Financialization of Commodities and Cyclical Dynamics in Chinese Economy[1]

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Abstract

This paper challenges two conventional wisdoms about the Chinese economy: (i) the economic slowdown in 2008 was primarily driven by external demand shock caused by financial crisis; and (ii) global commodity price volatilities have been driven by supply shocks from China. We argue that the commodity price collapse in July 2008 played an important role in China's economic slowdown, and that global commodity prices have been to a large extent driven by financial demand rather than by industrial demand. The rising influence of financial forces in the commodity market, i.e., the "financialization of commodities", has important (and under-researched) implications for economic growth and welfare in China and the world.

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I. Introduction

The Chinese economy slowed down substantially in 2008. Why did the slowdown happen? According to the conventional wisdom, the main reason is the financial crisis in developed economies that led to a decline of demand for China's exports. But a close look at the macro data in China indicates the conventional wisdom might be wrong. The slowdown in the Chinese economy occurred in July 2008, while the financial crisis in the US started to affect the rest of the world in September when the Lehman Brothers turned bankrupt, so the former can not be caused by the latter.

This paper argues that China's economic slowdown in July 2008 was caused by a sharp decline of commodity prices in the world market. The slowdown was exacerbated by the decline of external demand due to the US financial crisis in September 2008. While the role of the financial crisis has been well acknowledged, the commodity price shock has been largely neglected in academic research and policy analysis.

We illustrate the role of the commodity price shock in China's slowdown by providing two sets of evidence. First, we compare the performance of export-oriented industries and other industries before and after the US financial crisis in September 2008. If external shock is indeed a key factor behind the slowdown, export-oriented industries would perform worse than other industries. We find that: (i) from May to August 2008 (before the US financial crisis broke out), both export-oriented industries and other industries slowed down and there is no correlation between export exposures and degree of economic deceleration; (ii) from August to November 2008, export-oriented industries weakened more than other industries. The validity of the above empirical evidence depends critically on the measure for export exposure. Exports by individual industries are not the best measure for such exposure as domestic industrial sales ca n be used as intermediate inputs for. We utilize the input-output table to capture this indirect export exposure. Section II provides details on how to construct such a measure.

Secondly, we conduct a case study of the steel industry, which is a key industry in China. The steel industry experienced a dramatic boom in early 2008 and an equally dramatic collapse afterwards. We examine the main sources of demand for steel output, and illustrate that the up and down in China's steel industry was to a large extent driven by the unprecedented volatility in global commodity market. Steel producers in China were attracted by the rapid rise of steel prices in early 2008 and built up iron oar inventories in anticipation for even higher prices, only to find the crash in steel and iron ore prices in July 2008 and a huge loss incurred on their iron ore inventories.

The importance of the commodity market for the Chinese economy goes beyond the slowdown in 2008. The conventional wisdom is that commodity prices rose substantially before the crisis due to the "China factor", i.e., prices were driven up by an industrial demand shock from China. We argue this conventional wisdom does not cover the whole story, that commodity prices in recent years have been largely affected by financial forces, and that such "financialization" of commodities affected the Chinese economy substantially.

How can we tell if commodity prices were not driven by industrial demand only? How can we prove that financial demand also played an important role? This is indeed a challenging task, as industrial demand and financial demand are usually correlated -- speculators would go long commodities when they observe or expect industrial demand to rise, and short when industrial demand to fall. Moreover, when financial demand declines due to liquidity shocks, as it happened in the financial crisis, industrial demand is also affected adversely.

This paper proposes an innovative way to isolate financial demand from industrial demand by utilizing the commodity trade data. We focus on the case of the copper bubble in 2005/2006 as an example, which provides a rare case where financial and industrial demands went in opposite directions. The Chinese economy was facing the risk of overheating and the government tightened policies to curb overcapacity. The demand for commodities was constrained. But copper price soared to unprecedented level. Who bought copper and pushed up the price? Trade data indicates that US imports of copper increased from 577 thousand tons in 2004 to 953 thousand tons in 2006, while Chinese imports of copper declined from 1076 thousand tons in 2004 to 584 thousand tons in 2006. This is clear evidence that the demand for copper was pushed up by financial forces rather than industrial forces, as financial demand attracts copper flows to the commodity exchange warehouses in the US.

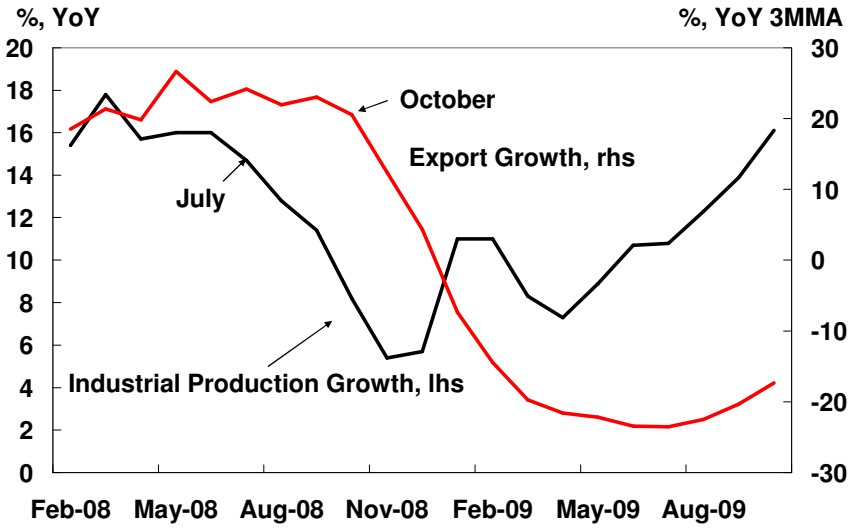
The paper is arranged as follows. Section II explores the timing of slowdown in the Chinese economy relative to the burst of commodity prices and the financial crisis in the US, illustrates the difference in slowdown across industries, and conducts a case study of the steel industry to show the connection between commodity prices and industrial output. Section III documents the "financialization" of commodities, and shows how financial demand dominated the copper market in 2005 and led to the unprecedented copper bubble. Section IV concludes and discusses policy implications for China.

