The European chemical industry: Competing in global markets

Ad hoc Group Meeting on Trade and Competitiveness with Other Regions

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cefic

The European chemical industry: Competing in global markets

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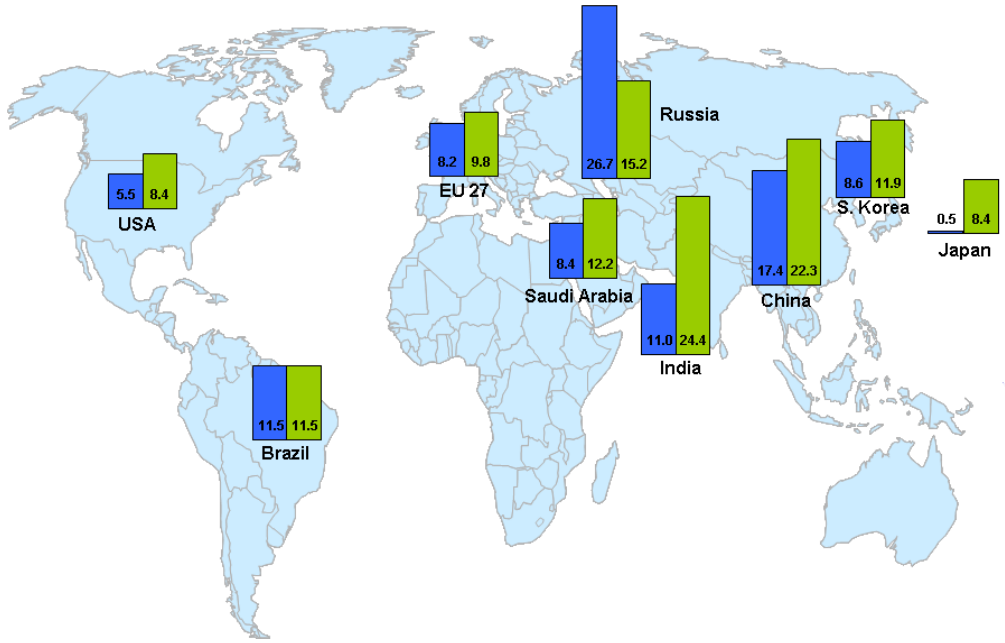
Setting the scene

Igor Magdalenic, Essenscia

The main characteristics of the chemical industry strongly influence its competitiveness

- **The chemical industry has some unique characteristics which have to be taken into account in a competitiveness analysis**
  - **Energy intensive**
  - **Highly complex**
  - **Integrated along the value chain into its downstream industries, creating unique clusters**
  - **Capital-intensive**
  - **Innovation-driven and knowledge-intensive**
  - **Globalised industry**

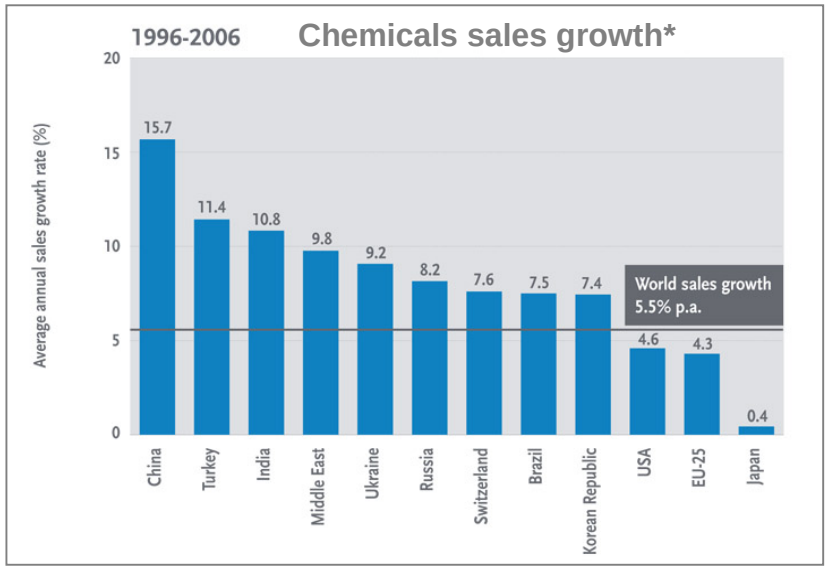
Chemicals are a truly globalised industry in which competition takes place at a global level

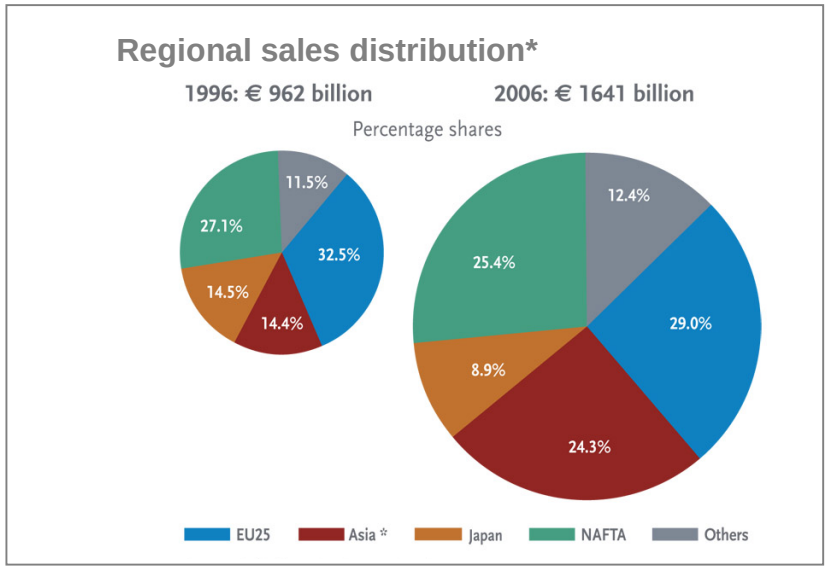


- Markets are booming around the world, with average growth rates p.a. of trade and production of up to 25% in certain countries
- More than 45% of the value of the global chemical industry is traded. Over 35% of this world trade is intra-company in nature.

Source: CEFIC, COMTRADE and BASF

Global competition in the chemical industry is beneficial, if everybody competes on equal and fair terms





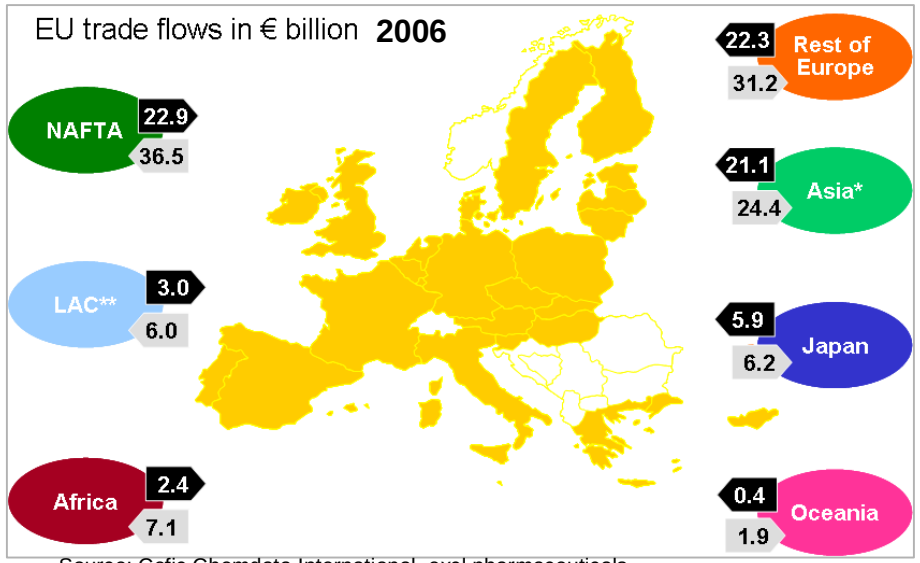
- Competition in the chemical industry takes place on all levels:
  - Trade – from and to Europe
  - Investment - building up a presence sales and production
- High growth markets are mainly in non – OECD countries
- But growth in other parts of the world is not a zero sum game, as long as any player can benefit from it

Access to markets and a global level playing field are prerequisites for fair and beneficial competition

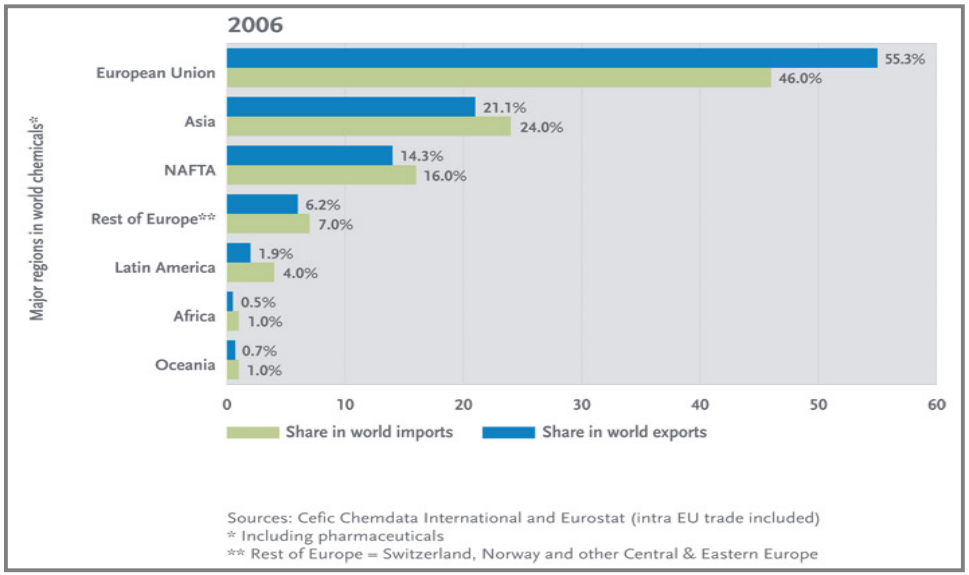
* Source: Cefic Chemdata International, excl pharmaceuticals

Trade is crucial for the European chemical industry

- Trade is an important means to seize global opportunities
- Trade links the European chemical industry with all regions around the world



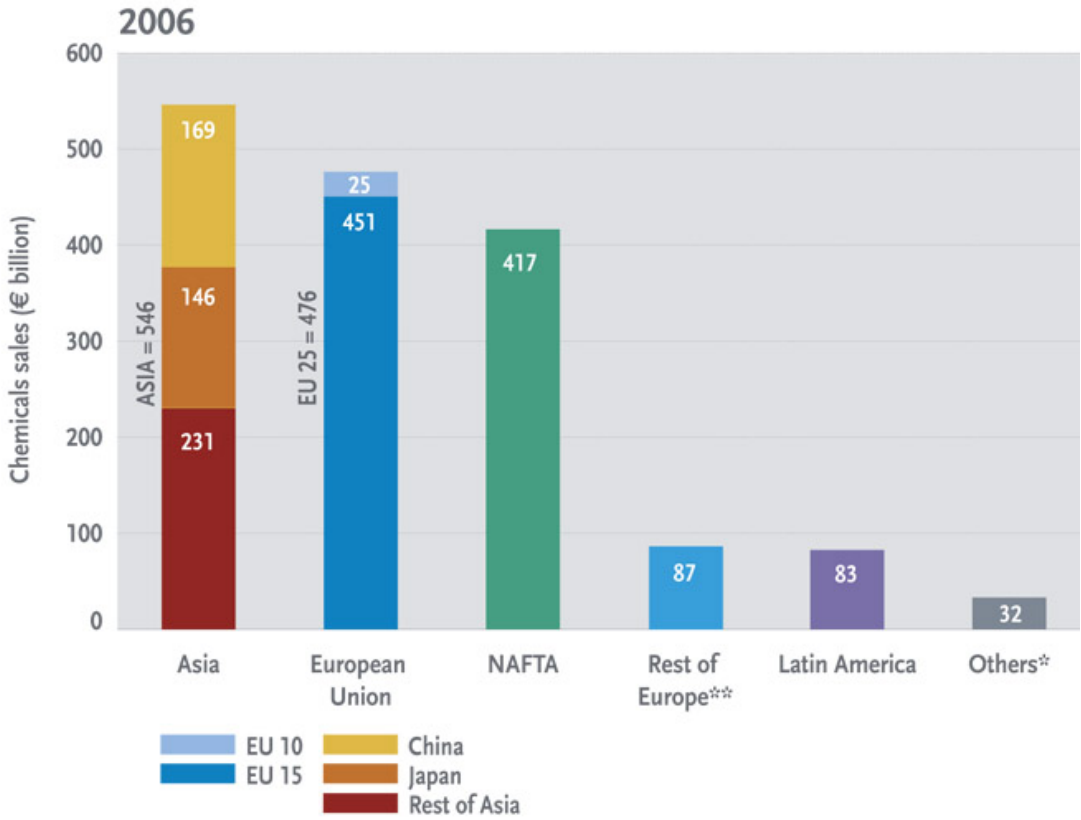
Source: Cefic Chemdata International, excl pharmaceuticals
*Asia excl Japan ** Latin America and the Caribbean



- The European chemical industry has so far been in a position to benefit from trade

The European chemical industry is still in a good position and Europe is a good place to do business

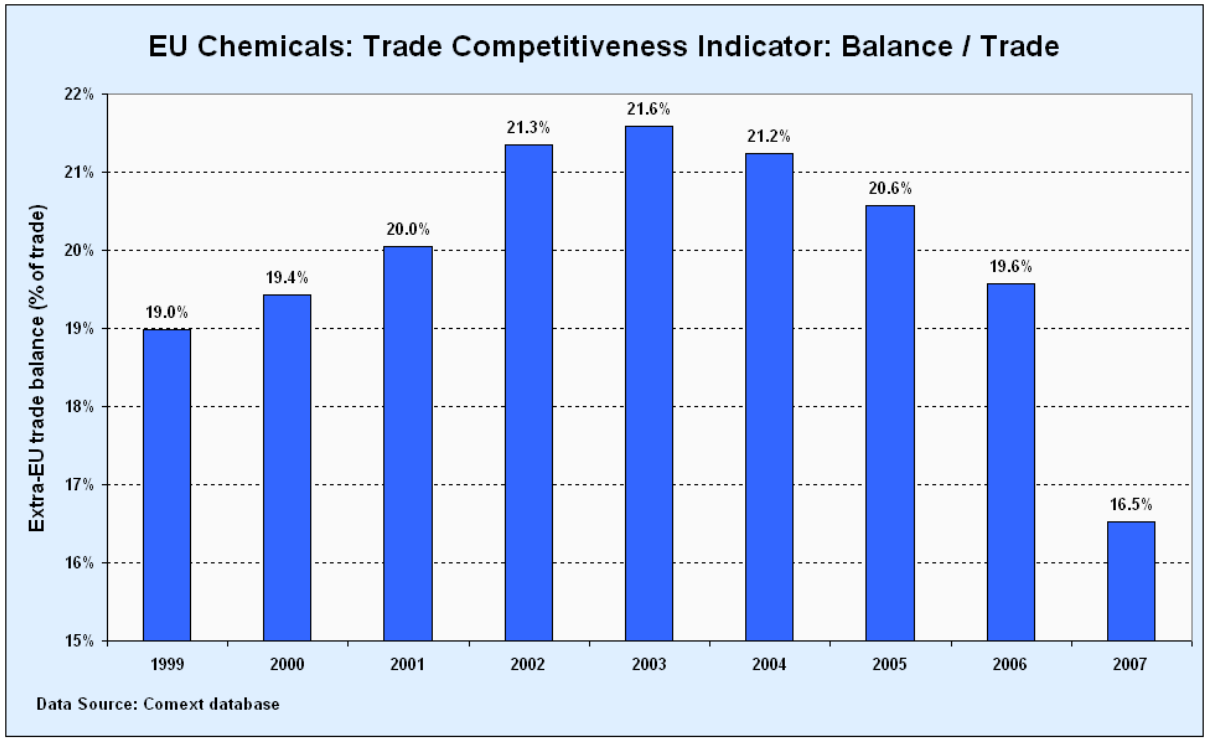
Geographic breakdown of world chemical sales



Source: Cefic Chemdata International
Others* = Oceania and Africa
Rest of Europe** = Switzerland, Norway and other Central & Eastern Europe (excluding the new EU 10 countries) excl pharmaceuticals

- With 29%, Europe is the leading integrated market in the world
- Asia has a strong position as a chemical market and is a serious competitor for the EU

Declining trade competitiveness is the first sign of an eroding international position of the European chemical industry



- The trade analysis shows that EU trade competitiveness declined by almost 30% over the last five years
- Imports into the EU are growing much faster than exports

On the approach and the notion of competitiveness

Ø The concept of competitiveness

- Ü Comparative concept of the ability and performance of a firm, sector, country or region to sell or supply goods/services in given market by exploiting its success factors
  - à Several dimensions of competitiveness (firm, sector, regions, ...)

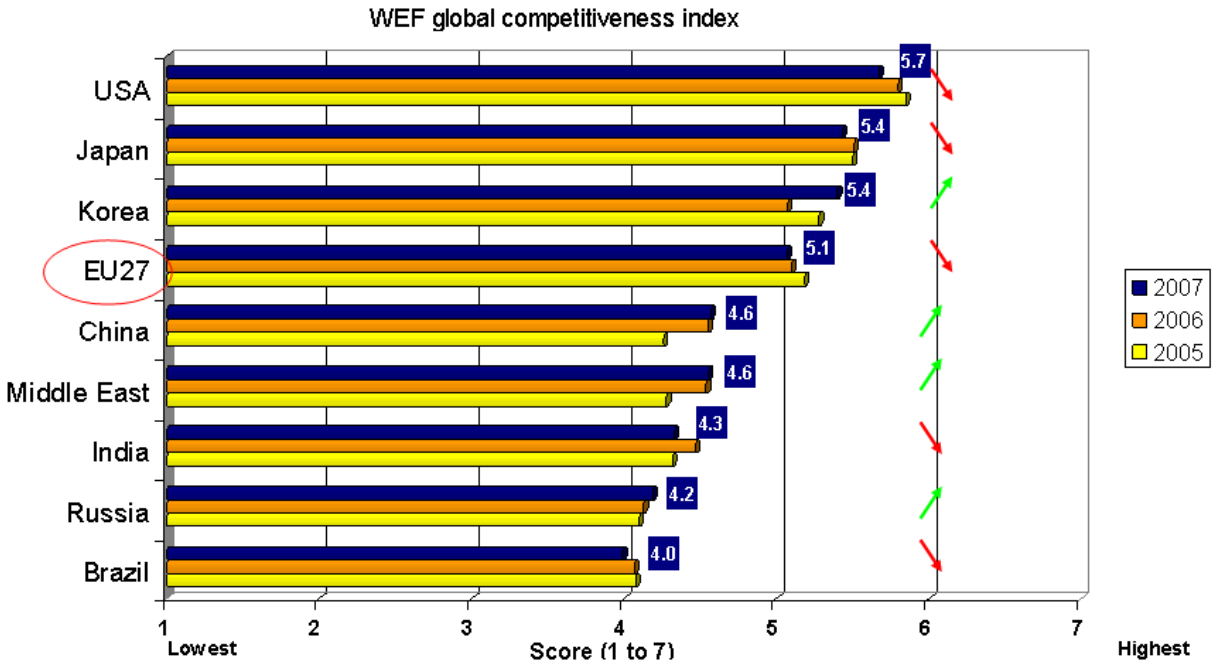
- Ü "Regional and national competitiveness relate to the achievement of high rates of quality employment and high rising standards of living that can be sustained by providing economic opportunity to citizens in an increasingly globalised economy."

  This ability to anticipate and successfully adapt to economic and social challenges by providing new economic opportunities is influenced by a number of factors.

