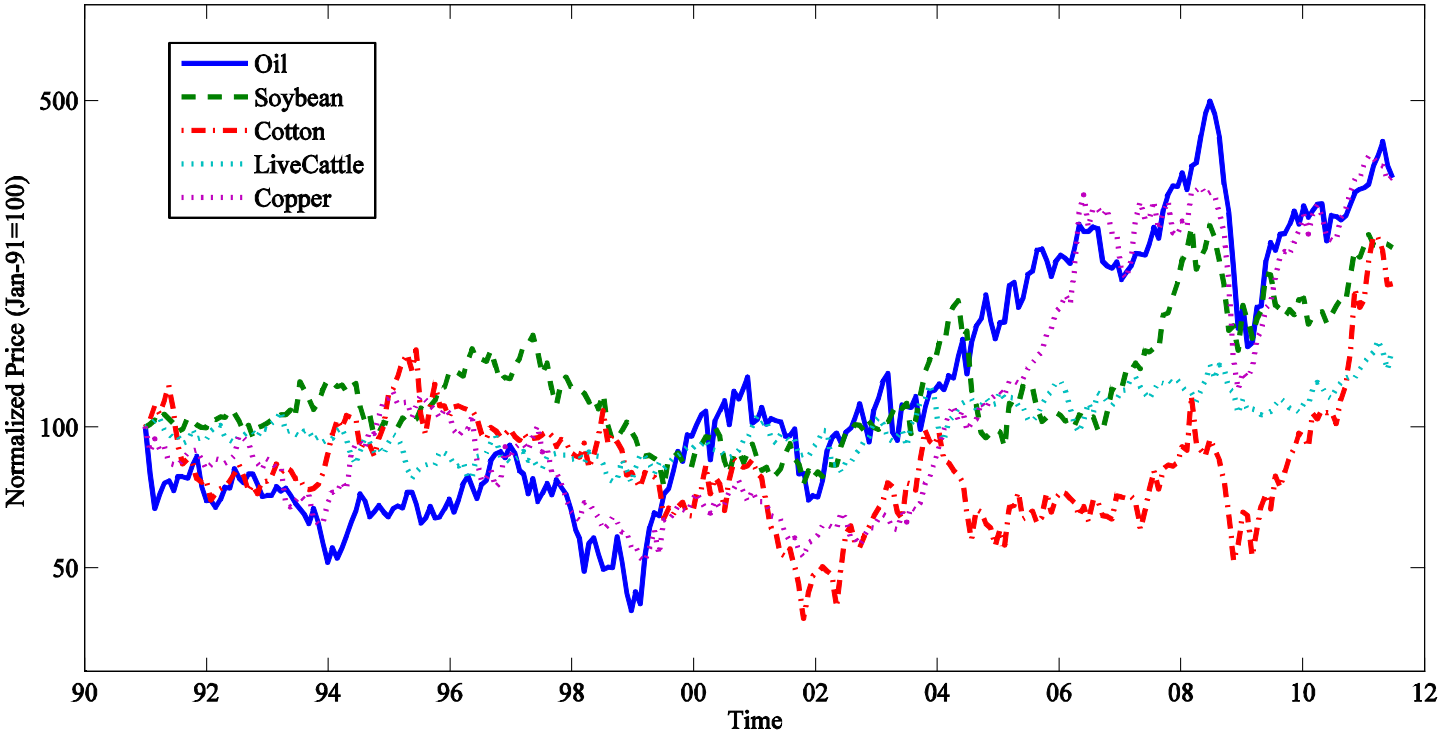
The Informational Role of Commodity Futures Prices

Conghui Hu, Peking *University*
Wei Xiong, *Princeton University*

EIA Financial and Oil Market Linkage Workshop
September 23, 2013

Synchronized Boom and Bust of Commodity Prices



- Supply shocks, demand shocks, or speculative shocks?

