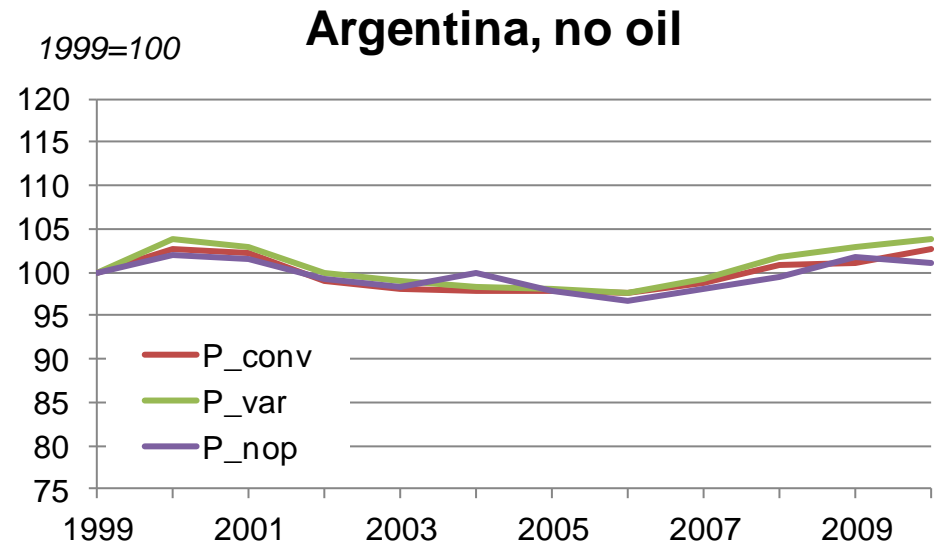
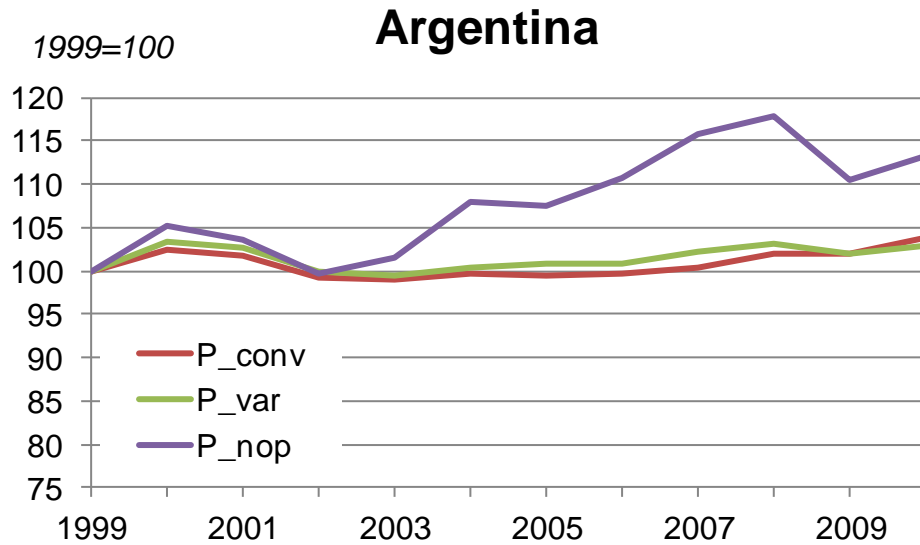
Non-Price Competitiveness