Focus of the analysis

- Ü A comparison with 8 competitors accounting for ~ 90% of world trade in chemicals and ~85% of world chemical sales
  - § BRIC (Brazil, Russia, India, China)
  - § Middle East (Saudi Arabia)
  - § South Korea
  - § Japan
  - § US

Europe's overall competitiveness is good, but there is a risk of losing out

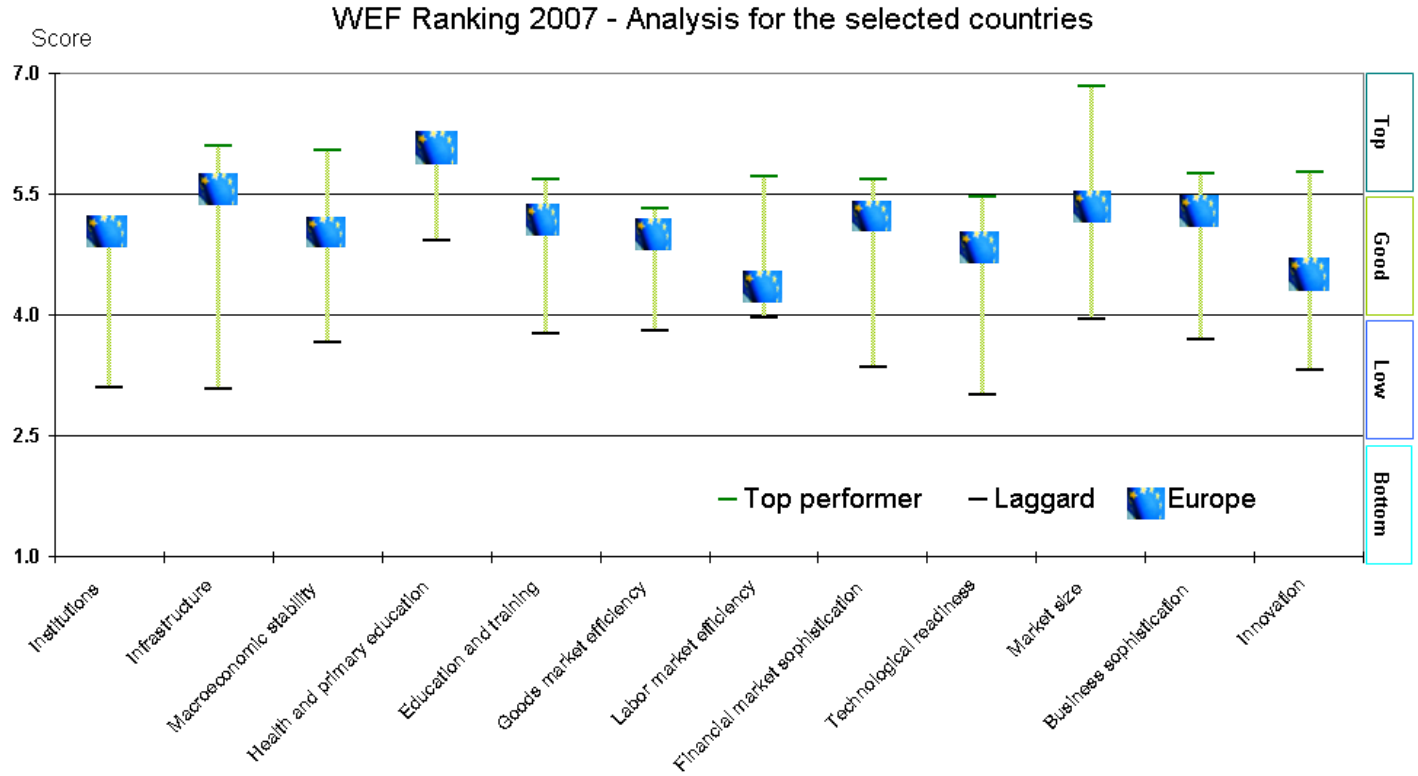


- The USA is the top performing country and therefore the point of reference for all the other countries
- Overall competitiveness is a basic condition for and confirms the positive picture of the competitiveness of the European chemical industry
- Europe shows good results for its overall competitiveness, but has still room for improvement
- However, all countries show a relatively good performance
- An analysis over time shows that most developing countries are catching up fast, whereas most developed countries are losing out

Source : WEF

2005 data are based on 9 pillars of competitiveness (instead of 12) and EU27 / Middle East : weighted average of national scores based on Nominal GDP 2006 $

Countries are increasingly competing on a similar footing, so the global framework does not need exceptions



- In comparison to the top performer, Europe has to catch up in the area innovation and labour market efficiency
- Nevertheless, all important chemical producers play in the same league and no country seems to have a very weak point
- There are no significant differences between the countries' performance which would require exceptions to the overall rules

Source : WEF

Key messages

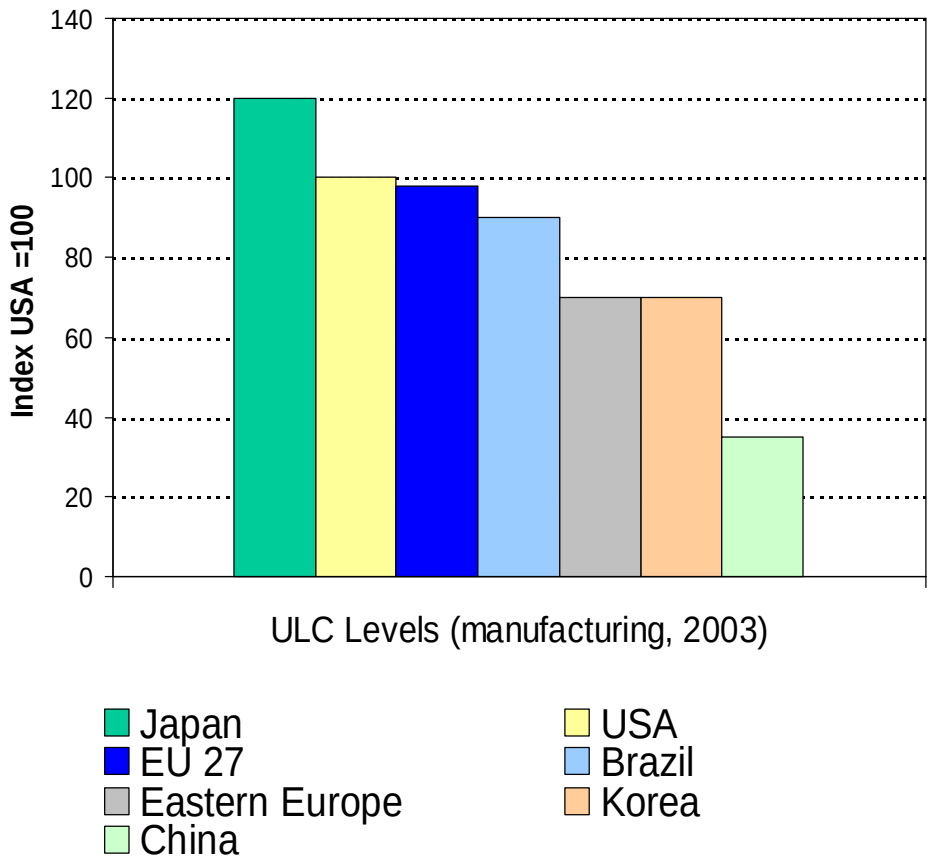
- Competition in the chemical industry takes place at the global level
- A competitive Europe is a prerequisite for a competitive European chemical industry, on the European market and abroad
- Overall competitiveness analysis indicates that Europe is still in a good position, but other countries are catching up rapidly
- Europe cannot sit back and allow others to overtake; instead it should try to reduce the gap to the top
- The overall competitiveness analysis shows no requirement for exceptions to unbalance the global level playing field

Factors impacting the global level playing field of the European chemical industry

Dr. Henrik Meincke, VCI

Labour Costs – high but competitive

- Labour costs in the EU chemical industry are high.
- There are large differences within Europe.
- Adjusted by productivity, ULC levels in the EU are competitive with most countries.
- Asian countries have lower ULC. This is a comparative advantage.
- A strong Euro harms labour cost competitiveness of the EU chemical industry.

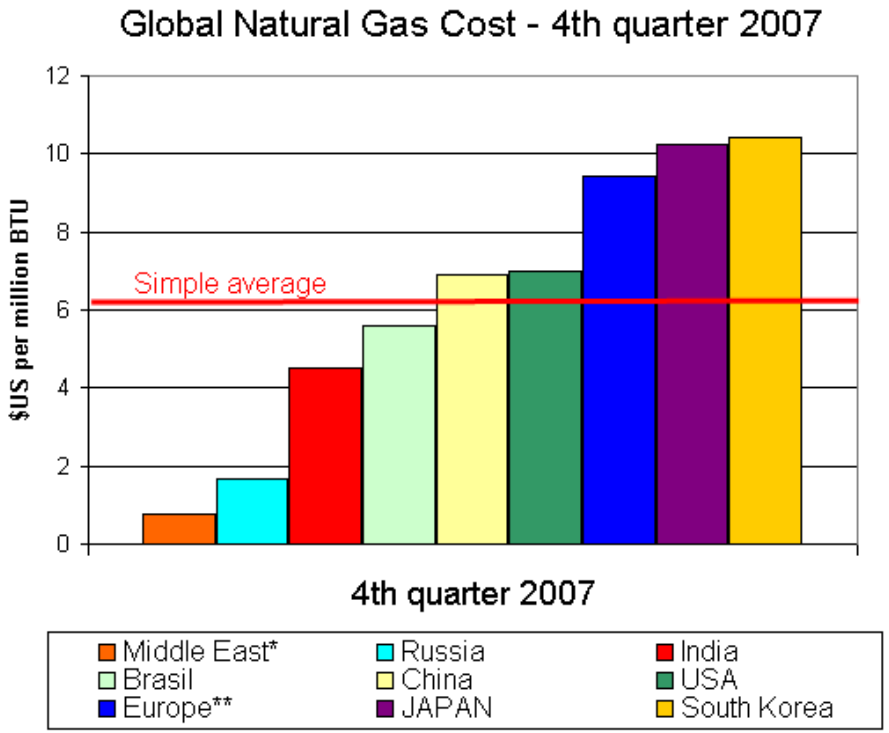


Exchange Rate
2003: 1.13 US$/Euro
2007: 1.37 US$/Euro (+20%)

Source: "Unit Labor Costs, Productivity and International Competitiveness", RuG 2005

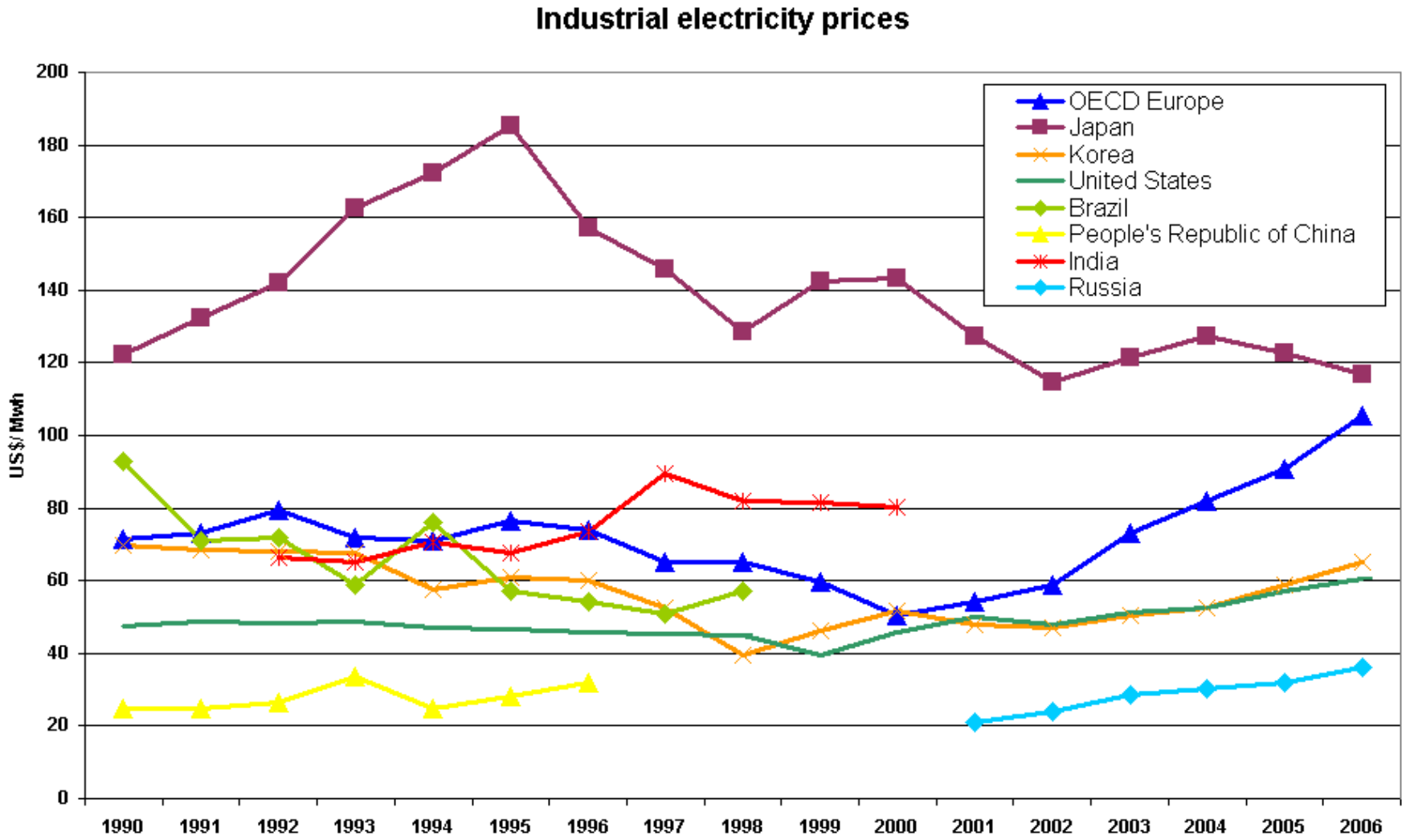
Gas prices give a clear advantage to Russia and Middle East

- Expensive and scarce goods in Europe, as Europe is neither a strong gas nor oil producer country and has to import its raw materials.
- Europe has a good infrastructure, but inputs have to be sourced from other countries.
- Security of supply is crucial for a competitive European chemical industry.
- Other countries have preferential access to these energy sources. Prices are lower than in Europe and additionally unfair commercial practices take place (e.g. double pricing).



Source: ACC * Saudi Arabia ** UK

Electricity prices in Europe have gone up in recent years



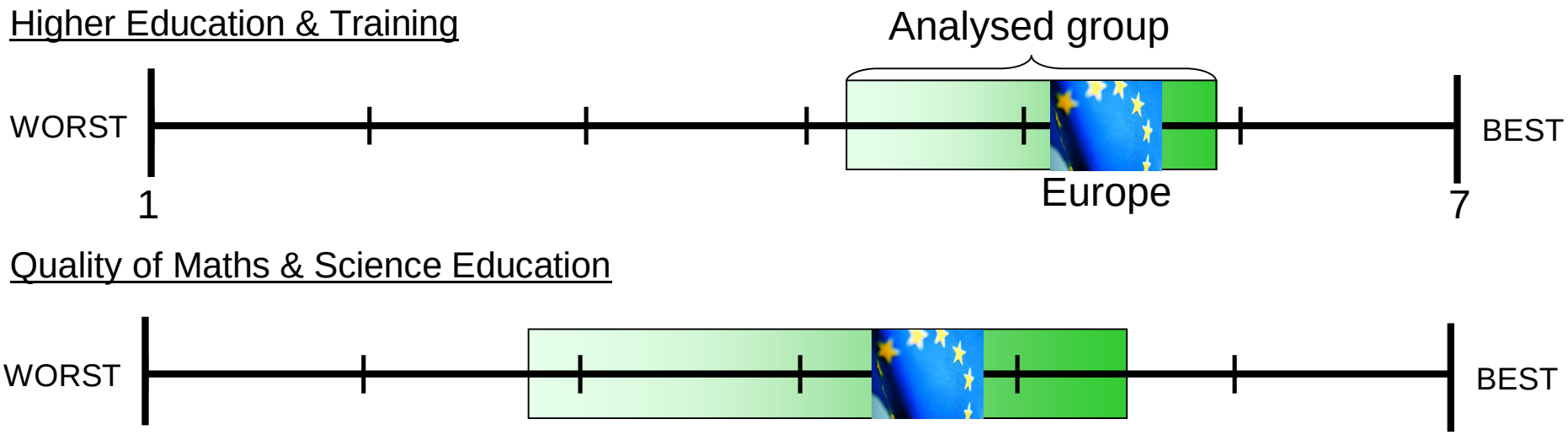
Source: IEA

Electricity costs in Europe are high

Energy cost (Electricity)

- Expensive in Europe, and especially in recent years, electricity prices have risen much faster than in the benchmark group.
- The European electricity market is not efficient and limited openness leads to oligopolistic structures which put upwards pressure on prices.
- Other countries, such as Russia or China, keep their local electricity prices artificially low, also by subsidising electricity production input factors, such as gas or oil.
- Energy policies in Europe are not favourable. Additional energy costs come from the Emissions Trading Scheme (ETS).