II. External Demand, Commodity Prices, and Economic Slowdown

(i) Slowdown in 2008: what triggered it?

The conventional wisdom blames the collapse of Lehman Brothers and the US crisis for the slowdown in China. A close look at the production and trade data cast doubt on this claim. As Chart 1 shows, industrial production started to weaken in China from July 2008, but exports started to decelerate in October. While export slowdown exacerbated the economic slump, it did not trigger the contraction.

Chart 1: Industrial Production and Exports in China



Another way to check the export effect on economic slowdown is to examine correlations between industrial production and export dependence across industries[2]. If exports were the main driver of weakness in industrial production, the output of high export dependent industries should decrease more compared to those depend less on exports.

It is not straightforward to measure export dependence of an industry because export dependence derived from direct exports could be misleading. For example, the direct exports of coal mining industry is only 0.96% of the total output, but its actual export dependence is much larger (over 4.5%) because some high export dependent industries use coal as important inputs. Therefore, instead of relying on industry-level export data to measure export dependence, we employed the IO table to calculate actual export dependence for each industry, which includes both the direct exports by each industry and the indirect exports for each industry through its linkage to other industries. Details about calculating indirect export exposure can be found in Appendix 1. We then make two scatter plots (Chart 2) to show the change of growth in industrial production (IP) and the export dependence across industries. The first scatter plot refers to the changes in IP from May to August 2008 (before the collapse of Lehman Brothers), while the second refers to the changes in IP from September to November 2008.

Chart 2 shows that, before the Lehman crisis, there is not much correlation between changes in IP growth and export dependence across industries. In other words, export dependence is not a major factor affecting the industry level slowdown. After the Lehman shock, higher export dependent industries seemed to suffer slower IP growth, though the correlation is not statistically significant.

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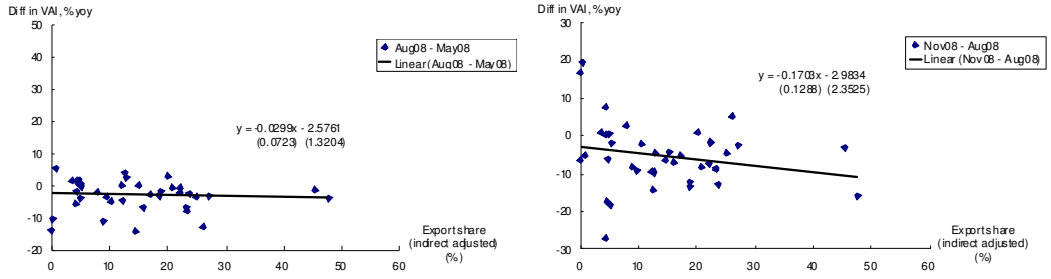
[2] We focus on the manufacturing industries in this study because of availability and quality of data.

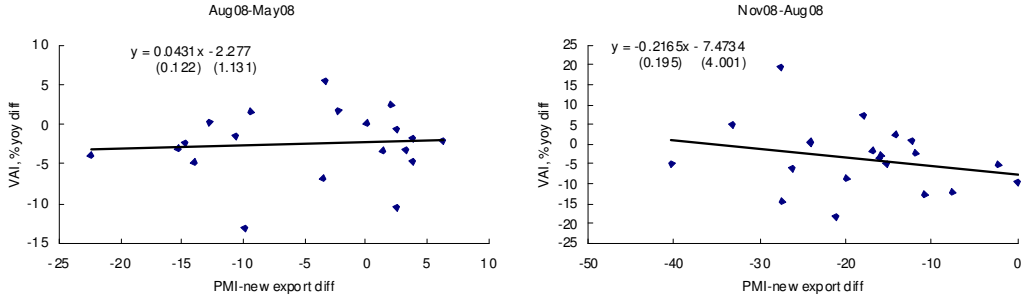
Chart 2: Export Dependence and Changes in Growth of Industrial Production



Note: The horizontal axis measure the actual export dependence, after adjusting for indirect exports through upstream-downstream industry linkages. The vertical axis measures the difference of annual growth rates of industrial outputs measured in two months. For the chart on the left, the difference refers to August 2008 versus May 2008. For the chart on the left, the difference refers to November 2008 versus August 2008.
Source: CEIC and staff estimates

Could the mismatch in slowdown of IP and exports be driven by the lag between export orders and export delivery? In other words, could it be that export ordered declined in July 2008 which led to slower growth in IP, and exports only weakened later because of production lag? If this claim is true, we should observe industries that experienced more decline of export orders cut down production more. We utilize the Purchasing Manager Index (PMI) to measure changes in new export orders on the industry level, and construct two scatter plots between changes in IP growth and changes in new export orders (Chart 3). Again, the first scatter plot refers to the changes in IP from May to August 2008 (before the collapse of Lehman Brothers), while the second refers to the changes in IP from September to November 2008.

Chart 3: New Export Orders and Changes in Growth of Industrial Production



Note: The horizontal axis measure the change of PMI export new order index in two months. The vertical axis measures the difference of annual growth rates of industrial outputs measured in two months. For the chart on the left, the difference refers to August 2008 versus May 2008. For the chart on the left, the difference refers to November 2008 versus August 2008.
Source: CEIC and staff estimates

We find there is no correlation between changes in export orders and changes in IP growth across industries before the Lehman bankruptcy. After the bankruptcy, the correlation between the two became negative, implying decline of export orders leads to higher IP growth, which is counter intuitive. We therefore conclude that the time lag between export orders and export delivery can not be the reason to explain the mismatch between exports and IP growth. We move to conduct a case study of the steel industry to

find out what caused the decline of steel output in the summer of 2008.

(ii) The slowdown in the steel industry

The steel price rollercoaster in 2008

Chinese steel production more than tripled in last 10 years and China has become the largest steel producer in the world who accounts for about 30% of global output. Steel industry accounts for 7.7% of China's total industrial output in 2007, with about 10% of outputs shipped overseas and 3% of steel products imported from other economies in 2008.

The steel price in China rallied in the first half of 2008 by around 60 percent and collapsed around July 2008 (Chart 4). By November 2008 the steel price has gave up all its gains and returned to its 2007 level. China is not the only country going through the steel price rollercoaster. The international steel price doubled in the first half of 2008 and also lost its gains quickly afterwards (Chart 5, left). The surge of international steel price led to a rise in exports in the first half of 2008, and the collapse of price led to a sharp decline of exports (Chart 5, right).

