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Commodities Markets : New paradigm or new fashion?

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Abstract :

The huge increase in industrial commodity prices since 2001 has coincided with a new market context, an equation comprising three unknowns: scarcity, price levels and the environment. By again giving raw-material markets a central place in economic analysis and forecasting, this trend begs discussion on our part. The *why* – What imbalance? Which players? – gives way to the *how* – Is this trend so different from cycles that have occurred since the early 20th century? Did a raw-material bubble follow the Internet bubble? – and the *where are we going* – How long will it last?

The 1990s, symbolized by the rise of the New Information and Communications Technologies (NICT) sector and dot-coms, marked the end of economies' dependence on raw materials, or so it was believed at the time. Finally liberated, the world economy would, via the Internet and the New Economy, flourish by freeing itself from the materials content of its supply, particularly as commodities¹ prices had, by the end of the century, reached the lowest levels ever recorded. The Asian crisis thus caused oil prices to fall to less than \$10 per barrel, while at the same time some NICT companies saw their values increase a hundredfold in a just few weeks based solely on the prospect of future gains. And yet, what has the topic of discussion been since the start of the 2000s: business-to-business (BtoB) and start-ups? No, we are talking about oil, reels of copper stolen from construction sites, potential increases in bread prices as a result of soaring wheat prices and so on. In this early part of the 21st century, the traditional production function – labour, capital and land – is therefore being revisited, bringing to the foreground the basic components of economic activity: raw materials.

The dramatic surge in prices between 2001 and 2007 (industrial raw-material prices up 150% according to the IMF Commodity index) coincides with a new market context, an equation comprising three unknowns: scarcity, price levels and the environment. By again giving raw-material markets a central place in economic analysis and forecasting, this trend begs discussion on our part. The *why* – What imbalance? Which players? – gives way to the *how* – Is this trend so different from cycles that have occurred since the early 20th century? Did a raw-material bubble follow the Internet bubble? – and the *where are we going* – How long will it last?

I- A brief history of supply and demand

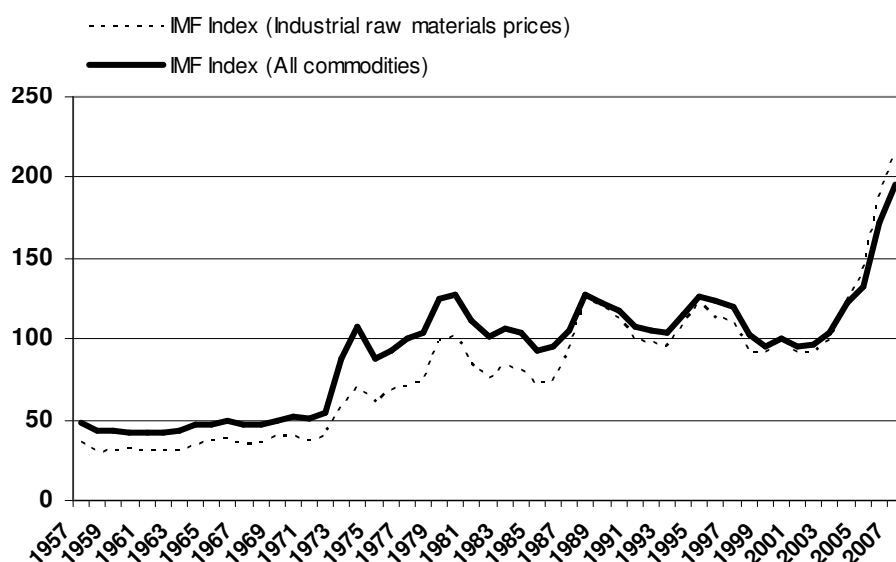
Wheat prices at about \$7 per bushel, oil at more than \$130 per barrel and copper at nearly \$8,000 per ton in late 2007-early 2008 represent increases of 100%, 200% and 500%, respectively, over their average 2002 levels. Since the start of the 21st century, the global landscape of raw-material markets has undergone a transformation, with upward pressure on prices an apparent break from the trend seen since the early 1980s, when prices fell by an average of 1% per year. Although the situations in the various raw materials segments still vary, the upward movement of prices that began in late 2001 has gradually made its way into all commodities markets since 2005. Measured by the IMF Commodity index, commodities prices (excluding energy) have risen, on average, by approximately 140% between 2001 and 2008. Industrial raw materials, the prices of which have increased by 250% on average, have largely driven this movement, with a sharp increase – a tripling of prices – in the non-ferrous metals markets (including copper, aluminium, zinc and nickel). Currently, a ton of copper is traded on the London Metal Exchange (LME) at a price five times higher than that of January 2002, with zinc and aluminium prices higher by some four and two times, respectively. Driven mainly by the situation in the rubber market (traded at \$0.60/kg in early 2002 and currently at more than \$2.00/kg), agro-industrial raw materials (including cotton, rubber and paper pulp) have not been outdone, with average price increases of roughly 80% over the period. Finally, in the food commodity markets – driven in the first few years (2002-2005) by stronger fundamentals in tropical commodity markets (including cocoa, coffee and sugar) and, since 2006, by grain markets – prices have risen by an average of 75%.