Education – more focus on science needed

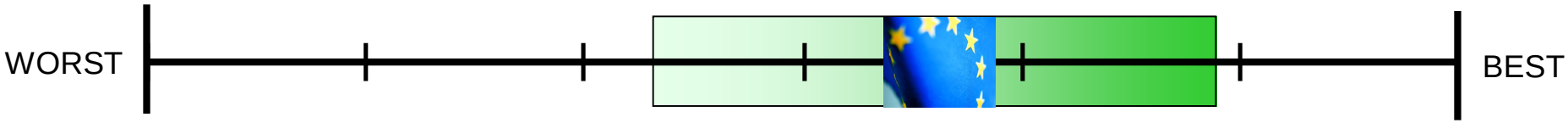


- The chemical industry needs a highly qualified workforce. For an innovative and progressive industry a good maths & science education is required.
- The overall educational system and the science education in Europe is among the best of the world.
- Other countries do have a stronger focus on maths & science (MINT-graduates: Korea: 76%; EU 55%; Japan: 44%)

Source: WEF, 2007

Europe needs a better environment for innovation

Company spending on R&D

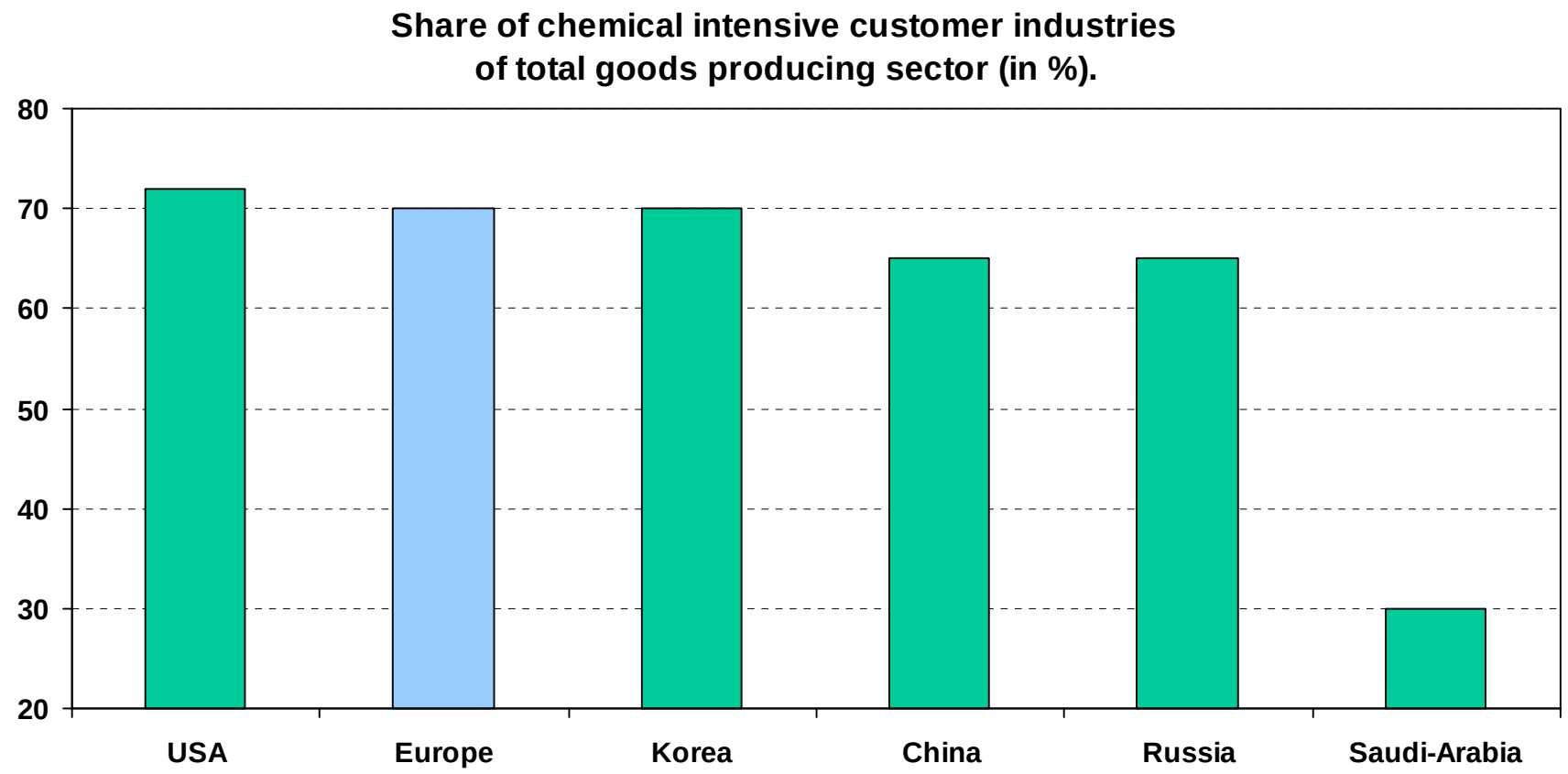


- Total economy:
  - Companies in Europe invest significant amounts of money into R&D, but some countries perform better.
- Chemical industry:
  - R&D intensity* is higher in industrialised countries than in new competitors (EU: 2.0%, China: 0.8%, Korea: 1.7%; USA: 2.1%).
  - However, emerging countries are catching up.
- Chemistry & biotech Patents filed at the European Patent Office:
  - The industrialised countries still account for over 90 percent (EU: 35%).
  - However, emerging countries are catching up.
    e.g. India: annual growth of 4.2% (2000–2004); 1.3% (1995-2000).

*R&D expenditure in % of sales

Source: WEF, 2007, ZEW Innovationsmotorstudie 2007

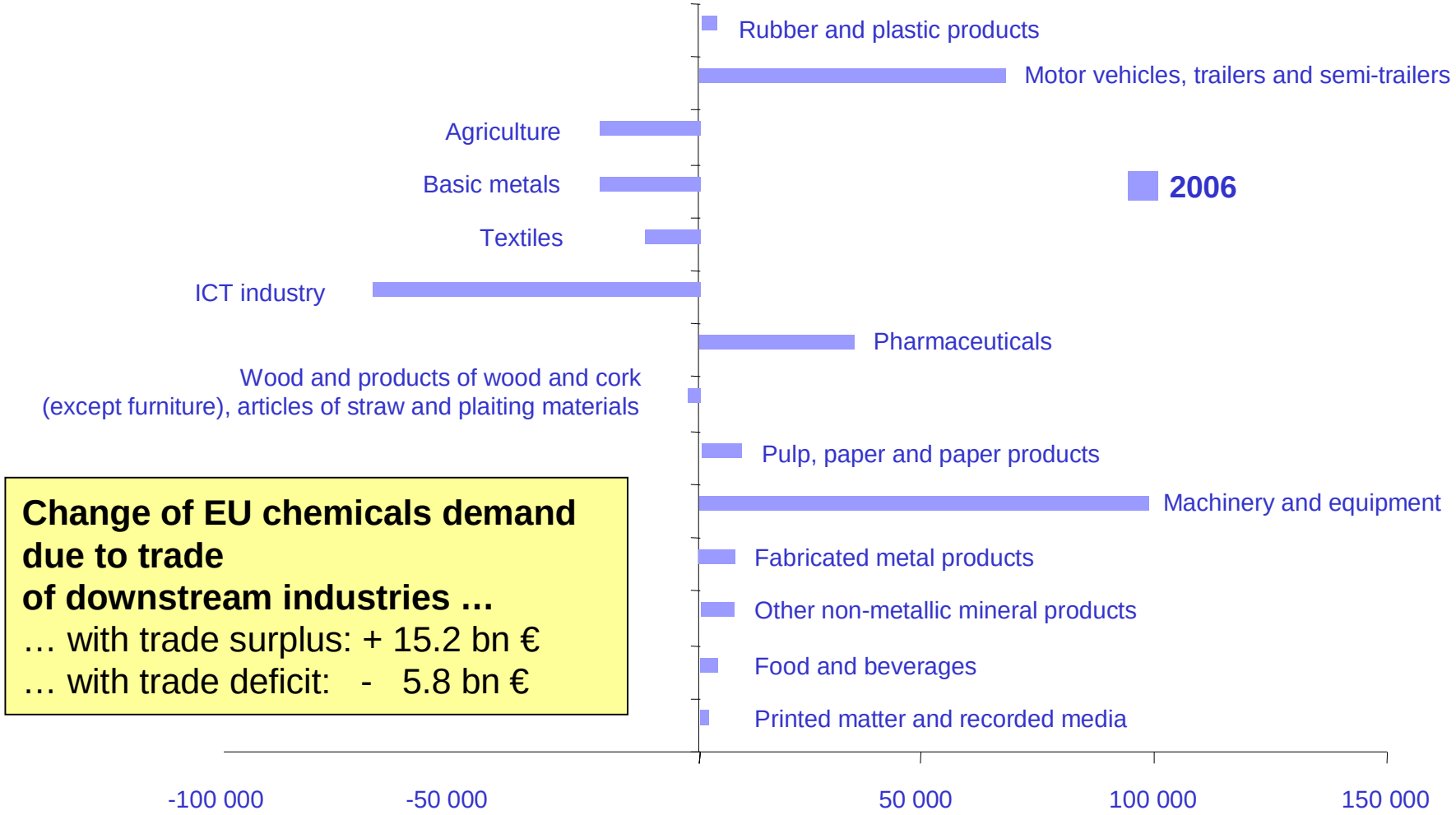
Europe offers a high density of industry clusters



- A strong customer base in Europe is a strong point of the European Union
- The European chemical industry is highly integrated with its customer industries.

The chemical industry benefits from trade in other sectors

EU27 trade in goods* – Trade balance in 2006, € millions



Change of EU chemicals demand due to trade of downstream industries …

… with trade surplus: + 15.2 bn €

… with trade deficit: - 5.8 bn €

Source: Eurostat, * selection of downstream industries with a share in chemical consumption higher than 1 % in 2004, sorted by decreasing share of total chemical consumption

EU regulatory framework influences competitiveness

- **Regulation and interventionism has increased:**
  - **e.g. promotion of renewable energies**
  - **e.g. ecodesign requirements**

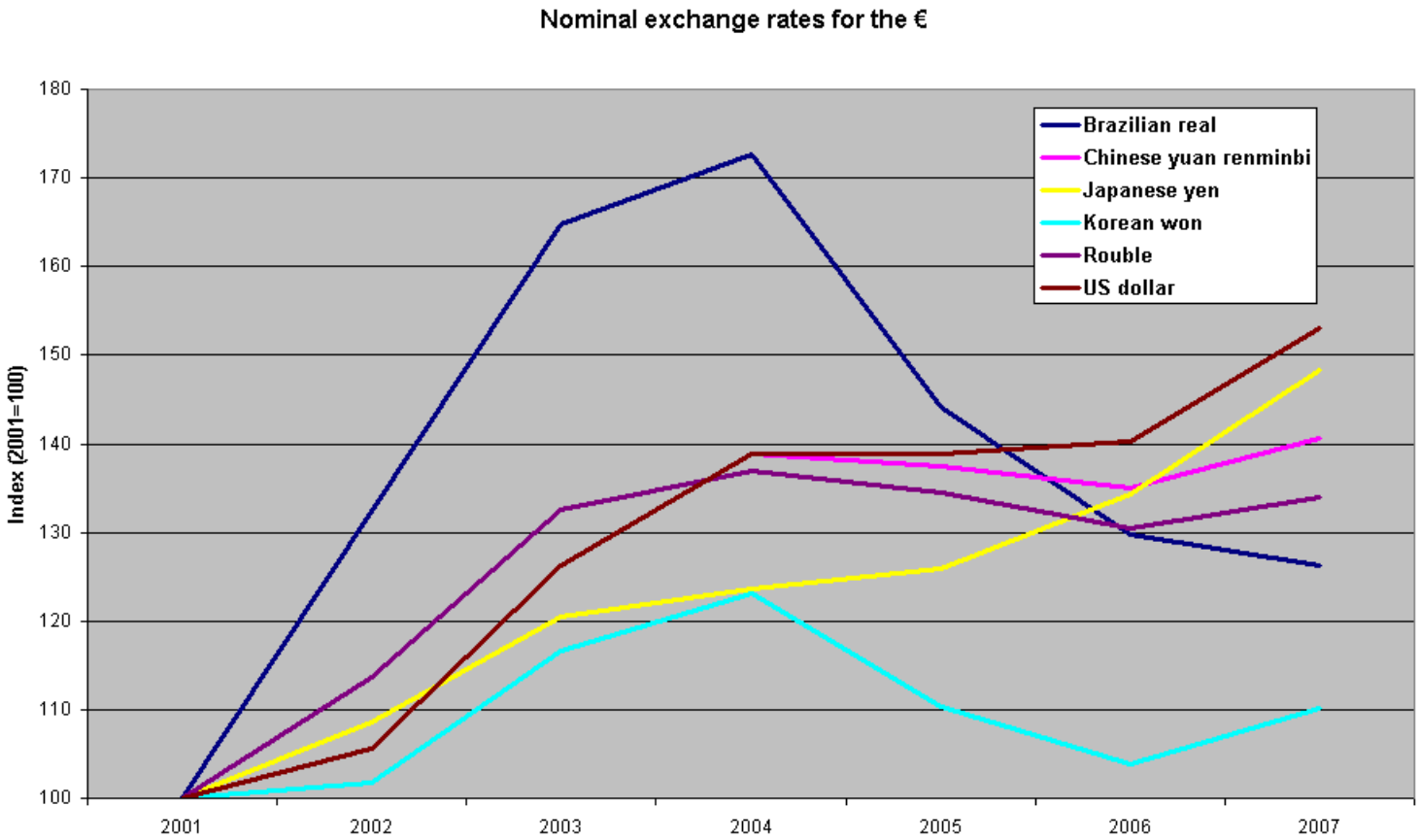
- **Regulation could impose additional costs.**
  - **e.g. ETS**

- **Interventionism could provoke unwanted secondary effects.**
  - **e.g. biofuels**

- **Interventionism could harm creativity and investment.**

Regulation should always take into account its impact on competitiveness.

Exchange rates can be used as an instrument of active industrial policy



- **A strong Euro harms price competitiveness of European producers. European products become more expensive in comparison with those of competitors.**
- **Countries like China conduct <u>exchange rate interventions</u> to keep the value of the local currency artificially low.**

Source : ECB

Key messages

An analysis of different factors shows that the European chemical industry can remain competitive

- **General framework**
  - **Cost aspects**
    - **Labour costs**
    - **Feedstock / Energy**
  - **Innovation environment**
    - **Education**
    - **Innovation**
  - **Market conditions**
    - **Industry Clusters**
    - **Infrastructure**
- **Industrial policy framework**
  - **EU regulatory framework**
  - **Industrial policies abroad**
  - **Trade policies**

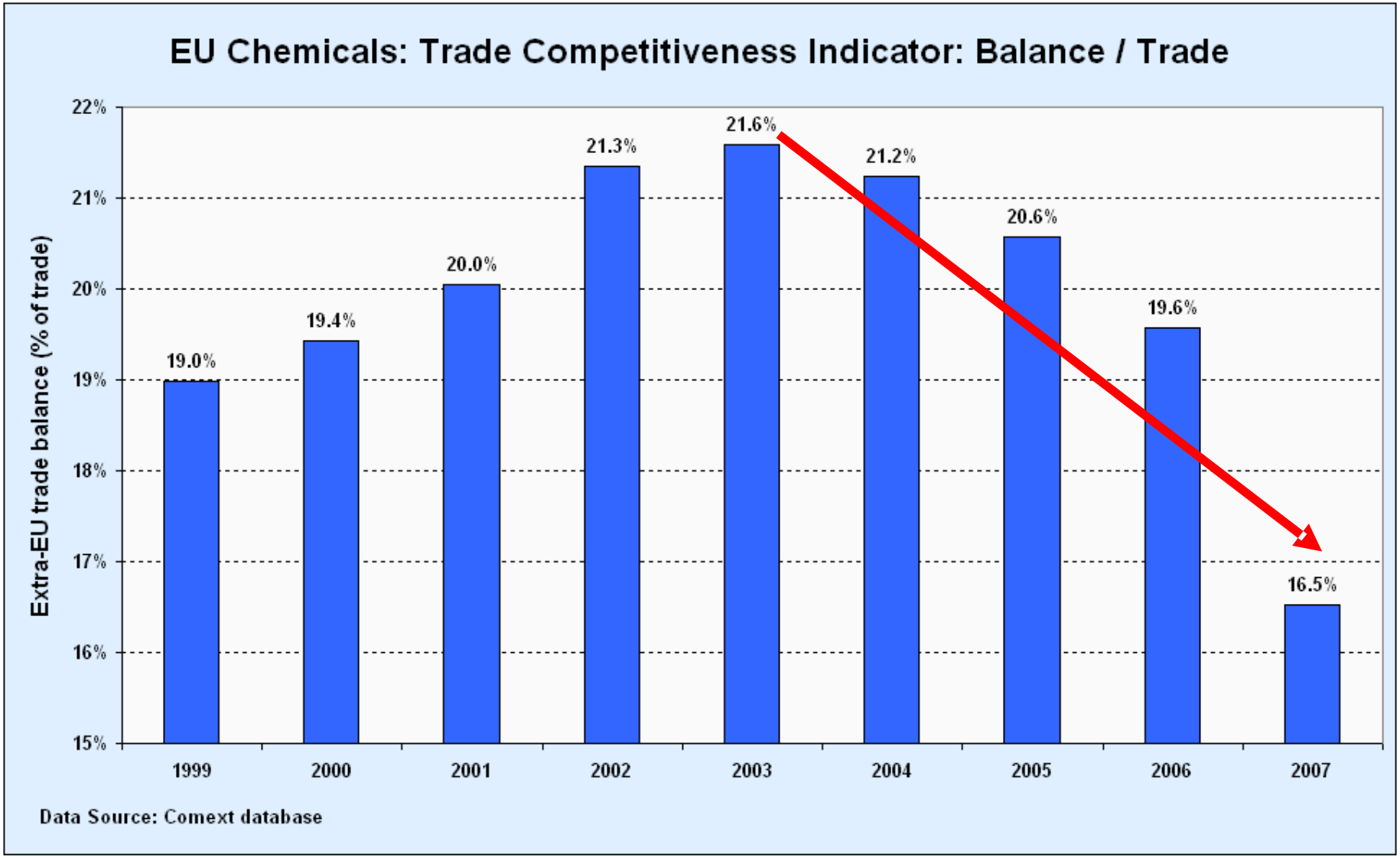
Europe is a high cost region, but can compensate this by being innovative and having favorable market conditions.

Europe must ensure a level playing field for global competition.

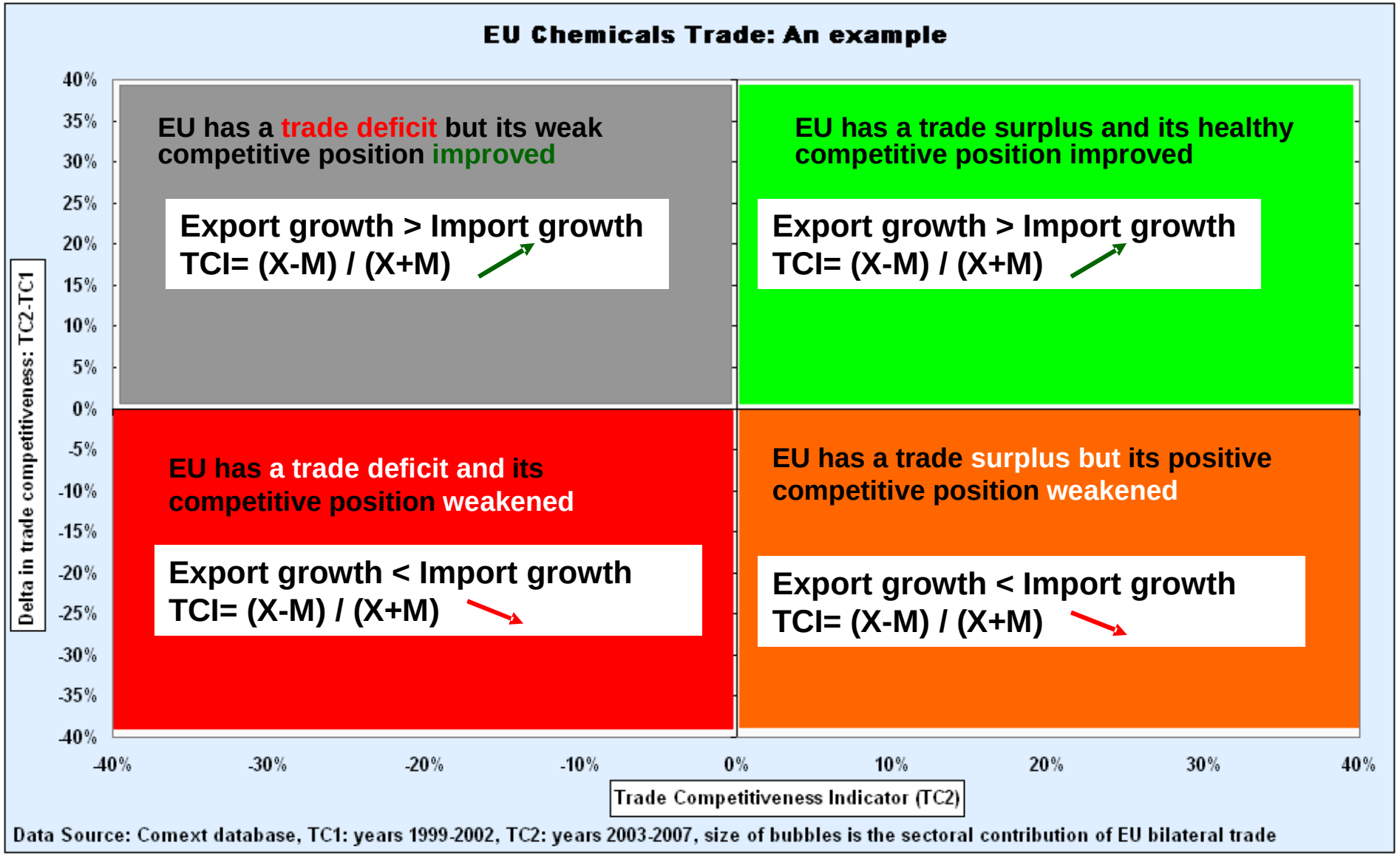
Trade Flows as Indicator of Competitiveness

Dr. Moncef Hadhri, Cefic

Trade flows indicate an eroding competitiveness of the EU chemicals industry



Trade Competitiveness Trends: Four cases



The EU has a trade surplus with seven out of the nine countries analysed.

