

# Toward Recoupling?: Assessing the Impact of a Chinese Hard Landing on Commodity Exporters

Results from Conditional Forecast in a GVAR Model

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*China is "Dubai times 1,000 – or worse"*

- ▶ Jim Chanos, hedge fund manager (November 2009)

*China credit bubble "unprecedented in modern world history"*

- ▶ Charlene Chu, Fitch Ratings (quoted in The Telegraph, June 16, 2013)

*"The Chinese model is about to hit its Great Wall, and the only question now is just how bad the crash will be."*

- ▶ Paul Krugman (New York Times, July 19, 2013)

# Outline

China's growth prospects

China and commodities

Methodology

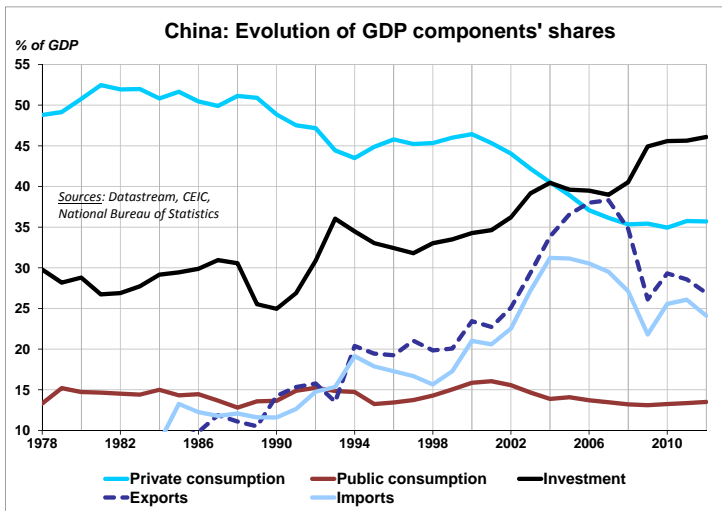
Results

Towards Recoupling ?

Appendix

## 4 main arguments pointing to a hard landing :

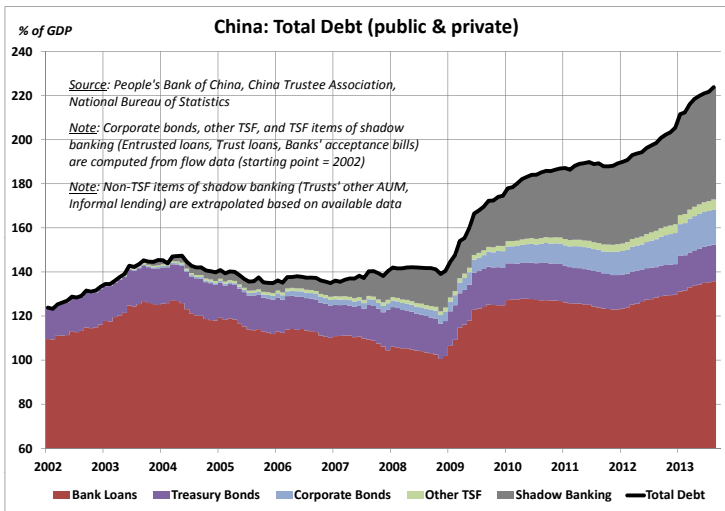
1. Historical rebalancing precedents
2. Overinvestment (Lee et al, 2012)
3. Unsustainable debt dynamics
4. Probable real-estate bubble



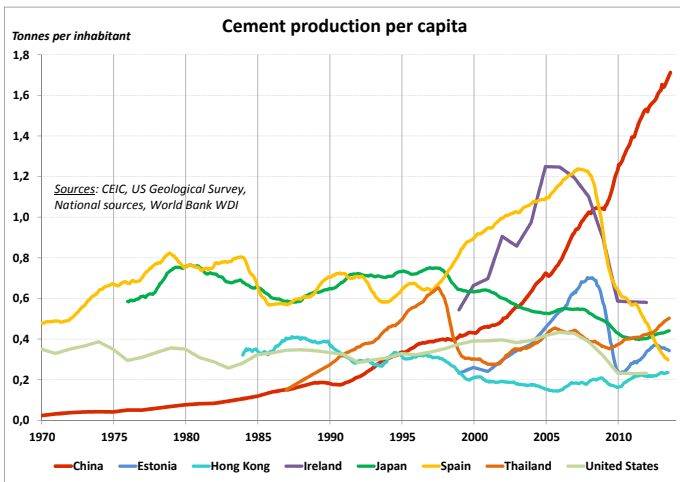
**FIGURE:** China's internal imbalances.