Informational Frictions in Commodity Markets

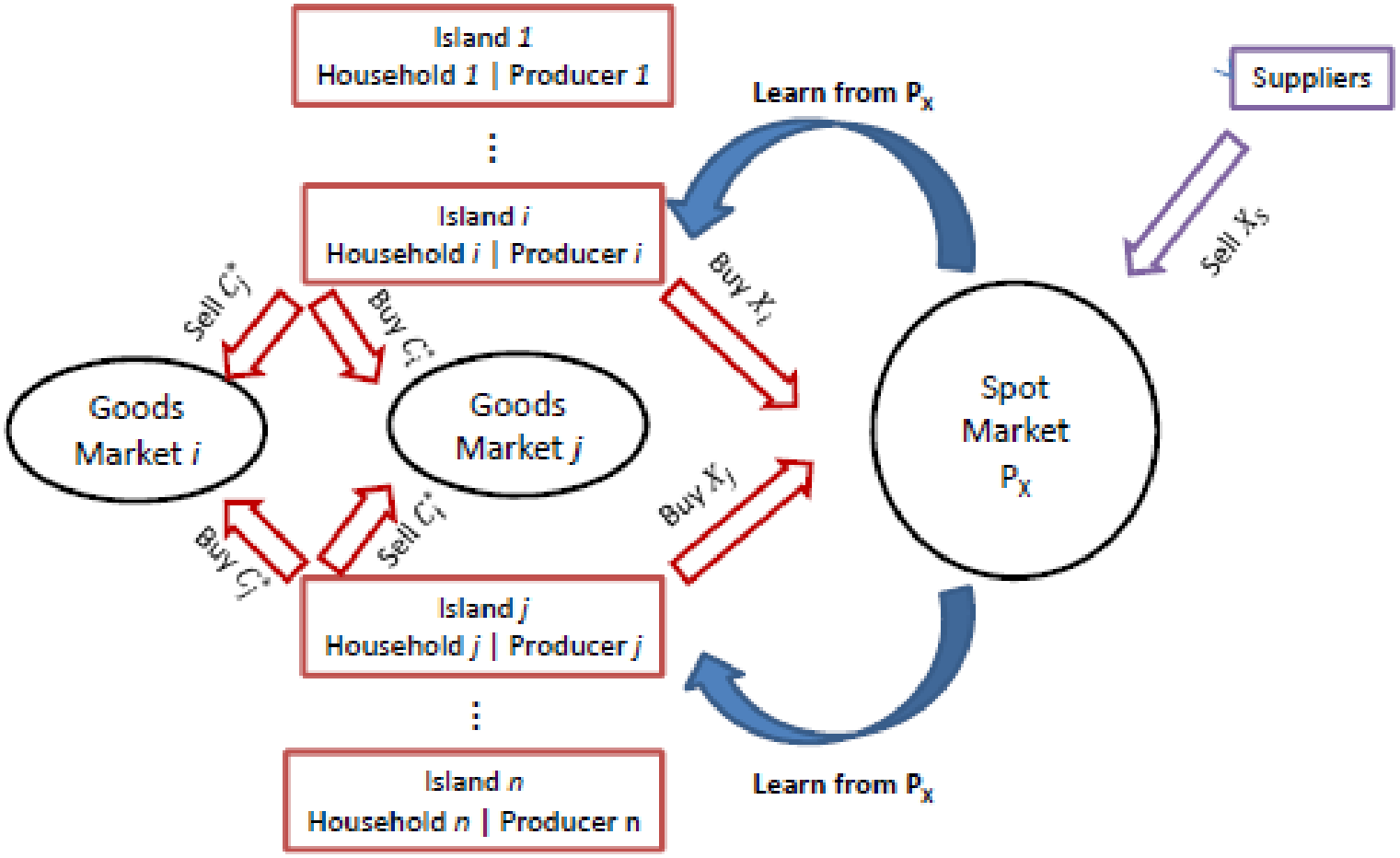
Participants face severe information frictions

- supply and demand from all over the world
- scant data from emerging economies
- recent concerns about manipulated information on inventory

From a conceptual perspective, a la Sockin and Xiong (2012)

- Commodity prices and commodity futures prices can both aggregate dispersed information regarding strength of global economy
- The prices in turn serve as feedback channels for trading to affect commodity demand and spot prices

A Simplified Global Economy



Key Insights of Sockin and Xiong (2012)

Without informational frictions:

- A higher price leads to lower demand
- A supply shock reduces price and boosts demand
- Futures price is a shadow of spot price

With informational frictions about global economic strength:

- A higher price leads to two offsetting effects:
  - a usual cost effect and an informational effect: **a higher price signals a stronger economy and thus leads to higher demand**
  - complementarity in production magnifies the informational effect
  - in net, price elasticity of demand is reduced and can be even positive
- Through the informational channel, supply shock has an amplified price effect and an undetermined effect on demand
- Futures price provides a price signal even if spot price is observed
  - noise from futures market can boost demand and spot price

Informational Role of Commodity Futures Prices

- ECB raised interest rate in March 2008 and cited high commodity prices as a key reason

- Roll (1984)
  - Price of orange juice futures efficiently aggregates information about weather in central Florida

- Garbade and Silber (1983)
  - Commodity futures prices tend to lead spot prices and play a greater role in price discovery

- Questions:
  - Do people react to information revealed by commodity futures prices? If so, what kind of information?