EU has a trade deficit in specialty chemicals with advanced chemicals producing areas (USA, Japan)

EU chemicals Industry is losing its comparative advantage with key leading countries in Asia

	USA	Japan	Brazil	Russia	India	China	South Korea	Middle East	Rest of Asia
Basic Inorganics									
Organics				Rain		Rain			
Specialities	Rain								
Consumer Chemicals						Rain			
Polymers	Rain	Rain					Rain		
Vitamins		Rain							
Dyes									
Pigments	Rain	Rain							
Fertilizers				Rain				Rain	
Chemicals						Rain			

EU has a trade surplus and its healthy competitive position improved

EU has a trade deficit but its weak competitive position improved

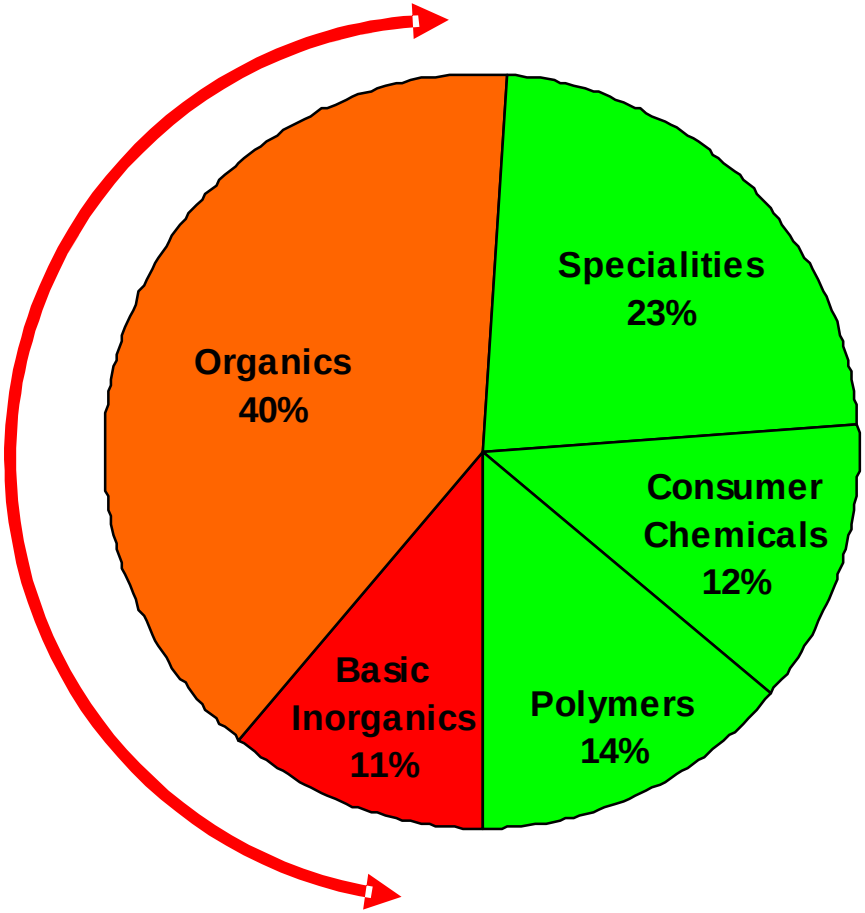
EU has a trade surplus but its positive competitive position weakened

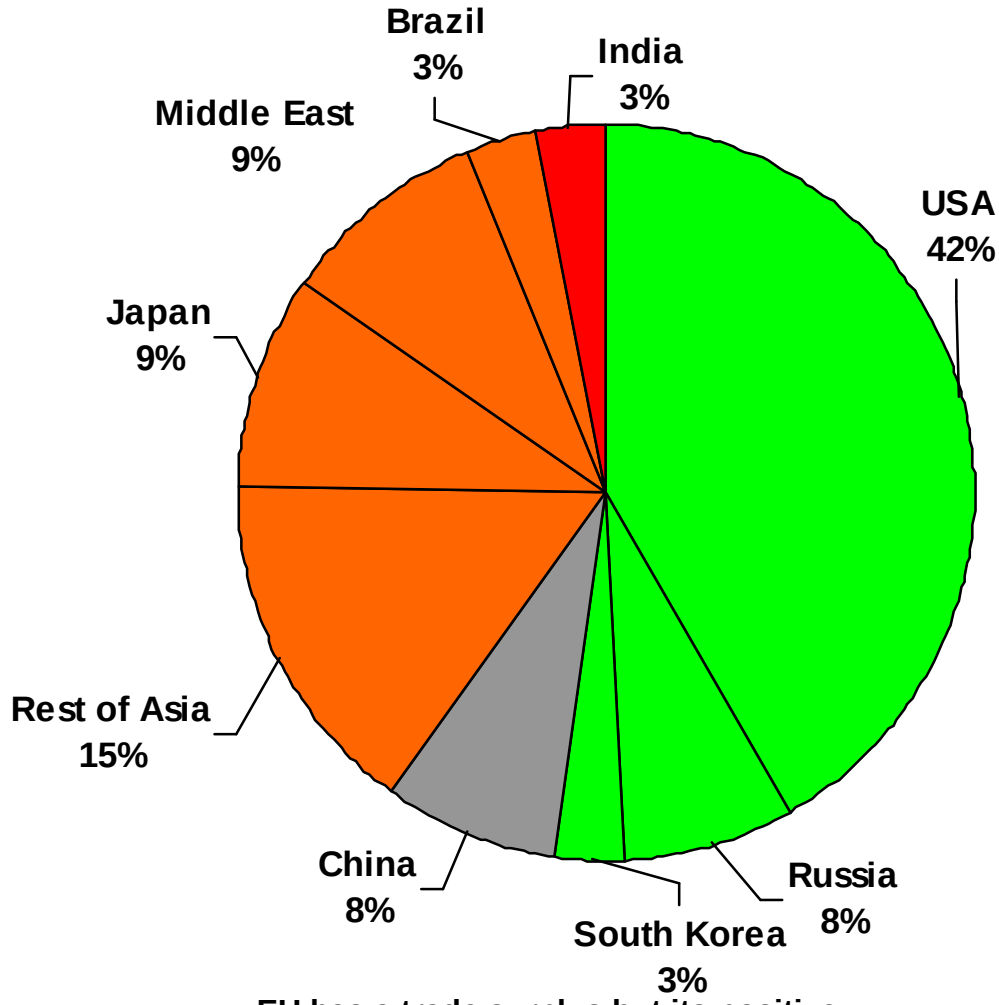
EU has a trade deficit and its competitive position weakened

Period 1: average (1999-2002), Period 2: average (2003-2007), Delta Analysis = TCI 2-TCI1

Trade = Exports + imports, Balance = Exports – Imports, TCI: Trade Competitiveness Indicator = Balance/ Trade

Trade flows show a competitive position at risk for 50% of the countries (or sectors) analysed





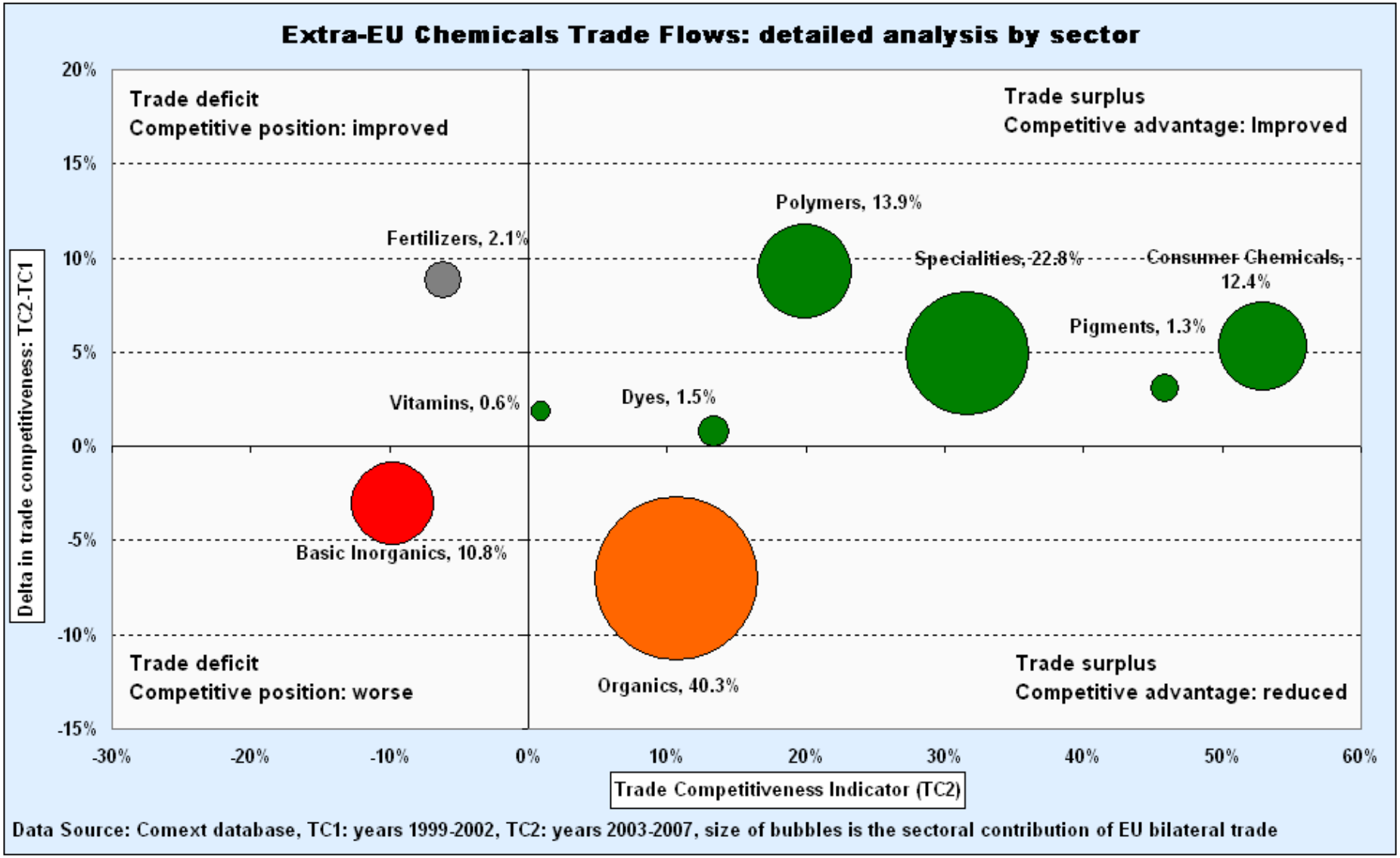
EU has a trade deficit and its competitive position weakened

EU has a trade deficit but its weak competitive position improved

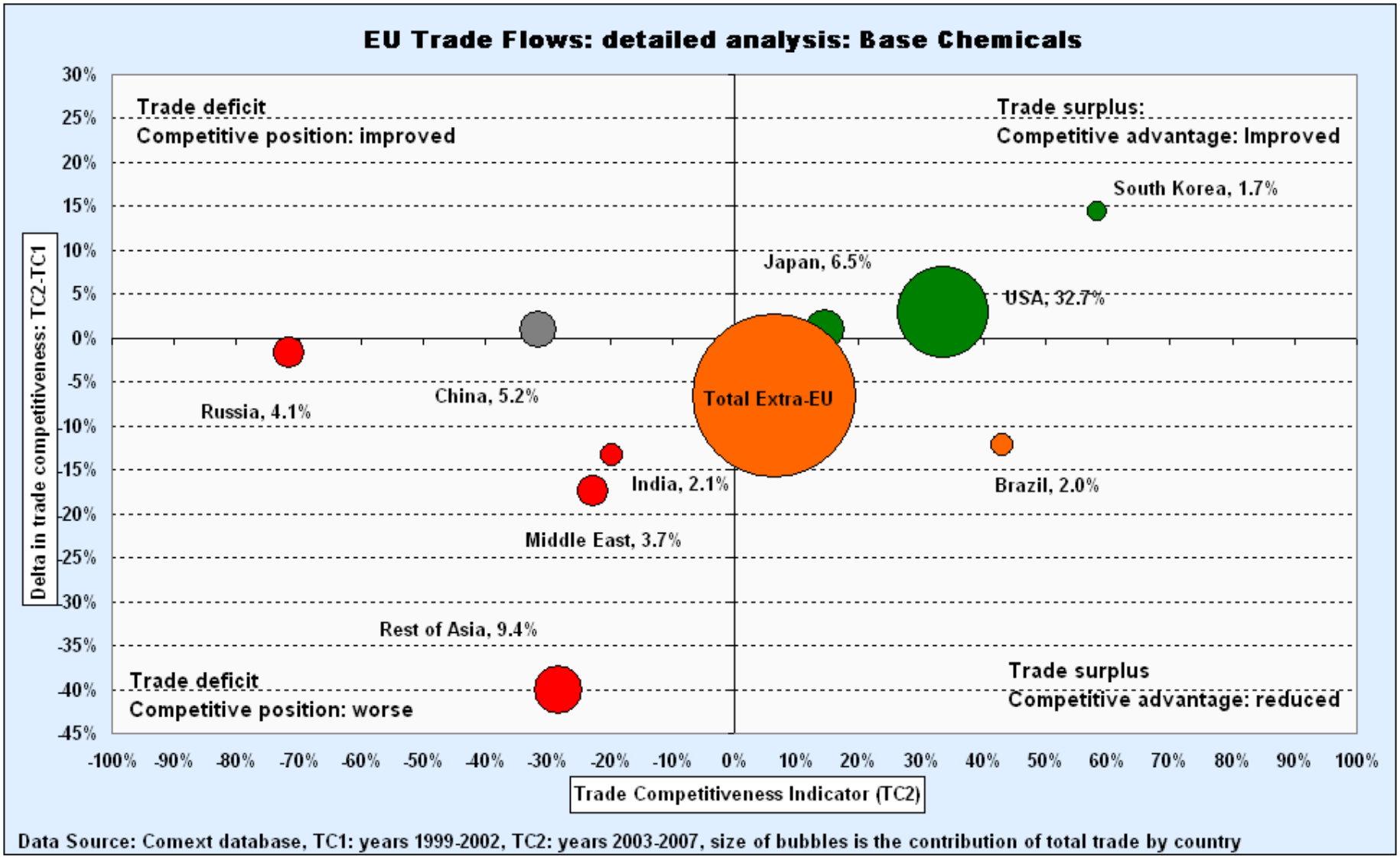
EU has a trade surplus but its positive competitive position weakened

EU has a trade surplus and its healthy competitive position improved

Specialty chemicals is the best performing chemicals sector. However, basic inorganics and organics are the two most sensitive sectors where Europe is facing strong import exposure with Russia & key Asian countries.



Competitiveness Analysis for Base Chemicals

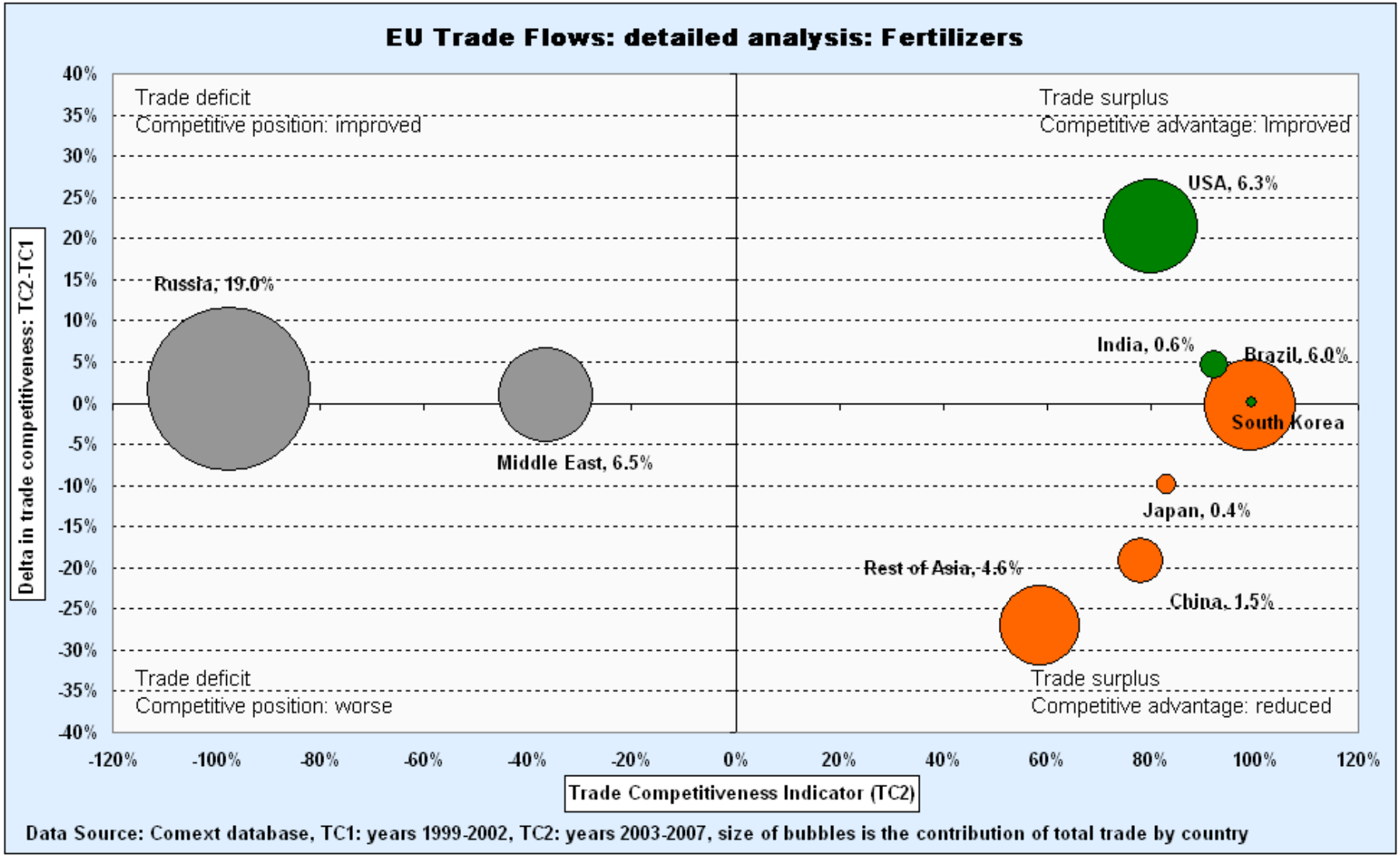


Data Source: Comext database, TC1: years 1999-2002, TC2: years 2003-2007, size of bubbles is the contribution of total trade by country

An integrated EU chemical industry needs all sectors to be successful, but base chemicals are under strong competitive pressure

- **Regions with a natural advantage of access to raw materials have a strong competitive advantage in base chemicals, such as Russia and the Middle East.**
- **Trade with Middle East indicates that the region increasingly uses its raw material access to develop an integrated chemical value chain and strengthen its position in other chemical subsectors.**
- **Russia is only successfully using its competitive advantage in the base chemical sector and in fertilizers**
- **As a consequence the European chemical industry's competitive position is at risk with the Middle East. Trading practices such as double pricing add to this pressure**

