

Minerals For A Green Society Symposium

Role of China in Global Mineral Supply and Demand

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Study Limiting Conditions



- Statistics based on announced deals, but not necessarily closed deals.
- Chinese activities lack transparency so there are many more deals than those presented here.
- Off-take, strategic alliances and other cooperative agreements not included in this set
- This study focused only on minerals (metals + coal): not oil and gas

Study Results



- 155 announced mineral transactions examined
- 2005 – 2010 time period
- US\$98 billion in potential eventual investments
- 17 commodities: aluminum, coal, copper, gold, iron, lead, lithium, molybdenum, nickel, platinumoids, potash, rare earths, silver, tin, tungsten, uranium, zircon
- Investments in at least 28 countries, many of which are underdeveloped economies (China has become Africa's largest FDI)

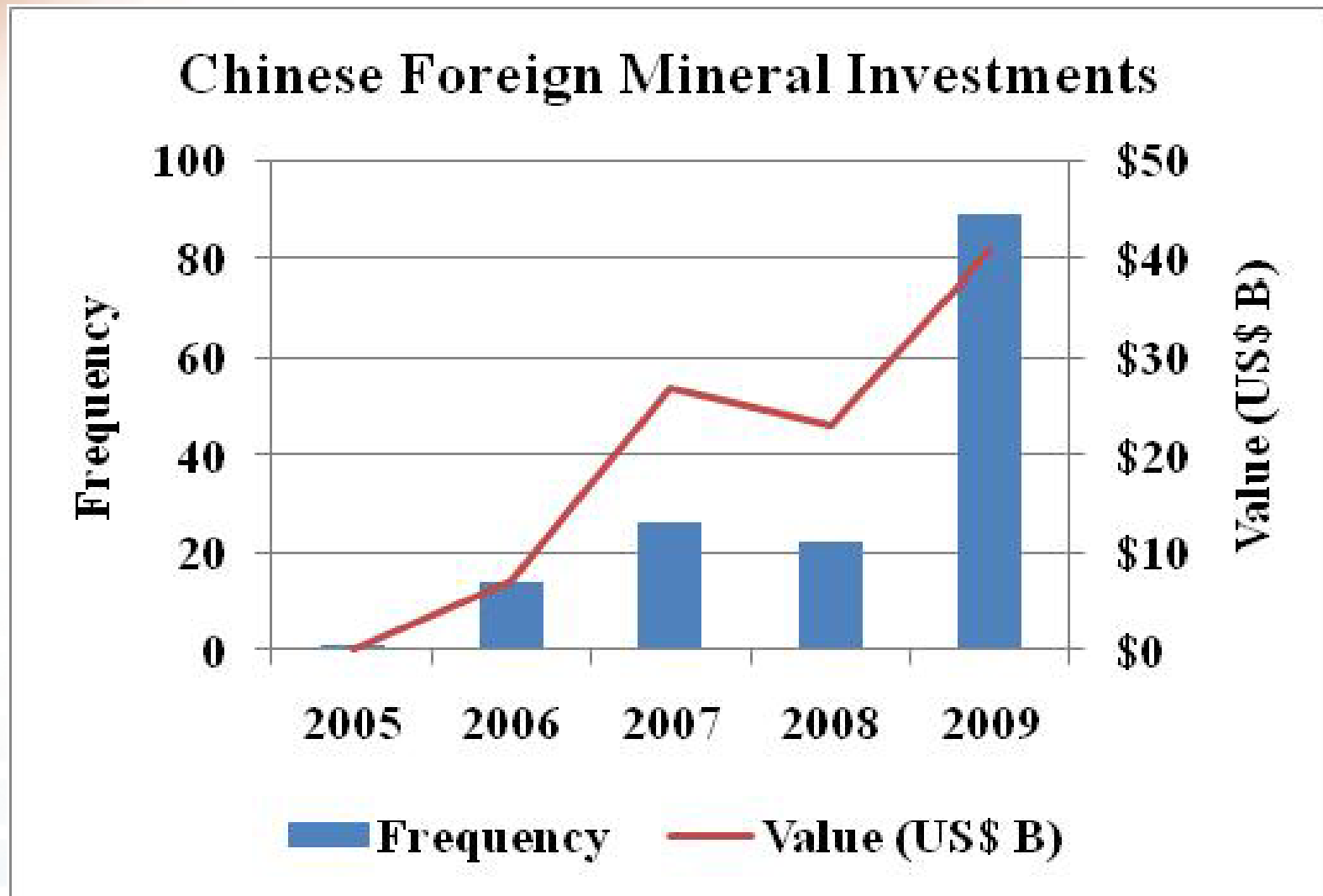
Takeaway Points



1. Explosive Growth in Chinese foreign mineral investments

- a. Locking up iron supplies to support large-scale domestic infrastructure development (railroads, office buildings, ship building, bridges, etc.)
 - Australian iron is closest to China geographically (lower freight costs) and hosts the highest production volumes and highest grades
 - Brazil is the next best location for large volumes and high grades
- b. Opportunistically acquiring other metals
- c. Also pursuing energy commodities (uranium, coal, oil and gas)
- d. Tighten the monopoly on the Rare Earth metals
- e. At least 50% of imported ores are being used domestically in China
- f. Converting U.S. dollars into hard assets