Empirical Strategy

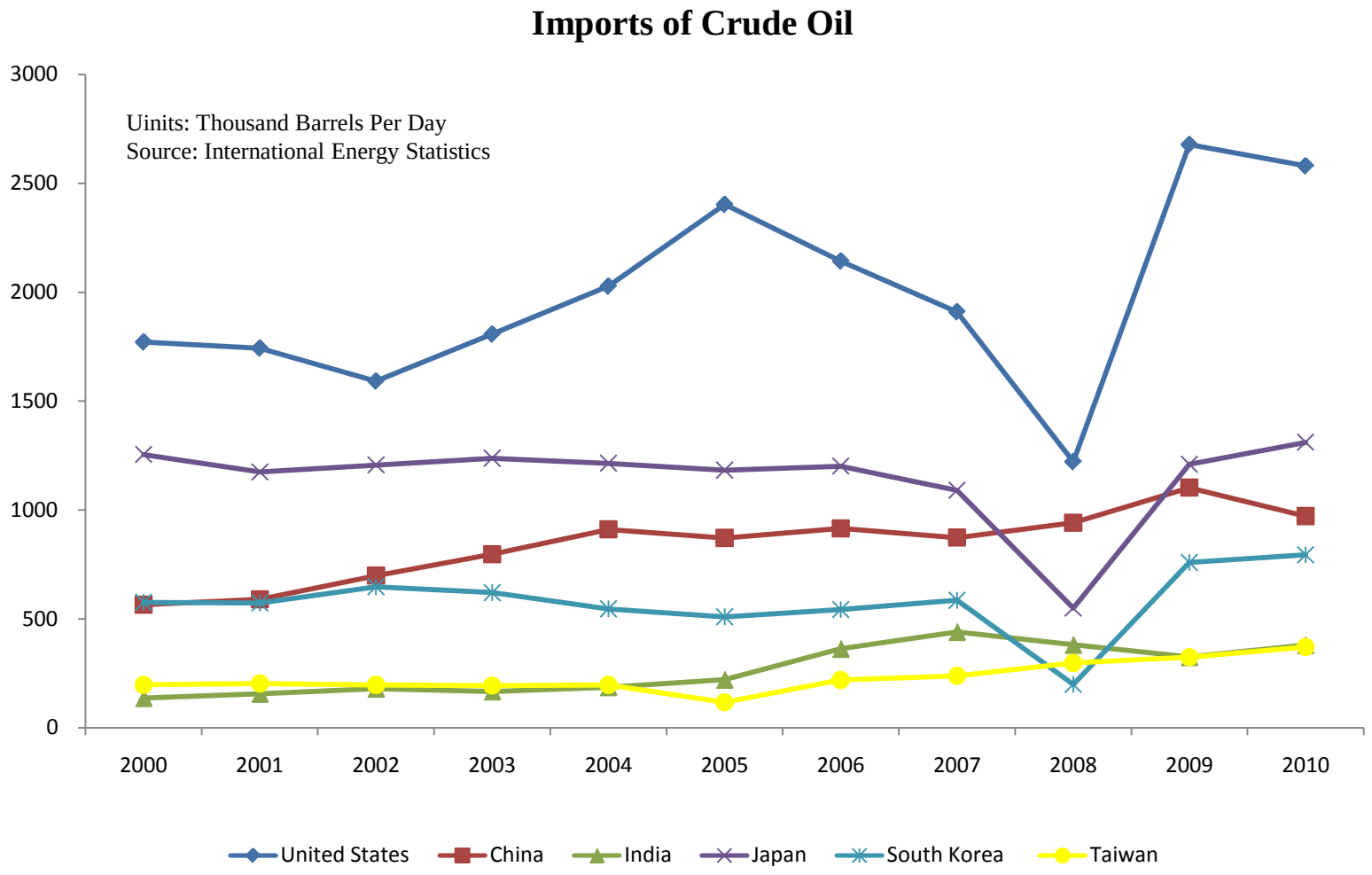
We analyze information flow between commodity futures markets in U.S. and stock markets in East Asia--China, Japan, Hong Kong, South Korea, and Taiwan

- U.S. has the most liquid and popular commodity futures markets
- East Asia has several vibrant economies and key commodity importers

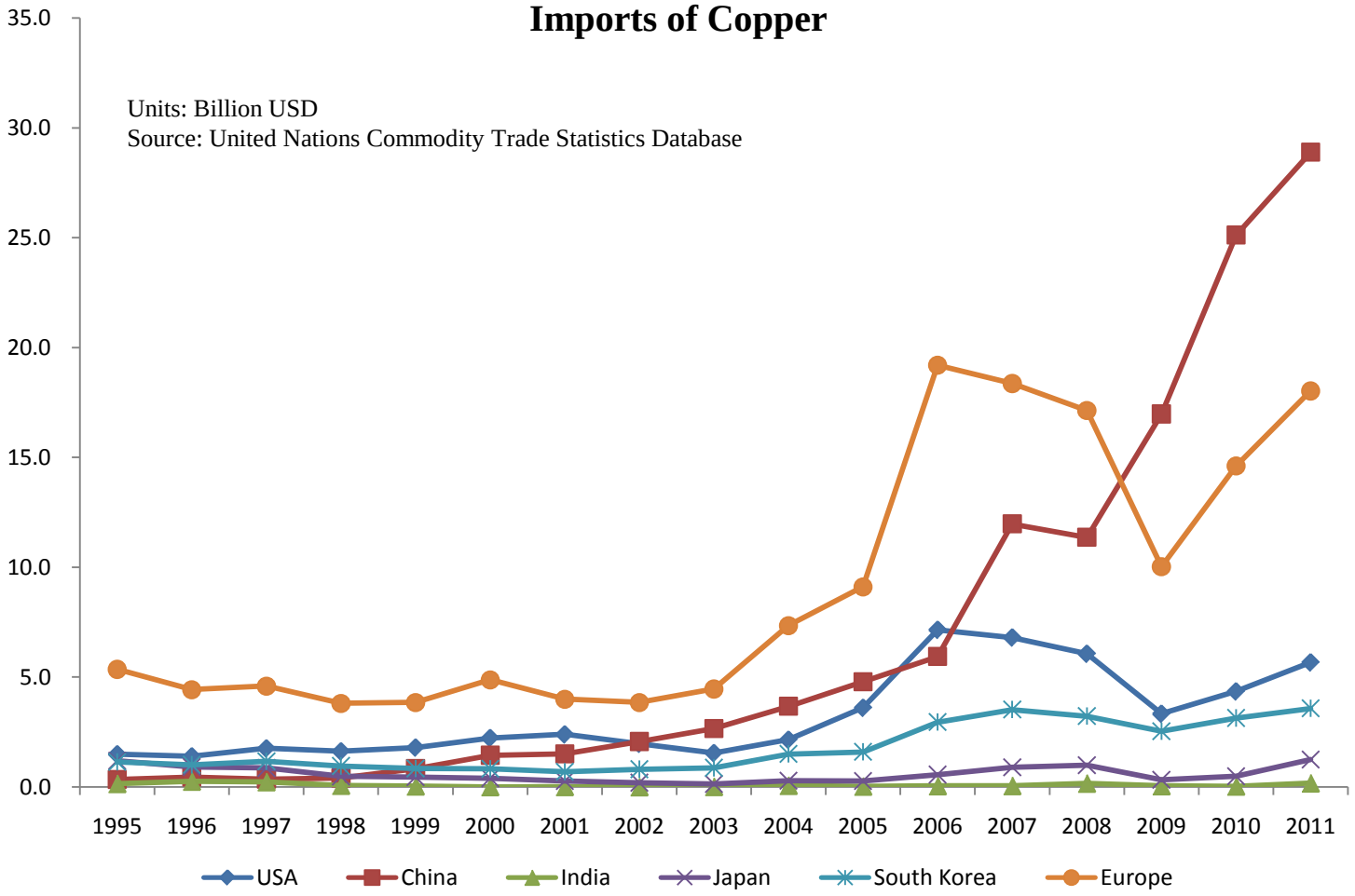
Time zone difference between U.S. and East Asia leads to asynchronous trading hours

