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Oryx Stainless Research Series

**“How free are free
markets in reality?
Strategic trade policies
and its impact on the
stainless steel industry”**

September 2013

A study by

Prof. Timo Goeschl, Ph.D.

Prof. Dr. Andreas Löschel

(Heidelberg University
and Centre for European Economic
Research (ZEW), Mannheim)

and Mr. Frank Pothen,

(Centre for European Economic
Research (ZEW), Mannheim)

on behalf of

Oryx Stainless



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I. Market environment and starting point

II. Study – Models and Methods

III. Results

I. Trade Theory

II. Empirical Analysis

IV. Conclusion

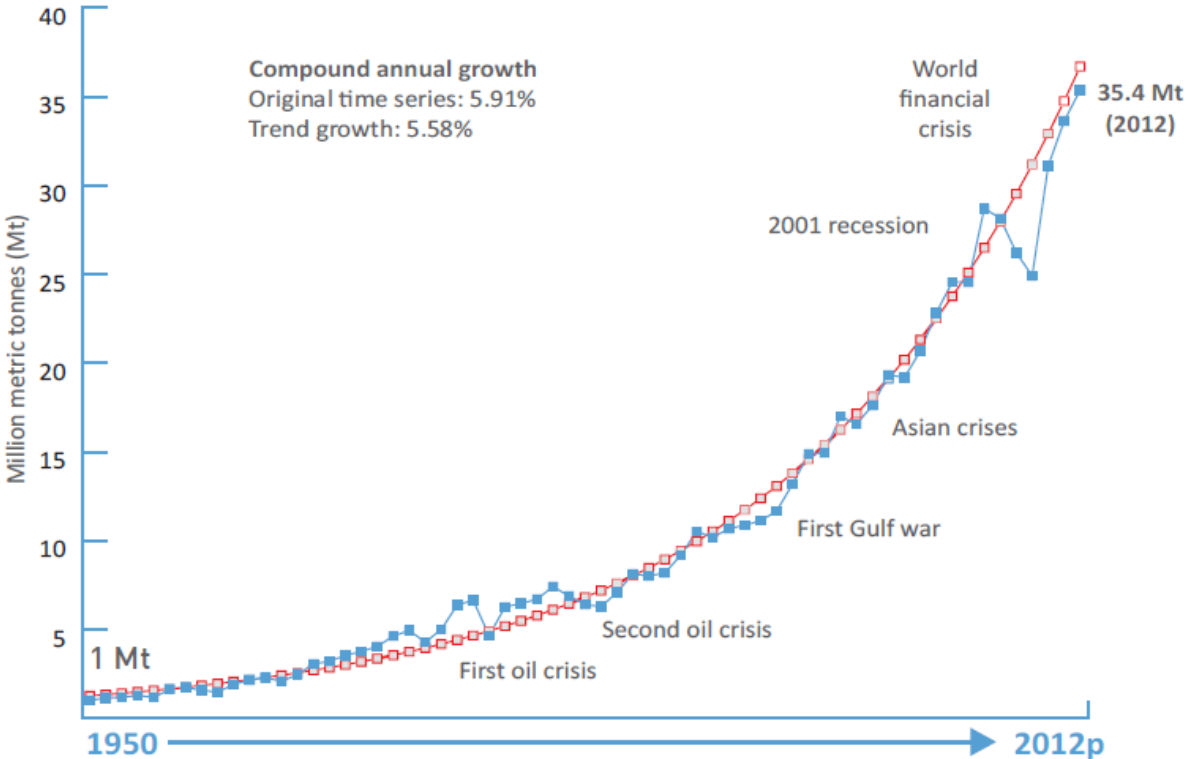
V. Research Team

VI. About Oryx Stainless



Worldwide stainless steel production continues to grow

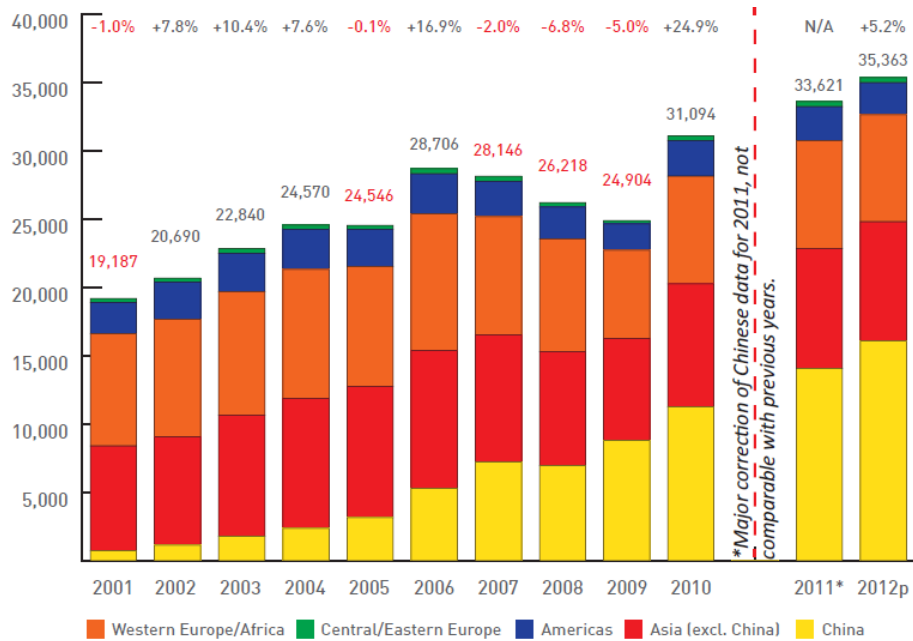
Growth of stainless steel demand 1950-2012



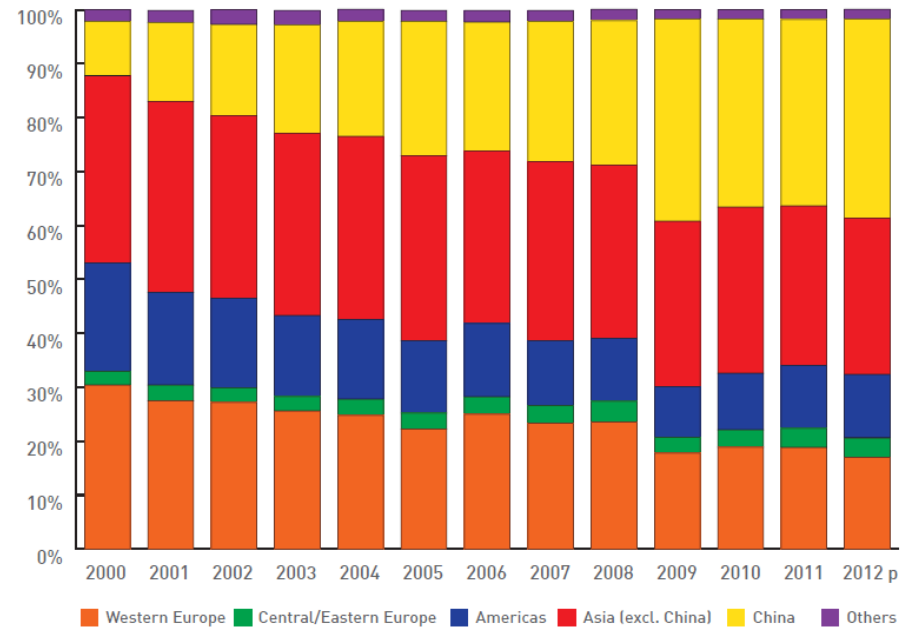
Source: International Stainless Steel Forum (2013)