Chart 4: Steel Price and Steel Industry Production Growth

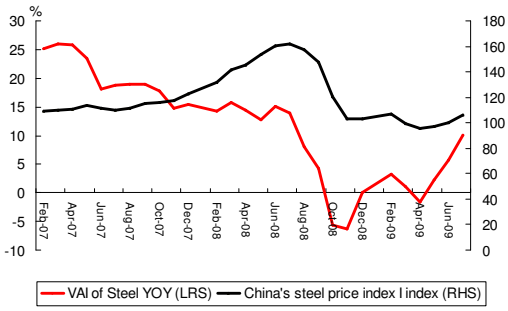
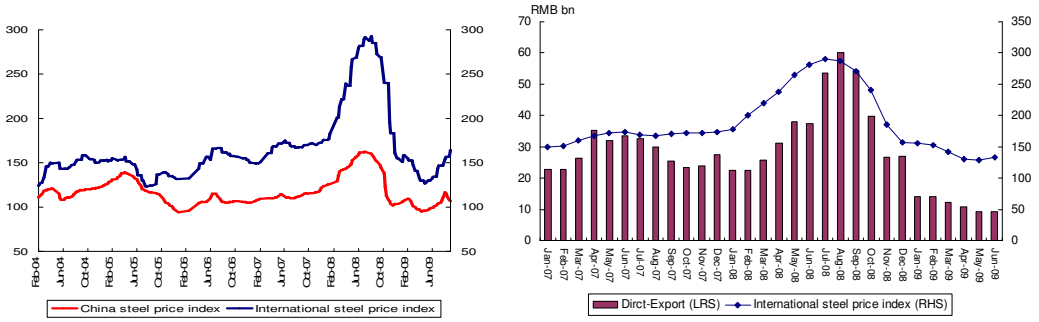


Chart 5: Steel Prices and Exports

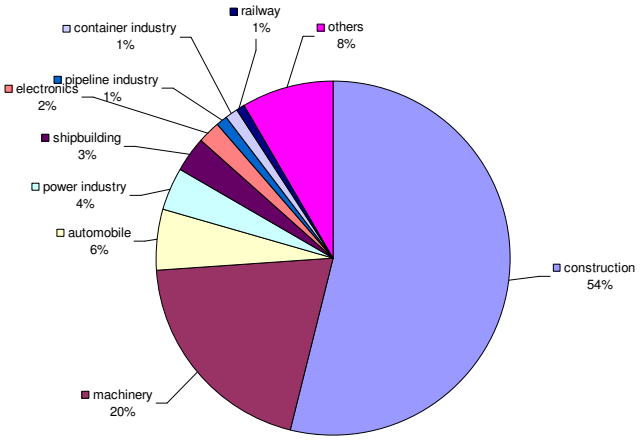


Source: CEIC and Wind

Reason behind the steel price volatility: domestic demand or global demand?

So what caused the price to rise so much in the first half of 2008 and fall so much afterwards? The conventional wisdom is that demand dynamics in China drove the international prices, a popular story in the financial press. But this story does not fit the data. To illustrate this point, we explore the domestic demand of steel by looking at sector level steel consumption. Chart 6 shows the structure of domestic steel use, which indicates that construction and machinery are the top two steel consumption sectors, and account for 54% and 20% of total domestic steel demand respectively. Checking the dynamics in these two sectors allows us to verify if domestic demand in China went through the same cycles as steel prices did.

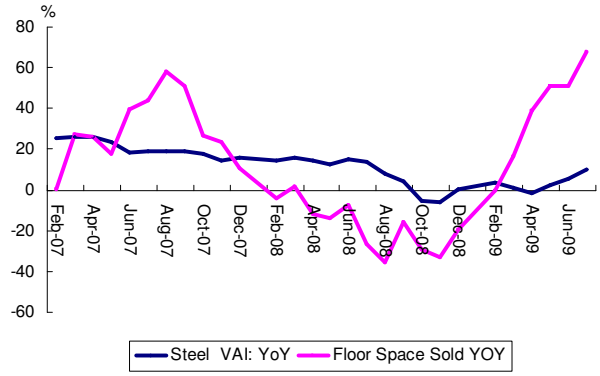
Chart 6: Domestic consumption structure of steel industry



Source: CEIC

The demand change in real estate market shapes the construction sector. The downturn of floor space sold in China started in the second half of 2007 when the financial crisis started in the US (Chart 7). It is not hard to infer that gloomy housing market was not main driver for rising prices in the steel market.

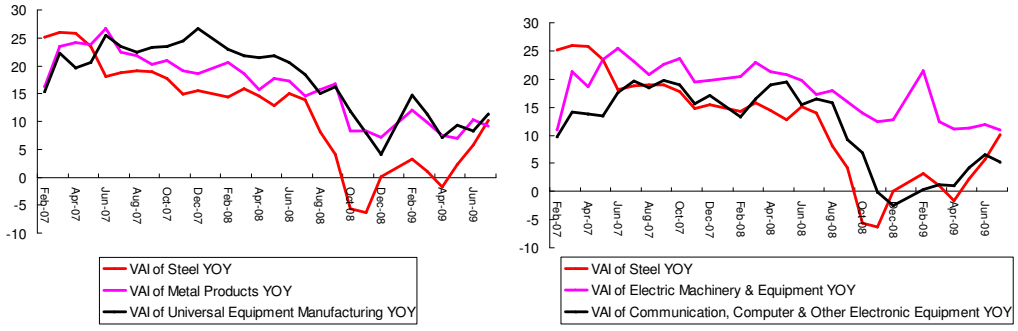
Chart 7: Real estate market and steel industry production



Source: CEIC and staff estimates

Machinery industry includes a lot of small subsectors and we pick up four main subsectors as the indicators of machinery industry: metal products, universal equipment manufacturing, electric machinery & equipment and communication, computer & other electronic equipment. In general, machinery industry did not go through a boom in early 2008, so it can not explain the rise of steel price; and it declined later than steel industry, which implies that machinery industry was not likely the trigger of steel price increasing (Chart 8).