Selected EMEs

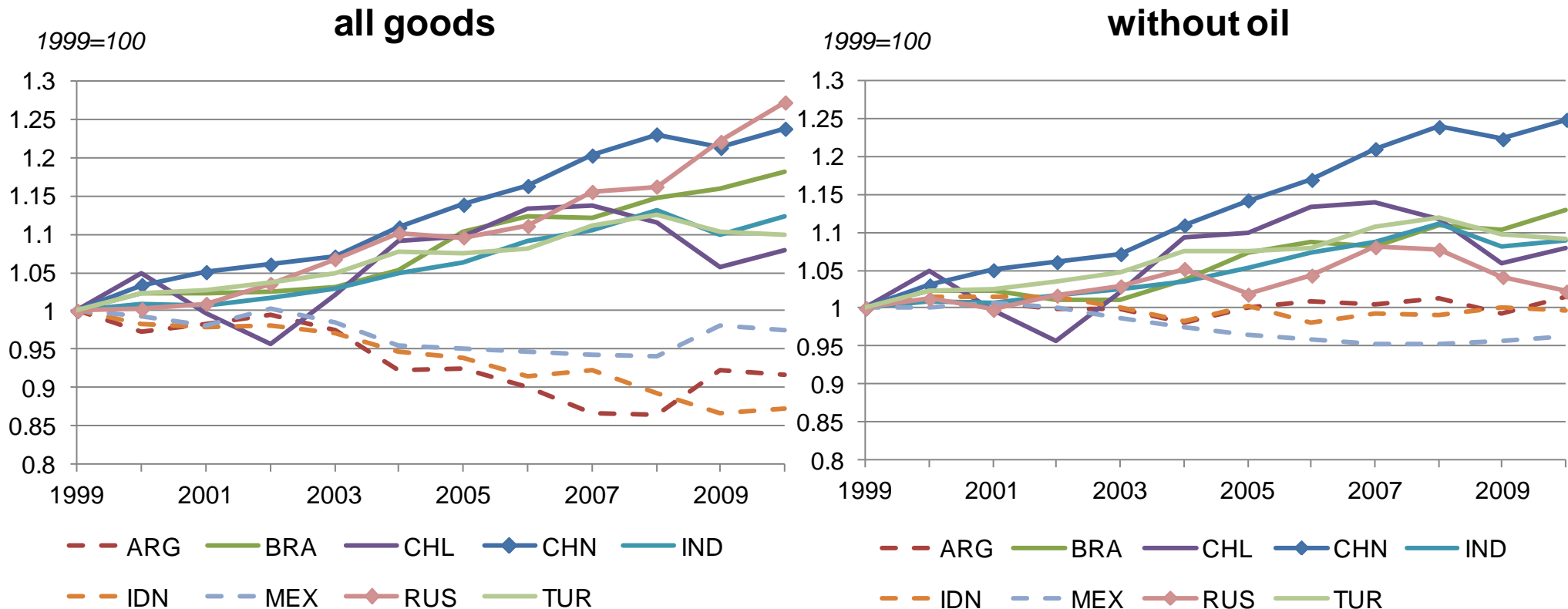


Non-Price Competitiveness

Excluding Oil Products



Contribution of Non-Price Factors to Competitiveness



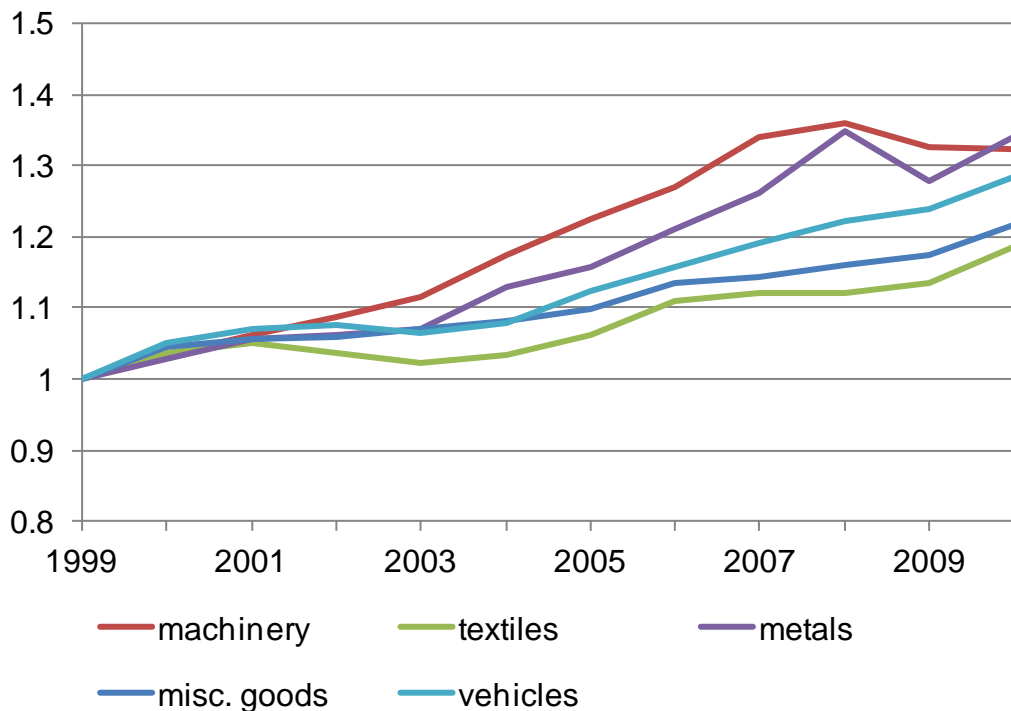
Source: own calculations.