China and Asia are still the drivers of growth

Stainless steel production per region in 1000 tons



Stainless steel consumption by region (from 2000 – 2012)



Source: International Stainless Steel Forum (2013)

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International trade in stainless steel inputs: A gap between political ambitions and political reality

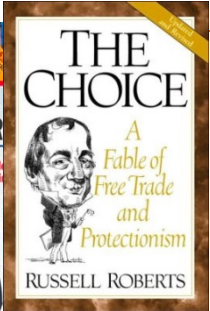
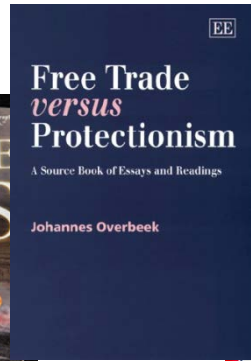
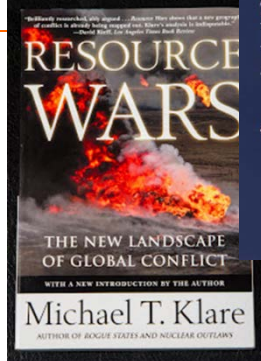
“Any increase in protectionism by any country is damaging. Such actions will hurt growth prospects where fostering growth is most essential. And they are sending the wrong signal, threatening to undermine the ability of governments everywhere to build support for market-oriented reforms.”

Horst Köhler, Managing Director International Monetary Fund
 Michael Moore, Director-General World Trade Organization
 James D. Wolfensohn, President World Bank Group (2002)



“The number of countries applying export duties over the period 2003-2009 was higher than in previous years and such duties were introduced primarily by developing and least developed countries. Under the current WTO rules [...], there is no substantive discipline on export duties.”

Kim, J.: “Recent Trends in Export Restrictions”, OECD Trade Policy Papers, No. 101 (2010)



Trade restrictions: Under-researched with respect to nature, scale, and impact on the stainless steel sector

- Trade restrictions apply to a significant share of the trade in stainless steel inputs, but timely and detailed data on their nature and scale is often lacking

SA scrap export directive to come into force on Sept 16

JOHANNESBURG
BY BIANCA MARKRAM

South Africa's scrap export directive, which is aimed at controlling exports of recycled ferrous and non-ferrous material, will come into effect on September 16, the minister of economic development, Ebrahim Patel, announced on August 2.

All export permits issued until the directive, dubbed the price preference system, is in force will be valid for one month only, while volumes reflected in export permit applications will be "closely monitored", a note in the Government Gazette stated.

From September 16, scrap may not be exported unless it has first been offered to domestic consumers at a discount for a period determined by the International Trade Administration Commission of South Africa (ITAC), for local beneficiation.

ITAC pricing policy currently determines that scrap metal be offered to domestic users at a 20% discount to international spot prices. ITAC will calculate the discounted prices for different scrap grades at the end of each month and publish them on its website.

Under the new price preference regime, the regulator also wants to ensure that the quality of the scrap intended for export is accurately reflected on applications for export permits.

All permit applications will have to be accompanied by a letter or certificate, signed by a metallurgical engineer to confirm the grades, type and quantity of scrap available for export. The applications must also contain information showing where and when the scrap metal can be inspected by prospective buyers in the domestic market.

→ [Click here for full story](#)

MetalBulletin



Informationsstelle Edelstahl Rostfrei



- Need for a comprehensive dataset of restrictions applied on inputs in stainless steel production
- Need for an analysis of effects of export restrictions on the European stainless steel production

ZEW study important step to get answers on key questions of the sector

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6

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- I. Market environment and starting point
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Task of the study

Are there any trade restrictions on the key components for stainless steel?

Why do nations restrict exports of raw materials?

- Academic study on strategic trade policies with a special focus on export restrictions and their impact on the stainless steel sector
- Focus on nickel, chromium, molybdenum and stainless steel scrap

Do empirical export restrictions match theoretical predictions?

What are the options for countries affected by trade restrictions?

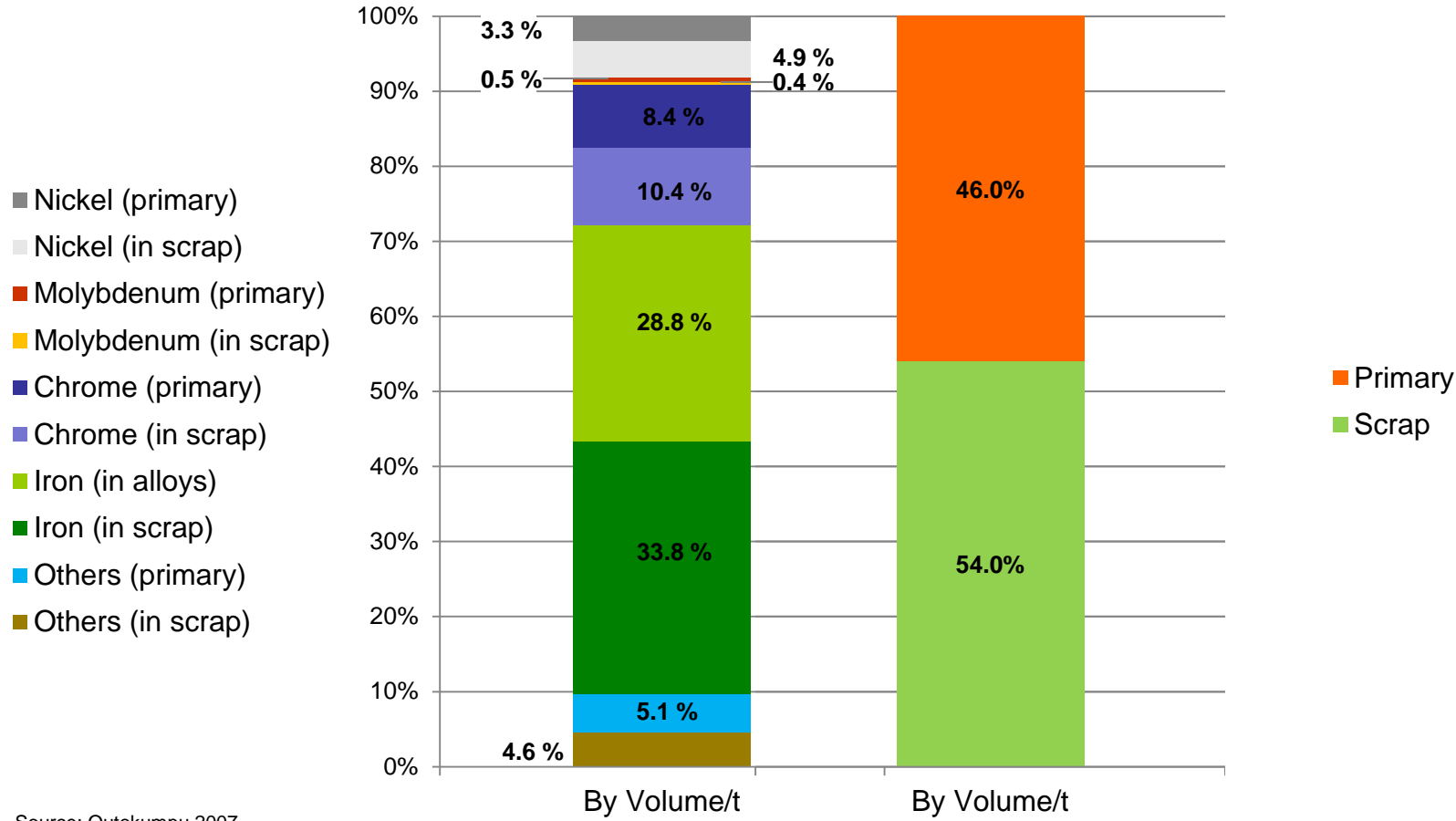
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8