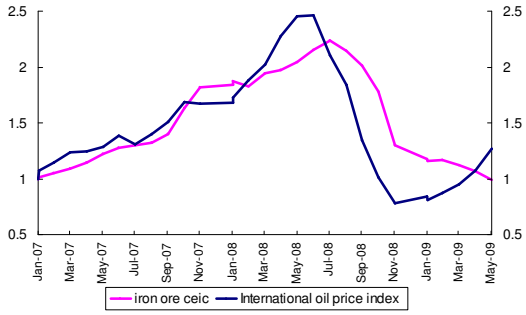
Chart 8: Machinery industry and steel industry



Source: CEIC

The above analysis indicates that the domestic demand does not seems to be the driving force behind the up and down of steel prices in China and international market. An alternative explanation is that the domestic prices were driven by international prices, which in term were driven by global demand. Interestingly, prices for steel, iron oar (main input for steel production), and oil prices all followed the same up and down cycle in 2008 (Chart 9). A plausible hypothesis therefore is that a global shock has pushed commodity prices up and down in 2008. It is not industrial demand in China (as Charts 7 and 8 illustrate), and not global real demand (as the US economy was weakening in the first half of 2008). We will discuss the role of financial forces in the commodity price bubble in the next section. Before going there, let us examine how the volatility in international prices affected firms in the steel industry.

Chart 9: Steel, Iron Oar, and Oil Prices

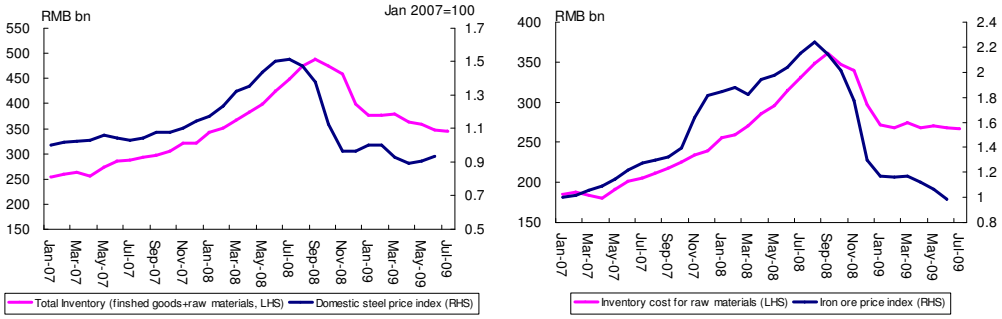


Source: CEIC, WIND.

How did commodity price rollercoaster affect steel producers?

The Chinese steel producers suffered huge losses in 2008 because they were misled by the price signals. In the first half of the year, both iron oar and steel prices soared in the international market, which gave two signals to the steel producers: more steel production can still lead to more profits even domestic demand is weak, as the international market would absorb the output; and building up iron oar inventory is profitable. Consequently, the steel producers continued to build up their inventories and purchase more iron oar from the international market (Chart 10)[3]. When steel price collapsed after July 2008, both finished goods inventory (produced by expensive inputs) and expensive raw materials inventory became huge financial burden to firms. The whole steel industry had to go through a "destocking" process – writing down the valuation loss from their iron oar and steel inventory, and stop buying iron oar until inventory is run down.

Chart 10: Prices and Raw Material Inventory



Source: Wind

III. Financialization of Commodities

One of the most significant characteristics of current financial crisis is unusually sharp ups and downs of commodities prices before and after the crisis. The dramatic change in commodities prices has attracted increasing public attention since it has substantial consequences in the real economy. However, most mainstream economists still believe

[3] About 70% of inventory cost came from raw material inventory (Chart 10, Right).

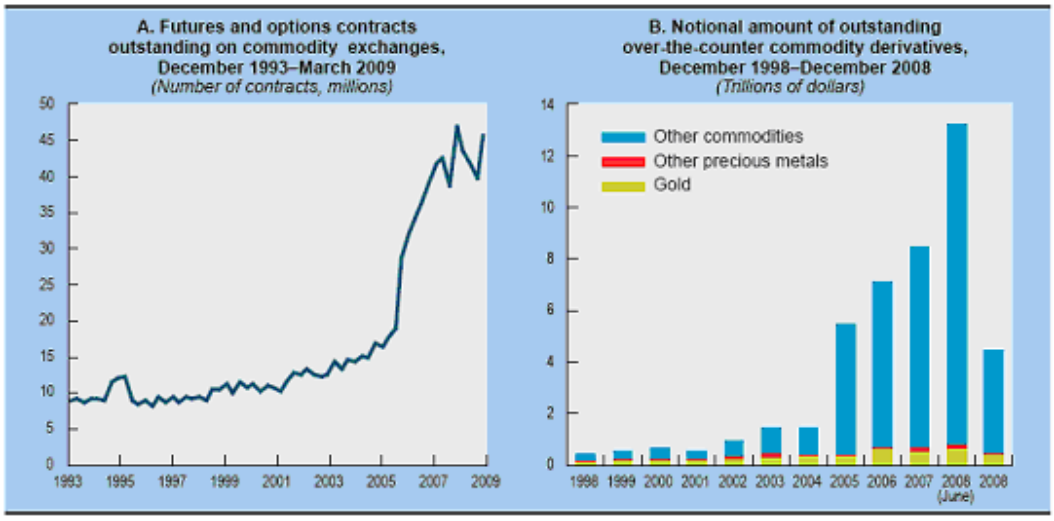
that commodities prices are determined mainly by economic fundamentals (Krugman, 2008). This section provides some descriptive analysis on the rise of "financialization" of commodities, and takes the copper bubble in 2005/2006 as an example to illustrate how rising financial demand overwhelmed declining industrial demand and pushed copper price to an unprecedented level.

(i) The rise of financial demand in the commodity markets

Commodities became an asset class

Major changes in commodity market took place over the last 20 years, and the number of futures and options contracts outstanding in commodity exchanges worldwide rose more than threefold between 2002 and mid-2008. During the same period, the notional value1 of commodity-related contracts traded over the counter (OTC) increased more than 14-fold, to $13 trillion (BIS, 2009). Financial investments in commodities fell sharply after the outbreak of the financial crisis. The amounts outstanding of commodity derivatives fell from 13 trillion to $4.4 trillion in 6 months.