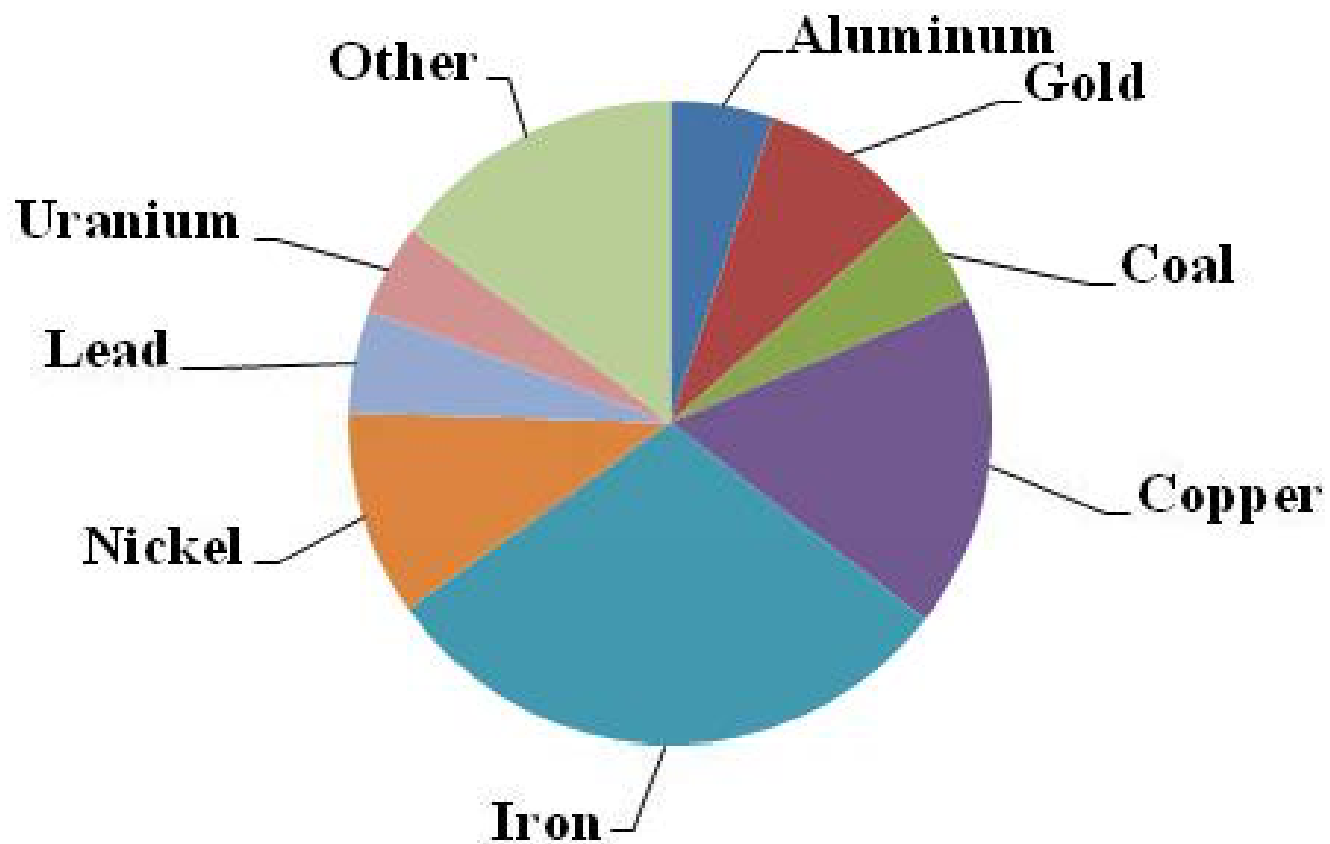
Explosive Growth in Investments



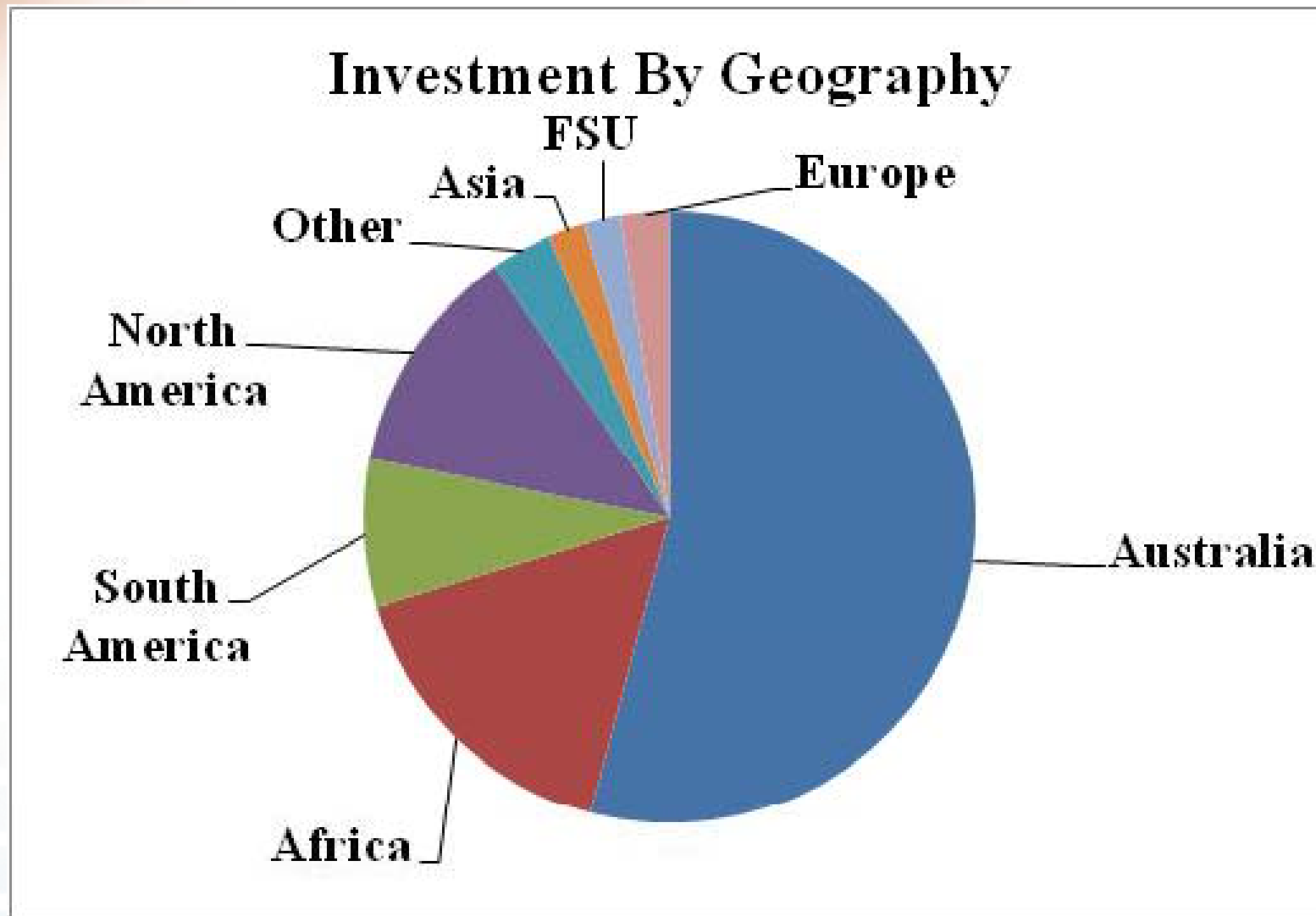
Focus on Iron, Copper, Nickel



Investment By Commodity



Focus on Australia, Africa and South America

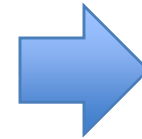


Takeaway Points



- 2. Investments being made by one or more mechanisms:**
 - a. Equity investments in corporations
 - b. Earn-in agreements on mineral and mining properties
 - c. Project financing in exchange for off-take agreements
 - d. Project loan financing to create indirect control of assets

Investment Strategies



Corporation



**Equity Stakes
Corporate Loans**

Mine



**Direct Equity Stake
Project Loans**

Output



**Off-take
Agreements**

Takeaway Points



- 3. Current purchases have been fairly benign**
 - a. Small, mediocre deposits (small tonnage, low-grade or high cost)
 - b. Most attempts at large purchases have failed (e.g. Noranda, Rio Tinto)

- 4. However, they are learning and becoming more competitive**