## What does history tell us ?

- ▶ RGE (2013) : The Myth of a Gradual Rebalancing and Soft Landing for China
  - ▶ 46 episodes of rebalancing after investment-led growth
  - ▶ Growth is 3.6 percent lower on average after the investment peak
  - ▶ Imbalances in China much more acute
- ▶ Eichengreen et al (2012) : When fast-growing economies slow down : International evidence and implications for China
  - ▶ China shares many of the characteristics of "slowdown economies"
  - ▶ High investment-to-GDP ratio, undervalued currency, ageing population

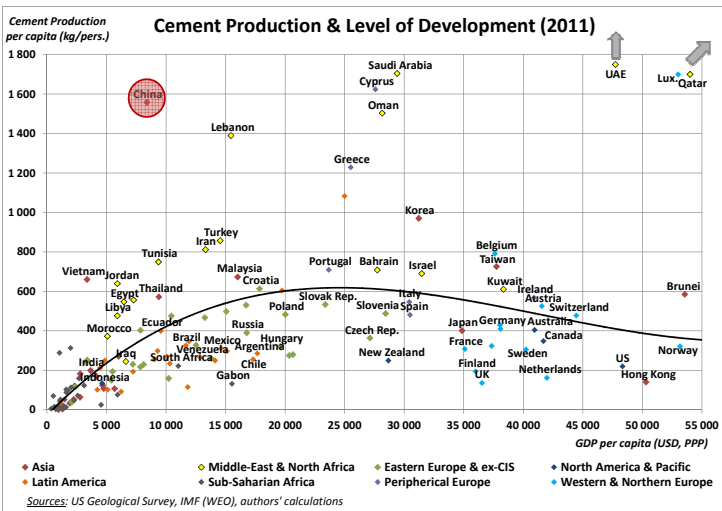


**FIGURE:** China's total debt surge.



**FIGURE:** Cement production in China compared to past real estate bubbles.

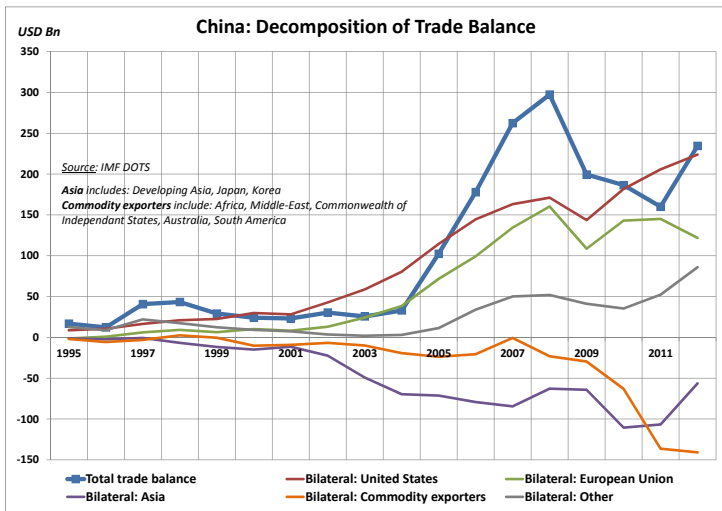




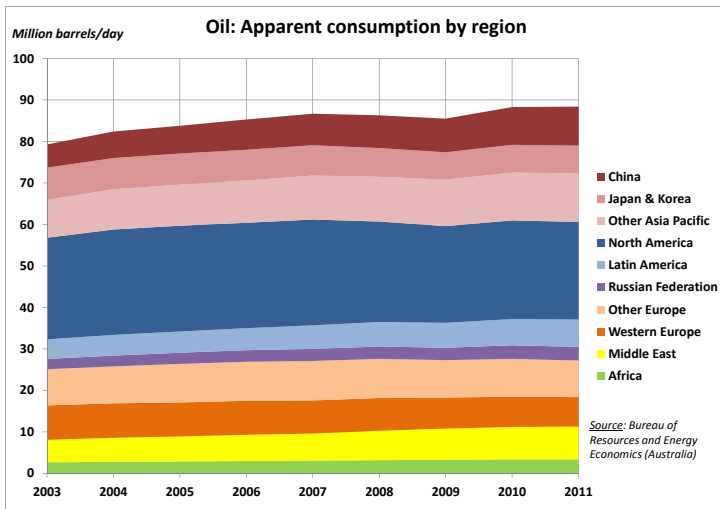
**FIGURE: Cement production and level of development.**

## 4 main arguments pointing to a hard landing :

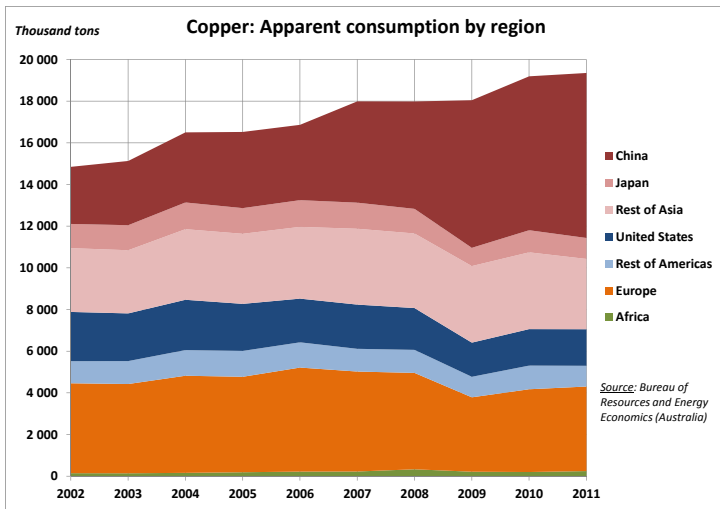
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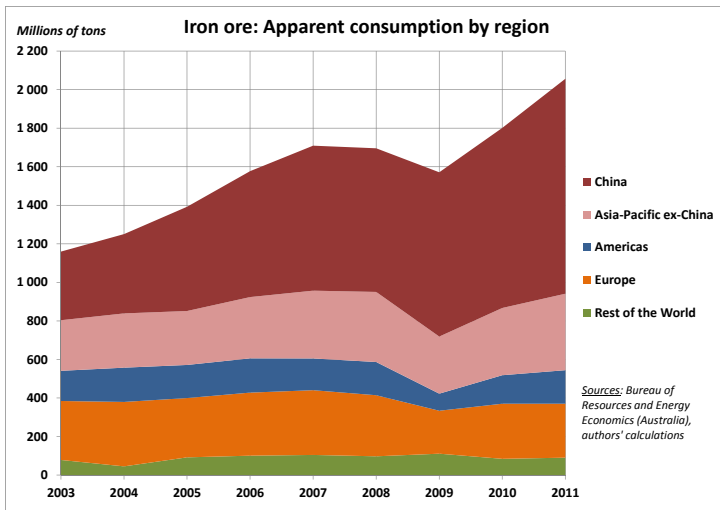
**FIGURE:** China's bilateral external imbalances.



