Excess Liquidity and Commodity Boom

S. Ohno

***Abstract*—This paper presents an investigation of whether excess liquidity has been serving as a driving force for the increase in international commodity prices. This study uses a structural VAR model including two global liquidity indicators and the world production index to examine the determinants of international commodity prices. The lending of tolerant international bankers promoted commodity price might increase before the global financial crisis while the international liquidity squeeze brought about their decline after the Lehman Shock. Among commodities, the prices of industrial metals are more attributable to funding liquidity, and the price of crude oil, with a market believed to be more vulnerable to speculative money inflows, has been less dependent on liquidity. Gold is exceptional. It acted as a safe haven during the period of international financial dysfunction.**

***Index Terms*—Commodity index investment, excess liquidity, flight to quality, TED.**

I. Introduction

In the 2000s, international commodity futures markets' trade volume has increased considerably. During that period, the percentage of trades made by non-commercial traders such as hedge funds, mutual funds, floor brokers, has been increasing relative to that of commercial traders engaged in business activities hedged by the futures. The increase in the futures trade volume is likely to be linked with the development of investment vehicles such as commodity index funds and commodity ETF, which might stimulate commodity investment by pension funds and sovereign wealth funds.

Institutional investors hold commodity-related products as parts of their respective portfolios, which might cause the increased interdependence between commodity and other traditional financial asset classes like equities, or the more interdependence across commodities which constitute major commodity indices. This can be referred to as "financialization of commodities". Tang and Xiong [1] reported that, concurrent with rapidly growing index investment in commodities markets since the early 2000s, futures prices of different commodities in the US have become mutually correlated to an increasing degree. This trend was more pronounced for commodities in the two popular GSCI and DJ–UBS commodity indices. They also found that such commodity price co-movements were absent in China. The difference of empirical results for the US and China disproves the growth of commodity demands from emerging economies as the dominant driver of commodity price movements. Ohashi and Okimoto [2] revealed similar results that price co-movement of commodities, adopted as components of major indices, have become prominent compared with correlation with off-index commodities.

Although commodities had been believed to contribute to portfolio risk reduction because of negative correlation of their prices with traditional asset prices, financialization of commodities might degrade that diversification effect. Gorton and Rouwenhorst [3] showed that commodity futures prices had a negative or non-existent correlation with bond and equity prices, and that they contribute to the improvement of portfolio returns.

The increased speculative money inflows might have a strong impact on commodity futures markets with small transaction volume. The market scale of commodity futures is extremely small compared with that of equity and bonds. Therefore, commodity futures prices are expected to be fragile because of market liquidity risk. For example, in 2011, the annual turnover on financial futures markets transactions around the world was 22.1 billion, whereas the annual turnover on the global commodity futures markets was only 2.5 billion transactions. Similarly, the annual turnover of euro-dollar futures on CME, as an example of major financial futures products, was 560 million transactions, and the annual turnover of WTI futures on NYMEX, which has the largest amount of trade volume in the category of commodity futures, was 170 million transactions[1]. These Figs imply that a small portion of portfolio rebalancing by institutional investors has a dominant market impact in commodity futures markets.

Two scenarios exist to address the prominent upward trend of commodity prices in recent years, although investigators have reached no consensus. The first scenario highlights the balance between physical production and the demand for commodities. The second scenario comes from the explanation by factors unrelated to the balance of supply and demand for the physical markets. Krugman [4] offered a counterargument against the insistence of supporting the existence of bubble in crude oil prices, by demonstrating that the crude oil price exceeding its fair value might create excess supply and an increased amount of stored oil. He concluded that the drastic increase in the crude oil price resulted from increased demand because no excess stock of oil was observed.

The source of the increased speculative money might be traced to global excess liquidity. Even though excess stock of commodities was not observed, the overvaluation of commodity prices can emerge because the demand for the physical goods can also be inflated by excess liquidity.

Manuscript received April 25, 2013; revised June 25, 2013. This work was financially supported by a Grant-in-Aid for Scientific Research (B, 21330080) as well as (C, 24530367) from the Japan Society for the Promotion of Science.

Sanae Ohno is with the Faculty of Economic, Musashi University, Tokyo, 176-8534 Japan (e-mail: sanaeon@cc.musashi.ac.jp).

[1] These figures are based on information provided by Mitsuhiro Onozato, executive officer at Tokyo Commodity Exchange.