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Focus on the most important components of stainless steel: Nickel, chromium, molybdenum and stainless steel scrap



Source: Outokumpu 2007

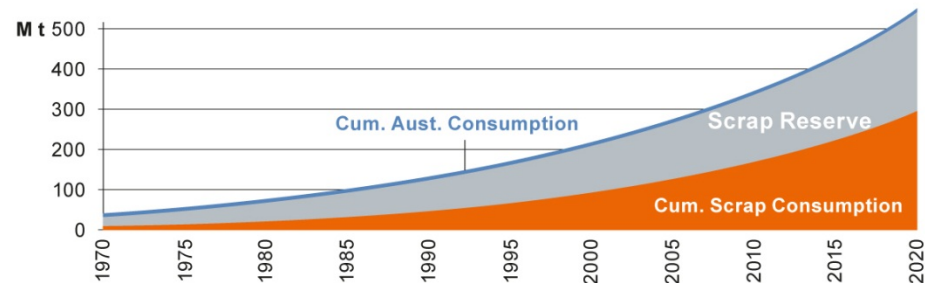


Key material class: Stainless steel scrap

Stainless steel today consists on average of 50% re-melted scrap. About 60% in Europe.

- Price advantage over primary raw materials
- Lower processing costs, e.g. due to higher energy efficiency
- Environmental advantage over primary raw material
 - by reducing CO₂ emissions
 - By avoiding impacts on ecosystems due to mining activities

| in M t | 1980 | 2000 | 2009 | 2010 | 2020 |
|----------------------------------|------|-------|-------|-------|-------|
| Cumulated austenitic consumption | 66.1 | 207.6 | 320.7 | 335.5 | 543.1 |
| Cumulated scrap consumption | 20.2 | 91.4 | 157.4 | 167.2 | 296.9 |
| Scrap reserve | 45.9 | 116.3 | 163.3 | 168.3 | 246.2 |



Source: Heinz H. Pariser

The approach to the study

Main tasks

Identify

Types of countries and their propensity to employ export barriers

Compile

A comprehensive dataset of export restrictions

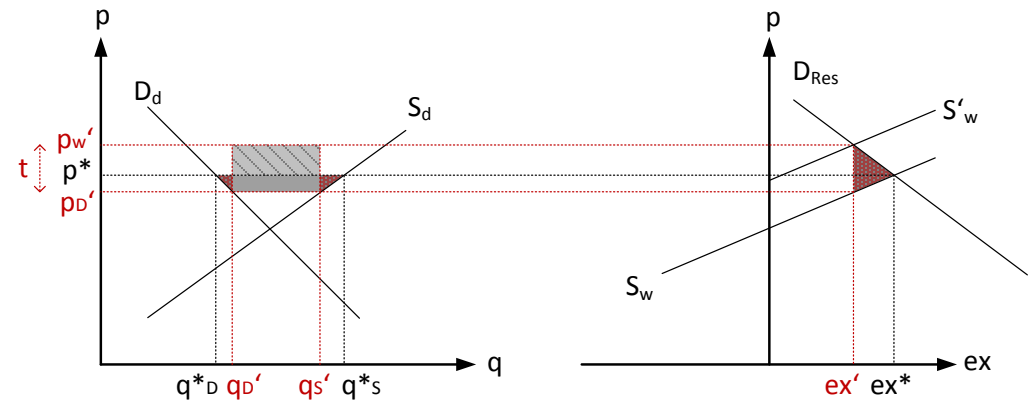
Verify

The predictions in the light of actual export barriers

Derive

Policy recommendations for Europe

Effects of an export tax for a large country



Source: ZEW

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The definition of export restrictions

...“a border measure that takes the form of a government law or regulation which expressly limits the quantity of exports or places explicit conditions on the circumstances under which exports are permitted, or that takes the form of a government-imposed fee or tax on exports of the products calculated to limit the quantity of exports.”

Report of the Panel on the Case “United States - Measures Treating Exports Restraints as Subsidies” (WTO, 2001a)



“It is widely recognized that the World Trade Organization (WTO) law on export restrictions is an area of ‘under-regulation’—as it neither defines the circumstances that justify quantitative restrictions nor regulates export duties.”

Karapinar, B.: Defining the Legal Boundaries of Export Restrictions: A Case Law Analysis. Journal of International Economic Law 15 (2), P. 443-479 (2012)



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12

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Three reasons for restrictions

1. Market and government failures

Export restrictions: Sometimes justifiable as second-best instruments in the presence of externalities.

Typical policy objectives:

- to generate government revenues.
- to counteract learning externalities within infant industries.
- to protect the environment.
- to conserve exhaustible natural resources

For each of these objectives, less distortionary policy measures exist. If these are unavailable, using export barriers may be justifiable as “second best”.

Three reasons for restrictions

2. National policy making and market power

Countries exhibit market power if world market prices react to their imports and exports.

⇒ Scope for strategic influence on prices

Typical objectives behind strategic use of market power on world market prices:

- to increase world market prices in order to raise domestic purchasing power (terms-of-trade-effect)
- to make downstream firms relocate into the country's borders
- to prevent transfers of resources rents by foreign mining companies

Costs of these instruments are imposed on other nations.