**FIGURE: Oil consumption by region.**



**FIGURE:** Copper consumption by region.



**FIGURE:** Iron ore consumption by region.

## China's commodity consumption : main facts

- ▶ 10% of global oil consumption
  - ▶ Coal is the main energy source for China (nearly 70%)
  
- ▶ More than 40% of global metal consumption
  - ▶ Predominantly linked to investment
  - ▶ Example : Construction alone accounts for 50% of China's end-use of steel (2007)

Global VAR (first developed by Dees et al. 2007, Pesaran et al. 2004).

Widely used in the international macro literature :

- ▶ Useful to study international linkages with a limited time sample.
- ▶ Construct 1 VECMX by country.
- ▶ For a given country, a given exogenous variable (for example foreign GDP) is the weighted average of other countries' corresponding variables (other countries' GDP).



VARX for each country :

$$x_{it} = a_{i0} + a_{i1}t + \sum_{j=1}^p \Phi_{ij}x_{i,t-j} + \sum_{k=0}^q \Gamma_{ik}x_{it-k}^* + u_{it}$$

By "pooling" estimated VARX one can rewrite the GVAR :

$$X_t = FX_{t-1} + D_t + V_t$$

## Unconditional forecast mean and variance-covariance matrix :

$$\mu_h = E_1 F^h X_T + \sum_{s=0}^{h-1} E_1 F^s D_{T+h-s}$$

$$\Omega_{hh} = E_1 \sum_{s=0}^{h-1} F^s \tilde{\Sigma} F'^s E_1'$$

Conditional forecast is conceptually similar to counter-factual analysis (Pesaran et al. 2007, Dubois et al. 2009).

Conditional forecast mean :

$$\mu_h^* = \mu_h + (s'_{h\bar{H}} \otimes I_k) \tilde{\Omega} (I_{\bar{H}} \otimes \Psi') [(I_{\bar{H}} \otimes \Psi) \tilde{\Omega} (I_{\bar{H}} (I_{\bar{H}} \otimes \Psi'))]^{-1} \tilde{g}_{\bar{H}}$$

Bootstrap R=500 simulations :

1. For each  $r$  simulation we recalculate  $X_t^{(r)}$  :

$$X_t^{(r)} = FX_{t-1}^{(r)} + D_t + V_t^{(r)}$$

- 1.1 This allows to estimate  $F^{(r)}$  (and intercept and trend).
- 1.2 Compute  $\mu_h^{(r)}$  and  $\mu_h^{(r)*}$ .
2. Calculate median and other quantiles for conditional and unconditional forecasts.

- ▶ 25 countries (6 are grouped in RoW) + 1 Metal (MPI) block + 1 oil block.
- ▶ From Q2 1992 to Q4 2012.
- ▶ We focus on 6 countries which are highly dependent from China regarding metals (Australia, Brazil, Chile, India, Peru and South Africa).
- ▶ The impact of countries on "commodity blocks" is weighted by the share of each countries in global consumption of metals and oil :
  - ▶ MPI block : Copper and Iron ore consumption.
  - ▶ Oil block : Oil demand.

	Endogenous variables						
	y	Dp	Inv.	Exp.	REER	Oil price	MPI
most countries	x	x	x		x		
Exporters	x	x	x	<b>X</b>	x		
MPI Block							<b>X</b>
OIL Block						<b>X</b>	

TABLE: GVAR specification : Endogenous variables.

	Exogenous variables						
	y	Dp	Inv.	Exp.	REER	Oil price	MPI
most countries	x	x					
Exporters	x	x	<b>X</b>			<b>X</b>	<b>X</b>
MPI Block	x	x	<b>X</b>				
OIL Block	x	x					
<i>Exceptions :</i>							
Germany	x	x	<b>X</b>				
Russia	x	x				<b>X</b>	

TABLE: GVAR specification : Exogenous variables.