DOI: 10.7763/JOEBM.2014.V2.106

Kawamoto et al. [5] examined the impact of the low interest rate policy implemented by the major economically developed countries on commodity prices using a structural VAR, and showed the possibility of QE2 conducted by Fed pushing up commodity prices.

Money includes not only currency supplied by a central bank but also deposit money provided by private financial institutions. Therefore, the increased speculative investment in commodity futures markets to push up the commodity prices can be attributed to the quantitative monetary policies as well as expansionary lending by optimistic financial institutions.

This paper presents an investigation of determinants of commodity prices using a structural VAR model, particularly addressing two liquidity indicators. This study compares results of two subsample periods divided by a time point of 2001 when the emergence of the global excess liquidity was expected to begin influencing on the commodity futures markets.

Although extensive literature related to the pricing of financial assets has already been published, studies of commodity prices are lacking to date. Furthermore, commodity prices reflect their intrinsic value inherent in physical goods. Gorton, Hayashi and Rouwenhorst [6] collect inventory data for a broad cross-section of commodities and directly examine the negative relation between inventories and the risk premium. In this paper, prices of various categories of commodity are contained for the analysis to examine the connection between liquidity and the form of the futures curves.

II. Empirical Model and Data

A. Empirical Model

This paper presumes that the international commodity price index and its determinants are represented by the following structural VAR model.

$$A(L)X_t = u_t \qquad A(L) = A_0 - A_1 L - \cdots - A_k L^k. \tag{1}$$

where A_0 is specified as a recursive form to avoid the parameter identification problem, and k is the maximum lag. Vector u comprises structural shocks of those variables with a variance–covariance matrix $E[u_t u_t']=I$. To identify the structural model, this paper imposes a recursive specification on matrix A_0.

X_t is a 6×1 vector of endogenous variables defined as the following.

$$X_t' = [WP_t, \quad TED_t, \quad CO_t, \quad FF_t, \quad FX_t, \quad ST_t,].$$

Therein, *WP*, *TED*, *CO*, *FF*, *FX* and *ST* specifies world industrial production, TED, commodity price index, US federal fund rate, US dollar nominal effective exchange rate and US stock index, respectively.

According to this specification, *WP* is defined as the most exogenous variable and *ST* as the least exogenous variable. Among the six variables, *WP*, *TED* and *CO* are regarded as world variables and *FF*, *FX* and *ST* as US variables. Those US variables are presumed to respond endogenously to shocks in the world variables. Here, TED is regarded as a world variable because the U.S. dollar is circulated across the international financial markets as a key currency.

The ordering of the world variables is determined based on the following reasons: 1) world industrial production adjusts with lags to shocks in TED and commodity prices; 2) commodity index prices react contemporaneously to shocks in real-world economic activities; and 3) TED might reflect the credit risk of international financial institutions and the ease of funding U.S. dollar liquidity. The tightened lending caused by the change in financial institutions' perception for credit risk and funding liquidity risk restrict commodity investors conducting leveraged investments.

This paper uses the world industrial production index as an indicator of the world economic business cycle, similar to Kawamoto et al. [5][2]. This paper, different from Kawamoto et al. [5], which adopts the world stock price index as an indicator of risk appetite, investigates the impact of TED on commodity price indices by presuming that TED reflects concerns about the stability of the financial system related to a lack of creditworthiness of financial institutions and investors' perceptions of liquidity tightness. Kawamoto et al. [5] interprets changes in commodity prices caused by increased capital flows into futures markets as well as an unwinding of investors' positions in commodities as an idiosyncratic shock of the commodity index price. In this paper, a structural shock of *CO* is interpreted as a shock caused by heightened geopolitical risk, climate change, and so forth because a commodity price index is extracted with the impact of TED.

This paper also supposes that the Fed adjusts the target interest rate after observing the effects of changes in commodity prices on domestic prices as well as the effects of the global economic business cycle and Eurodollar market conditions. In this paper, a structural shock (or an idiosyncratic shock) of the US monetary policy is defined as a shock in the FF rate resulting from other causes aside from those endogenous interest rate adjustments. This paper also assumes that the monetary policy is not intended to be implemented for stability of securities markets, and that stock prices and foreign exchange rates respond contemporaneously to a shock in the target interest rate.