- Lead-lag in prices allows us to identify information flow

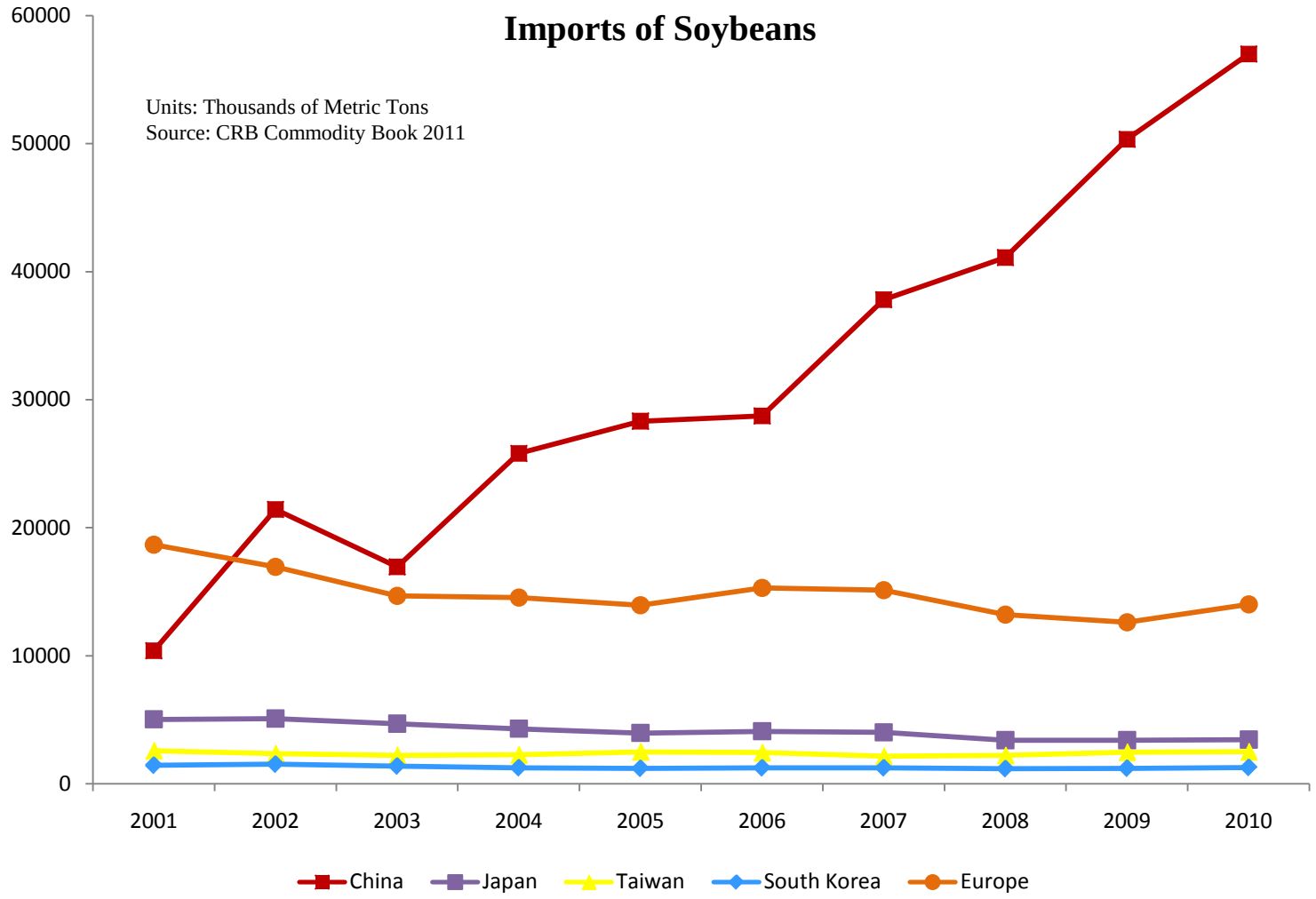
Crude Oil Imports across Regions



Copper Imports across Regions



Soybean Import across Regions



Summary of Results

- Little reactions of East Asian stock prices to lagged overnight futures returns before mid-2000s