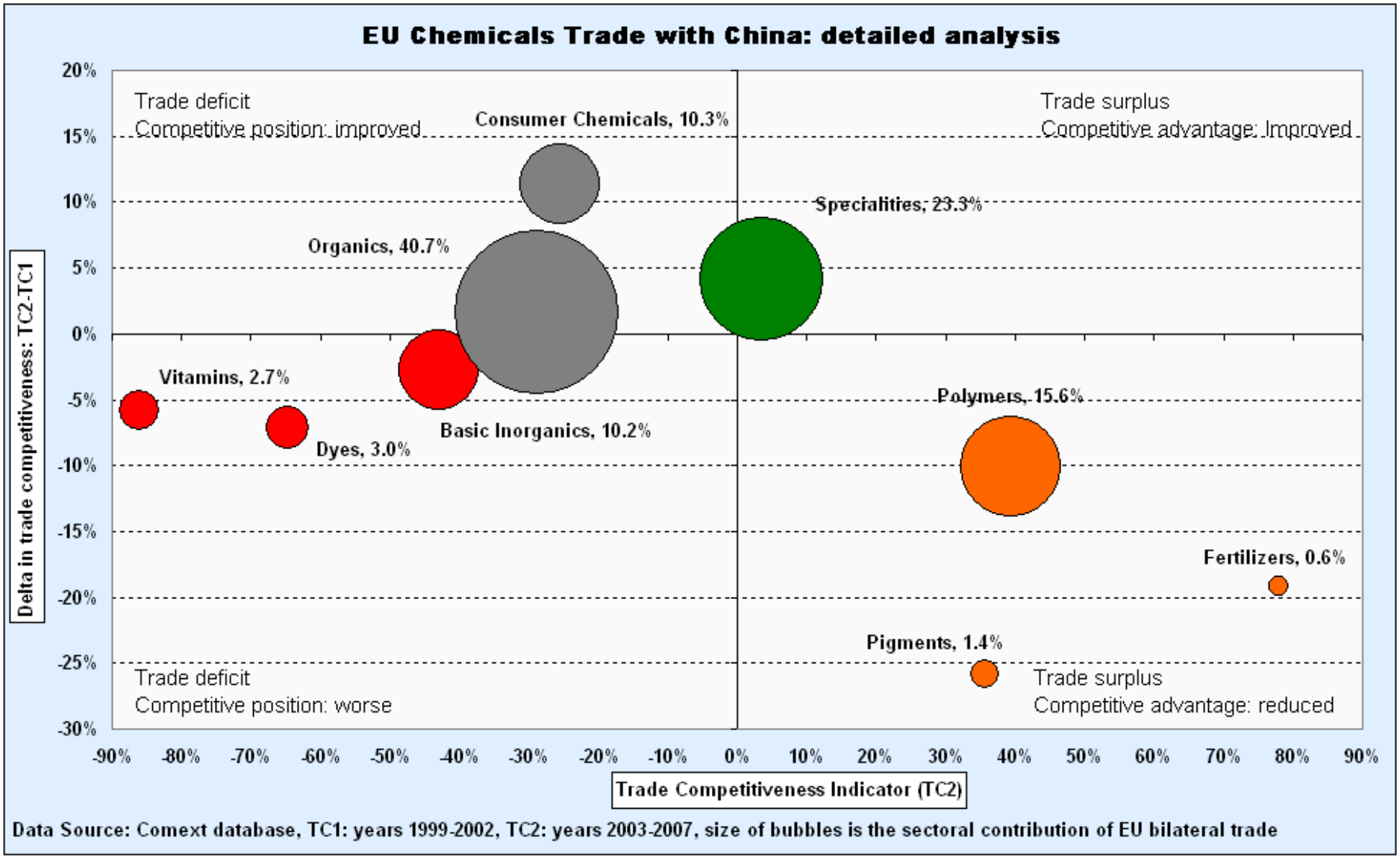
Competitiveness Analysis for Fertilizers



Fertilizers are another sensitive sector

- **Fertilizers are one of the sectors for which the EU shows the weakest trade position. Almost 90% of the analysed trade shows a competitive position at risk.**
- **Russia and Middle East especially are using their preferred access to gas as the main raw material for fertilizers to strengthen their competitive position.**
- **Anti-dumping duties have been decided by the European Union for ammonium nitrate as a result of injurious dumped imports from Russia, which indicates that unfair trading practices also play a role in the strong competitive position of Russia.**
- **In strong agricultural markets with increasing fertilizer demand, such as Brazil and Rest of Asia, Europe is not benefiting from growth but other producer countries.**

Competitiveness Analysis on China

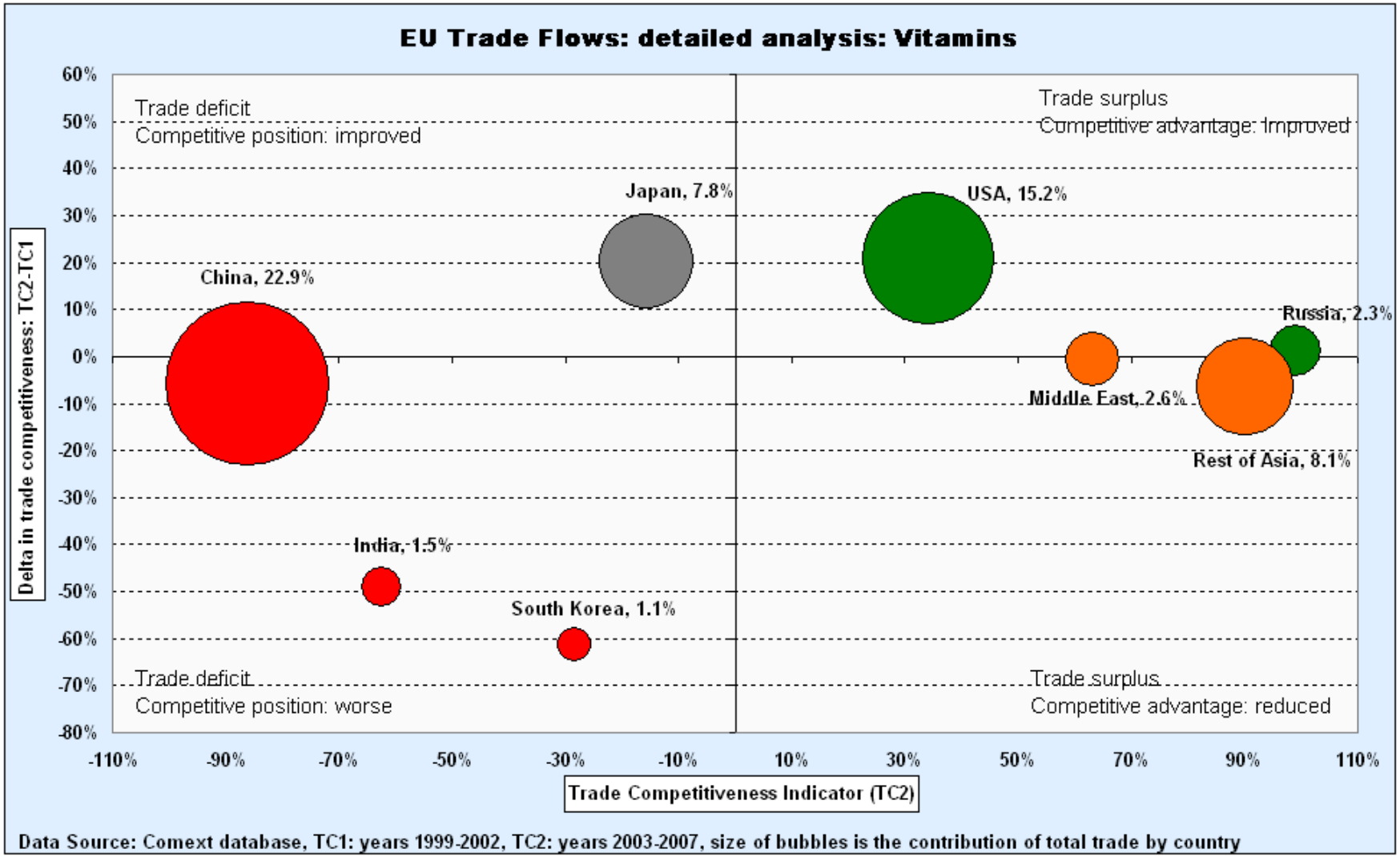


Data Source: Comext database, TC1: years 1999-2002, TC2: years 2003-2007, size of bubbles is the sectoral contribution of EU bilateral trade

EU chemicals trade with China shows that the EU's competitive position is at risk

- **China is an important trading partner of the EU, but the EU shows a trade deficit**
- **China is a chemical growth market and already accounts today for 10.6% of global production, to which European countries would like to have trade and investment access**
- **The trade analysis shows that the EU has a trade deficit with China (base chemicals and consumer chemicals) which represents more than 75% of our trade.**
- **The picture is particularly negative for certain fine chemicals, such as dyes an pigments, for which an active and supportive industrial policy can be observed on the Chinese side (restrictive market access on the home market and aggressive marketing abroad)**

Europe has an increasing trade deficit in Vitamins trade with Asia. 70% of the trade shows a competitive position that is at risk.



Key messages

- Chemical trade data indicate a significant **loss in competitiveness of Europe** in recent years
- In some sectors Europe still has a competitive advantage **(e.g. specialties, polymers and consumers chemicals)**
- Certain sectors are already experiencing a competitive disadvantage, with a deteriorating balance or even worse, an increasing trade deficit **(base chemicals)**
- Certain countries are step by step conquering the value chain of the chemical industry, implementing successfully their industrial policy strategy **(e.g. Middle East)**

Outlook for the European chemical industry and its main competitors

Comparative Trends 2006-2020 for EU, USA, Japan, BRIC countries = Brazil, Russia, India, China, Korea, Saudi Arabia, Iran

Dr. Ralf Gronych, BASF Strategic Planning

BASF
The Chemical Company

The basis of the analysis

- As has been demonstrated, the European chemical industry has some significant strengths on which it can build its competitive position in the coming years
- Commission's Communication "Global Europe" published in October 2006: Having the right internal policies and regulations, as well as ensuring greater openness and fair rules in other markets.
- This analysis is based on a successful implementation of the "Global Europe Communication"
  - No additional unilateral strains on competitiveness, such as arising from the ETS revision proposal
  - An international business environment that is based on an equal level playing field

China - Epicentre of Growth

Ranking GDP Size 2006 vs. 2020

EU is and will be the largest integrated market of the world

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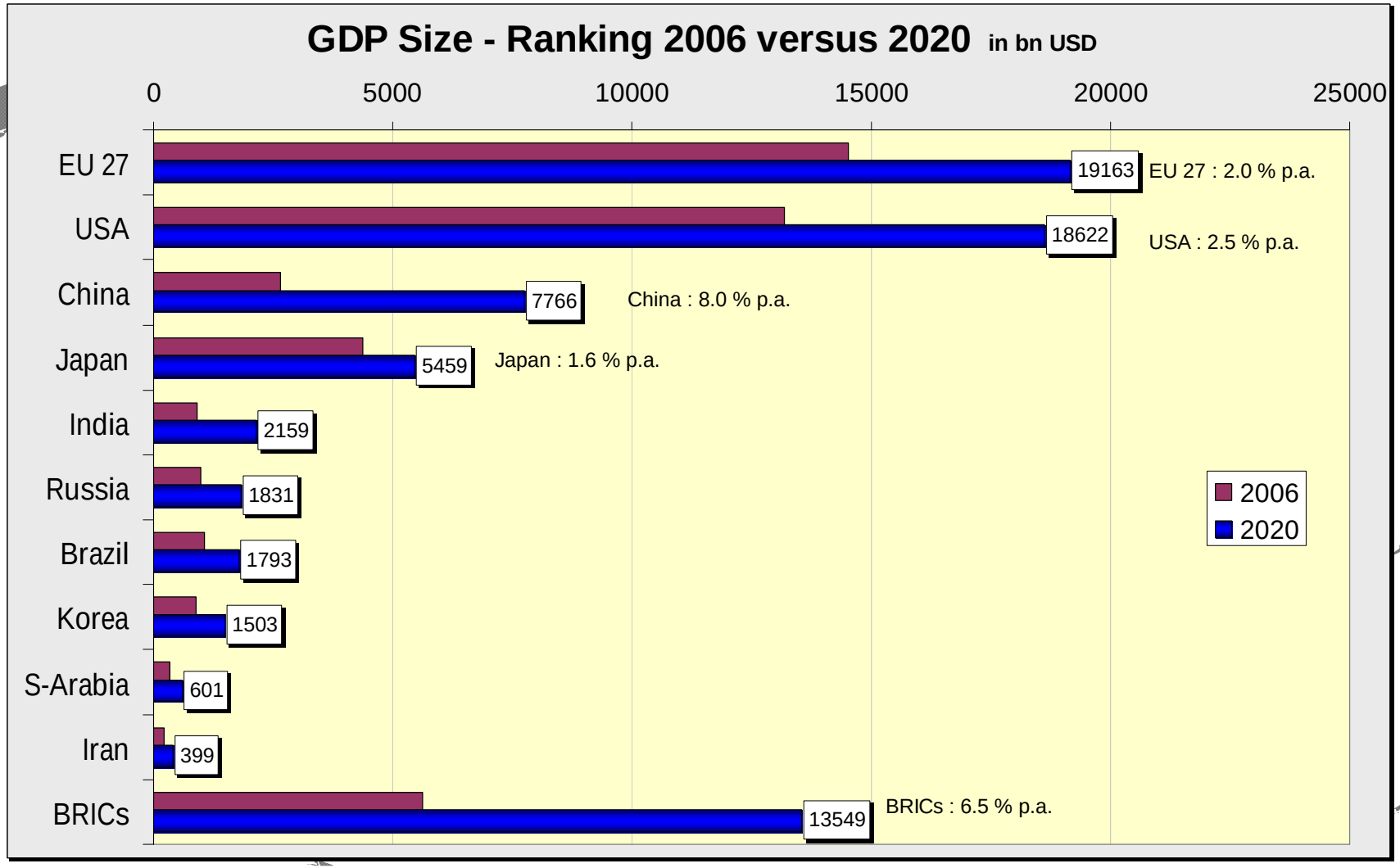

EU is also the largest Industrial market in the world

but China is catching up fast, overtaking the US and Japan

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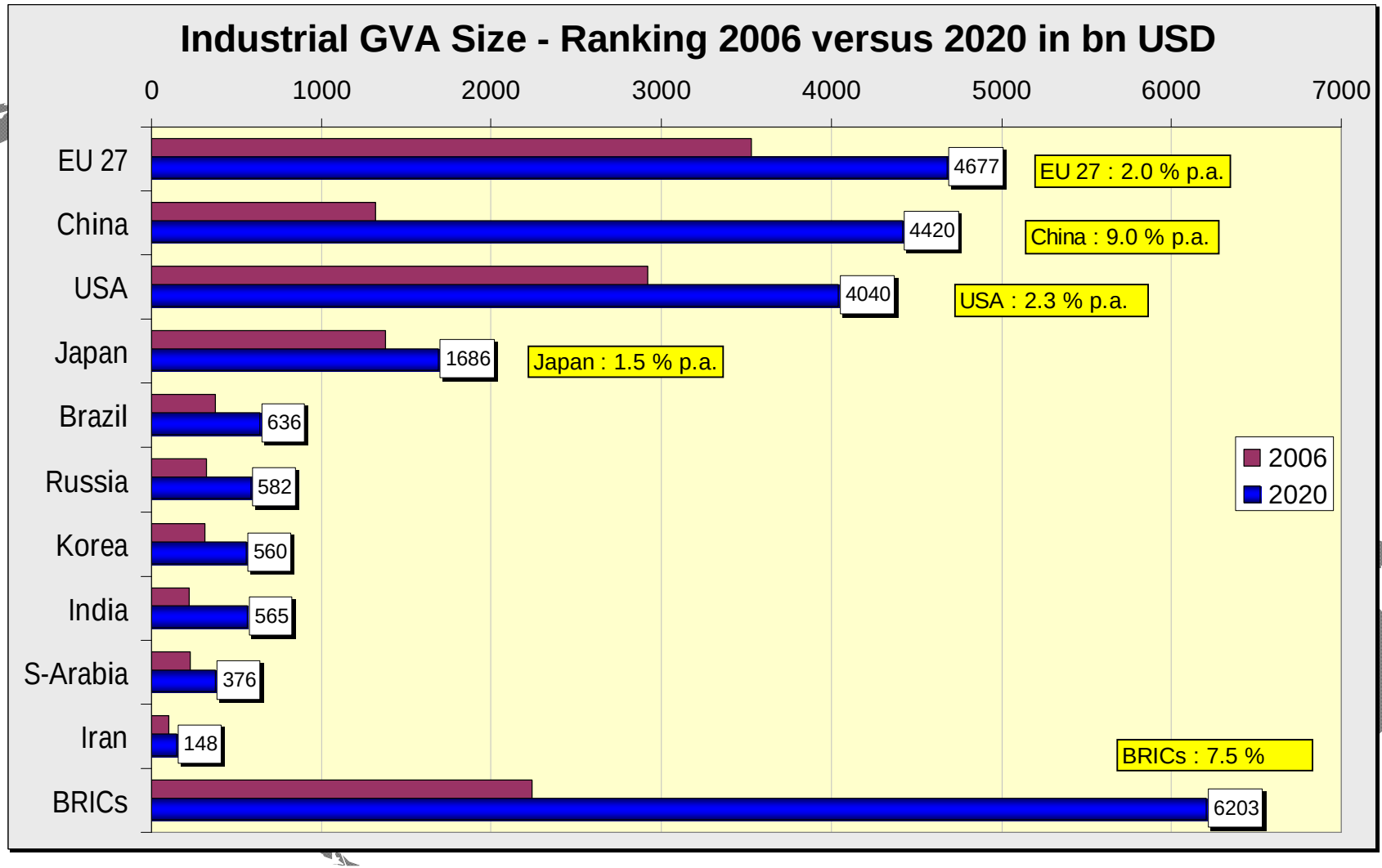

Growth Trends Chemicals vs. GDP (1)