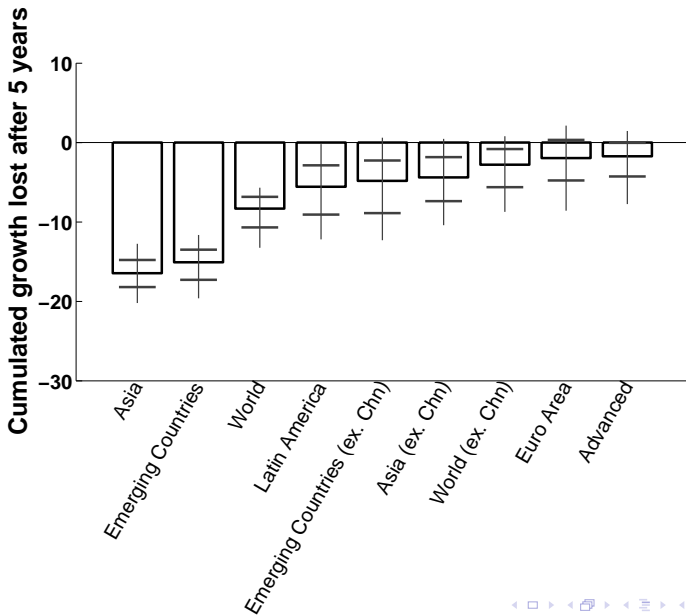
# The hard landing scenario

Some studies :

- ▶ Pettis (2013) : China will grow at no more than 3% during rebalancing.
- ▶ Nabar & N'Daye 2013 (IMF WP 13-204) : downside scenario in which China would grow at no more than 4%.

Our scenario :

- ▶ GDP growth slows down to 3%.
- ▶ Investment growth slows down to 0%.
- ▶ This implies some rebalancing : investment-to-GDP ratio down to 40% after 5 years.





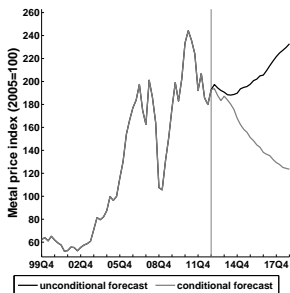
## 3 possible transmission channels :

1. Commodity prices
2. Real exports
3. Investment

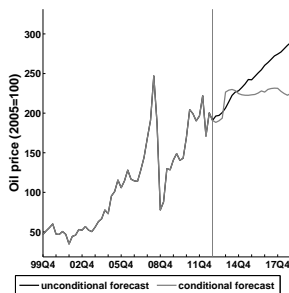
## 1 possible buffer :