 - a. Bought \$200 million in Glencore International bonds in 2010
 - b. Equity stakes in Teck, MMX, Oz Minerals, Fortescue, Felix
 - c. Several multi-billion project loans put in place in 2009
 - d. Acquisitions for U.S. dollars may not be economically sensitive

Takeaway Points



- 5. Controlling natural resources provides a competitive advantage to China**
 - a. All wars fought over natural resources (including people)
 - b. Investing in natural resources leads to development of local and national infrastructure which curries favor with the host country leading to increased military assistance and opportunities for political manipulation
 - c. This is about commercial warfare not military
 - d. China is recycling U.S. dollars to help manage foreign exchange reserves

Domestic growth will consume more; leaving less for others



China's Share of World Mineral Production in 2005

Commodity	Percentage	Rank
Industrial minerals:		
Cement	45	1
Fluorspar	51	1
Rare earths	96	1
Metals:		
Aluminum	24	1
Antimony	86	1
Copper	16	2
Gold	9	4
Lead	32	1
Magnesium	75	1
Molybdenum	22	3
Silver	12	3
Steel, crude	31	1
Tin	35	1
Tungsten	87	1
Zinc	26	1

As China's economy grows, domestic consumption will take a larger share of the production of these minerals.

Troubling Thoughts



1. \$9 billion infrastructure investment (\$3.0 billion for copper mining) in Zambia in 2008 included establishment of an economic free zone in the Copper belt. 60 Chinese mining companies intend to invest US\$800 million in this zone.
2. Chinalco tried to take control of Rio Tinto, one of the world's largest iron producers. Chinese have the financial capital to do very large deals.
3. China provided several multi-billion project loans in 2009. Appear to be amping up their game.
4. Why would the Chinese be taking control of two large Rare Earth deposits in Australia when they currently control 97% of global supplies?
5. Chinese have publicly stated their intention to unload U.S. dollars through hard asset purchases.
6. Chinese set up their own commodities exchanges to circumvent the speculative LME exchange.