Except in agricultural markets (food and agro-industrial), raw-material prices have reached record highs in current dollars, and in segments like non-ferrous metals in constant dollars.

¹ In this article, we will consider commodities and raw materials as the same thing.

The key player in this price surge is of course China, and any attempt to minimize its impact is futile. While barely mentioning the upturn in world growth since 2001, it must be noted that, although this increase was of course partly due to stronger growth in the US, it was mainly due to Chinese growth, which exceeded 10% and had strong ripple effects throughout the various economic zones. Supported by expansionist monetary policies in the United States and Europe, world growth has attained levels near or above 5% since 2001, levels not seen since the 1970s for so long a period. China's industrialization model is a defining aspect of the 2000s and the landscape of raw-material markets. Spurred by some 17% growth per year in industrial production, China's growth has required huge amounts of non-ferrous metals (such as aluminium, copper and zinc) to support the development of regions far from coastal zones and to reduce social inequalities between provinces. The construction of roads, highways, airports and other infrastructure is eating up mineral raw materials, as is the boom in the housing sector. In addition, construction related to the 2008 Olympic Games and the Shanghai World Expo in 2010 is fuelling a certain market frenzy.

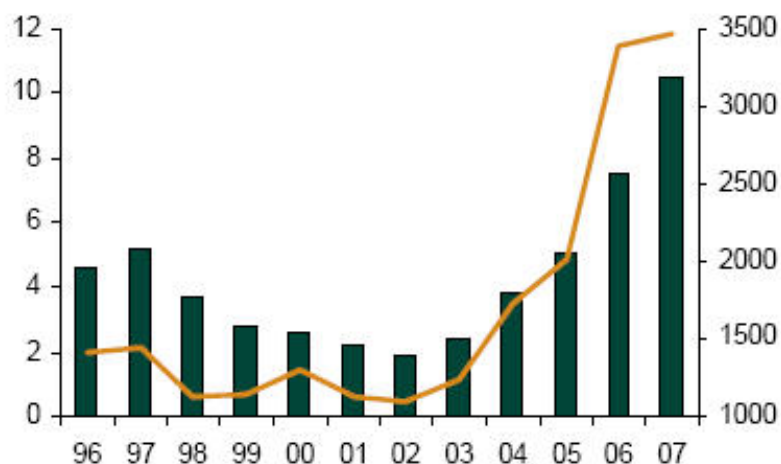
Figure 1 : IMF Commodity Index (current terms, in \$)