1. Real effective exchange rate

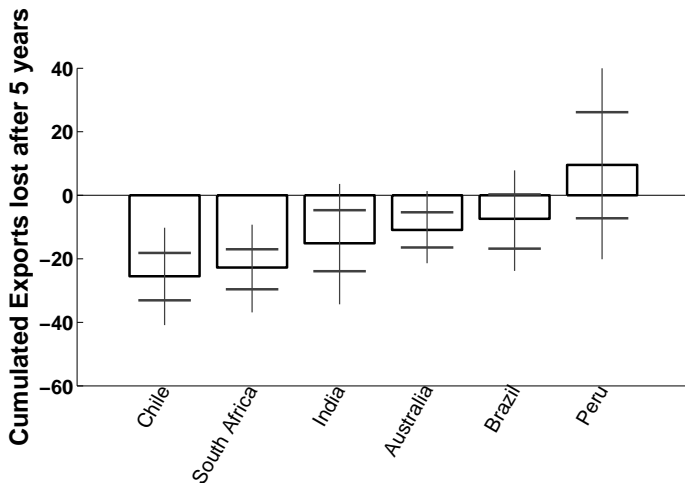
## Metal Price index



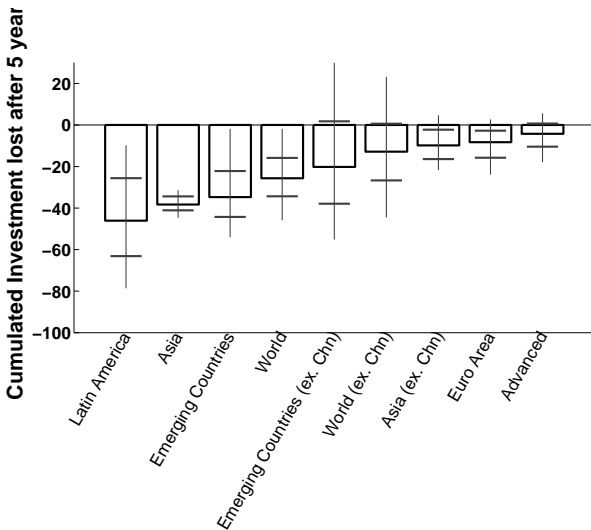
## Oil price



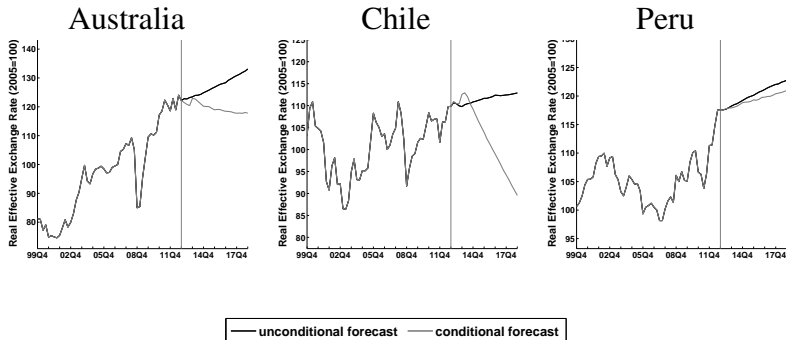
**FIGURE: Cumulated export loss.**

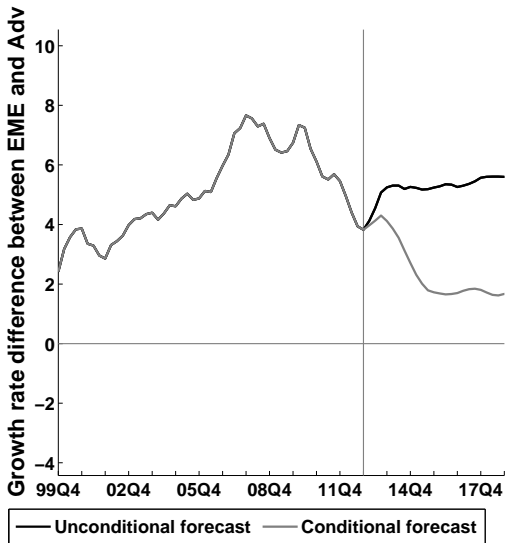


**FIGURE: Cumulated investment loss.**



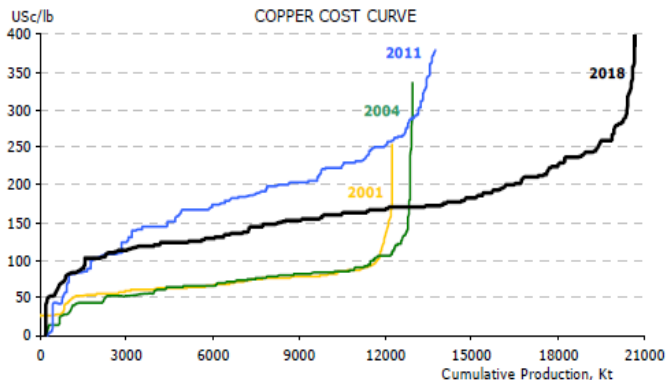
**FIGURE:** Commodity exporters' real effective exchange rate.





# Limit 1 : Could the fall in metal price be *underestimated* ?

## Supply Curve for Copper



Source: Peter Richardson, Morgan Stanley Research

## Limit 2 : Financial variables not taken into account

- ▶ Financial contagion ? Impact on confidence, hence on investment ?
- ▶ Rise in risk aversion => Capital outflows from EMEs towards safe havens ?
- ▶ Interaction with Fed tapering ? The issue of EMEs' current accounts



# Conclusion

- ▶ China : Imbalances, credit growth, real-estate bubble : towards a hard landing ?
- ▶ Large impact on metal exporters (Latin America especially)
- ▶ Provides a possible interpretation for decoupling :
  - ▶ Decoupling = Emergence of China + Imbalanced growth + Impact on commodity exporters ?
  - ▶ Hard landing in China may trigger partial recoupling

## Work in progress

- ▶ More countries.
- ▶ Better identification of "commodity dependent countries" (with net exports).
- ▶ Similar modeling for all countries.

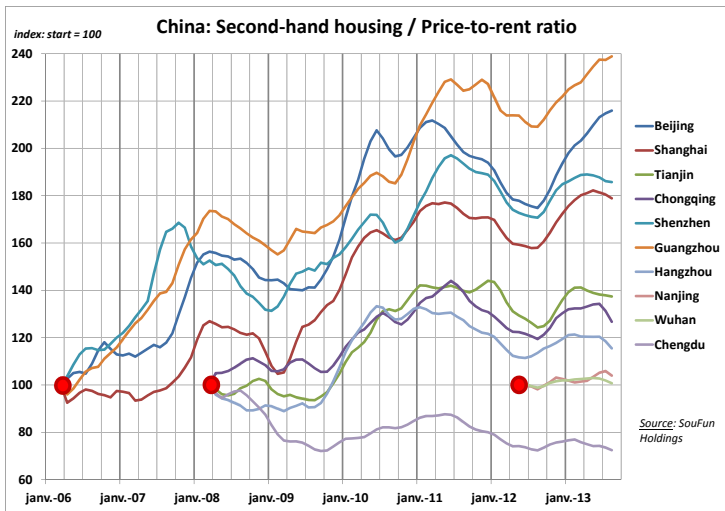
But then we had some issues :

- ▶ Very large confidence intervals.
- ▶ Some countries (such as Argentina) had very large cumulated loss.
- ▶ Very large drop in oil and copper price.

Solutions (still in progress) :

- ▶ Add dummies : Argentina end 90's/beginning 2000, GFC (for all countries), Euro Area crisis, Asian Crisis...
- ▶ Add production in commodities block.