This paper includes TED in addition to the FF rate because the impact of liquidity provided by private financial institutions is discriminated from the impact of liquidity as a result of implementation of monetary policy. The degree of liquidity tightness implied by the changes in the target interest rate might differ from that indicated by the interbank interest rate at some moments. Take as an example the period of 2004–2007, when FF rate had been rising continuously to restrain inflation pressure, and TED, however, remained at a low level.

As another example, it is also apparent that during latter 2007 to the early part of 2008 when the commodity price index shows a sharp increase, TED rose abruptly because financial institutions raised their doubts and fears of one

[2] Kilian [7] disentangles supply and demand shocks in the physical markets of crude oil.

another related to the possibility of bankruptcy, whereas the FF rate started declining to calm the tension of the interbank market. Kawamoto et al. [5] revealed that the relative contribution of the idiosyncratic shock of commodity prices increased during the period, concluding that the result can be interpreted as the increase in commodity investments led by a "flight to simplicity" triggered by the collapse of securitization markets. This paper presents an examination of whether a "flight to simplicity" can be discovered after controlling the effect of TED on commodities.

Financialization of commodities, or the increased correlation between prices of commodities and securities such as stock, is ascribable to the effect of common factors. This paper adopts TED as well as the world industrial production as common factors and explores whether the commodity futures markets have become more vulnerable to a transition of global liquidity after commodities were regarded as alternative investments, stimulated by the development of commodity investment vehicles.

B. Data

World industrial production data were downloaded from the webpage of CPB Netherlands Bureau for Economic Policy Analysis. Other data were obtained from Thomson Reuters' *Datastream*. Empirical analysis of this paper uses monthly data with sample observations ranging from June 1991 to August 2011, which are divided at 2001 to estimate the structural VAR model described above.

TED is the difference between the three-month Eurodollar contract as represented by LIBOR and interest rates for three-month U.S. T-bills. *CO* is the international commodity price index represented by the DJ–UBS commodity index. This paper adopts the composite index as well as several sub-indices. As for *S*, the MSCI–US stock price index denominated in U.S. dollars is applied.

III. Empirical Analysis

A. Variance Decomposition and Impulse Response Analysis

The results of variance decompositions are presented next. Table I portrays the variance decomposition for all variables considered in the analyses for the two estimation periods. The numerical values in TABLE I are the averaged contributions of variance of the one-step forecast error through that of the twenty-step forecast error for each component. In this case, the DJ–UBS commodity composite index is used for *CO*.

The analysis reveals that the relative contribution of TED to FF rate increases greatly in the second period. The evidence might reflect the fact that the Fed accommodated by lowering the target interest rate for the emergency where financial institutions doubt and fear one another for the probability of bankruptcy brought about the dysfunction of the international interbank markets. It also seems readily apparent that the impact of TED on the world industrial production increases in the second period, implying that the extreme liquidity squeeze aggravated the world economic recessions. TED has also become more influential on the US dollar effective exchange rate, the US equity index, and the commodity composite index in the second period. Results show that the impact of *WP* shock on the indices of commodities and US equities increases in the second period, which is consistent with the results of impulse response functions.

TABLE I: Variance Decomposition in Applying Composite Index

(a) First Period: June 1991-December 2000

	WP shock	TED shock	CO shock	FF shock	FX shock	ST shock
WP	90.201	1.277	1.746	1.487	3.084	2.204
TED	9.481	83.463	0.226	2.377	0.792	3.663
CO	7.861	4.233	73.402	2.567	3.089	8.847
FF	7.024	1.529	2.766	84.724	0.663	3.294
FX	2.871	1.436	1.450	0.785	86.616	6.842
ST	3.490	2.774	1.949	2.695	5.380	83.713

(b) Second Period: January 2001-August 2011

	WP shock	TED shock	CO shock	FF shock	FX shock	ST shock
WP	62.631	19.500	4.775	0.254	8.364	4.476
TED	2.717	87.900	2.893	4.247	1.980	0.263
CO	13.254	8.917	66.420	2.001	7.725	1.683
FF	4.378	25.450	3.191	63.262	0.530	3.190
FX	5.916	9.463	6.389	2.060	74.068	2.105
ST	9.292	9.176	8.435	2.102	8.163	62.833

Table II presents the variance decomposition of sub-indices of commodities for the second period. We can find that the industrial metals and precious metals are more prone to TED. Although energy products should be regarded as the core of the commodities investments and although they have a propensity to form the futures curve of backwardation, the relative contribution of TED is not significant. The tendency can be confirmed by the result of impulse response analysis. Fig. 1 shows the impulse response of sub-indices of commodity to a shock in TED. The impulse response of sub-indices of industrial metals and precious metals are statistically significant and presents negative reactions to TED. Prices of industrial metals show a particularly larger response to liquidity condition. The response of the sub-index of energy, on the other hand, is statistically insignificant although the sign of the response is negative.