Chart 11: Financial Investment in Commodities



Source: BIS Quarterly Review, June 2009

The rise of financial investment in commodities since 2002 has to be related to an influx of new investors into the market – commodity index investors (including pension and endowment funds) that seek exposure to commodities through passive long-term investment in commodity indexes, and swap dealers that seek to hedge price risk resulting from their over-the-counter (OTC) activity (CFTC, 2009). In the US commodity futures market, the index speculator only accounted for 7% of total open interest in 1998, the percentage increase sharply to 40% in 2008. Meanwhile, the share of physical hedge dropped from 79% in 1998 to only 34% in 2008, which means speculators (including traditional speculator and index speculator) dominate the commodity futures market in the US.

Table 1: Commodity Futures Markets Open Interests

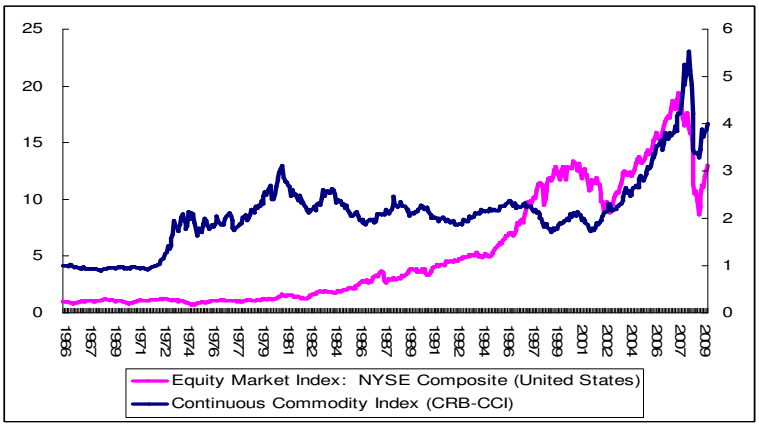
1998	LONG / DEMAND SIDE		
	Physical Hedger	Traditional Speculator	Index Speculator
COCOA	89%	9%	2%
COFFEE	81%	18%	2%
CORN	87%	9%	4%
COTTON	84%	14%	2%
SOYBEAN OIL	73%	27%	0%
SOYBEANS	87%	11%	2%
SUGAR	87%	9%	3%
WHEAT	68%	21%	11%
WHEAT KC	86%	5%	8%
FEED CATTLE	52%	37%	10%
LEAN HOGS	57%	28%	16%
LIVE CATTLE	68%	24%	9%
WTI CRUDE OIL	84%	4%	12%
HEATING OIL	88%	2%	10%
GASOLINE	80%	4%	16%
NATURAL GAS	90%	3%	7%
AVERAGE	79%	14%	7%

2008	LONG / DEMAND SIDE		
	Physical Hedger	Traditional Speculator	Index Speculator
COCOA	33%	48%	19%
COFFEE	26%	35%	39%
CORN	41%	24%	35%
COTTON	32%	27%	41%
SOYBEAN OIL	46%	22%	32%
SOYBEANS	30%	28%	42%
SUGAR	38%	19%	43%
WHEAT	17%	20%	64%
WHEAT KC	37%	32%	31%
FEED CATTLE	17%	53%	30%
LEAN HOGS	18%	20%	63%
LIVE CATTLE	13%	24%	63%
WTI CRUDE OIL	59%	10%	31%
HEATING OIL	37%	16%	47%
GASOLINE	41%	20%	39%
NATURAL GAS	62%	10%	28%
AVERAGE	34%	26%	40%

Source: CFTC Commitments of Traders Reports, and estimates derived from CFTC CIT Supplements

As commodity market continued to be influenced by investors who treat commodities as an asset class, the correlation between commodity market and equity market rose substantially (Tang and Xiong, 2009). The correlation was slight negative before 2000 (as there were not many derivatives and index speculators in the commodity markets), and changed to significant positive since 2006. The co-movement between commodity prices and equity prices is obvious from the following chart.

Chart 12: Equity and Commodity Prices



Source: CEIC.

Along with the rapid growth in total value of commodity derivatives trading, the frenzy spread to almost all commodities. The average daily value of open interest for wheat and sugar in the US market increased more than 10 times from 2002 to 2008, and WTI oil increased 12 times at the same period (Table 2). The average daily open interest of metals like copper doubled from 2005 to 2006 when copper price increased from US 1.58/lb to

2.95/lb.