Source : IMF

A true alchemist, in the course of five years China has become the world's leading consumer in the main non-ferrous metals and agro-industrial raw-material markets. Between 2001 and 2006, it accounted for all additional demand in the lead market, 80% in the cotton and zinc markets, and some 50% in the copper and aluminium markets. It has also begun to change the face of the markets –particularly the rare metals and steel segments – as a leading world producer. This Chinese market boom of the early 2000s had a particular impact as it followed on from the 1990s, a decade marked by a lack of investor interest and a strong downsizing trend in key industrial activities like the non-ferrous metals sector. Between 1997 and 2002, mining companies' exploration budgets were cut in half before being increased in 2004, two years after the upturn in worldwide demand. This cyclical shift is not uncommon in industrial activities. It was exacerbated, however, particularly in the oil and mining markets, by a degree of closure to international investment for these activities, with the focus on more nationalistic management of income derived from increases in raw-material prices.

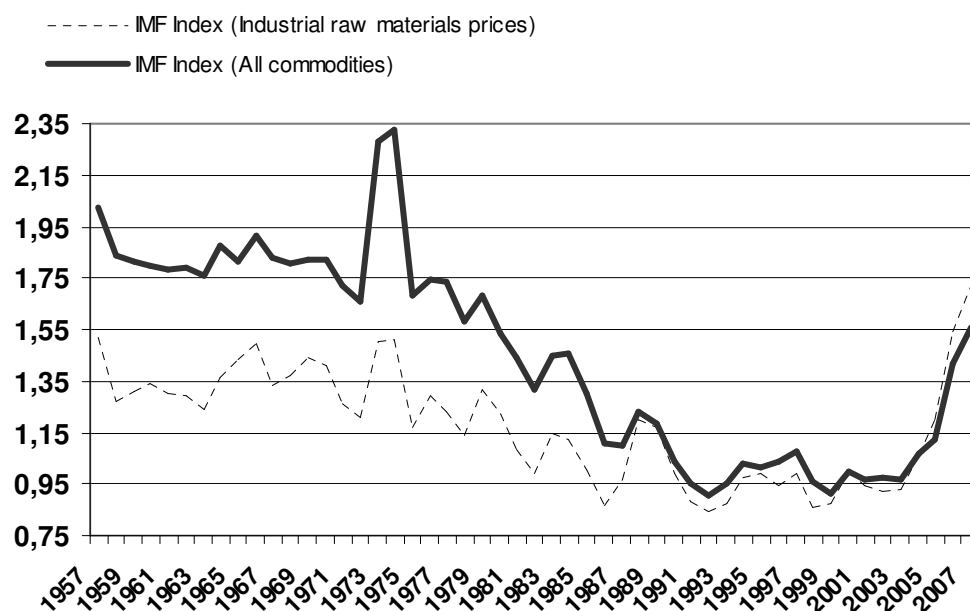
Figure 2 : Exploration budgets and Prices of non ferrous metal in the London Metal Exchange



Source : London Metal Exchange, Lehman Brothers

Moreover, in some sectors (such as oil-related industries and mining engineering), the rise in raw-material prices led to a *de facto* increase in project costs, as well as delaying investment decisions and triggering huge order backlogs, mainly due to a lack of qualified personnel! In this context – demand driven by a synchronized upturn in world growth, propelled by a player (China) capable of causing a strong ripple effect in the industrial sector, and limited supply, which offered a weak response in terms of investment – inventories in key markets were greatly reduced on the LME from eight weeks to less than four weeks of consumption, on average, between 2001 and 2006 – and prices skyrocketed!

Figure 3 : IMF Commodity Index (deflated by Us CPI, in \$)



Source : IMF

II- A different cycle in raw-material markets?

A historical study of the cycles observed in raw-material markets demonstrates the similarities and differences between the current trend and those that have occurred since the beginning of

the 19th century. Some studies² have shown the existence of “stylized facts” in raw-material markets: (1) phases of falling prices seem to be longer than those of rising prices, (2) in the long run, downward pressure on prices was identified, (3) the hypothesis of joint changes in market prices has never been statistically verified, and (4) markets remain subject to the effects of climatic factors. Although these analyses are overly superficial, as some claim,³ particularly regarding their effort to make economic policy a factor, they can provide an opportunity to observe and characterize the movement of the 2000s. For example, *The Economist's* price index study covering 1862 to 1999 revealed short three- to 11-year cycles⁴ and long four- to 47-year cycles.