Basic rule: The less price-elastic world market demand, the greater the cost of export barriers borne by the rest of the world.

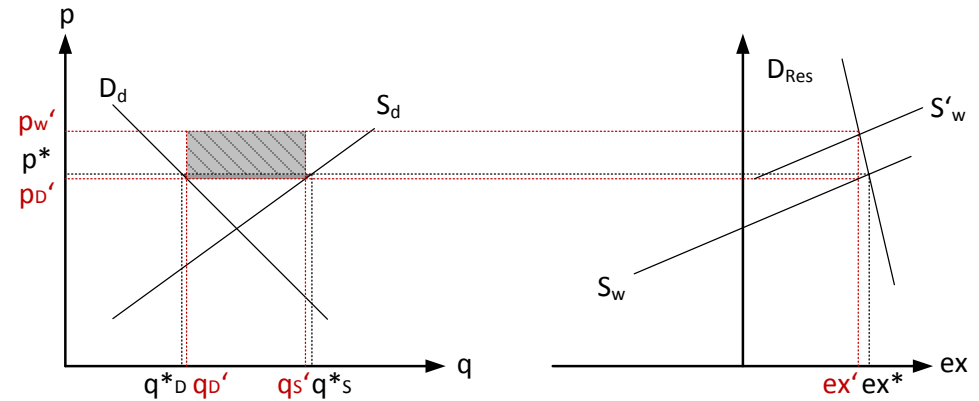
Why protectionism on raw materials boosted after 2002

After 2002, raw material markets turned from buyers' to sellers' markets, in particular due to China's dynamic growth.

Residual demand from abroad becomes more inelastic. Incentives for beggar-thy-neighbor policy grow.

- Large terms-of-trade effect
- High tax revenues
- Small distortions in domestic markets
- Costs are burdened upon the rest of the world

Inelastic residual demand



Source: ZEW

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Three reasons for restrictions

3. Special interest group policies

Domestic consumers of a raw material benefit if its exports are restricted.

⇒ Temptation to lobby for export restrictions to redistribute wealth in their own favor. Redistribution works even in the absence of market power of the country.

The propensity of successful lobbying increases if

- the sector consuming the raw material is concentrated.
- the raw material is supplied by an industry consisting of small firms.
- the consuming sector is large.
- the country suffers from weak institutions.

Scrap metals in developing countries fulfill all of these conditions => Prediction: A large number of export restrictions on scrap metals.

Three country prototypes and their attitude to trade barriers

1. Industrialized country

- Highly diversified economies, deeply integrated in the global economy
- Typically abstain from using export restrictions in order to continue reaping the benefits of free trade

2. Resource-rich, industrializing countries

- Power in the international markets of one or more raw materials, but less comparative advantage in non-primary sectors
- High propensity to exploit market power and to erect export barriers
 - to raise the world market price of their exports
 - to support growth in downstream industries

3. Developing countries

- Trade restrictions as the result of a combination of weak institutions and successful special interest policies at the domestic level

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Selected current export restrictions on nickel ores and ferronickel

- Prior to 2012, Russia was the only top five producer of nickel ore using export barriers
- Most important change 2012: Indonesia introduced an export licensing system and export taxes on unprocessed ores. Export prohibition announced for 2014
 - Motivated by the aim of moving up the value chain
 - Direct effects mostly on China and Japan
- China has export restrictions on nickel ore and primary nickel. Most important: Export tax on ferronickel

| Ores, Concentrates and Intermediates | | | | | | | | | |
|--|-------------|-----------------------|------|------|------|------|------|------|--|
| Commodity | Country | Measure | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | |
| Nickel ores and concentrates (260400) | China | Export tariff | 10% | 15% | 15% | 15% | 15% | 15% | |
| | China | Licensing requirement | No | Yes | Yes | Yes | Yes | Yes | |
| | Indonesia | Export tariff | - | - | - | - | - | 20% | |
| | Indonesia | Licensing requirement | No | No | No | No | No | Yes | |
| | Philippines | Licensing requirement | No | Yes | Yes | Yes | Yes | Yes | |
| Nickel mattes (750110) | Russia | Export tax | 5% | 5% | 5% | 5% | 5% | 5% | |
| Class II Nickel | | | | | | | | | |
| Ferronickel (720260) | China | Export tax | 10% | 20% | 20% | 20% | 20% | 20% | |
| | China | Licensing requirement | No | No | No | Yes | No | No | |

Source: ZEW

Selected current export restrictions on chromium ores ...

- Two of the most important producers of chromite ores – India and Zimbabwe – have introduced restrictions on their exports
- Indian export barriers have allegedly shifted trade flows significantly (Korinek and Kim, 2010)
- China replaced imports from India by South African ores. Increased raw material costs for South African ferrochrome producers. But: Also high costs of electricity

| Ores and Concentrates | | | | | | | | |
|---|--------------------|--|-----------|-----------|-----------|-----------|------|------|
| Commodity | Country | Measure | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| Chromium ores and concentrates (261000) | China | Export tax | 10% | 15% | 15% | 15% | 15% | 15% |
| | India | Licensing requirement | Yes | Yes | Yes | Yes | Yes | Yes |
| | India | Export tax | 3000 Rs/t | 3000 Rs/t | 3000 Rs/t | 3000 Rs/t | 30% | 30% |
| | | Other export measures: Congestion charge | - | - | - | 20% | 20% | - |
| | Philippines | Licensing requirement | No | Yes | Yes | Yes | Yes | Yes |
| | Zimbabwe | Export tax | - | - | - | 15% / 20% | 20% | - |
| Zimbabwe | Export prohibition | Yes | Yes | Yes | No | Yes | Yes | |

Source: ZEW

... and selected current export restrictions on ferrochromium

- Export barriers for ores discussed in South Africa
- China is the only major producer of ferrochrome restricting exports

| Ores and Concentrates | | | | | | | | |
|--|---------|-----------------------|------|------|------|------|------|------|
| Commodity | Country | Measure | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| Ferrochromium (720241, 720249, 720250) | China | Export tax | 10% | 20% | 20% | 20% | 20% | 20% |
| | China | Licensing requirement | Yes | Yes | Yes | Yes | Yes | Yes |

Source: ZEW

Selected current export restriction on molybdenum ores and ferromolybdenum

- Export restrictions on molybdenum are mostly a Chinese phenomenon
- Measures encompass export taxes, quotas and a licensing system
- Ores, ferromolybdenum and pure metals are affected
- Restrictions also in Russia, but Russian output only accounts for 1.6% of worldwide production
- Other countries supplying a large share of world markets (USA, Chile, Peru) do not employ export restrictions
- USA, EU, Japan challenge Chinese restrictions at the WTO