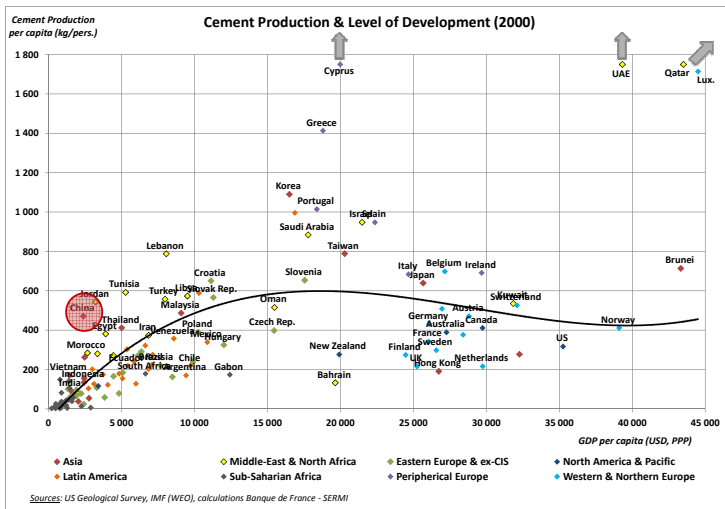
Thank you !



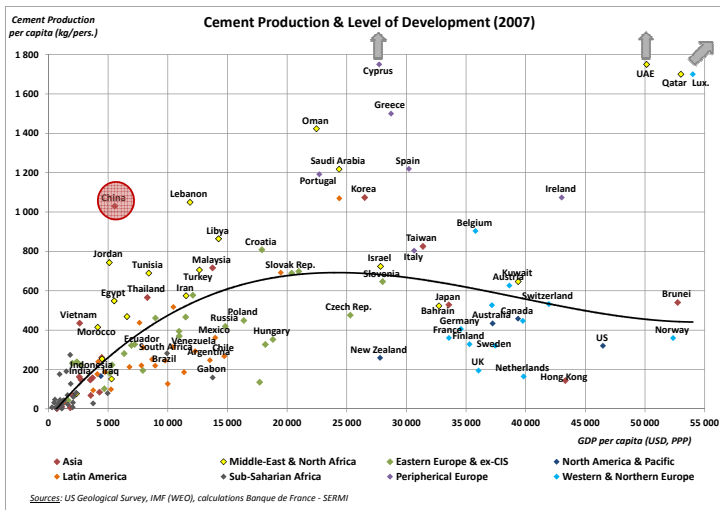
**FIGURE:** Price-to-rent ratios in China's ten largest cities.



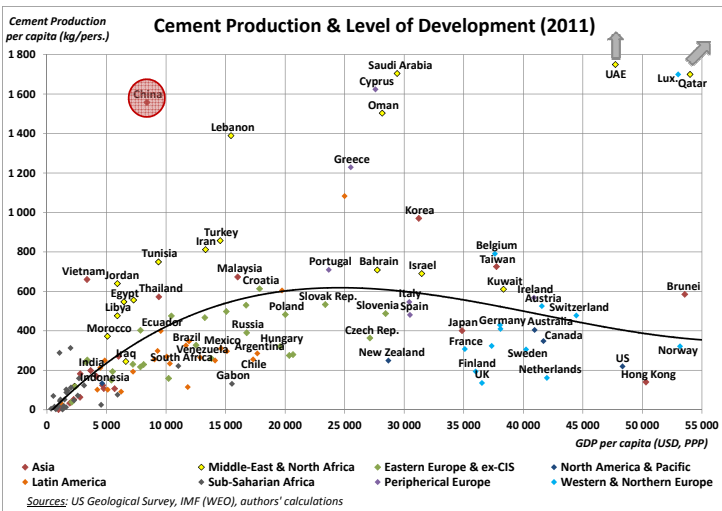
**FIGURE:** Price-to-income ratios in China's ten largest cities.