EU in 2006 still in a dominating position – share 29%

Analysis covers 83 % of world market

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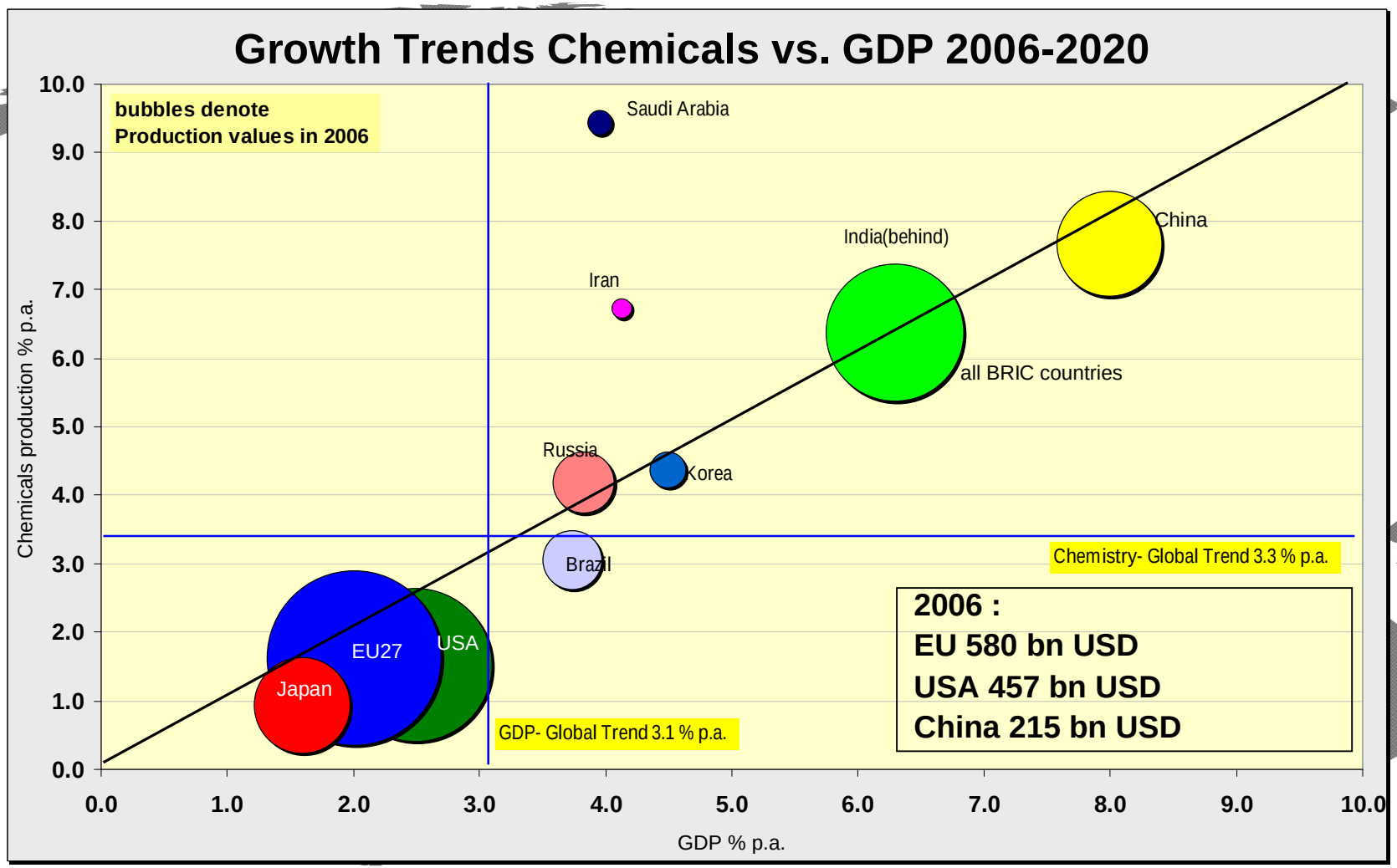

bubbles denote Production values in 2006

Growth Trends Chemicals vs. GDP (2)

BRICs in 2020 largest producer led by China – share 28%
EU falls back – share 23 %

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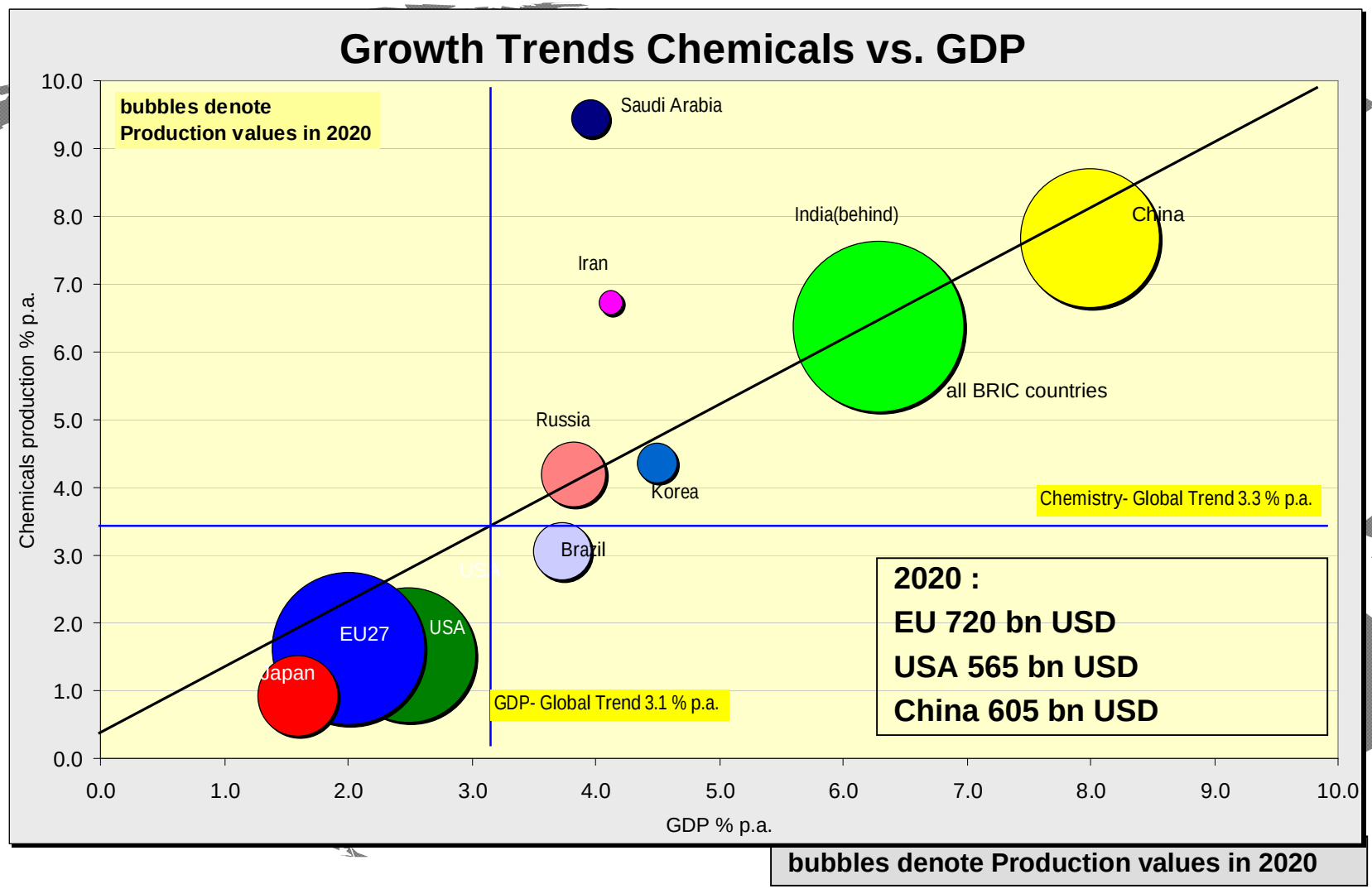

bubbles denote Production values in 2020

Growth Ranking 2006-2020 Chemicals

resource-rich countries and China with strongest expansion

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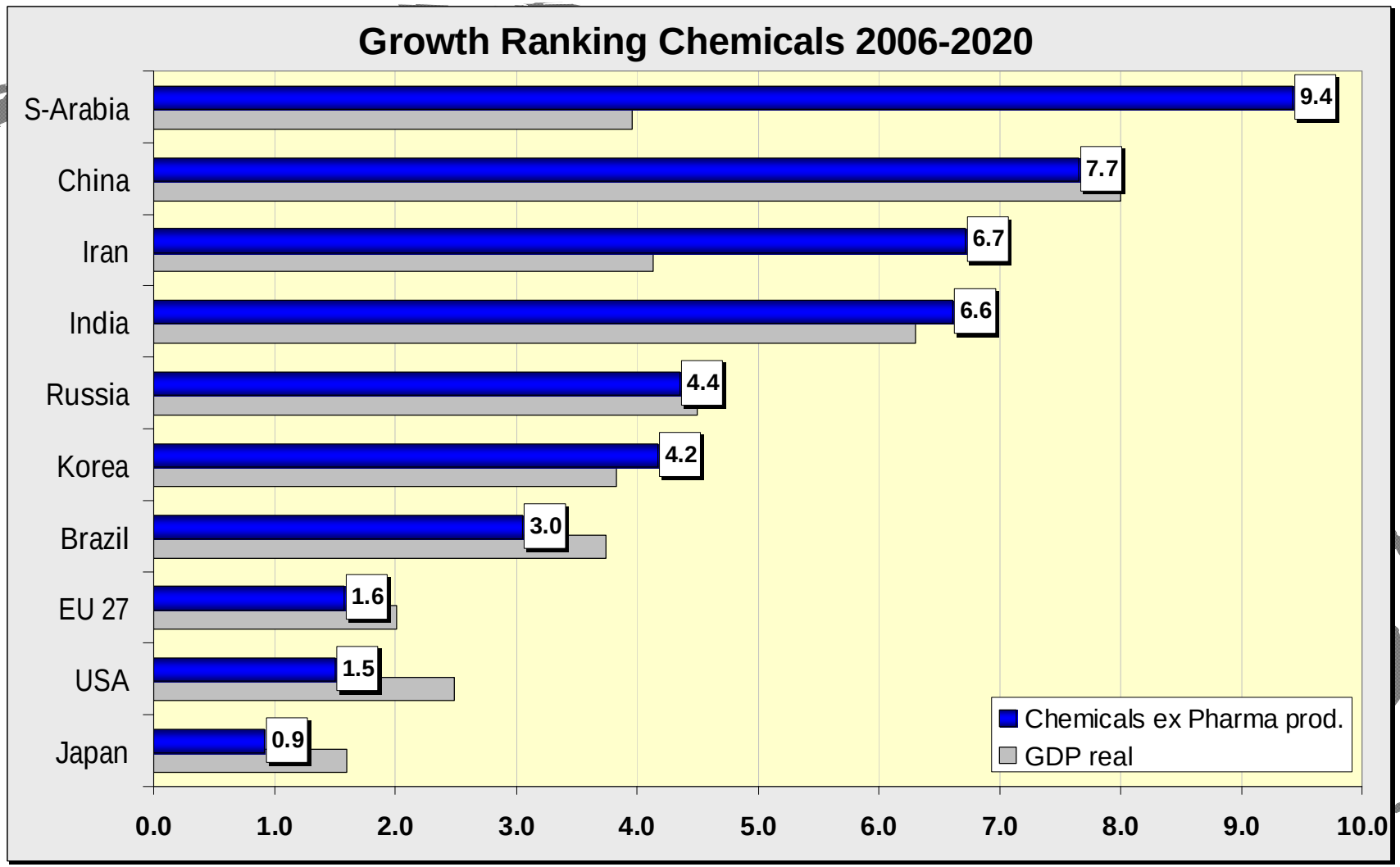

EU Chemical Production Trends

Declining growth potential 2006-2020 vs. historic trends

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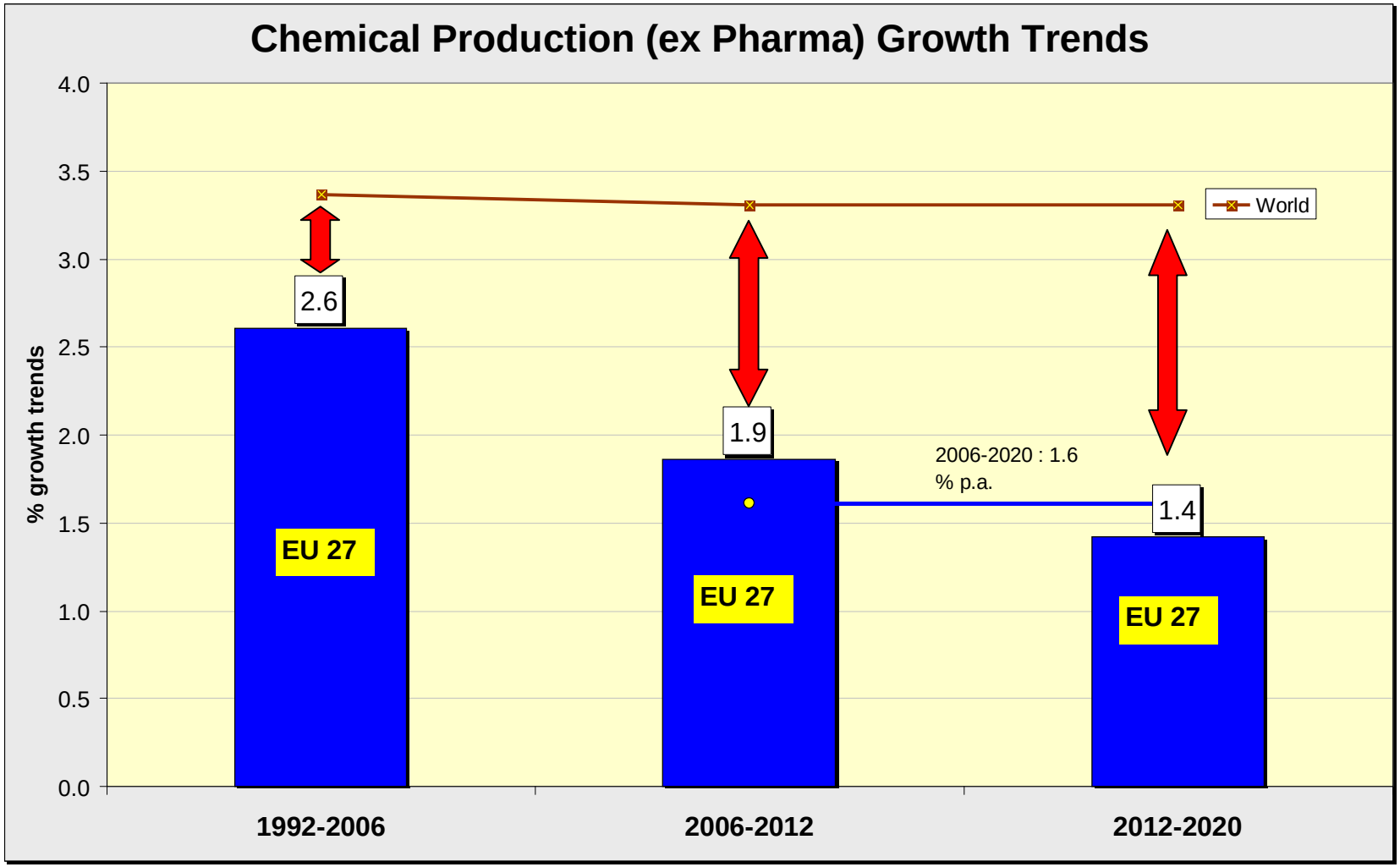

Dynamics of Chemical Production

BRICs will overtake EU by 2015 and China overtake the USA

Sales/ production Value – from 2006 onwards in real terms

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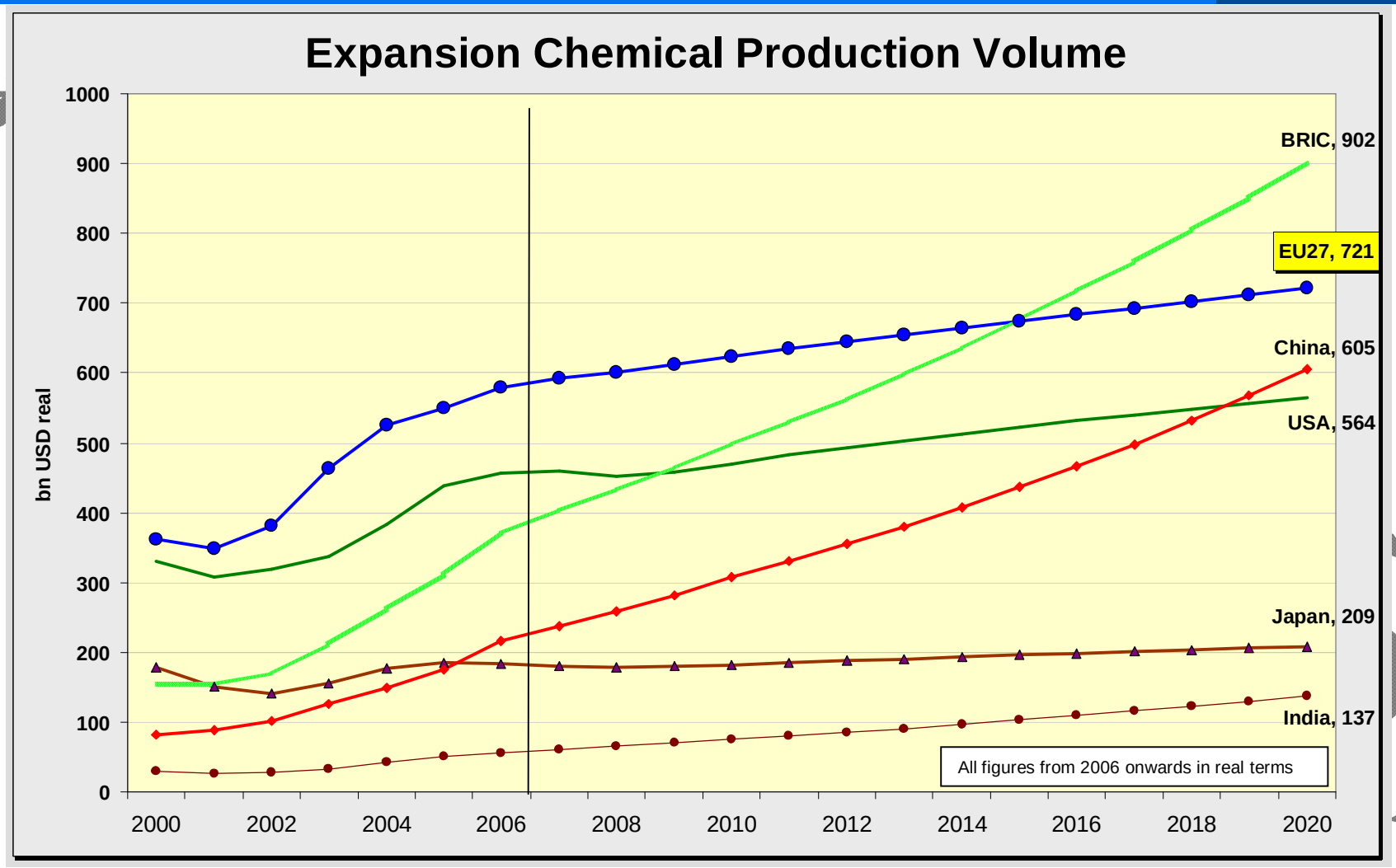