Issues to Watch



- The largest three iron producers represent 60-70% of the annual ship-borne iron ore production.

BHP Minerals - Australian / British

Vale - Brazilian

Rio Tinto - British

These companies need to stay free of Chinese influence to insure that iron markets are open to Western companies / countries.

Projection: Within ~20 years, China will consume half of the world's annual copper production

China is currently the largest consumer of many critical minerals. Continued growth will reduce the amount of these commodities available to others.

Summary



1. In a global economy, everyone must compete, including the United States.
2. Decreasing number of areas available in the USA for exploration and mine development due to expanding urban areas and lands set aside.
3. Very difficult to permit metal mines in a timely manner due to lack of a politically supported national mineral policy. Currently takes about 15 years from discovery to production.
4. Chinese are paying fair value for their foreign acquisitions.
5. United States' lack of a proactive mineral policy means our country will be facing increased risks of:

Insufficient rare earth metals supplies

Much higher raw materials costs

Critically increased dependency on foreign ore sources, many of which reside in countries unfriendly to the USA.

Recommendations



1. Provide the USGS Mineral Information Team with sufficient funding to do their job of tracking mineral statistics. Your decision to cut their funding by tens of millions of dollars is potentially forfeiting billions of dollars of new commerce while also jeopardizing national security. They need research funding to study critical issues such as material flow patterns and undiscovered resources.
2. Create the equivalent of “special economic zones” for exploration and development of specific strategic minerals.
3. Stockpile specific minerals
4. Balance anti-development tactics with good, real science-based regulations that consider real economic impacts.
5. Consider implementing flow-through funding of foreign projects as a mechanism for locking in foreign mineral supplies for the USA.

Canadian Flow-through Funding



- Exploration stimulus package implemented more than 50 years ago.
- Program designed to raise funding for exploration activities
- Allows the investor to deduct 100% of investment against net taxable income
- Finance Canada study showed that for every \$1.00 of lost tax revenue, the program created \$2.60 in exploration funding.
- Creates new sources of commodity resources, jobs, tax revenues and infrastructure development

Questions?

Consider me as a resource on mineral questions

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APPENDIX

(Other Thoughts)

Strategic Minerals



- Rare earths – catalytic converters, magnets, hybrid cars
- Cobalt – super magnets, super-alloys, jet engines, gas turbine engines
- Manganese – steel strengthener
- Indium – LCD displays, semi-conductors, high-speed resistors, specialized solders and metal allows
- Gallium – lasers, photo cells, LEDs, Solar cells, semi-conductors, transistors
- Lithium – Electric car batteries, glass, ceramics, medicine, synthetic lubricants

Substitutes for Strategic Minerals



Strategic Minerals

Cobalt

Gallium

Indium

Lithium

Manganese

Rare earths

Known Substitute

Nickel-iron, neodymium-iron-boron

Silicon

Halfnium, Gallium-arsenide

Potassium, zinc, nickel, magnesium
cadmium, mercury

None

Different rare earth elements substitute
for each other

Not all substitutes will be as effective or have the same chemical and physical properties as the element they replace

Green Technologies



- Green Technologies is a phrase that will cause more confusion than clarity. Green Technologies = Future Technologies (which hopefully have a Green component).
- Focus on electronics applications:
 - Computers: high-purity silica, rare earths
 - Displays: indium, gallium
 - Solar Receptors: gallium, indium, silica
 - Hybrid batteries: lithium, nickel
 - Magnets: neodymium, cobalt

These commodities are rare in nature; high demand will drive up prices on an accelerated basis.
- Manufacturers will have to pay market prices. It is their responsibility to locate suppliers. Chinese will favor their manufacturers over others.
- Government policy should be to support Green technologies. It would help if the nation could provide needed mineral supply sources.