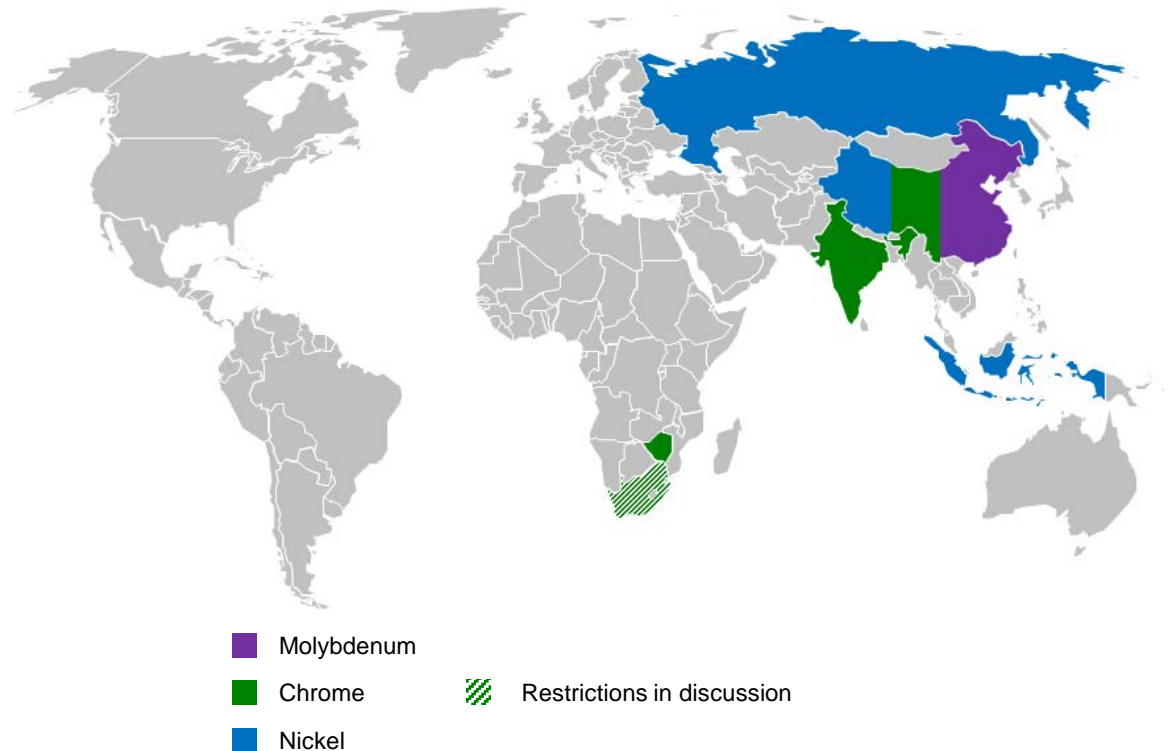
| Ores and Concentrates | | | | | | | | |
|--|---------|-----------------------|---------|---------|---------|---------|---------|---------|
| Commodity | Country | Measure | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| Molybdenum ores and concentrates (261310, 261390) | China | Export tax | 10% | 15% | 15% | 15% | 15% | 15% |
| | China | Licensing requirement | Yes | Yes | Yes | Yes | Yes | Yes |
| | China | Export quota | 33.9 kt | 33.9 kt | 33.9 kt | 33.9 kt | 33.9 kt | 33.2 kt |
| Ferromolybdenum | | | | | | | | |
| Ferromolybdenum (720270) | China | Export tax | 10% | 20% | 20% | 20% | 20% | 20% |
| | China | Licensing requirement | Yes | Yes | Yes | Yes | Yes | Yes |
| | China | Export quota | - | 33.9 kt | 33.9 kt | 33.9 kt | 33.9 kt | 33.2 kt |

Source: ZEW

Primary raw material: Exploiting market power

- Comparatively low number of export barriers on nickel, chrome and molybdenum
- Mostly imposed by countries potentially exhibiting market power
- Most of those are of the resource-rich, industrializing country type
- No restrictions by EU, USA, etc.
- Each primary raw material has its own “story”
- Export restrictions are best explained as exploitation of market power

Key countries for nickel, chrome and molybdenum



Source: ZEW

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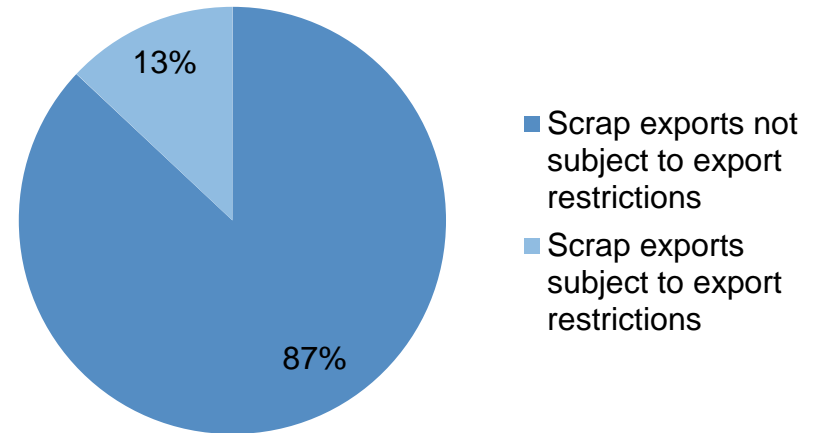
24



Many export restriction in particular on stainless steel scrap

- More than 30 countries make use of instruments limiting exports of stainless steel scrap
- Most of these countries are lower-middle-income economies (13 of 34) or upper-middle-income economies (10 of 34) according to the World Bank's classification
- Seven of the countries implementing export restrictions are low-income economies
- Four are high-income countries (Kuwait, Russia, Uruguay and the United Arab Emirates)
- The most important nations impeding trade in stainless steel scrap are China, India and Russia
- Export restrictions on stainless steel scrap are often part of more general export barriers for scrap metals
- The number of restrictions on scrap metals is increasing even further

Share of stainless scrap exports subject to export restrictions



Source: UN Comtrade, ZEW, 2013

Long list of export restrictions on stainless steel scrap (1/3)

| Stainless Steel Scrap (720421) | | | | | | | |
|--------------------------------|-----------------------|-------------|-------------|-------------|-------------|-----------|-----------|
| Country | Measure | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| Algeria | Licensing requirement | Yes | Yes | Yes | Yes | Yes | Yes |
| Argentina | Export tax | 5% | 5% | 5% | 5% | 5% | 5% |
| Argentina | Export prohibition | No | No | No | Yes | Yes | Yes |
| Azerbaijan | Export prohibition | Yes | Yes | Yes | NA | NA | NA |
| Belarus | Export quota | No | No | No | Yes | Yes | Yes |
| Burundi | Export prohibition | No | No | No | Yes | Yes | Yes |
| China | Export tax | - | - | 40% | 40% | 40% | 40% |
| Dominican Republic | Licensing requirement | Yes | Yes | Yes | Yes | Yes | Yes |
| Egypt | Export tax | 1500 LE/t | 1500 LE/t | 1500 LE/t | 1500 LE/t | 1500 LE/t | 1500 LE/t |
| Ghana | Export prohibition | | | | | | |
| Guinea | Export tax | 25000 GNF/t | 25000 GNF/t | 25000 GNF/t | 25000 GNF/t | NA | NA |
| Guyana | Export prohibition | No | No | No | Yes | No | No |
| Guyana | Licensing requirement | Yes | Yes | Yes | Yes | Yes | Yes |
| Iran | Export tax | - | 30% | NA | 50%/70% | 70% | 70% |