- Significant and **positive** reactions to lagged overnight futures returns after mid-2000s
  - The reactions to **copper** and **soybeans** are robust even after controlling for lagged overnight futures return of S&P 500 index & spot return
  - The reactions to **crude oil** become insignificant after controlling for overnight futures return of S&P 500 index

- Evidence of commodity futures prices as barometers of the global economy
  - The informational content of copper and soybeans is cleaner
  - Crude oil prices potentially contaminated by supply shocks

The Literature

Determinants of oil prices

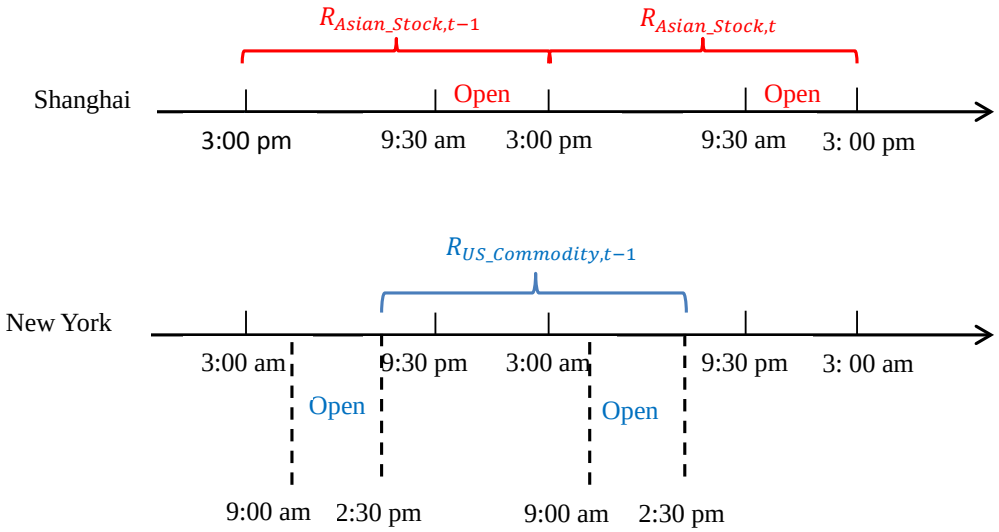
- Supply shocks: Hamilton (1983, 2003), Mork (1989), Backus and Crucini (2000), Davis and Haltiwanger (2001), Blanchard and Gali (2010)
- Demand shocks: Kilian (2009), Hamilton (2009), Kilian and Murphy (2012)
- Financial market shocks
  - Interest rate effects: Frankel (2006), Caballero, Farhi, and Gourinchas (2008)
  - Financialization of commodity futures markets: Tang and Xiong (2012), Singleton (2012), Buyuksahin and Robe (2012), Cheng, Kirilenko and Xiong (2012), Henderson, Pearson, and Wang (2012),

Effects of oil shocks on stock markets

- Significantly negative impacts across the world: Jones and Kaul (1996), Nandha and Faff (2008), and Park and Ratti (2008)
- Little correlation: Huang, Masulis, and Stoll (1996)
- Need to decompose the shocks: Kilian and Park (2009)

Empirical Design without Overnight Trading

- Daytime in the U.S. is nighttime in East Asia
  - Time zone difference 12-14 hours
  - Overnight trading in US futures markets not popular until mid-2000s

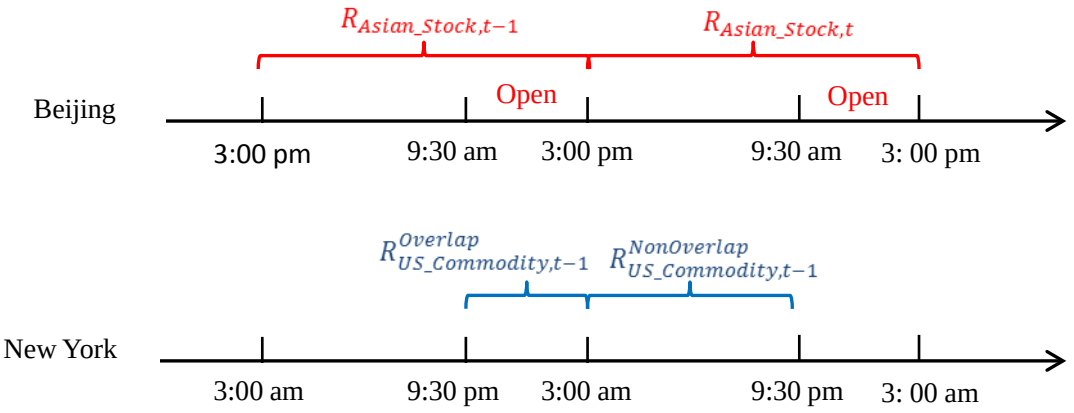


- Information flow identified by lead-lag in returns across markets
  - $R_{Asian\_Stock,t} = b_0 + b_1 R_{US\_Commodity,t-1} + b_2 R_{S\&P500,t-1} + b_3 R_{Asian\_Stock,t-1} + \varepsilon_t$
    - *We control for both lagged S&P futures return and spot return to show information in commodity futures is special*