Note: A positive value implies that non-price factors contribute positively to competitiveness.

Contribution of Non-Price Factors China

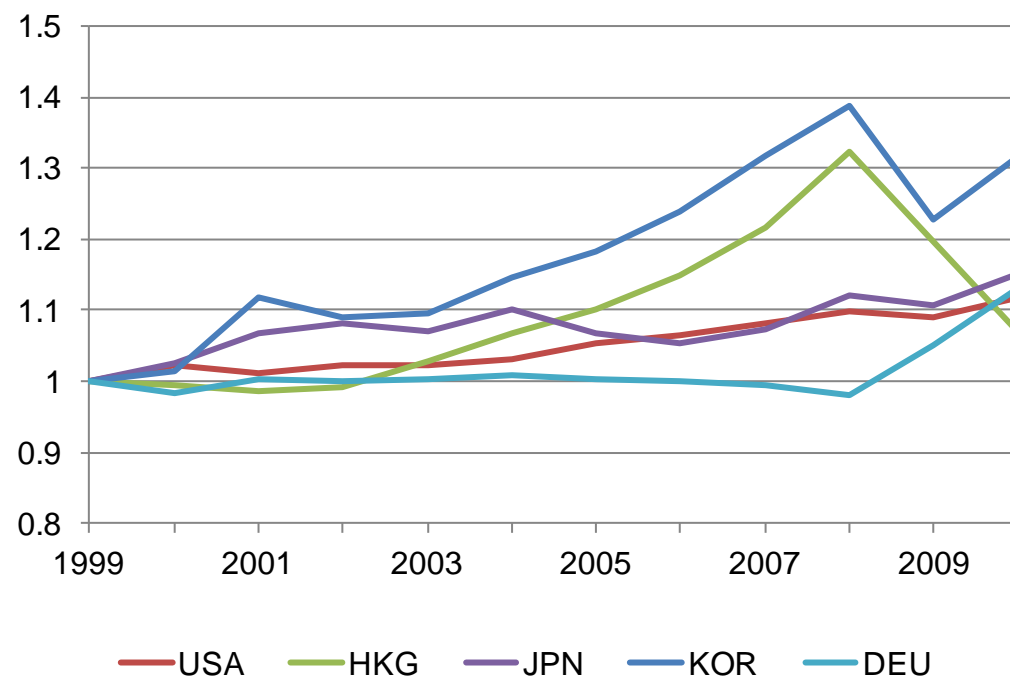
by main sectors

1999=100



by main export markets

1999=100



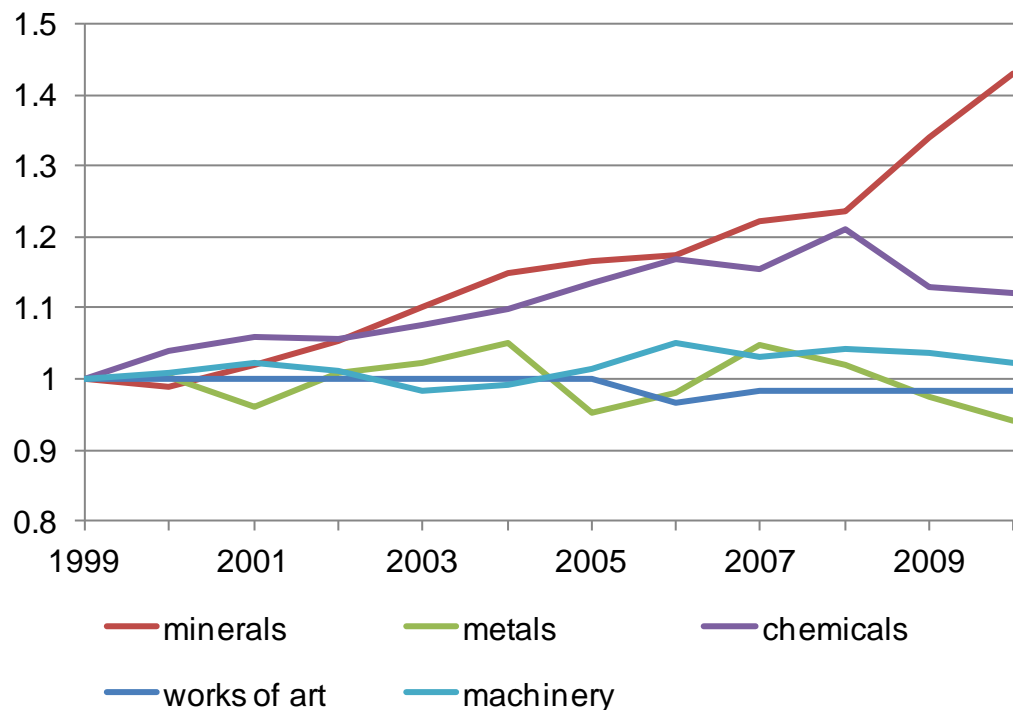
Source: own calculations.