Source: ZEW

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26

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Long list of export restrictions on stainless steel scrap (2/3)

| Stainless Steel Scrap (720421) | | | | | | | |
|--------------------------------|-----------------------|------|------|------|------|------|-------|
| Country | Measure | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| India | Export tax | NA | 15% | 15% | 15% | 20% | 20% |
| Indonesia | Licensing requirement | Yes | Yes | Yes | Yes | Yes | Yes |
| Jamaica | Licensing requirement | Yes | Yes | Yes | Yes | Yes | Yes |
| Kenya | Export prohibition | No | No | No | Yes | Yes | Yes |
| Kuwait | Licensing requirement | NA | NA | NA | NA | NA | Yes |
| Malaysia | Export prohibition | Yes | Yes | No | No | No | No |
| Malaysia | Export tax | 10% | 10% | 10% | 10% | 10% | 10% |
| Malaysia | Licensing requirement | No | Yes | Yes | Yes | Yes | Yes |
| Morocco | Licensing requirement | No | No | Yes | Yes | Yes | Yes |
| Nigeria | Export prohibition | NA | NA | Yes | Yes | Yes | Yes |
| Pakistan | Export tax | 25% | 25% | 25% | 25% | 25% | 25% |
| Paraguay | Licensing requirement | No | Yes | Yes | Yes | Yes | Yes |
| Russia | Export tax | 15% | 15% | 15% | 15% | 15% | 12.5% |
| Rwanda | Export prohibition | No | No | No | Yes | Yes | Yes |
| South Africa | Licensing requirement | No | Yes | Yes | Yes | Yes | Yes |
| Sri Lanka | Export tax | 10% | 10% | 10% | 10% | 10% | 10% |
| Sri Lanka | Licensing requirement | No | No | Yes | Yes | Yes | Yes |
| Tanzania | Export prohibition | No | No | No | Yes | Yes | Yes |

Source: ZEW

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Long list of export restrictions on stainless steel scrap (3/3)

| Stainless Steel Scrap (720421) | | | | | | | |
|--------------------------------|--------------------|-------------------------|-------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Country | Measure | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
| Uganda | Export prohibition | No | No | No | Yes | Yes | Yes |
| Ukraine | Export tax | 30%, min 0.4 €/kg | 30%, min 0.4 €/kg | 27%, min 0.36 €/kg | 24%, min 0.32 €/kg | 21%, min 0.28 €/kg | 18%, min 0.24 €/kg |
| United Arab Emirates | Export tax | Dh 250 / t | Dh 250 / t | Dh 250 / t | Dh 250 / t | Dh 250 / t | Dh 250 / t |
| Uruguay | Export prohibition | Yes | Yes | Yes | Yes | Yes | Yes |
| Zambia | Export tax | 25% | 25% | 25% | 25% | 25% | 25% |
| Zimbabwe | Export prohibition | NA | NA | NA | Yes | Yes | Yes |
| Viet Nam | Export tax | 45% | 40% | 37% | 33% | 29% | 22% |

Source: ZEW

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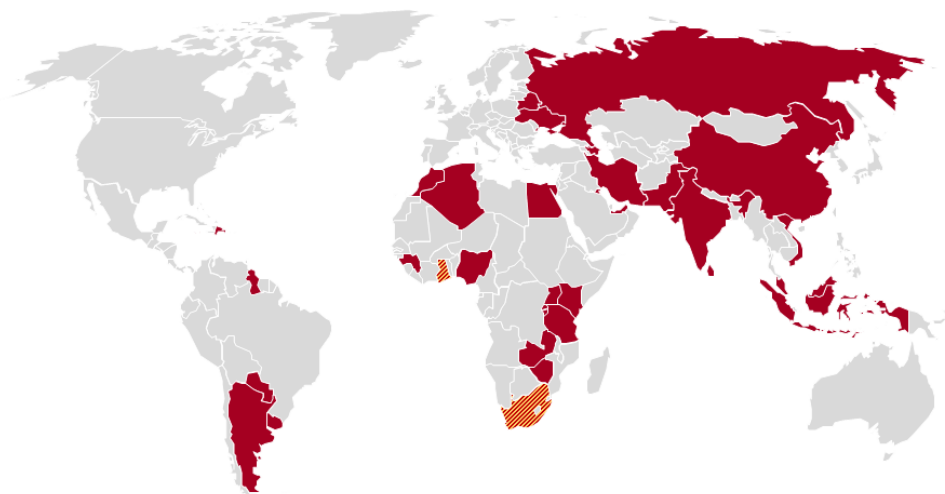
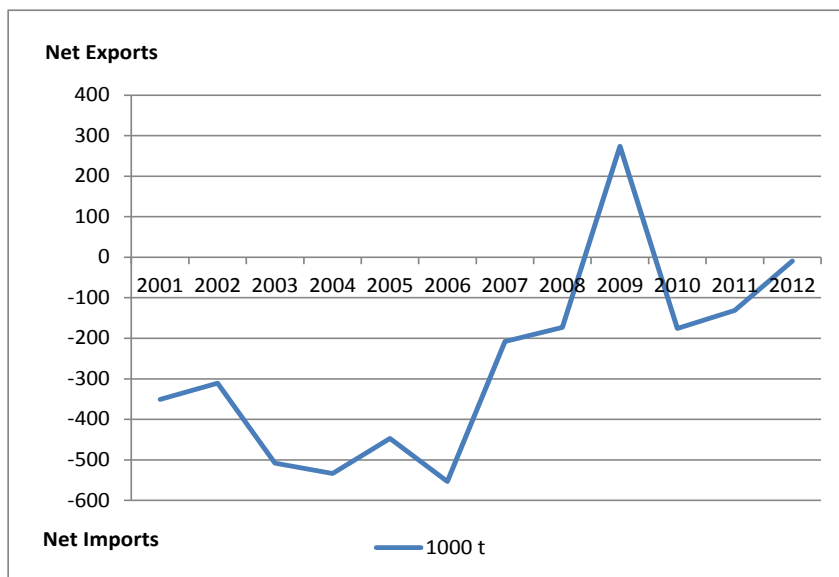
28

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... but export restriction on stainless steel scrap with limited relevance for Europe

- EU still depends on stainless steel scrap imports
- Biggest European scrap exporters can just meet the demand of Belgium and Finland