In the history of raw-material markets, three periods of sharp market price increases are generally identified. The first followed the Great Depression of the 1930s and, all in all, simply reflected an upward adjustment in the main markets. The second, which was limited to a few quarters in 1949-1952, stemmed from consequences of the Korean War, particularly in terms of emergency reserve build-ups. During this period, prices of raw materials⁵ increased on average by 45%, with a surge in prices of agro-industrial products (+84%) and, to a lesser degree, of metals and minerals (+34%), given that Asia was a key player in these types of commodity at the time. The third, in early 1970, is clearly marked by external factors (oil crises), but its structural origin lies in price rises for agricultural products of +60% between 1971 and 1974 as a result of severe weather conditions in certain production areas. Overall, during this period when oil prices quadrupled, raw-material prices tripled on average.

As a result of external factors (war and OPEC [Organization of Petroleum Exporting Countries] decisions), the catalyst for price increases during these three periods was accelerated world growth (or sustained growth) of 2.6% to 7.2% between 1949 and 1951 and an average of 5% between 1971 and 1973, driven mainly by an upturn in industrial production.⁶ In this regard, the trend observed since the beginning of the 2000s has followed a similar logic, with stepped-up world growth and industrial production.

However, with the exception of this factor, the current trend is quite unusual in several respects. The current increase has been particularly fast and has gradually affected all markets. Moreover, in terms of intensity, it has reached unprecedented levels: +130% for prices of industrial raw materials between 2001 and 2007 versus an increase of 55% between 1971 and 1974. Finally, while price increase cycles have lasted about 27 months on average since the early 1960s, the current cycle began at the end of 2001 and is still not over.

² Cashin P, McDermott J, (2002), Cashin P, Scott A, (1999).

³ See Calabre (2003).

⁴ For simplicity's sake, a cycle will be defined in this article as a period of rising prices (boom) followed by a period of falling prices (slump).

⁵ Measured by the International Monetary Fund (IMF) index.

⁶ According to Radetzki, industrial production (North America and Europe in the 1950s, the OECD in the 1970s) rose from -0.3% to 9.3% between 1949 and 1951 and from 6.5% to 8.1% between 1972 and 1973.

Table 1 : Commodity prices (current prices)

	1990-2000	2001	2004	2005	2006	2007
Oil (\$/bbl)	19,24	24,51	38,2	54,5	65,2	72,67
Aluminium (\$Us/t)	1 454	1 447	1 716	1 899	2 568	2 638
Copper (\$Us/t)	2 187	1 578	2 866	3 680	6 712	7 122
Lead(\$Us/t)	580	476	886	977	1 288	2 583
Nickel (\$Us/t)	7 055	5 958	13 835	14734	24 177	37 228
Cotton (US\$/lb)	71	43	62	55	58	63
Rubber (cts/kg)	96	69	125	141	196	216
Wood pulp (\$Us/t)	607	541	615	610	675	794
Coffee (US\$/lb)	92	46	62	89	95	107
Sugar (US\$/lb)	10,5	9	8,6	11,4	15	11,61
Wheat (US\$/bushel)	3,71	3,28	4,1	4,1	5	6,75
HWWI index (2000=100)						
Except energy	114	90	127	140	178	209
Industrial raw materials	107	89	128	147	195	225
Non ferrous metal	101	88	130	151	240	273
Food	127	93	126	126	139	174

Sources : Crude oil : Brent, spot price, London US\$/barrel ; Non ferrous metal (Aluminium, copper, nickel & lead) : Cash prices, London Metal Exchange, London US\$/t; Cotton Middling upland, 1 1/16 inches, contract No 2, nearest month New York US\$/lb ; Rubber Natural rubber, RSS 1, nearest month Kuala Lumpur Malays. cts/kg ; Wood pulp NBSK pulp benchmark index Helsinki US\$/t ; Wheat US hard red winter, nearest month Kansas City US\$/bushel ; Coffee ICO composite average indicator price NY,F,D US\$/lb ; Sugar Raw, CSCE, contract No 11, nearest month New York US\$/lb.