Empirical Design with Overnight Trading

- Overnight trading in U.S. futures markets complicates analysis
  - Introduced by GLOBEX in 1994, made convenient by electronic trading systems
  - Overnight volume became heavy after mid-2000s

- Tick-by-tick data after 2005 for futures returns in overlapping and non-overlapping hours



- Info flow from lagged futures return to East Asia stock prices
  - $R_{Asian\_Stock,t} = b_0 + b_1 R^{NonOverlap}_{US\_Commodity,t-1} + b_2 R^{NonOverlap}_{S\&P500,t-1} + b_3 R_{Asian\_Stock,t-1} + \varepsilon_t$

Interpret Information Content

If East Asian stock prices react to lagged commodity futures returns, what type of information do they reveal?

Type of shocks

- Supply shocks
  - Bad news for East Asian stocks except those in supply industries
- Idiosyncratic U.S. demand shocks
  - Bad news for East Asian stocks, except those in supply industries
- Global demand shocks
  - Good news for all stocks
- Financial market shocks
  - Tend to induce positive correlations bw stock returns and futures returns, not valid for Chinese stocks due to China's capital controls

We don't isolate each type of stocks in driving commodity futures prices, but measure average stock price reactions to commodity futures returns.

- Reactions might vary over periods due to changes in composition of shocks

Data

- Daily index returns of each East Asian stock market
  - Tokyo Price Index
  - Hang Seng Index
  - Korea Composite Stock Price Index
  - Shanghai Market Index
  - Taiwan Market Index
- Daily returns for a set of industries in Tokyo, Shanghai, and Hong Kong
- Futures of copper, soybeans, crude oil, and S&P 500 Index
  - Daily returns before 2005
  - Tick-by-tick prices in Jan. 2005-Sep. 2012
- Daily spot prices of copper, soybeans, and crude oil

East Asian Market Reactions to Copper Return before 2005

$$R_{Asian\_Stock,t} = b_0 + b_1 R_{US\_Commodity,t-1} + b_2 R_{S\&P500,t-1} + b_3 R_{Asian\_Stock,t-1} + \varepsilon_t$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VAR	**Japan**		**Hong Kong**		**Taiwan**		**South Korea**		**Shanghai**	
	Panel A: Copper									
b_1	0.0119*	0.000170	0.0274**	0.00308	0.0159	0.00553	0.0162*	0.00749	0.00829	0.00653
	(1.80)	(0.03)	(2.16)	(0.26)	(1.58)	(0.55)	(1.91)	(0.88)	(0.31)	(0.24)
b_2		0.268***		0.458***		0.205***		0.181***		0.0262
		(10.08)		(14.25)		(9.89)		(7.05)		(0.78)
b_3	0.0836***	0.0615***	0.0100	-0.0127	0.0726***	0.0684***	0.0890***	0.0859***	0.0427	0.0428
	(3.69)	(3.01)	(0.41)	(-0.49)	(4.59)	(4.39)	(2.90)	(2.78)	(1.60)	(1.60)
Obs	9,999	9,976	6,980	6,979	8,770	8,748	9,849	9,830	3,092	3,091
Adj R^2	0.008	0.082	0.001	0.068	0.006	0.023	0.009	0.017	0.002	0.002

East Asian Market Reactions to Soybean Return before 2005

$$R_{Asian\_Stock,t} = b_0 + b_1 R_{US\_Commodity,t-1} + b_2 R_{S\&P500,t-1} + b_3 R_{Asian\_Stock,t-1} + \varepsilon_t$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VAR	**Japan**		**Hong Kong**		**Taiwan**		**South Korea**		**Shanghai**	
					Panel B: Soybeans					
b_1	0.00447	-0.00142	0.0293*	0.0189	0.0144	0.0110	0.00144	-0.00188	0.0340	0.0339
	(0.73)	(-0.25)	(1.93)	(1.26)	(1.48)	(1.14)	(0.14)	(-0.18)	(1.01)	(1.00)
b_2		0.266***		0.454***		0.204***		0.179***		0.0270
		(10.06)		(14.27)		(9.92)		(7.06)		(0.82)
b_3	0.0912***	0.0682***	0.0110	-0.0123	0.0718***	0.0661***	0.0909***	0.0875***	0.0434	0.0435
	(3.96)	(3.24)	(0.45)	(-0.48)	(4.54)	(4.24)	(2.98)	(2.83)	(1.63)	(1.63)
Obs	10,060	10,027	7,012	7,007	8,812	8,784	9,913	9,884	3,107	3,103
Adj R^2	0.009	0.081	0.001	0.067	0.006	0.023	0.009	0.017	0.002	0.002