**FIGURE: Cement production and level of development (2000).**

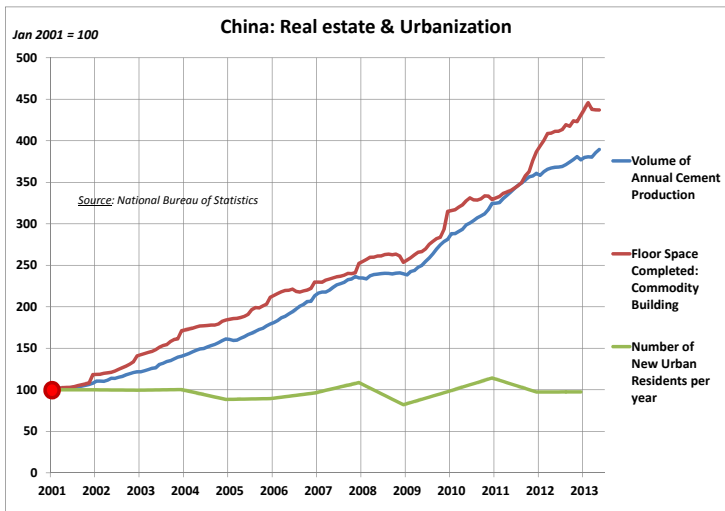


**FIGURE: Cement production and level of development (2007).**

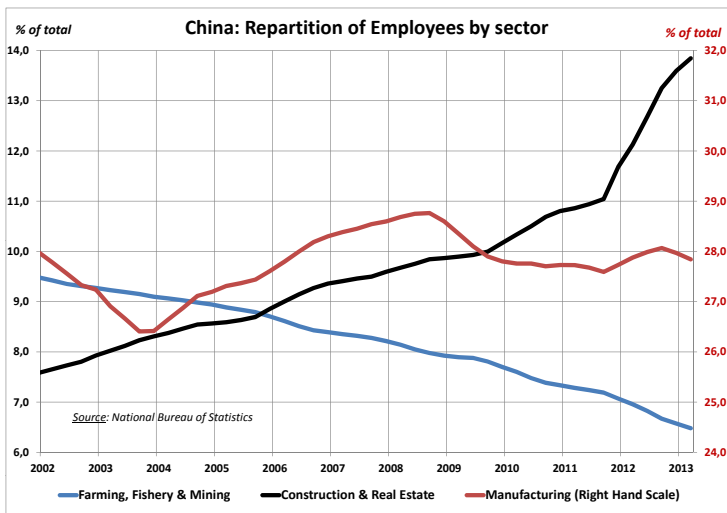


**FIGURE: Cement production and level of development (2011).**

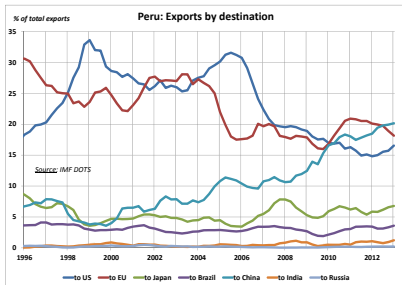
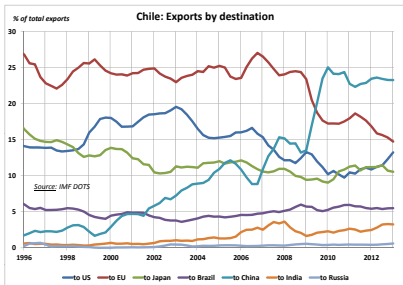
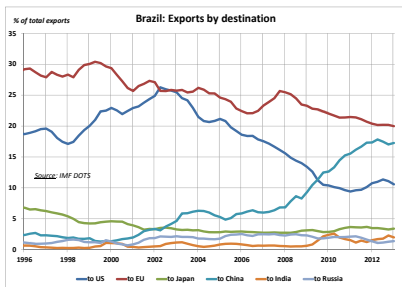
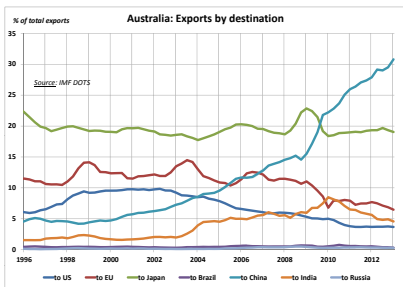