Idiosyncratic shocks tend to be more dominant for products related to agriculture, grain, livestock and energy. This might result from omission of variables vital to those commodities. Omitted variables might include geopolitical risk and climate changes.

The following reasons can be listed as explanations of a marked influence of TED on industrial metals: 1) Because the trading volume of industrial metals on the futures markets is less than that of energy products, the market impact caused by the increased speculative capital inflows might be considerable. 2) Because some of the industrial metal futures prices tend to form the futures curve of "backwardation", institutional investors, who are likely to choose "buy and hold" strategy, might prefer to invest in those commodities.

The downward futures curve (backwardation), a situation of the price of a futures contract traded below the expected spot price at contract maturity, creates the roll return. Erb and Harvey [8] present that the roll return is dominant in the total return of commodity investments, which is an important source of profits of commodities yielding no income return. Fuerte, Miffre and Rallis [9] demonstrate the profitability of trading strategies combining momentum and term structure and conclude that the double-sort strategy creates an abnormal return of 21.02%.

TABLE II: VARIANCE DECOMPOSITION FOR COMMODITY INDICES
SECOND PERIOD: JANUARY 2001-AUGUST 2011

	WP shock	TED shock	CO shock	FF shock	FX shock	ST shock
DJ–UBS Composite Index	13.254	8.917	66.420	2.001	7.725	1.683
Energy	7.596	2.429	82.757	1.886	5.001	0.331
Crude Oil	9.476	3.216	76.925	1.273	7.786	1.323
Heating Oil	7.631	3.486	79.587	1.208	6.431	1.658
Unleaded Gas	6.218	6.205	79.641	0.825	6.115	0.997
Industrial Metals	14.783	16.269	56.819	1.635	7.307	3.188
Aluminum	12.153	10.947	66.155	3.700	4.589	2.457
Copper	9.874	16.972	63.315	1.935	5.303	2.601
Lead	6.074	9.330	77.395	0.968	5.797	0.436
Nickel	11.142	8.226	71.010	1.149	6.117	2.357
Tin	10.393	9.469	74.970	0.770	2.030	2.369
Zinc	8.198	12.543	64.912	2.222	7.629	4.495
Precious Metals	5.860	12.370	74.114	0.453	4.968	2.236
Gold	7.363	13.624	71.295	1.076	4.758	1.884
Silver	3.223	11.514	78.587	0.127	4.279	2.270
Platinum	16.708	17.234	56.496	1.581	4.985	2.996
Agriculture	9.128	7.132	73.188	2.359	3.102	5.091
Cocoa	1.112	6.753	81.223	6.401	1.712	2.799
Coffee	2.407	2.737	91.237	0.291	1.138	2.190
Cotton	6.345	4.816	80.364	1.515	3.263	3.697
Suger	4.572	4.294	86.345	1.591	2.238	0.961
Grains	7.375	5.396	78.603	1.245	2.177	5.204
Corn	4.299	3.246	85.478	1.577	1.749	3.650
Soybean	6.683	6.023	78.985	2.324	1.969	4.015
Wheat	5.952	4.141	81.854	0.688	1.746	5.619
Livestock	2.453	3.309	89.583	2.710	0.829	1.117
Cattle	4.582	2.732	89.134	1.788	1.050	0.715
Leanhogs	0.679	4.155	90.703	1.745	1.756	0.963

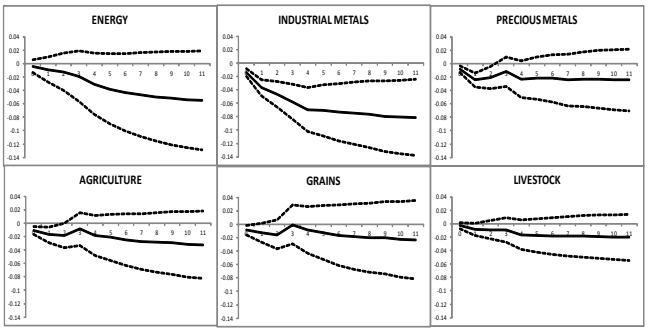


Fig. 1. Impulse response analysis for sub-indices of commodity.