- Export barriers for stainless steel scrap are erected by many nations without notable international market power, but with domestic special interest groups
- China and India are net importers of stainless steel scrap themselves



- Restrictions on stainless steel scrap (data 2007-2011)
- ▨ New restrictions on stainless steel scrap (introduced since 2012)

Source: UN Comtrade, ZEW

Source: ZEW

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China is the most important key country in terms of production and restrictions

“Key countries are those nations which are among the top five producers of an input in stainless steel production and implement export restrictions beyond licensing requirements”

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| Country | Raw Material | Share of Production |
|------------------------|--|---------------------|
| China | Nickel, Chromium, Molybdenum, Scrap metals | 45.5% |
| India | Chromium | 6.4% |
| Indonesia | Nickel | - |
| Russia | Nickel | 0.32% |
| (South Africa)* | (Chromium) | 1.42% |
| Zimbabwe | Chromium | - |

- Largest stainless steel producer
- Export restrictions on all major components of stainless steel
- But dependent on imports of nickel and chromium ores



* South Africa is a potential key country and listed because of discussed export restrictions on chromium

Source: ZEW

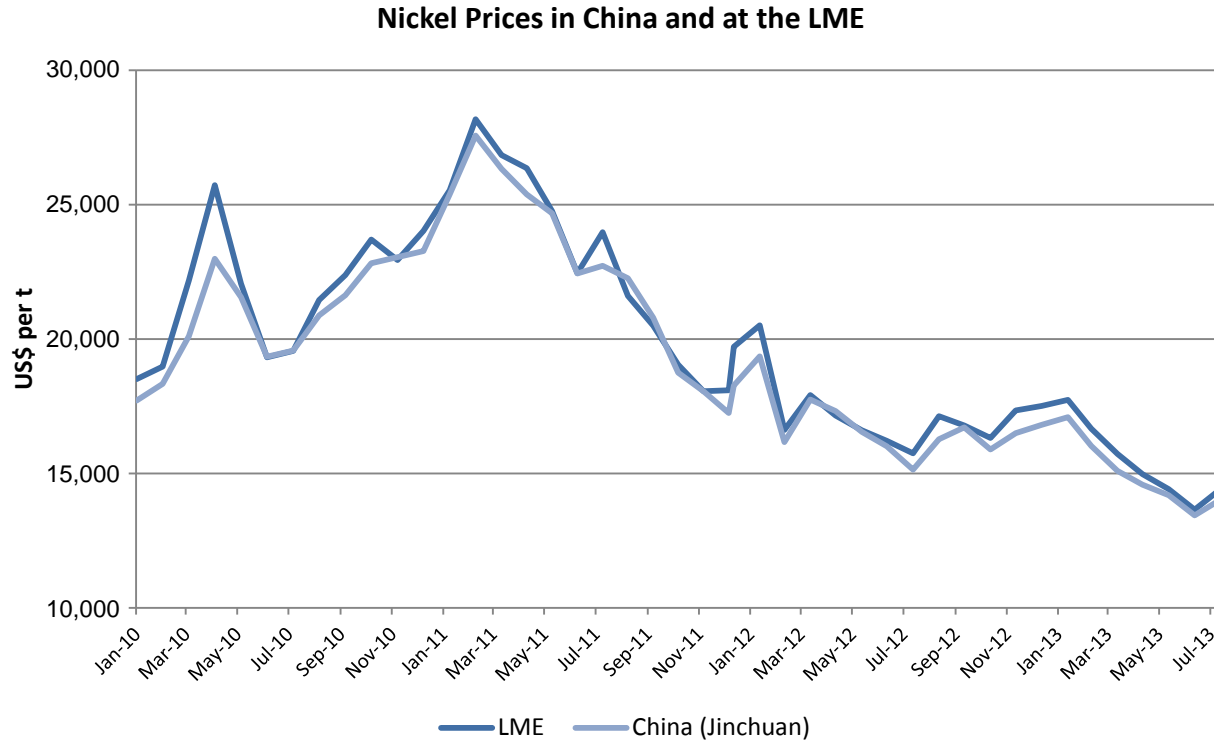
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30

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Export restrictions can be effective ...

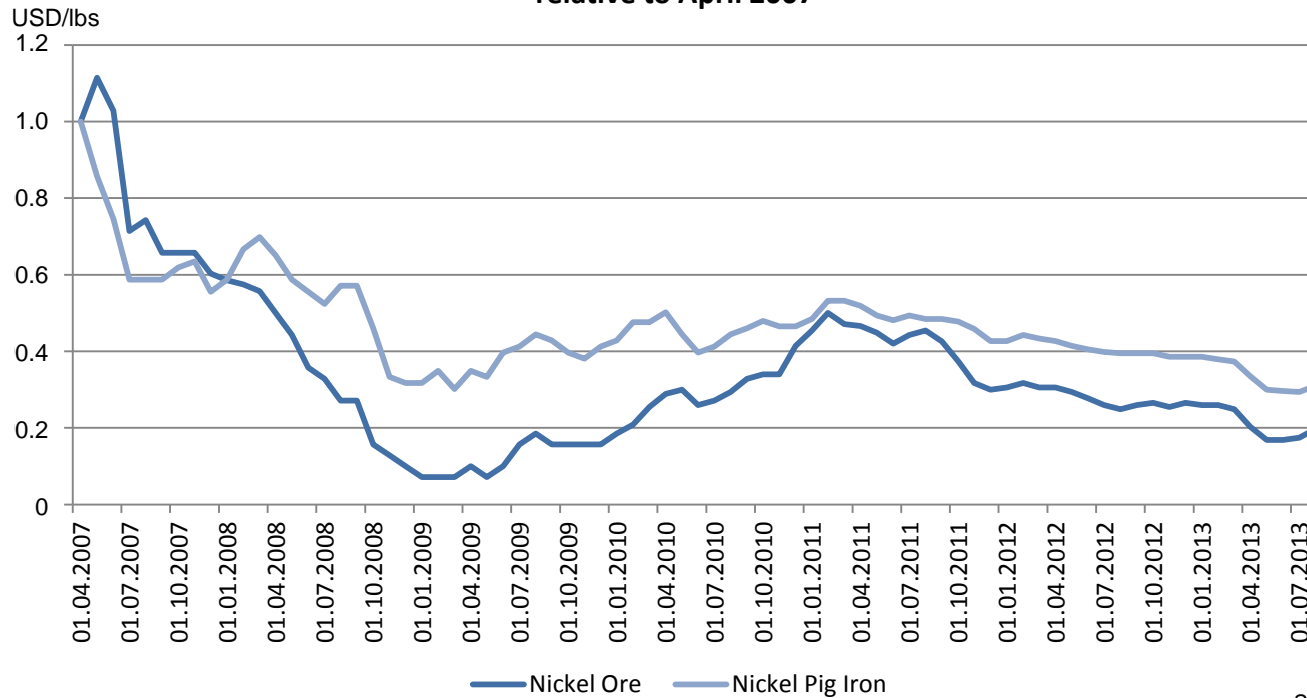


Source: LME; SMM

Chinese export restrictions on nickel plausibly result in lower domestic prices. Nickel is the price driver #1 of stainless steel