Note: A positive value implies that non-price factors contribute positively to competitiveness.

Contribution of Non-Price Factors Russia

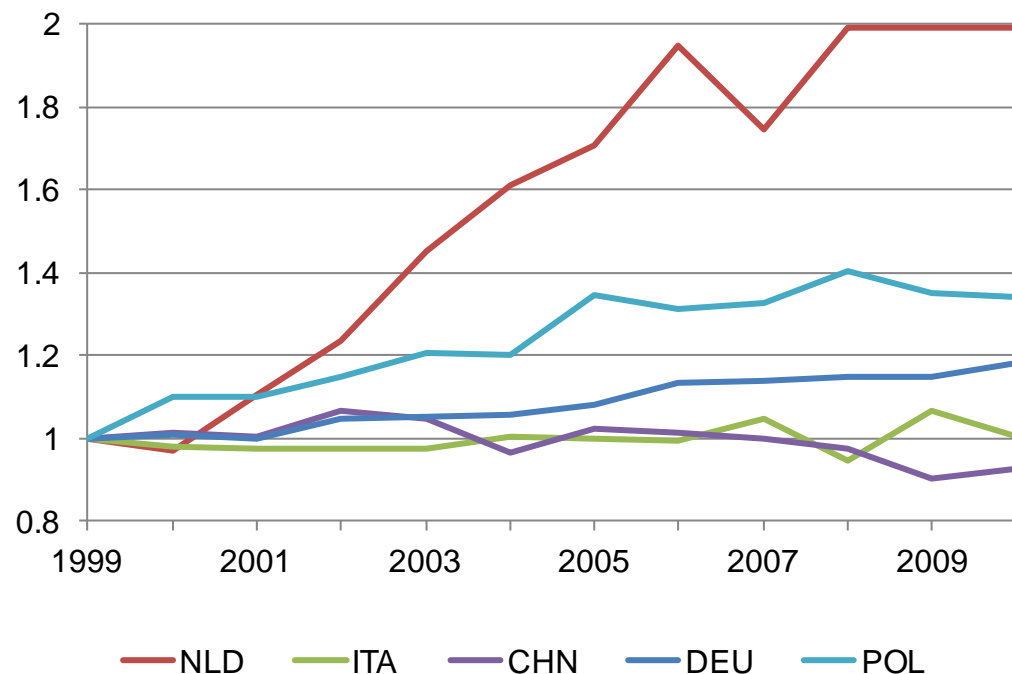
by main sectors

1999=100



by main export markets

1999=100



Source: own calculations.

Note: A positive value implies that non-price factors contribute positively to competitiveness.

Results

- **The traditional competitiveness measures based on REER show mostly losses in price competitiveness for EMEs**
 - Can be explained by catching-up related price convergence
 - But does it reflect "ability to sell" of those countries?
- **If we allow for changes in non-price factors and for different trade structures most EMEs show improved competitiveness**
 - Strong impact of non-price factors in China, but also in Brazil, Russia (related to oil exports) and Turkey
 - Dominating role of oil exports for some countries (Russia, Indonesia, but also Argentina)
 - Clear losses in competitiveness in Mexico

Concluding Remarks

- **Correcting for changes in “quality/taste” and taking account of differences in trade structures appears to be important.**
- **Our index combines price and quantity information.**
- **Importance of non-price factors is related to degree of market power:**
 - **Monopolistic competition: quantities dominate (i.e. market shares become a good indicator of competitiveness)**
 - **Perfect competition: prices dominate**
- **Hence, estimation of elasticities of substitution is crucial!**
- **Further advantage of this application: no need to specify a benchmark product/exporter as is the case for an import price index.**