Morota [10] lists energy products and copper as candidates of commodities that can form backwardation. Erb and Harvey [8] also show that the roll returns of heating oil and copper are likely to be positive, although the roll returns of agricultural products and precious metals are likely to be negative. Campbell, Orskaug and Williams [11] use the price of aluminum listed on the London Metal Exchange during 1997–2006 and reveal that aluminum tends to form anupward futures curve (contango) for 60% of the estimation period, which is consistent with the results presented in this paper, which verifies that TED had the greatest impact on copper and the least impact on aluminum among industrial metals.

B. Historical Decomposition

In this subsection, the results of historical decomposition are presented. Fig. 2 portrays the historical decomposition of the DJ–UBS commodity composite index for the second period. The monthly changes in the DJ–UBS index are decomposed by contributions of the six identified structural shocks. In this analysis, the decomposed structural shocks are accumulated for every three-month to present each relative contribution for the commodity index.

The Fed promptly accommodated the IT bubble burst by conducting a drastic interest rate reduction. The FF shock contributing to raising of commodity prices during 2001–2002 is suggested in historical decomposition. After the fourth quarter of 2004, the contribution of TED shock exceeded the contribution of FF shock, which implies the possibility of the expansion of loans by financial institutions, which became more optimistic, thereby pushing up commodity prices.

From the third quarter of 2007 when the subprime loan problems surfaced, the TED shock started acting as a downward shock. This negative impact lasted until the fourth quarter of 2008: the Lehman Shock. After the subprime loan shock was actualized, the world industrial production index continued an upward trend until the second quarter of 2008, during which the WP shock contributed to raising of the DJ–UBS index. The period from the third quarter of 2007 to the second quarter of 2008 is a period of rapid rise of the commodity index. The evidence of historical decomposition suggests that the world demand for physical commodities as well as idiosyncratic shocks as major force to push up commodity prices. This analysis also reveals that the interest rate reduction starting in July 2007 contributed to the increase of commodity prices.

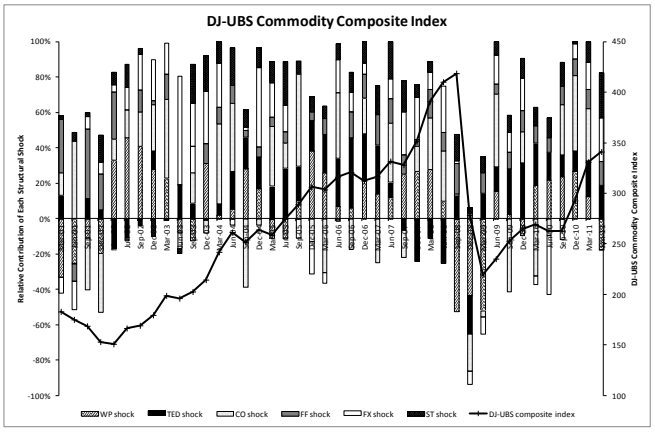


Fig. 2. Historical decomposition for commodity composite index.

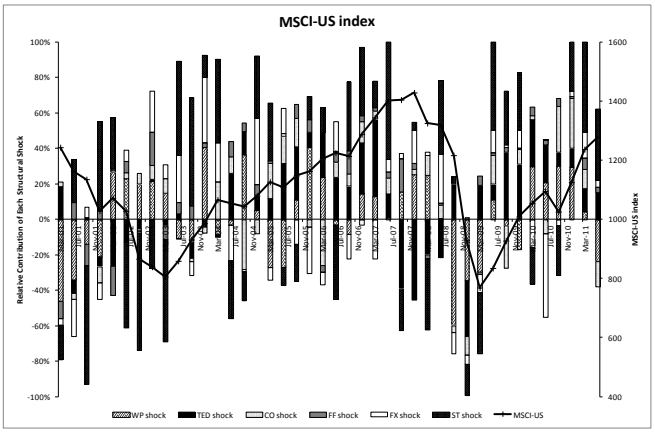


Fig. 3. Historical decomposition for US stock index.