East Asian Market Reactions to Crude Oil Return before 2005

$$R_{Asian\_Stock,t} = b_0 + b_1 R_{US\_Commodity,t-1} + b_2 R_{S\&P500,t-1} + b_3 R_{Asian\_Stock,t-1} + \varepsilon_t$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VAR	**Japan**		**Hong Kong**		**Taiwan**		**South Korea**		**Shanghai**	
	Panel C: Crude Oil									
b_1	-0.0268***	-0.0168**	-0.00439	0.00938	-0.0442***	-0.0361***	-0.0229**	-0.0140	0.0117	0.0132
	(-3.56)	(-2.44)	(-0.46)	(1.03)	(-3.14)	(-2.70)	(-2.09)	(-1.33)	(0.73)	(0.83)
b_2		0.372***		0.500***		0.272***		0.296***		0.0315
		(10.23)		(13.09)		(9.95)		(10.18)		(0.96)
b_3	0.0649**	0.0280	-0.0383	-0.0728**	0.0922***	0.0873***	0.0587***	0.0469**	0.0443*	0.0444*
	(2.13)	(1.07)	(-1.21)	(-2.18)	(4.69)	(4.51)	(3.04)	(2.52)	(1.66)	(1.66)
Obs	4,591	4,590	4,507	4,506	5,089	5,089	5,078	5,077	3,094	3,093
Adj R^2	0.008	0.128	0.002	0.108	0.013	0.040	0.005	0.044	0.002	0.002

East Asian Market Reactions to Copper Return in 2005-2012

- $R_{Asian\_Stock,t} = b_0 + b_1 R^{NonOverlap}_{US\_Commodity,t-1} + b_2 R^{NonOverlap}_{S\&P500,t-1} + b_3 R_{Asian\_Stock,t-1} + \varepsilon_t$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VAR	**Japan**		**Hong Kong**		**Taiwan**		**South Korea**		**Shanghai**	
					Panel A: Copper					
b_1	0.265***	0.0919***	0.280***	0.0675**	0.169***	0.0185	0.202***	0.059**	0.155***	0.083***
	(10.53)	(3.99)	(8.28)	(2.18)	(6.71)	(0.81)	(6.24)	(2.20)	(6.09)	(2.85)
b_2		0.613***		0.702***		0.505***		0.466***		0.234***
		(17.54)		(15.66)		(13.33)		(9.60)		(4.43)
b_3	0.018	0.0304	-0.052	-0.070	0.028	0.043	0.086*	0.088**	-0.0005	0.004
	(0.45)	(0.80)	(-1.09)	(-1.43)	(0.98)	(1.53)	(1.86)	(1.97)	(-0.02)	(0.15)
Obs	1,692	1,690	1,715	1,715	1,731	1,728	1,711	1,709	1,720	1,718
Adj R^2	0.123	0.377	0.095	0.323	0.057	0.243	0.069	0.196	0.023	0.044

East Asian Market Reactions to Soybean Return in 2005-2012

- $$R_{Asian\_Stock,t} = b_0 + b_1 R^{NonOverlap}_{US\_Commodity,t-1} + b_2 R^{NonOverlap}_{S\&P500,t-1} + b_3 R_{Asian\_Stock,t-1} + \varepsilon_t$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VAR	**Japan**		**Hong Kong**		**Taiwan**		**South Korea**		**Shanghai**	
					Panel B: Soybeans					
b_1	0.180***	0.0502*	0.240***	0.0832**	0.147***	0.0489**	0.157***	0.0546*	0.186***	0.134***
	(4.98)	(1.89)	(5.39)	(2.07)	(5.59)	(1.98)	(4.42)	(1.67)	(5.46)	(3.61)
b_2		0.655***		0.719***		0.504***		0.487***		0.249***
		(19.18)		(16.41)		(14.03)		(10.18)		(5.09)
b_3	0.00909	0.0285	-0.0383	-0.0666	0.0345	0.0465*	0.0941**	0.0911**	0.00944	0.0125
	(0.20)	(0.73)	(-0.78)	(-1.40)	(1.22)	(1.65)	(2.02)	(2.04)	(0.32)	(0.43)
Obs	1,688	1,688	1,714	1,714	1,727	1,727	1,707	1,707	1,716	1,716
Adj R^2	0.037	0.368	0.048	0.325	0.028	0.246	0.033	0.195	0.022	0.050

East Asian Market Reactions to Crude Oil Return in 2005-2012

- $$R_{Asian\_Stock,t} = b_0 + b_1 R^{NonOverlap}_{US\_Commodity,t-1} + b_2 R^{NonOverlap}_{S\&P500,t-1} + b_3 R_{Asian\_Stock,t-1} + \varepsilon_t$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VAR	**Japan**		**Hong Kong**		**Taiwan**		**South Korea**		**Shanghai**	
	Panel C: Crude Oil									
b_1	0.165***	0.0216	0.180***	0.00392	0.120***	0.00754	0.116***	-0.00289	0.0609**	-0.00527
	(7.47)	(1.23)	(6.72)	(0.18)	(6.03)	(0.43)	(4.64)	(-0.14)	(2.50)	(-0.20)
b_2		0.656***		0.741***		0.512***		0.504***		0.290***
		(19.34)		(16.55)		(14.22)		(10.61)		(5.56)
b_3	0.00177	0.0261	-0.0601	-0.0701	0.0191	0.0427	0.0818*	0.0887**	-0.00345	0.00492
	(0.04)	(0.67)	(-1.18)	(-1.42)	(0.68)	(1.52)	(1.76)	(1.99)	(-0.12)	(0.17)
Obs	1,692	1,690	1,715	1,715	1,731	1,728	1,711	1,709	1,720	1,718
Adj R^2	0.061	0.366	0.052	0.319	0.038	0.243	0.035	0.192	0.005	0.038