Ranking 2006-2020 Chemicals by Size

EU still largest producer but challenged by China

China overtakes the USA in 2020

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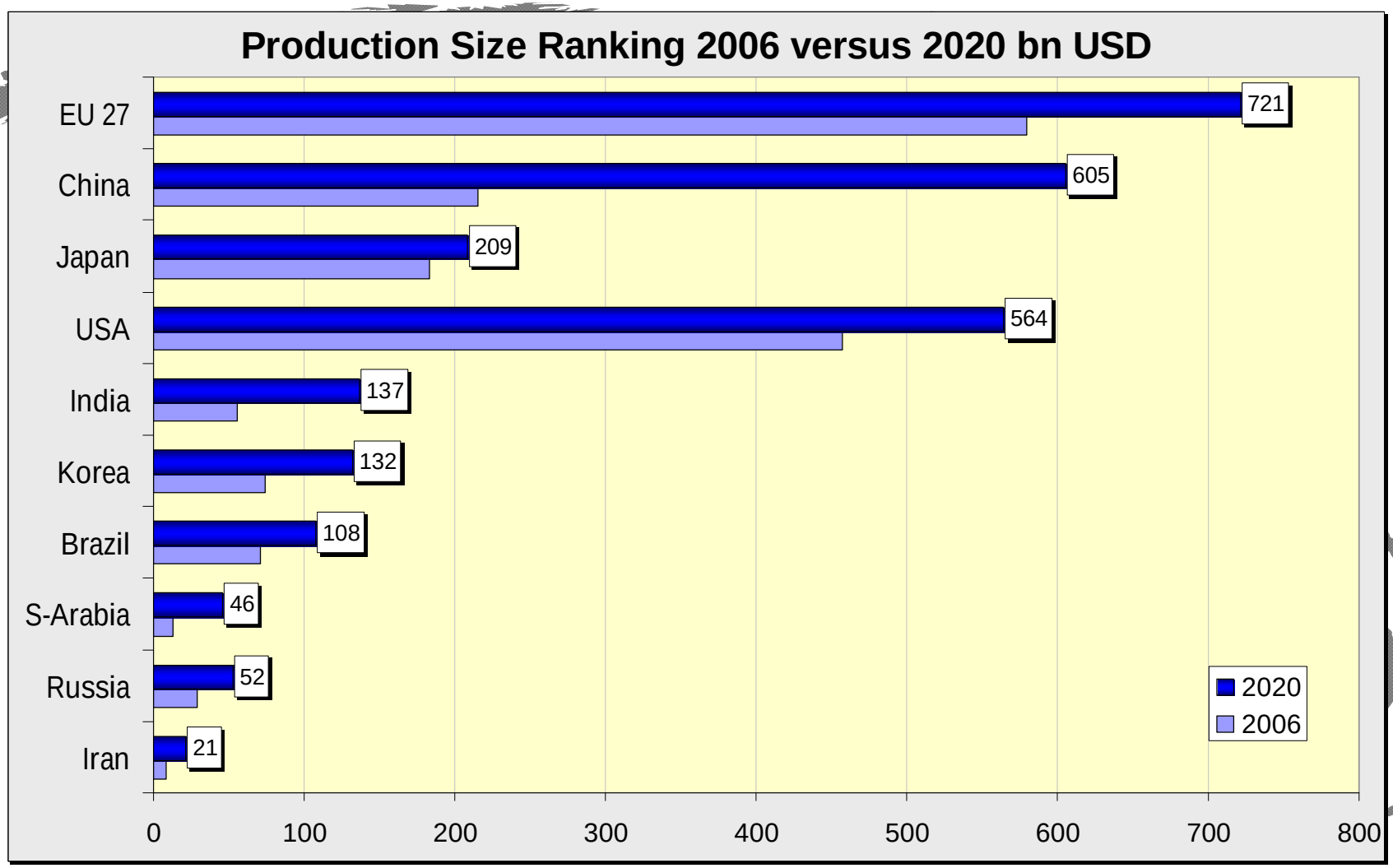

Trade in Chemicals

EU still largest exporter but challenged by China

EU Trade share will go down

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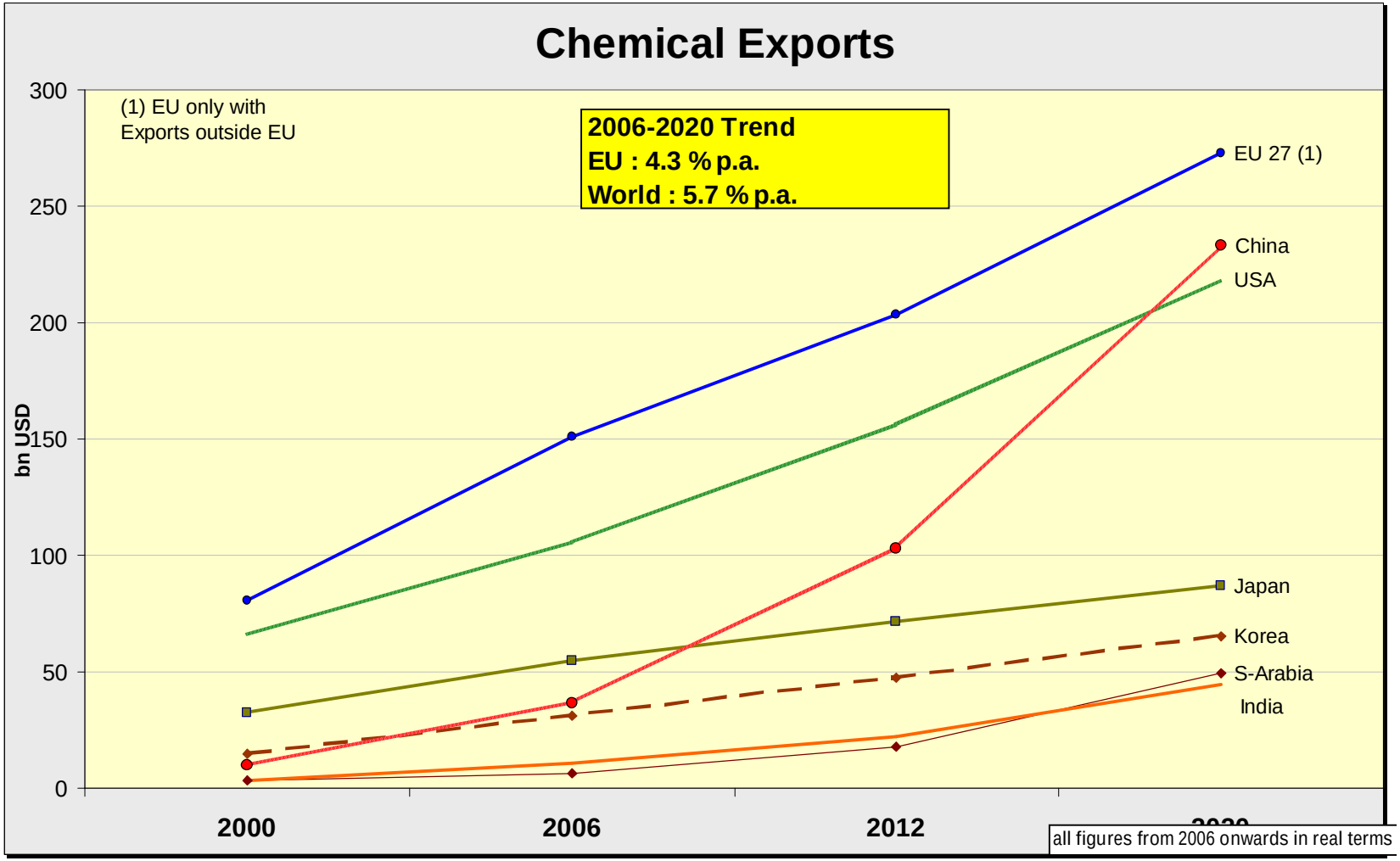
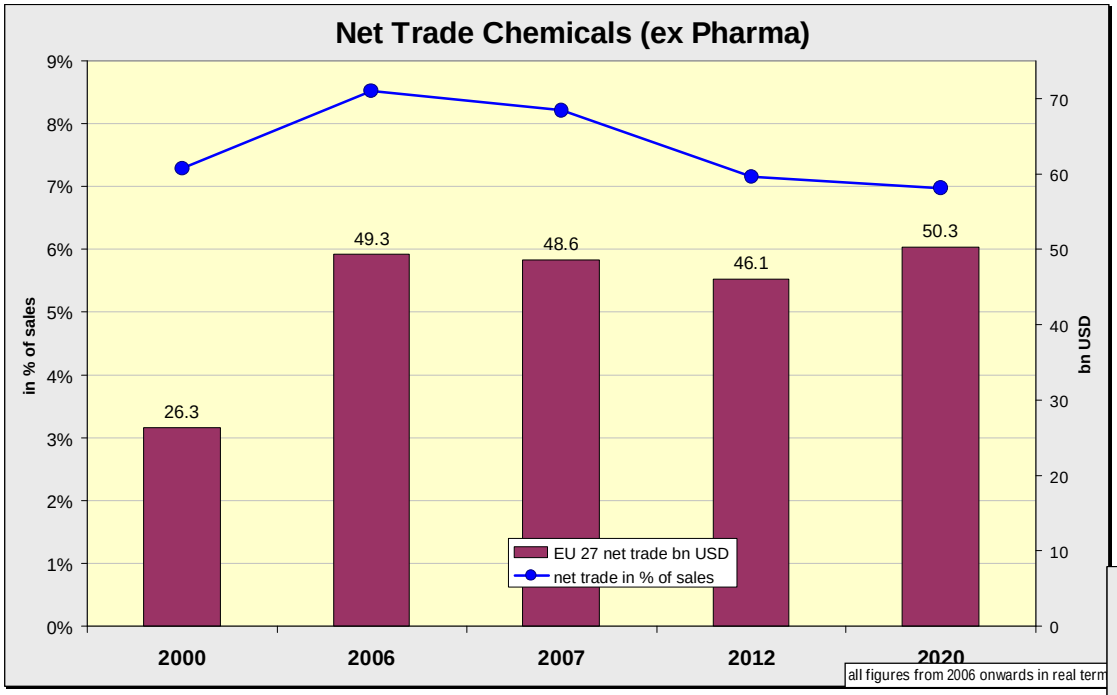


Relative Trade Importance Chemicals

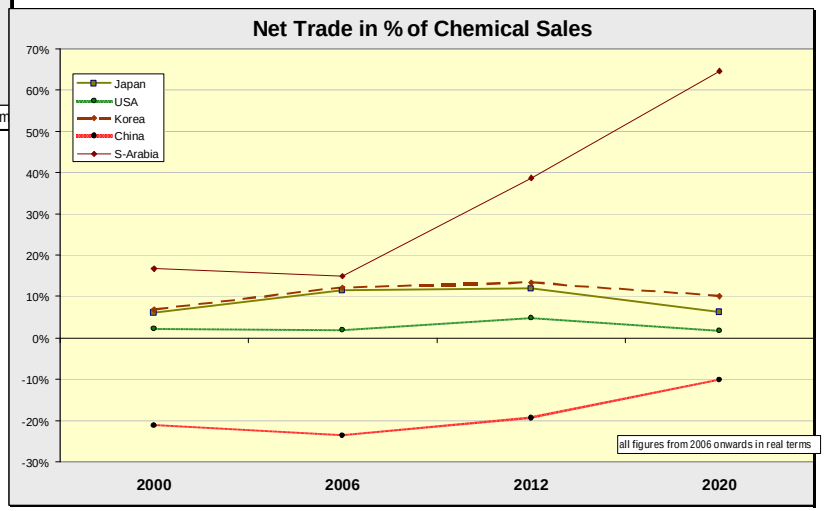
EU with lower net gains in Extra Trade

China still with trade deficits - Saudi Arabia with huge surplus



- EU for years with growing surplus
- 2007 already with some downsizing

- China still with slowing trade deficits
- Saudi Arabia with huge surplus
- USA with temporary gains only



Specific Chemical Demand ex Pharma

measured per capita – in USD

2006 US is leading – Emerging countries will catch up slowly

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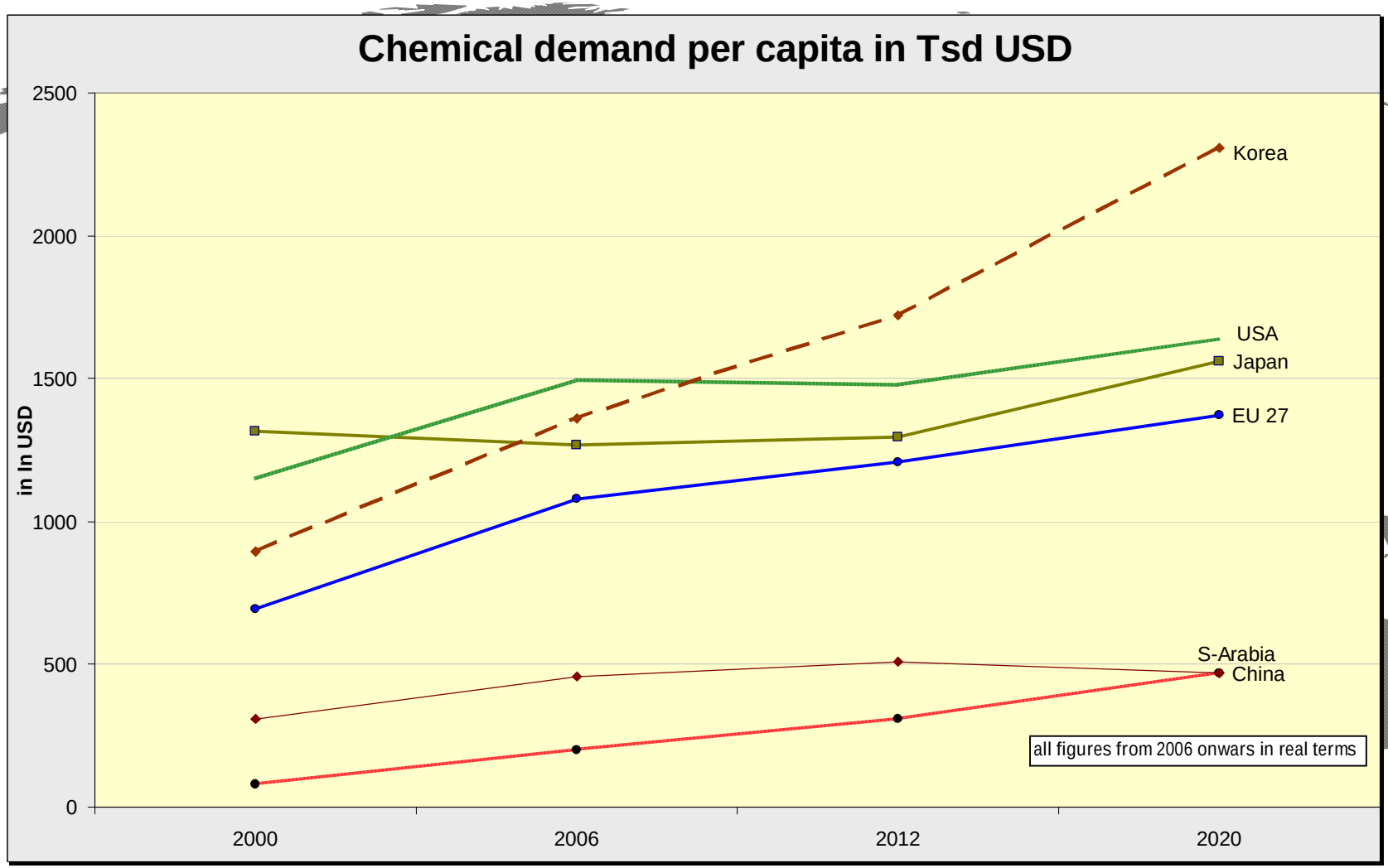
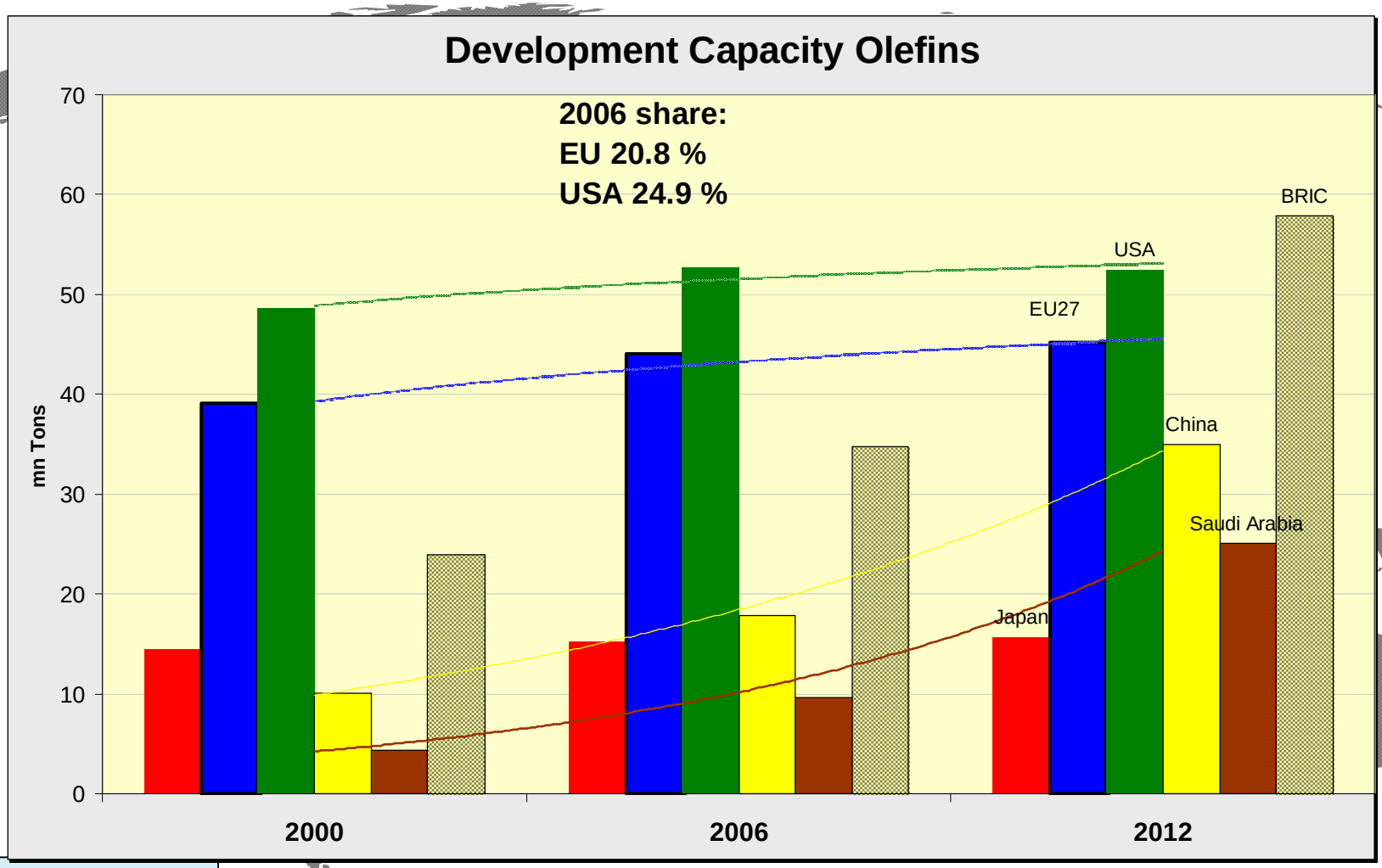


Development Capacity Olefins

BRICs will dominate in 2020

Olefins defined as C2 plus C3 plus C4



Source : CMAI

Polypropylene net trade flows

Middle East will flood the other regions in the world with its capacities in plastic products