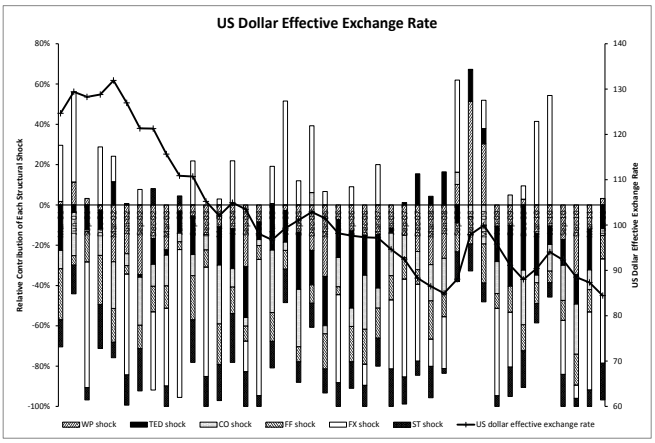


Fig. 4. Historical decomposition for US dollar exchange rate.

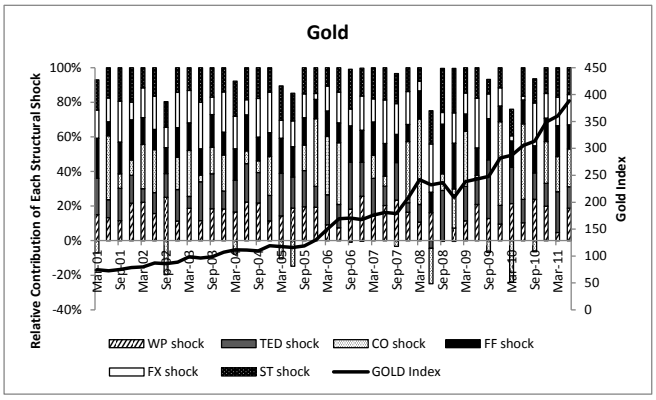


Fig. 5. Historical decomposition for gold index.

WP shock acted as a negative shock for the period from the third quarter of 2008 to the first quarter of 2009, lowering commodity prices. From July 2008, at a time the commodity index reached the peak, to March 2009 at a time it plunged to the bottom, the DJ–UBS commodity index dropped 83 percent. This paper verified that this drop was caused not only by the TED shock but also by the WP shock. Furthermore, the impact of the shrink in the world industrial production outstripped the impact of the liquidity squeeze for the period from the second quarter of 2008 to the first quarter of 2009.

Fig. 3 depicts historical decomposition of MSCI US index. The FF rate shock and TED shock worked to raise US equity prices after the IT bubble crash. It is also apparent that the commodity was influenced by the expansionary monetary policy and the increased tolerance of financial institutions at the earlier stage than the US equities. The possibility also exists that money injected by the eased monetary policy did not promptly flow in equity markets, but in commodity futures markets as an alternative investment opportunity. Regarding the impact at the financial turmoil in 2007 and 2008 and at the recovery in 2009, we can confirm similar features to those of the result shown in Fig. 2.

Fig. 4 presents the historical decomposition of the US dollar effective exchange rate. Although the TED shock has been acting as a negative factor for most of the estimation period, it functioned as a positive factor during 2007 and 2008. From this, the presumption that "speculators investing in commodity futures and equity markets under the easy money period fled to the US dollar as a safe asset during the period of liquidity crisis is implied. It is also apparent that an idiosyncratic shock has been dominant for the whole period. This can be interpreted as showing that uncertainty to the US dollar on the background of its expanding external debt was a vital factor in creating a downward trend.

Fig. 5 depicts the historical decomposition of gold. Among the commodities considered in this analysis, only gold was not affected significantly by the TED shock in 2007 and 2008. Even in the fourth quarter of 2008 immediately after the Lehman Shock, the impact of TED was negligible. Under the extreme liquidity crunch, gold was possibly chosen in a strategy of "flight to safety".

IV. Conclusion

The following describes conclusions of the empirical analysis of this study.

We confirmed that the influence of liquidity on commodity futures and US equity prices had become significant after 2001 when drastic easy monetary policies were implemented by economically developed countries, which suggests that "financialization of commodities" promoted by the development of commodity investment vehicles attracting institutional investors, coupled with the expansion of global liquidity, has been proceeding.