In terms of composition, the market segments most affected by this price surge are particularly unusual. Indeed, during the 20th century, up cycles were driven more by strong movements in agricultural products as a result of severe weather conditions (drought) or geopolitical uncertainties (like war), or by structural changes and changes in industrial organization (discontinuation of producer prices in some markets, de-integration of the oil production chain and the creation of OPEC, etc.). The current cycle is largely driven by higher prices for non-ferrous metals, which are outpacing other market segments. Prices of non-ferrous metals have reached record levels in both current and constant terms. In the 1960s to 1980s, the rise in non-ferrous metal prices was sparked by strong growth in demand, which then led to an upturn in investment and a correction of medium-term prices. For its part, the last investment boom in the early 1980s coincided with a drop in the level of consumption of non-ferrous metals, which, along with slumping demand from the former USSR, resulted in latent overcapacities in the sector in the 1990s. The restructuring plans implemented during this decade therefore prevented any attempt to rebalance the markets starting in 2001. The current cycle is therefore also unusual in terms of supply response time (as well as for the reasons mentioned above).

Table 2 : Industrial Raw Materials Cycle (based on HWWI Commodity Index)

Trough	Peak	Peak to Trough	Trough to Peak
January 1971	April 1974		+ 159%
November 1975	March 1977	- 26%	+ 21%
November 1977	February 1980	- 14%	+ 76%
November 1982	September 1983	- 38%	+ 19%
March 1985	June 1988	- 17%	+ 90%
December 1993	June 1995	- 39%	+ 50%
October 2001	- 40%	

Sources : DB global Markets Research, FMI

As a result, some are quick to wonder whether raw-material markets are currently in the midst of a “supercycle.” This term is generally associated with a prolonged upward pressure on prices for several decades as a result of the industrialization or urbanization of a major economy (e.g. the United States in the 19th century). Clearly, China and its industrialization model are currently behind the supercycle notion. One might also be tempted to compare the consequences of Chinese development with those observed during the industrialization phases of certain European countries (Germany) in the 1960s, Japan in the 1970s and South Korea in the 1980s. However, because of its demographic weight (the Chinese population is twice that of the entire G7), the size of its territory (and therefore the communication infrastructures to be developed) and its development model (based on a dynamic industrial sector), no comparison is possible. The existence of a supercycle is therefore a plausible hypothesis, particularly as studies of per-capita consumption of steel, aluminium and even automobiles in China clearly show that margins by product are high before this country achieves annual growth in industrial-commodity consumption comparable to that of old Europe or the United States. Despite this, however, a certain rebalancing of supply should occur, and prices should settle down; the problem lies in knowing when!

Although it is still too early to know whether we are really in the midst of a market supercycle, there is hardly any doubt that the current cycle is unusual and, moreover, has surely been exacerbated by major liquidity in world markets. In fact, some are quick to characterize the current trend as a speculative bubble, much like the one that occurred in the late 1990s with regard to new-technology markets. Although it is clear that raw-material markets are now asset classes in their own right and that certain markets have been euphoric (sugar in 2005, copper in 2006 and nickel in 2007), the single hypothesis of a speculative bubble is not tenable in the medium term. Indeed, in the first few years of price increases, raw-material markets were an ideal refuge for investors that weren’t making gains in the stock markets. Sharp price declines observed in the spring of 2004 and 2005, resulting from Chinese authorities’ announcements of tightened credit supply in some sectors of the economy, were triggered in part by investment fund flows, without market fundamentals being affected. Since 2004 and the recovery of the world’s major stock exchanges, yield differentials have declined, and a certain rebalancing, it can be said, has occurred. It should also be noted that, in the case of a speculative bubble, the sub-prime crisis that affected the financial markets in August 2007 should have brought about more dramatic changes in raw-material prices.