Table 2: Average Daily Dollar Value of Open Interests

(in millions)	2002	2003	2004	2005	2006	2007	2008
COCOA	$ 1,815	$ 1,510	$ 1,569	$ 1,883	$ 2,040	$ 2,690	$ 4,062
COFFEE	$ 1,408	$ 1,693	$ 2,748	$ 3,769	$ 4,203	$ 6,308	$ 9,521
CORN	$ 5,435	$ 5,118	$ 8,182	$ 7,657	$ 15,059	$ 23,763	$ 37,427
COTTON	$ 1,646	$ 2,990	$ 2,645	$ 2,841	$ 4,259	$ 6,822	$ 11,689
SOYBEAN OIL	$ 1,441	$ 1,952	$ 2,456	$ 1,944	$ 3,186	$ 5,756	$ 8,868
SOYBEANS	$ 4,883	$ 7,306	$ 9,480	$ 8,846	$ 10,129	$ 20,882	$ 37,399
SUGAR	$ 1,521	$ 1,712	$ 2,772	$ 5,120	$ 8,634	$ 8,174	$ 15,509
WHEAT	$ 1,836	$ 1,862	$ 2,647	$ 3,827	$ 7,414	$ 11,608	$ 19,742
WHEAT KC	$ 1,304	$ 1,081	$ 1,240	$ 1,525	$ 3,099	$ 4,094	$ 6,253
FEED CATTLE	$ 540	$ 757	$ 804	$ 1,298	$ 1,518	$ 1,409	$ 1,818
LEAN HOGS	$ 602	$ 858	$ 1,873	$ 2,309	$ 3,285	$ 3,875	$ 4,465
LIVE CATTLE	$ 2,670	$ 3,595	$ 3,556	$ 4,859	$ 6,701	$ 7,909	$ 8,764
BRENT CRUDE	$ 6,556	$ 8,486	$ 12,620	$ 19,388	$ 31,094	$ 45,653	$ 52,832
WTI CRUDE	$ 16,052	$ 20,400	$ 33,620	$ 55,297	$ 80,996	$ 130,699	$ 199,970
GASOIL	$ 3,990	$ 3,695	$ 5,461	$ 10,196	$ 14,749	$ 21,006	$ 22,917
HEATING OIL	$ 4,412	$ 5,105	$ 8,242	$ 11,838	$ 13,575	$ 17,903	$ 23,854
GASOLINE	$ 3,714	$ 3,947	$ 7,304	$ 10,276	$ 11,366	$ 16,085	$ 24,213
NATURAL GAS	$ 23,551	$ 27,812	$ 25,897	$ 42,427	$ 45,067	$ 54,075	$ 72,834
ALUMINUM	$ 0	$ 0	$ 0	$ 12,286	$ 23,676	$ 27,589	$ 32,741
LEAD	$ 0	$ 0	$ 0	$ 677	$ 981	$ 2,226	$ 2,134
NICKEL	$ 0	$ 0	$ 0	$ 1,986	$ 4,415	$ 6,690	$ 6,608
ZINC	$ 0	$ 0	$ 0	$ 2,696	$ 6,759	$ 6,917	$ 6,428
COPPER	$ 0	$ 0	$ 0	$ 11,864	$ 26,516	$ 28,921	$ 32,717
GOLD	$ 5,639	$ 9,851	$ 13,221	$ 13,860	$ 18,929	$ 24,891	$ 43,700
SILVER	$ 1,976	$ 2,438	$ 3,745	$ 4,286	$ 6,447	$ 7,437	$ 12,935
TOTAL	**$ 90,991**	**$ 112,168**	**$ 150,082**	**$ 242,955**	**$ 354,097**	**$ 493,382**	**$ 699,400**

Source: CFTC Commitments of Traders, and Bloomberg.

Why did large financial institutions enter into commodity futures market?

There are at least two reasons. First is the recent deregulation of commodity futures markets. When US congressmen introduced the commodities futures in 1930s, they believed that speculation motivation should not be a dominate force in the market. However, this rule was loosened step by step in the movement of financial deregulation starting from 1990s. In early 1990s, the US Commodity Futures Trading Commission (CFTC) granted Wall Street banks an exemption from speculative position limits when these banks hedge over-the-counter swaps transactions, which has effectively opened a loophole for unlimited speculation and banks use it to access the futures markets without position limits. In the CFTC's classification scheme all speculators accessing the futures markets through the swaps loophole are categorized as "commercial" rather than "non-commercial, which is a gross distortion in data that effectively hides the full impact of index speculation (Masters, 2008).

The second reason for financial institutions to enter commodity markets is to diversify risks. Before 2000, commodity prices did not co-move with equity prices and few large financial institutions invested much in commodity markets. In fact, it was found that commodity indices have a slight negative return correlation with stock indices (Tang and

Xiong, 2009). When equity market collapsed after September 11, 2001 and real interest rate became lower, large financial institutions like Goldman Sachs began to promote commodity futures as an effective way to reduce the portfolio risk through investing commodity futures, and financial deregulation happened to stimulate the trend.

Financial instruments for commodity investments

Motivated by portfolio diversification considerations, financial institutions developed four types of financial instruments that enable financial investors to gain exposure on commodity market easily: commodity index swaps, exchange traded funds (ETFs), exchange traded notes (ETNs) and Commodities-related ETFs.

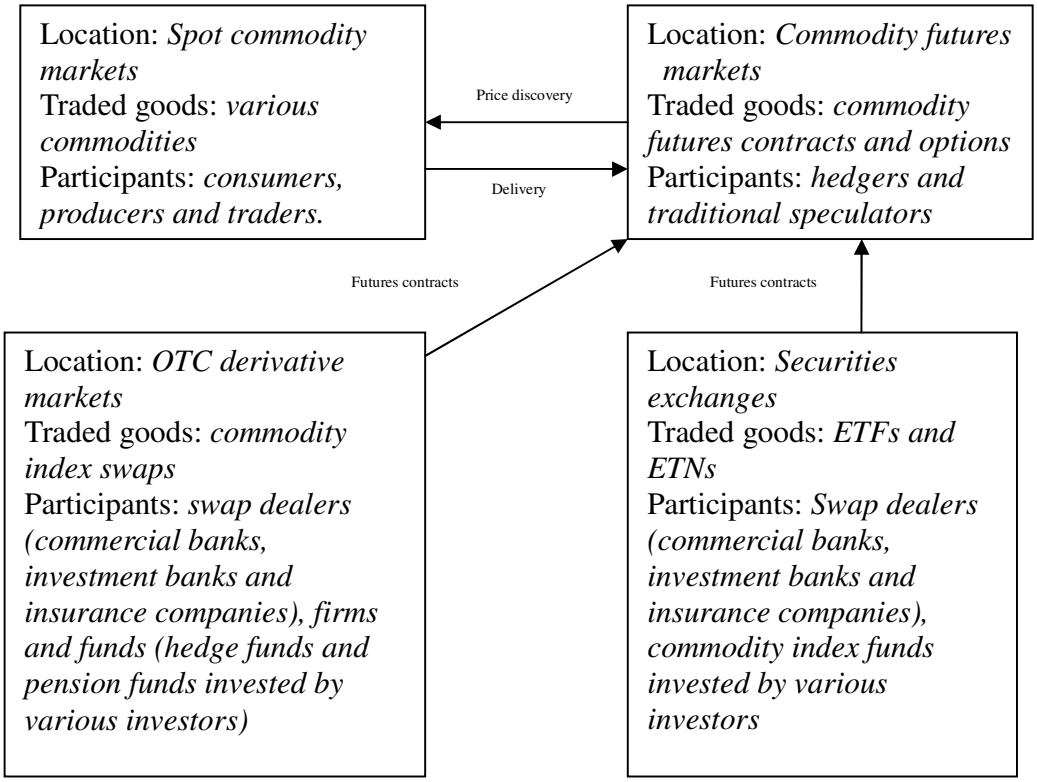
A commodity index swap is a financial instrument that pays a return based on the value of a specified commodity index, and most financial investors take positions related to those commodity indices. The two most popular commodity indices were created by two investment banks for the purpose: Standard & Poor's Goldman Sachs Commodity Index (S&P GSCI) and Dow Jones-Union Bank of Switzerland Commodity Index (DJ-UBSCI), and these two indices cover almost all commodities traded on global commodity exchanges. A swap dealer, such as an investment bank or broker-dealer, offers investors the opportunity to purchase, for a fixed price, a swap whose value is linked, on any given date, to the value of the specified commodity index on that date. After selling a swap contract, the swap dealer will typically hedge its own exposure to the swap contract by purchasing the corresponding futures contracts in the commodity index (Tang and Xiong, 2008).