Immediately after the IT bubble burst, the easing of monetary policy by lowering the target interest rate had a greater impact on prices of commodity futures as well as US equities. Over the course of time, a tolerant stance of financial institutions for lending had been becoming dominant for asset prices. During 2007–2008, however, the TED shock served to drive asset prices down. This tendency was confirmed for all commodities except for gold, which was chosen as the sole safe asset under the extraordinarily severe financial turmoil. Another "flight to liquidity", flight of speculative money to the US dollar market, was also observed with an enormous amount of market liquidity.

Even though the subprime loan crisis was actualized in 2007, the commodity price index accelerated. The upsurge of the commodity prices is explainable by real economic factors. The decline of the world industrial production index in latter 2008 lowered the commodity prices. The magnitude of its impact exceeded that of TED. The robustness of this result should be confirmed.

Results show that commodities including industrial metals such as copper and precious metals such as platinum, which tend to form the futures curve of backwardation, are more susceptible to liquidity conditions. This result implies that investments by institutional investors who prefer a buy and hold strategy had a sufficient impact on commodities with smaller market size. Energy products, which are regarded as the core of the commodity investments, are not strongly influenced by TED. Further studies should be undertaken for a detailed examination of the relation between liquidity and the form of the futures curve.

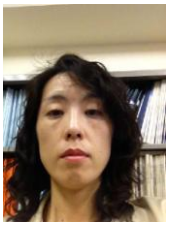
Acknowledgment

S. Ohno thanks Prof. Kitasaka (Doshisha University), attendants at the 2012 spring meeting of Japan Society of Monetary Economics, and members of the commodity research seminar supported by Tokyo Commodity Exchange, for helpful and beneficial comments.

References

[1] K. Tang and W. Xiong, "Index investment and financialization of commodities," NBER Working Paper, no. 16385, 2010.
[2] K. Ohashi and T. Okimoto, "Increasing trends in the excess comovement of commodity prices," *Unpublished*, 2013.
[3] G. Gorton and G. Rouwenhorst, "Facts and Fantasies about Commodity Futures," *Financial Analyst Journal*, April 2006.
[4] P. Krugman, "More on oil and speculation," *New York Times*, May 13, 2008.
[5] T. Kawamoto, T. Kimura, K. Morishita, and M. Higashi, "What has caused the surge in global commodity prices and strengthened cross-market linkage?" *Bank of Japan Working Paper Series*, no. 11-E-3, 2011.
[6] G. Gorton, H. Hayashi, and G. Rouwenhorst, "Fundamentals of commodity futures returns," *Review of Finance*, to be published, 2012.

[7] L. Kilian, "Not all oil price shocks are alike: Disentangling demand and supply shocks in the crude oil market," *American Economic Review*, vol. 99, no. 3, pp. 1053-69, 2009.
[8] C. B. Erb and C. R. Harvey, "The strategic and tactical value of commodity futures," *Financial Analysts Journal*, vol. 62, no. 2, pp. 69-97, 2006.
[9] A. M. Fuertes, J. Miffre, and G. Rallis, "Tactical allocation in commodity futures markets: Combining momentum and term structure signals," Unpublished, 2010.
[10] T. Morota, "Overview of commodity pricing models," Bank of Japan, *Monetary and Economic Studies*, vol. 29, no. 2, pp. 27-72, 2010.
[11] P. Campbell, B. E. Orskaug, and R. Williams, "The forward market for oil," *The Bank of England Quarterly Bulletin*, pp. 66-74, spring 2006.



Sanae Ohno was born at Ibaraki prefecture in Japan, December 7 1970 and now lives in Tokyo in Japan. I took a doctoral degree of commerce at Hitotsubashi University in Tokyo, in March 1999. Major research fields are international finance and asset pricing. She is PROFESSOR at Faculty of Economics, Musashi University in Tokyo. Her research papers are listed as; "Post-crisis exchange rate regimes in ASEAN: A new empirical test based on intra-daily data" (with S. Fukuda) *Singapore Economic Review* vol.53, no.2, pp.191-213, 2008; "European sovereign risk: The knock-on effects of default risk across the public and financial sectors" *Public Policy Review* vol.8 no.8 pp.775-806, 2013. Dr. Ohno belongs to Japan Society of Monetary Economy, Japanese Economic Association, and so on.