... but don't have to

Prices for Nickel Ore and Nickel Pig Iron (4-6% Nickel Content) in China relative to April 2007



Source: asianmetal.com, ZEW

Although Indonesia imposed its export tax on nickel ores in May 2012 no significant movement of prices is visible on the first sight

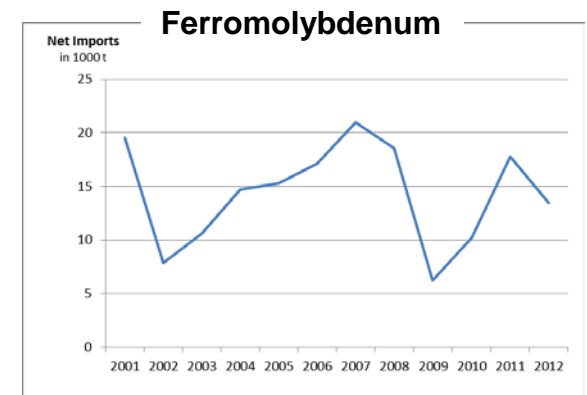
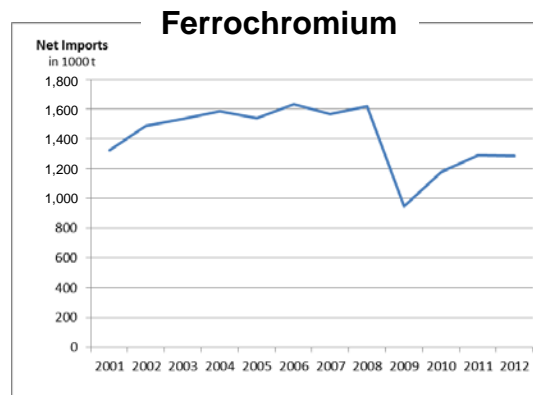
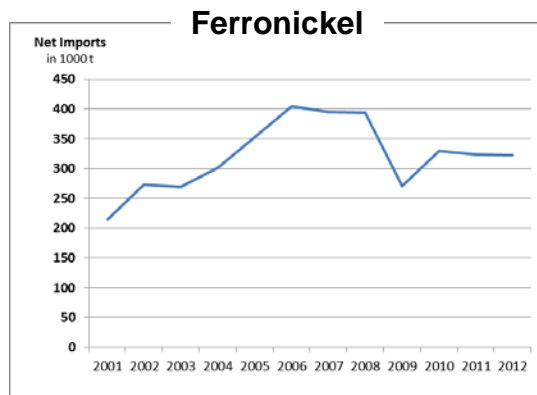
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- VI. About Oryx Stainless



The European response to unfree markets

“Free trade is always endangered by the pursuit of narrow or short-sighted self-interest of individual countries or politically powerful groups within them. The inputs into stainless steel production are no exception to this rule. But in its peculiar position as a net importer of most stainless steel inputs, the EU has most to gain from pushing for more multilateral trade agreements.”

ZEW



Source: UN Comtrade, ZEW

The increase of mining activities or the introduction of countervailing tariffs are no effective alternative for Europe

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34

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Call for actions

Recommendations to the EU

| Approach | Measure | Recommendation | Comment |
|---------------------------------|------------------------------------|---------------------------|---|
| Reducing impacts | Increasing transparency | Yes | |
| | Abolishing import tariffs | Consider | Quantitative research needed |
| Indirect approach | Increasing resource efficiency | More Research needed | Environmental aspects important |
| | Increasing recycling rates | More Research needed | Environmental aspects important |
| | Fostering mining in Europe | No explicit mining policy | Private sector decision |
| Enforce WTO rules | Enforce WTO rules | Yes | |
| Retaliatory tariffs | Import barriers on stainless steel | No | High probability of being counterproductive |
| | Export barriers on stainless scrap | No | Meaningless if EU remains net importer |
| International Agreements | Negotiate bilaterally | Yes | Short- to medium run measure |
| | Negotiate multilaterally | Yes | Long-run measure |

Source: ZEW

The abolition of existing trade restriction imposed by EU would serve as a positive signal for free trade in raw materials

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35

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- I. Market environment and starting point
- II. Study – Models and Methods
- III. Results
 - I. Trade Theory
 - II. Empirical Analysis
- IV. Conclusion
- V. Research Team**
- VI. About Oryx Stainless



Research team

The Centre for European Economic Research (ZEW), Mannheim

- Nonprofit and independent institute founded in 1990 on the basis of a public-private initiative in the Federal State of Baden-Württemberg in co-operation with the University of Mannheim
- **Prof. Timo Goeschl, Ph.D.**
 - Professor of Economics at Heidelberg University
 - Research Associate at the ZEW
- **Prof. Dr. Andreas Löschel**
 - Head of the department "Environmental and Resource Economics, Environmental Management" at the ZEW
 - Professor of Economics at the Heidelberg University
- **Frank Pothén**
 - Resource economist at the ZEW

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37

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A BRAND OF THE KMR GROUP

- I. Market environment and starting point
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Oryx Stainless Group

- Oryx Stainless – the internationally leading raw materials trading group
- Oryx Stainless is one of the world's leading trading organizations for raw materials employed in the stainless steel industry
- Its core business lies in handling and processing stainless steel scrap



Mülheim an der Ruhr
Germany

Dordrecht
The Netherlands

Bangkok Area
Thailand

Facts & Figures

- Established: 1990
- Locations: Mülheim an der Ruhr, Germany; Dordrecht, the Netherlands; Bangkok Area, Thailand
- Oryx Stainless, a KMR Group brand, possesses a stable shareholder base that fully supports the company's long-term strategy of sustainable growth. All owners have assumed entrepreneurial responsibility within the management of the holding company or in the individual divisions
- Volume (2012): approx. 450,000 t
- Global market share: approx. 6%
- Workforce (2012): 120

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Centre for European
Economic Research

Contact

Oryx Stainless Group

- Rheinstrasse 97
D-45478 Mülheim an der Ruhr
Phone: +49 208 5809 0
Fax: +49 208 5809 100
- 's-Gravendeelsedijk 175
NL-3316 AS Dordrecht
Phone: +31 78 632 6230
Fax: +31 78 632 6231
- info@oryxstainless.com
www.oryxstainless.com

Centre for European Economic Research (ZEW)

- Environmental and Resource Economics,
Environmental Management
- L7,1
D-68161 Mannheim
Phone: +49 621 1235 368
Fax: +49 621 1235 226
- pothen@zew.de
www.zew.de

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40

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