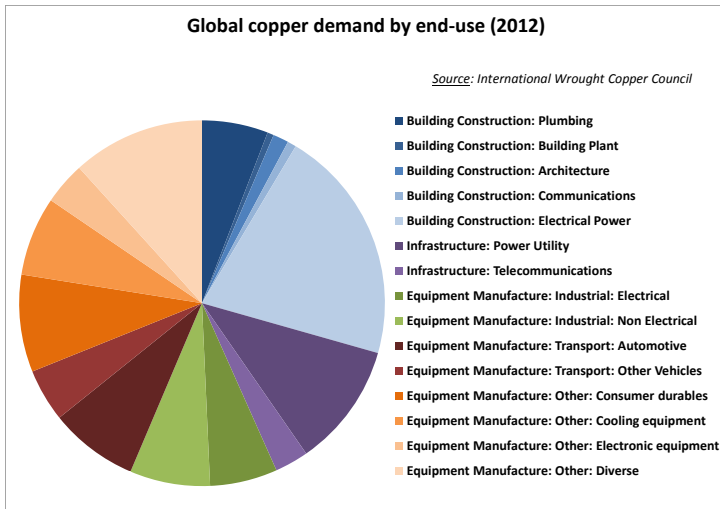


**FIGURE:** Urbanization and real estate in China.

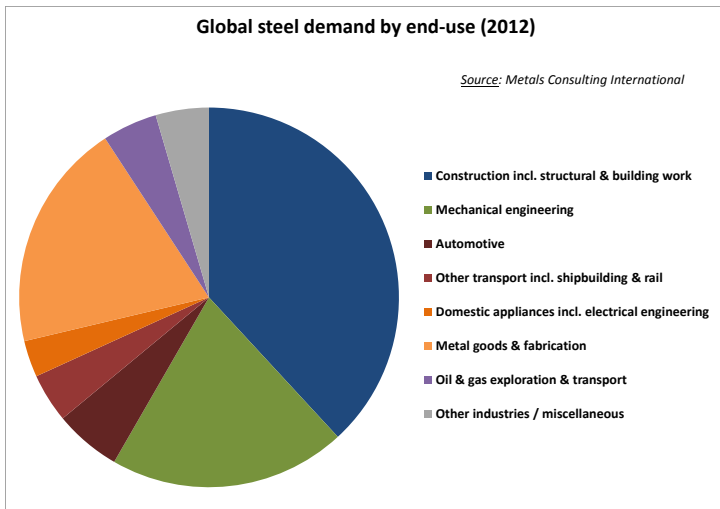


**FIGURE: China : Employment by sector.**

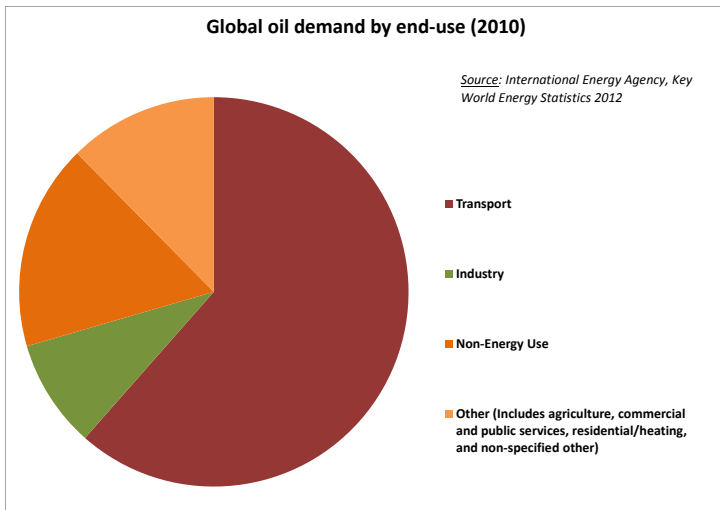




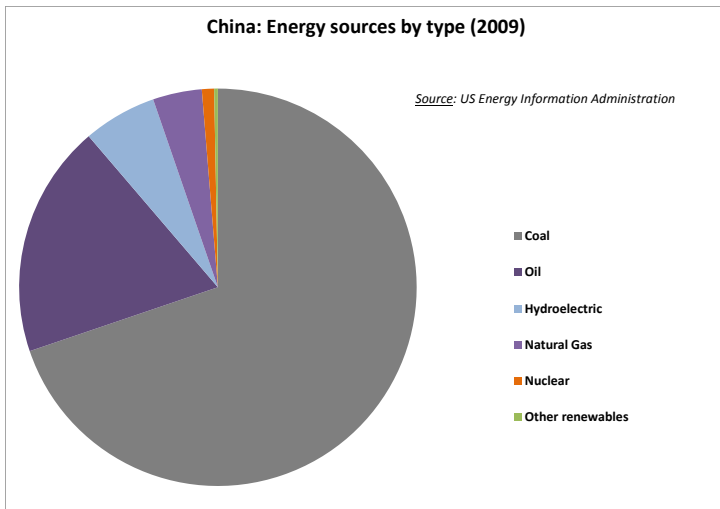
**FIGURE:** Global demand by end-use : copper.



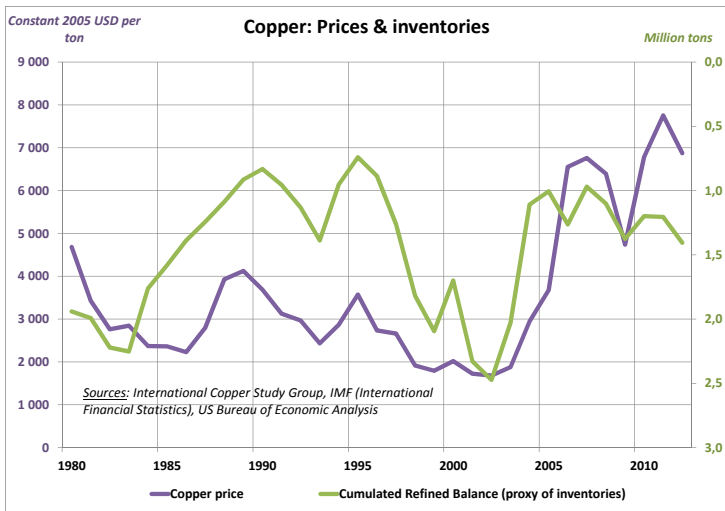
**FIGURE:** Global demand by end-use : steel.



**FIGURE:** Global demand by end-use : oil.



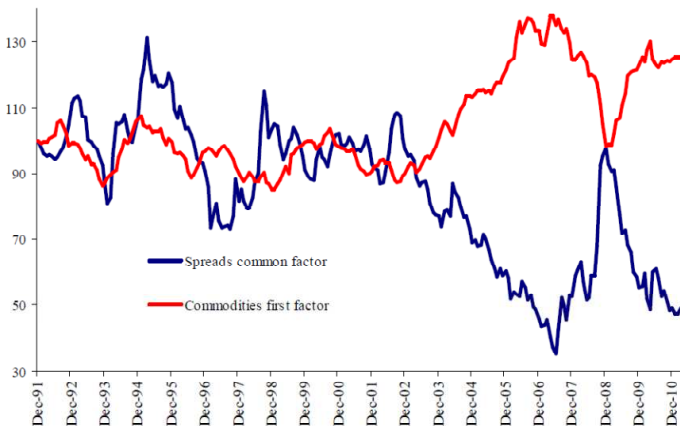
**FIGURE:** Sources of energy in China.



**FIGURE: Copper : Prices and inventories.**



**Figure 9. Association between spreads common factor and the first common factor of commodity prices (indices Dec-91=100)**



**FIGURE:** Latin America : Negative correlation between commodity prices and sovereign spreads (Bastourre et al, 2013).

**FIGURE:** Growth path for given regions.