In recent years, ETFs were created by many large institutions to facilitate transactions between investors and dealers. Unlike commodity index swaps, which are bilateral transactions between investors and swap dealers, ETFs are traded in exchanges like stocks (Tang and Xiong, 2009). ETFs attempt to track the price of a single commodity, such as gold or oil, or a basket of commodities (such as S&P GSCI or DJ-UBSCI) by holding the actual commodity in storage, or by purchasing futures contracts. Since futures provide leverage (more exposure than the actual cash invested), uninvested cash can be used to buy interest-bearing government bonds to cover the expenses of the ETF and to pay dividends to the holders (seekingalpha.com).

Commodity ETNs are non-interest paying debt instruments whose price fluctuates (by contractual commitment) with an underlying commodities index and ETNs in most cases invest in futures contracts on the underlying commodities directly.

Commodities-related ETFs generally track the producers of commodities, such as mining companies. While the financial performance of those companies -- and thus their stocks -- may be highly leveraged to the underlying commodity, other factors can impact the profitability of production. The ETFs, therefore, may not reflect the performance of the underlying commodity (seekingalpha.com). It is important to note that the ETFs and ETNs are mainly transacted through swap dealers even though they are traded on securities exchanges (CFTC, 2009).

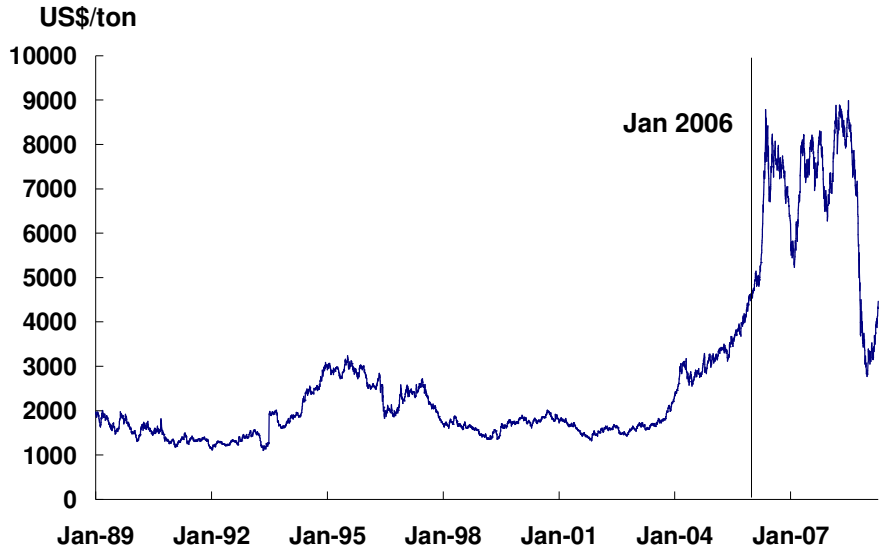
Figure 1: The structure and players in commodity markets



(ii) Identification of financial demand: the copper bubble in 2006

Copper has been a major commodity traded at the London Metal Exchange. The copper price skyrocketed in 2006 to an unprecedented level (Chart 13). Was it driven by industrial demand from China (as the conventional wisdom and financial press claim) or by the financial forces in the developed economies? Usually it is difficult to disentangle the two because they go in the same direction for most of the time – financial speculator would buy and hold copper when they perceive industrial demand to rise. But the copper bubble in 2006 turns out to be a rare case where the financial and industrial forces went in opposite directions, which allow us to identify the source of the bubble.

Chart 13: Copper Price at London Metal Exchange



Source: CEIC.

Here is a very simplified version of how copper exchange operates. The copper trading (both spot and futures) occur in London Metal Exchange (LME), but the LME operates a large number of warehouses across the world, with the US warehouses accounting for the bulk of the inventory. The inventory of copper in these warehouses is reported on a daily basis, and such information is used widely among investors and taken as a measure for relative supply and demand in the world copper market. Assuming supply is constant in the short term (which is a reasonable assumption given the time it takes to expand copper production), consider the following two cases:

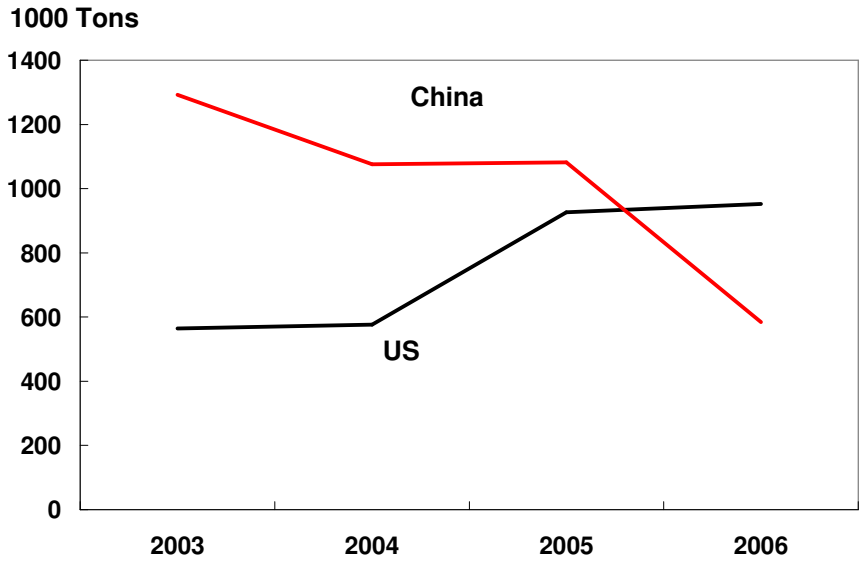
- Both industrial demand in China and financial demand in developed world go up
  In this case, we would observe more imports of copper in China, as well as more imports of copper in the US, but copper inventory would not rise, as speculators buy copper from LME warehouses and store it in private warehouses. This is what happened in 2004 and 2005

- Industrial demand goes down in China and financial demand in developed world goes up
  In this case, we would observe less imports of copper in China, as well as more imports of copper in the US, but copper inventory would not rise. This is what happened in 2006.