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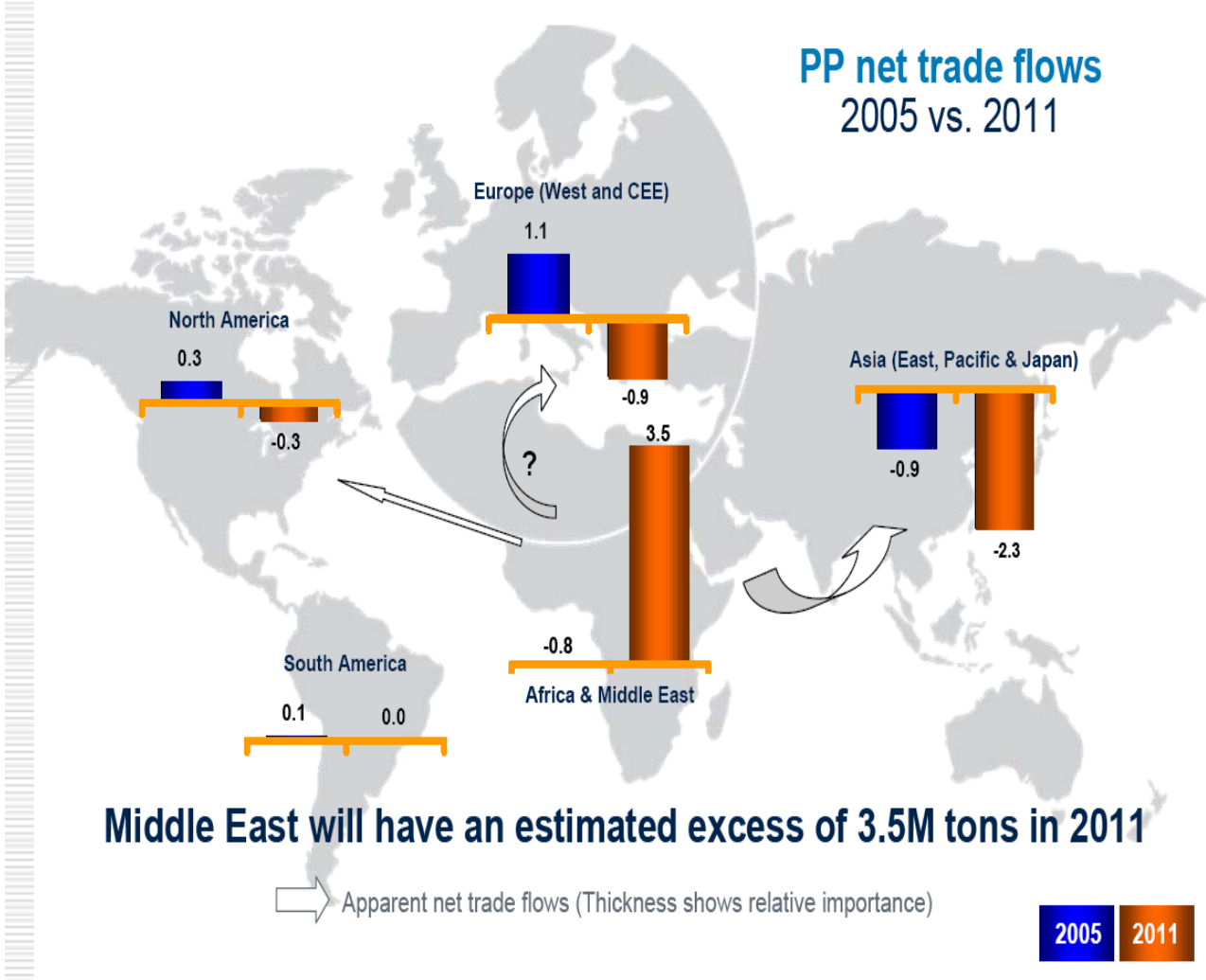

Source: Basell Polyolefins

Dynamics Capacity Olefins and Chemistry

nearly no capacity additions in EU and USA until 2012
ME producers and China become big players

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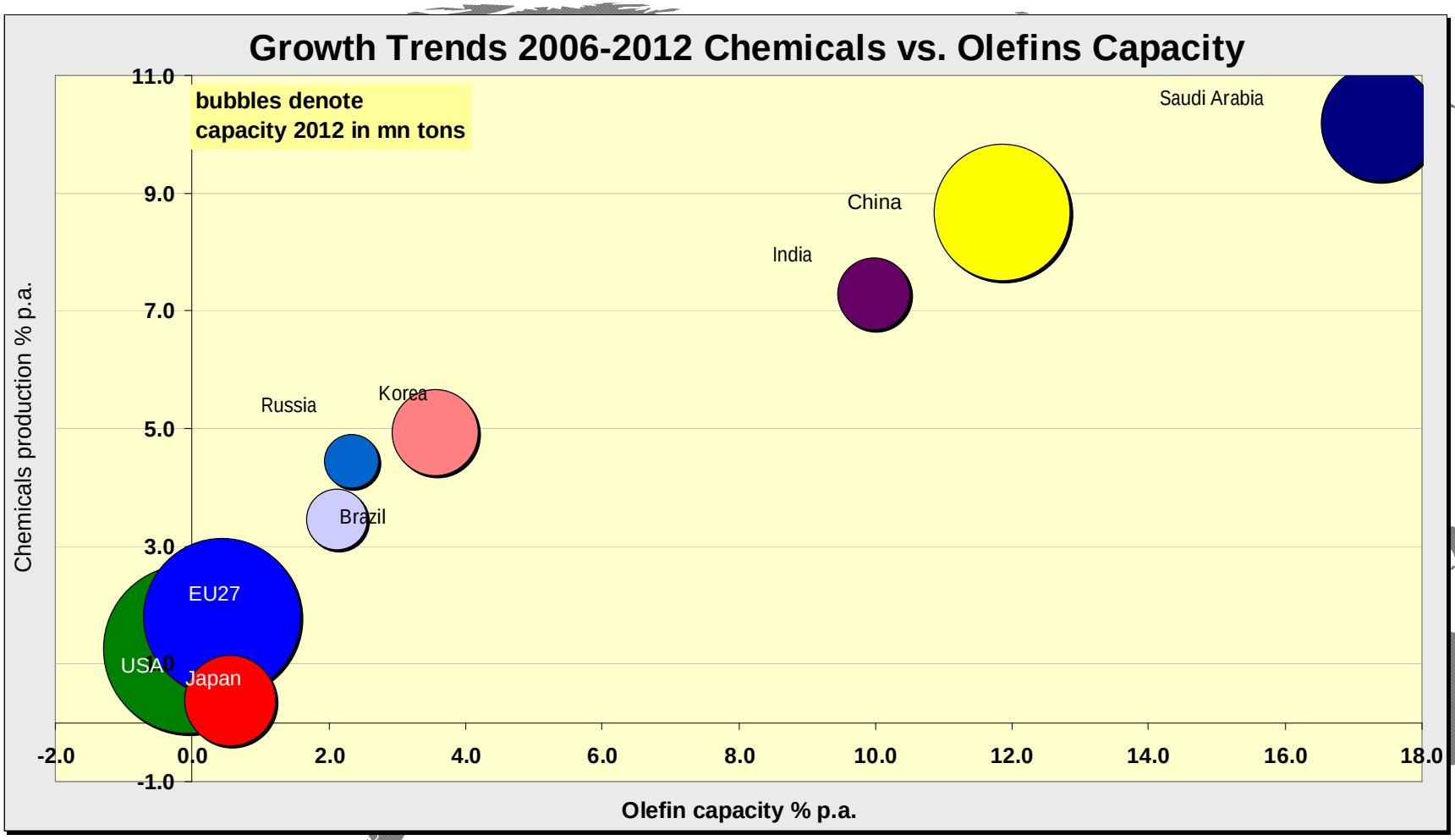

Source : CMAI

The future is driven by technology trends and innovation

Example - Growth clusters, BASF R&D spending approx. € 800 million in 2006 - 2008)

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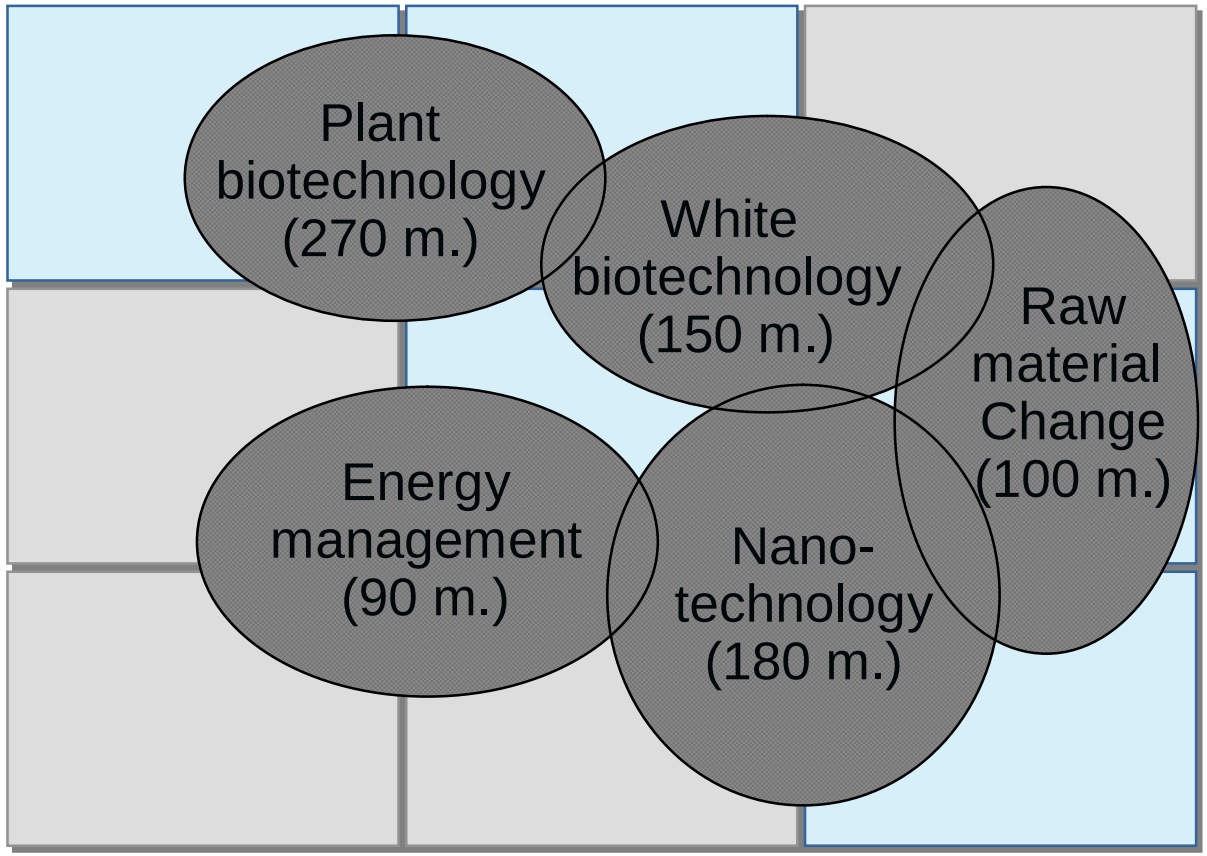

Key messages

Strengths and opportunities for the European chemical industry which the regulatory and business environment should support

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- Large integrated domestic market with strong customer industry cluster and reasonable demand growth from industry 2.0 % p.a.
- Continued strategic restructuring efforts to adapt flexibly to globalised markets
- High international orientation and global network to external customer industries
- Until now availability of skilled and motivated workers and scientists
- Still reasonable competitiveness but price-cost competitiveness challenged by overvalued € and undervalued Asian exchange rates
- Strong innovation efforts will generate new growth clusters : Biotechnology, Energy management, Nanotechnology, new materials and new raw material base which have the capability to solve upcoming global mega problems

Key messages

Weaknesses and threats for the European chemical industry that the regulatory and business environment should help to counteract

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- **Diminishing growth stimulus from external demand due to weaker growth prospects for exports to overseas and much stronger import penetration from polymers and specialities.**
- **EU has a comparative price and feedstock disadvantage in Olefins and its derivatives and is facing an upcoming wave of petrochemical capacity additions, especially in ME.**
- **Subdued potential macro growth prospects due to elderly population, shrinking working age classes, high saturation levels and limited technological progress.**
- **Excessive bureaucracy and regulatory framework and insufficient harmonised tax and labour market systems within EU, huge North – South gap in efficiency**
- **Energy markets have a “quasi” oligopolistic organisation with much too high energy cost for consumers and industry**

Conclusion

- Global competition is increasing as regards trade and production locations. Europe's overall competitiveness is good and the European chemical industry has considerable strengths, but other countries are catching up quickly.
- A detailed trade analysis already shows an eroding competitive position in some sectors and vis-à-vis certain countries
- Provided there are the right framework conditions and the right trade policy, Europe can remain an attractive platform for a competitive chemical industry and benefit from growth markets around the world.
  - A balanced regulatory framework in Europe
  - Free access to growing markets
  - Fair competition as a stimulator for further growth
  - A global level playing field

BACKUP

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Annex : EU 27

Facts & Figures and Projections - Chemical Industry

EU 27

concept		2000	2006	2007	2012	2020	Trends % p.a. 2000-2006	2006-2012	2006-2020
Production Indices									
Chemicals	Index 2000=100	100.0	117.9	120.6	136.1	159.8	2.8	2.4	2.2
Chemicals ex Pharma	Index 2000=100	100.0	109.2	111.6	122.0	136.5	1.5	1.9	1.6
Chemicals ex Pharma									
Production/Output Value	bn USD (1)	361	579	592	647	724	8.2	1.9	1.6
Exports Extra EU	bn USD real (1)	81	151	171	204	273	10.9	5.1	4.3
Imports Extra EU	bn USD real (1)	55	101	123	157	221	10.9	7.6	5.7
Demand	bn USD real (1)	335	530	544	601	673	7.9	2.1	1.7
Trade Performance									
Competitiveness RCA ChemexP	log (Xc-Mc:X/M)*100	17.2	18.0	15.0	12.4	11.0			
Net Trade	bn USD real (1)	26.3	49.3	48.6	46.7	51.5			
Trade intensity	exp % of sales	22.4%	26.0%	28.9%	31.5%	37.7%			
Size Chemistry									
Production Value (Total Chemicals)	bn USD nominal	501	835	952	1123	1518	8.9	5.1	4.4
GVA Chemicals (Total Chemicals)	bn USD nominal	146	266	303	353	467	10.6	4.8	4.1
Production Value ChemexP	bn USD nominal	361	579	663	758	963	8.2	4.6	3.7
Major Segments	bn USD (1)								
Basic Industrial Chemicals	bn USD (1)	138	257	260	273	281	10.9	1.0	0.6
Polymers	bn USD (1)	66	91	94	107	130	5.5	2.7	2.6
Specialities	bn USD (1)	97	144	147	164	191	6.7	2.2	2.1
Consumer Chemicals	bn USD (1)	60	87	89	99	117	6.5	2.1	2.1
Petrochemicals ($C_2+C_3+C_4$)									
Olefins Capacity	in mn T	39.1	44.0	44.4	45.2		2.0	0.4	
Global Share	in %	22.8%	20.8%	20.1%	16.1%				
Olefins Production	in mn T	34.9	39.3	39.7	39.4		2.0	0.0	
other Data :									
Employment (Total chemicals)	in tsd persons	1993	1799	1790	1724		-1.7	-0.7	
Capital spending (Total chemicals)	bn USD nominal	26.6	29.6	34.6	37.4		1.8	4.0	
Investment ratio	in % of sales	5.3%	3.5%	3.6%	3.3%				
R&D ratio (total chemicals)	in % of sales	4.0%	4.0%						
Industrial Cluster intensity	in %	67.9%	69.7%	69.6%	69.9%	70.3%			
relative Importance :									
GVA Chemicals nom in % GDP	in % of GDP	1.7%	1.8%	1.8%	1.8%	1.7%			
Demand of Chem exP per capita	USD (1)	694	1078	1102	1213	1376	7.6	2.0	1.8
Global share of production	% of world	28.7%	28.6%	28.6%	26.7%	23.0%			
Macro Variables :									
GDP real	bn USD real 2006$	12911	14510	14924	16510	19163	2.0	2.2	2.0
Industrial Growth in GVA real	bn USD real 2006$	3293	3533	3649	4040	4677	1.2	2.3	2.0
Population	Mill	483	492	493	495	489	0.3	0.1	0.0
Exchange Rate	USD/EUR	0.92	1.25	1.37	1.30	1.27	5.3	0.6	0.1
WEF Global Competitiveness	Score value	5.60	5.10	5.07					
WEF Innovation Score	Score value	3.89	5.06	4.90					
Corruption Perceptions Index	Score value	7.06	7.28	7.24					

(1) from 2006 onwards in real 2006USD

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RCA - Trade Competitiveness Chemicals broad concept used

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- RCA = Revealed comparative advantage

$$\mathbf{Log\ \{\ (X_c\ /\ M_c)\ /\ (X_M\ /\ M_M)\}\ *100}$$

where X = Exports, M = Imports

C=Chemicals ex Pharma

M = all Merchandise Goods

⇒ The larger the RCA value due to significant Chemicals balances compared to merchandise balance the higher is the competitiveness of the chemical industry in trade

⇒ Import measure to show patterns of trade specialisation

RCA - Trade Competitiveness Chemicals

RCA is going down in all traditional producer countries

RCA measured as Exp/Imp ratio chemicals related to the same in total merchandise trade

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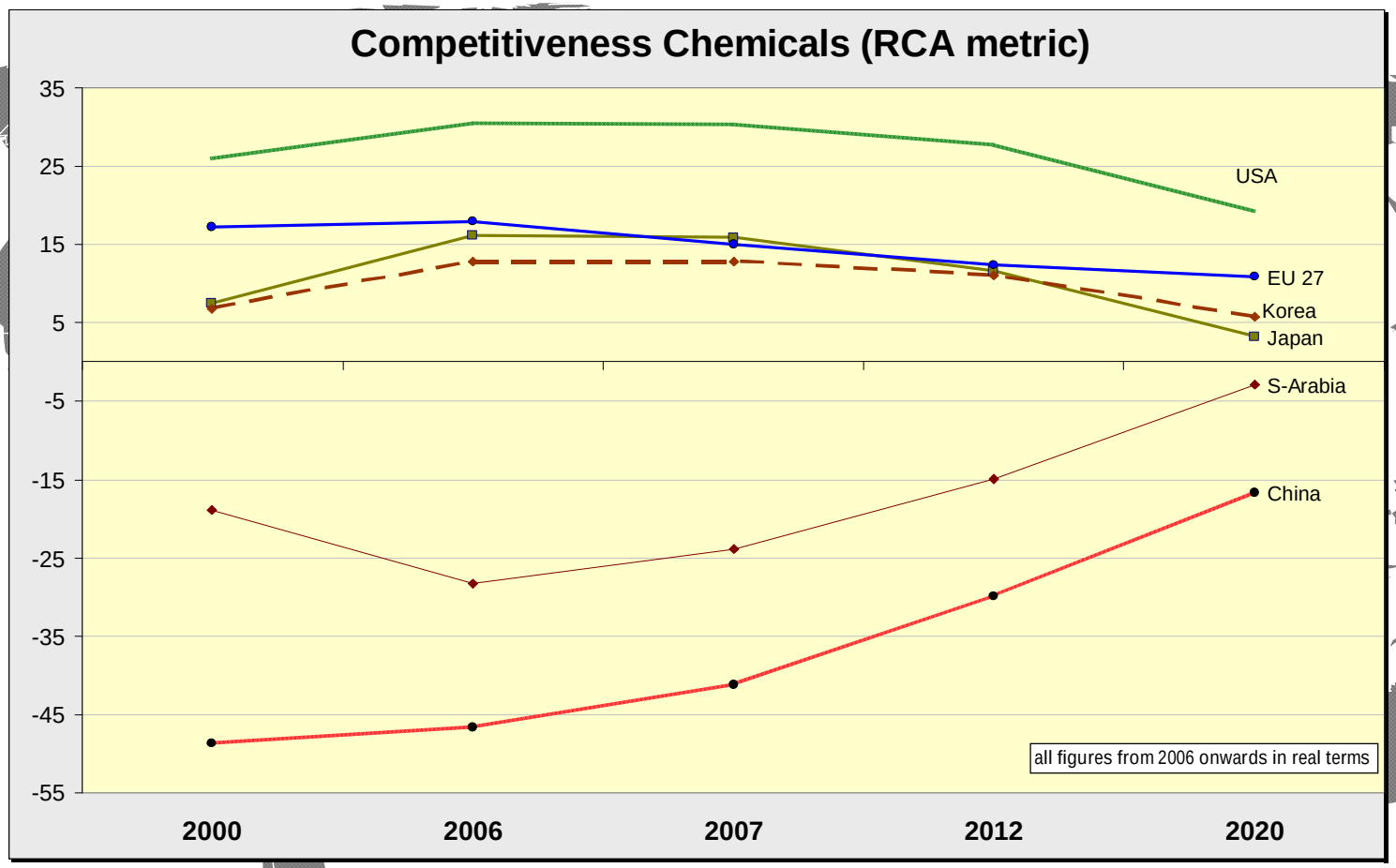

Notice : RCA is a relative measure, the US has a huge negative Trade balance in merchandise goods and a positive balance in chemicals whereas the EU has in both categories a trade surplus due to an overall sound structure