Table 3 : Doubling times

Growth rate (% per rate)	Approximate doubling times (years)
0.1	720
0.5	144
1.0	72
2.0	36
3.0	24
4.0	18
5.0	14
6.0	12
7.0	10
10.0	7

Source : Limits to growth, The 30-Year Update

III- A new market paradigm?

When some economists announced, starting in 2005, that oil prices would rise to some \$300 per barrel by 2015, they were basing their forecasts on a body of analyses developed at the beginning of the 20th century by Gray⁷ (1914), who conducted studies on deferments of production and profit maximization in the mining sector, and, above all, on Hotelling's work⁸ (1931) on optimal management of a finite resource in its intertemporal dimension, particularly with the notion of rent due to exhaustibility. The fact that the issue of raw materials has re-emerged today in the economic field is thus symptomatic of the movements that have been observed in economic theory for nearly two centuries. From Mirabeau (and the physiocrats) – “all politics emanates from a grain of wheat” – to Malthus' theses on demographic pressures on natural resources, raw materials would be a central theme of economic history until their gradual disappearance under the influence of neoclassical theory. It took until the 1970s and the rise of political ecology to see a resurgence of an ideological body related to raw materials.

What are we now seeing if not an update of the theses, developed by the Club of Rome with the 1972 Meadows report, *Limits to Growth*,⁹ followed in 1974 by *Beyond the Age of Waste*? At that time, the teams at the Massachusetts Institute of Technology (MIT) issued projections, at the Club of Rome's request, on the risk of a medium-term shortage of raw materials. More generally, these studies focused on the link between the growth of the post-war boom years and the massive use of resources (and their massive waste). In the mid-1970s, certain pressures on agricultural products followed by the first oil crisis were seen as signs of a perpetual increase in market prices. This period had major repercussions, particularly in terms of industrial organization: fears of market cartels and emphasis on the “Small is Beautiful” model. It was also at this time that waste control policies and substitution policies in the energy sector (including expansion of the nuclear industry in France) were introduced. In some developing countries, this period paved the way for the creation of large projects, which were reassessed a few years later in light of the widespread drop in raw-material prices.

⁷ Gray L.C., “Rent under Assumption of Exhaustibility”, *Quarterly Journal of Economics*, 28, pp. 466-489.

⁸ Hotelling H., The Economics of Exhaustible Resources, *The Journal of Political Economy*, Vol. 39, no. 2, pp. 137-175.

⁹ The Limits to Growth, for the French edition, “Halte à la Croissance? Rapports sur les limites de la croissance.” Éd. Fayard, 1972.

In the 1980s, these issues would become less relevant because of an overall decline in prices. The debt crisis and reassessment of development models would therefore come to define the period, as would the financialization of the economy. It was at this time that the financial markets, particularly raw-material markets, began to take off thanks to key players' growing need for protection against price risk. Indeed, despite downward pressure on prices in the medium term, markets were subject to strong volatility. The 1990s would not bring about a major change in this pattern. The gradual dematerialization of the economy, with the emergence of the New Economy, and the globalization of production systems would even cause raw-material constraints to be forgotten in work organization. From "capitalism without factories" to the dot-com era and even the permanent closing of some industrial activities – non-ferrous metals such as lead in Europe, coal mining and so on – "business as usual" remained the norm in a world where incentives to reduce the intensity of raw-material usage were few and far between.