A close look at the copper trade data indicates financial demand is indeed the force behind the copper bubble in 2006 (Chart 14). In 2003 and 2004, imports by China were indeed higher than imports by US. In 2005, the Chinese economy was facing the risk of overheating, and the government decided to impose credit limits and curb overcapacity in heavy industry, which led to lower copper demand. Copper imports in China flattened in 2005, but copper imports by the US soared from 577 thousand tons in 2004 to 926

thousand tons in 2005. Moreover, US copper imports in 2006 reached 953 thousand tons , while Chinese imports declined to 584 thousand tons. It is clear from the chart that the US imports were driving the copper price bubble, not Chinese imports. Nonetheless the "China factor" was quoted frequently in the press as the source of metal price rallies.

Chart 14: Imports of Refined Copper, US vs China



Source: World Bureau of Metal Statistics

IV. Conclusions

This paper tries to establish two claims. First, the 2008 economic slowdown in China was triggered by a commodity price shock rather than by an external demand shock. The external demand shock exacerbated the problem, but it is not the first domino to fall in China. Secondly, the unprecedented volatilities in global commodity market were not entirely driven by industrial demand. The financial demand played an important role. The 2006 copper bubble illustrate its role independent from the industrial demand.

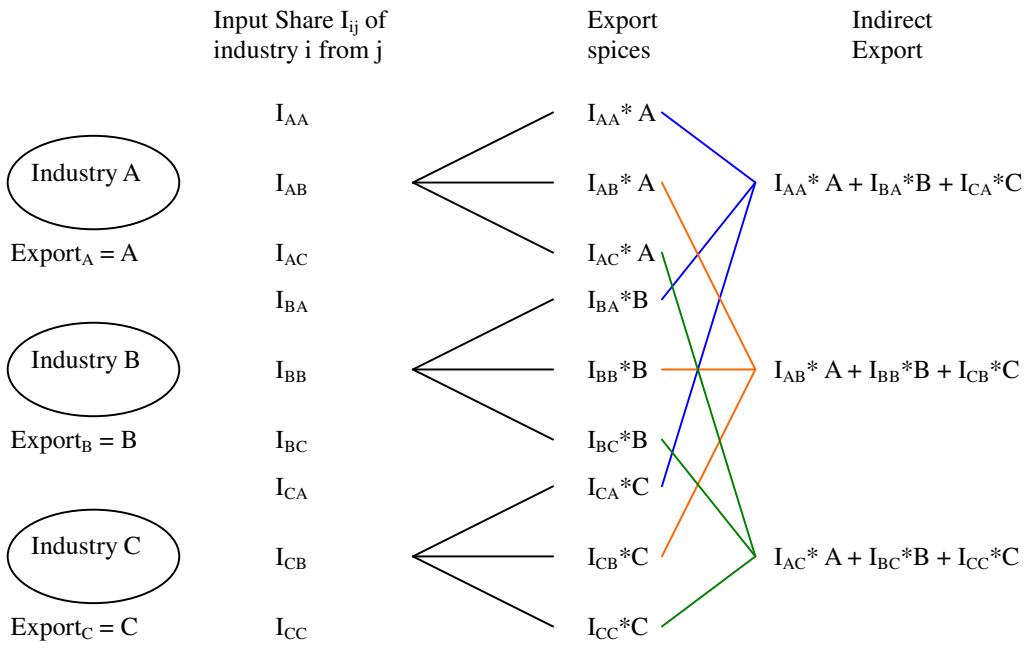
We do not expect the above claims to convince everybody. This is a descriptive paper with no sophisticated econometric technique or theoretical backing. Rather it is written to illustrate some simple facts and propose alternative hypotheses that are contrary to the conventional wisdom. Given the importance of these issues for the Chinese economy, more research with better data, methodologies, and models is certainly warranted.

But what if these claims are indeed true? They would have important implications for economic policies in China and the world. Is financial demand in commodity market price-stabilizing? The standard economics textbook says yes, but what we experienced in the past several years says absolutely no. Is financial demand in commodity market welfare improving? The conventional wisdom is yes, because of its role in price discovery and risk transfer, but again the recent experience shows the answer is not that simple. We look forward to further research in this area.

Appendix I: Measuring Export Dependence

The export dependence is defined as the share of output from a given industry that is exported, taking into account for the exports indirectly by other industries. To estimate indirect export exposure, the exports are adjusted according to contributions for each industry in a customized Input-Output (IO) table. The IO table contains the 39 sectors, showing the inputs of each industry from others in the year of 2002. For each industry, the input shares of the 39 industries are tabulated. Since some output of an industry is the input of another, the exports of the sectors are redistributed among the industries. The direct exports of an industry are divided into 39 spices, whose sizes are in proportional to inputs from the 39 industries. Every industry receives its spice from that industry. Therefore, if an industry A provides more (less) inputs to another industry B, it will receive more (less) exports from industry B. By aggregating the spices received from all industries, the exports adjusted for indirect exposure of an industry can be obtained. An example of a 3-sector economy is shown in Figure 1. On the other hand, the total production for each industry is total revenue of the industrial enterprises. Since some revenue is made from selling output as input of other domestic industries, the export dependence, which is adjusted export divided by total revenue, should reflect the true importance of exports towards each industry.

Figure 1: Example of adjusting indirect export for a 3-sector economy



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