However, it was during this period that certain environmental considerations began to fully emerge. Conferences in Rio (1992) and then Kyoto (1997) brought to the forefront the importance of the environment and, more generally, sustainable development in business management. At the time, these conferences did not have the impact that they would begin to have in the early 2000s. Indeed, although the environmental constraint was identified, there was no visible follow-up in the main markets, since the two previous decades had seen downward pressure on prices for key products. Theories about oil and copper production peaks have little impact when the price of oil is less than \$10 per barrel and that of copper under \$1,000 per ton. However, since the early 2000s, given the rise in some industrial and energy raw-material prices and the fact that this trend has become widespread, scarcity and management of commodity shortage have again become central themes of economic analysis. We have come full circle, so to speak, since the economy is basically defined as the identification and management of scarce resources!

In the 2000s, raw materials have therefore again become part of the great economic game, and we can now speak of the hypothesis of a new market paradigm or a new market order. Aside from the new raw-material landscape imposed by China's industrial development, the raw-material economy has reinvested entire fields in economics, geopolitics, sociology and more. Raw-material Monopoly is therefore being played from three angles now: scarcity of the resource, and thus its price; access to this resource, and its internal geopolitics; and the environmental consequences of its use (from the producer's or consumer's standpoint). Scarcity (depletion of resources) is currently a central theme of the various analyses related to raw-material markets.

In this context, raw-material markets have, as it were, rediscovered the uncertainty of tomorrow's production. This climate tends to exacerbate the slightest news concerning natural resources. It also fosters nationalism related to raw-material resources and closure to international investment, factors which themselves favour upward pressure on prices. This pattern is fuelled by various national, transborder and international tensions related to the control and management of natural resources. Aside from these factors, which are symbols of the new market order, one should add the current climate of uncertainty related to future use of certain products for energy and food purposes. While all types of commodity are feeling the effects of scarcity, there is also a constraint related to sustainable development and efforts to reduce global warming. In some sectors, such as non-ferrous metals, this new context has reinvigorated a sector created in the 1970s: recycling. In others, such as the energy and food

sectors, the issue is increasingly that of future choices to be made in the markets. Thus, after the financial unification of the markets, an interdependence related to environmental constraints seems to be emerging among various raw materials. The often-simplistic explanation given for the sharp increase in sugar prices (+40%) between 2005 and 2006, namely higher ethanol production, hardly explains the 30% decrease in prices in an increasingly tense energy context. Moreover, to attribute the current increase in wheat and corn prices exclusively to energy concerns is to simply deny the fact that agricultural production depends first and foremost on climate conditions!

Though it is clear that, in light of requirements, choices regarding the use of raw materials for energy and food purposes will need to be made in the long run, these choices are not yet driving market prices.

Something has clearly happened (and is still happening) in raw-material markets since the end of 2001. Given the segments affected (non-ferrous metals markets, and then gradually other markets), its intensity (and length), and the absence of the sort of external crisis (oil, war etc.) we saw in the 1950s and 1970s, the current cycle is quite different from those seen before. In the course of six years, China, the main protagonist in this change, has become a key player in all raw-material markets, to such an extent that some are quick to refer to the current cycle as a supercycle or to speculate that prices will continue to rise, as they did in the 1970s. It is also leaving its mark with regard to raised fears related to scarcity of natural resources and exacerbating certain forms of nationalism in a context where the environment is a factor in each stage of production. This new situation reminds us that the production system is, even now, founded on the production, processing and consumption of raw materials. It must cause us to reflect on the fact that the New Economy, which is based on dematerialization, has not made us more independent of raw materials. The most frequently visited websites in France include those of the SNCF (French national railroad company; www.sncf.com) and Amazon (www.amazon.com), two sites that electronically sell rail, air and automobile transport and various items to be delivered, services that consume energy raw materials for transport and agro-industrial raw materials for packaging.

Finally, it is worth noting that 2007 will be remembered as the year when the worldwide urban population exceeded the worldwide rural population. This gradual urbanization – in a context where, according to UN demographic forecasts, the world's population will be nearly seven billion by 2010 with only 10% additional agricultural area in production (as a best-case scenario!) – will represent a basic variable in understanding the markets, much like the structural changes in the Chinese and Indian development models.

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APPENDIX