East Asian Market Reactions to Copper Return in 2005-2012, Controlling for Spot Return

$$R_{Asian\_Stock,t} = b_0 + b_1 R^{NonOverlap}_{US\_Commodity,t-1} + b_2 R_{US\_spot,t-1} + b_3 R^{NonOverlap}_{S\&P500,t-1} + b_4 R_{Asian\_Stock,t-1} + \varepsilon_t$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VAR	**Japan**		**Hong Kong**		**Taiwan**		**South Korea**		**Shanghai**	
	Panel A：Copper									
b_1		0.107***		0.0926*		0.0421		0.0470		0.126***
		(2.76)		(1.88)		(1.47)		(1.17)		(2.70)
b_2	0.0871**	0.0273	0.0641	0.0484	0.0738**	0.0408*	0.0526	0.0336	-0.00600	-0.0237
	(2.32)	(1.35)	(1.27)	(1.02)	(2.38)	(1.76)	(1.25)	(0.82)	(-0.17)	(-0.67)
b_3	0.639***	0.641***	0.691***	0.632***	0.458***	0.460***	0.459***	0.438***	0.296***	0.216***
	(17.40)	(17.26)	(15.14)	(11.75)	(11.75)	(10.02)	(8.41)	(7.46)	(6.23)	(3.47)
b_4	-0.0289	-0.0274	-0.0958	-0.0843	0.0159	0.0157	0.0581	0.0620	0.0257	0.0288
	(-0.55)	(-0.52)	(-1.41)	(-1.30)	(0.46)	(0.46)	(0.94)	(1.02)	(0.64)	(0.72)
Obs	1,028	1,023	1,052	1,052	1,071	1,071	1,055	1,055	1,047	1,047
Adj R^2	0.413	0.414	0.307	0.313	0.240	0.240	0.192	0.193	0.053	0.063

East Asian Market Reactions to Soybean Return in 2005-2012, Controlling for Spot Return

$$R_{Asian\_Stock,t} = b_0 + b_1 R^{NonOverlap}_{US\_Commodity,t-1} + b_2 R_{US\_spot,t-1} + b_3 R^{NonOverlap}_{S\&P500,t-1} + b_4 R_{Asian\_Stock,t-1} + \varepsilon_t$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VAR	**Japan**		**Hong Kong**		**Taiwan**		**South Korea**		**Shanghai**	
	Panel B: Soybeans									
b_1		0.0490*		0.0964**		0.0638**		0.0804**		0.134***
		(1.70)		(2.46)		(2.30)		(2.34)		(3.37)
b_2	0.0145	-0.00444	0.00707	-0.0293	-0.00810	-0.0316	-0.0235	-0.0527*	0.0395	-0.00999
	(0.79)	(-0.23)	(0.22)	(-0.96)	(-0.44)	(-1.54)	(-0.89)	(-1.95)	(1.29)	(-0.32)
b_3	0.669***	0.658***	0.736***	0.713***	0.508***	0.495***	0.508***	0.489***	0.273***	0.243***
	(19.81)	(19.12)	(17.03)	(16.51)	(14.34)	(13.99)	(10.61)	(10.08)	(5.79)	(4.97)
B_4	0.0217	0.0272	-0.0749	-0.0660	0.0439	0.0510*	0.0883*	0.0958**	-0.00159	0.00723
	(0.54)	(0.67)	(-1.50)	(-1.41)	(1.57)	(1.82)	(1.96)	(2.14)	(-0.05)	(0.25)
Obs	1,664	1,660	1,684	1,683	1,698	1,695	1,683	1,679	1,689	1,685
Adj R^2	0.367	0.370	0.317	0.324	0.238	0.243	0.194	0.198	0.038	0.047

East Asian Market Reactions to Crude Oil Return in 2005-2012, Controlling for Spot Return

$$R_{Asian\_Stock,t} = b_0 + b_1 R^{NonOverlap}_{US\_Commodity,t-1} + b_2 R_{US\_spot,t-1} + b_3 R^{NonOverlap}_{S\&P500,t-1} + b_4 R_{Asian\_Stock,t-1} + \varepsilon_t$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VAR	**Japan**		**Hong Kong**		**Taiwan**		**South Korea**		**Shanghai**	
	Panel C: Crude Oil									
b_1		0.00438		0.00418		-0.00826		0.0722**		0.0278
		(0.16)		(0.10)		(-0.29)		(2.00)		(0.69)
b_2	0.0196	0.0166	0.00447	0.00155	0.0109	0.0165	-0.0290	-0.0772**	-0.0123	-0.0304
	(1.33)	(0.73)	(0.20)	(0.04)	(0.71)	(0.66)	(-1.51)	(-2.31)	(-0.58)	(-0.97)
b_3	0.656***	0.655***	0.731***	0.729***	0.501***	0.504***	0.508***	0.484***	0.282***	0.273***
	(19.25)	(19.33)	(16.45)	(16.92)	(14.17)	(14.13)	(10.54)	(10.19)	(5.85)	(5.26)
B_4	0.0190	0.0197	-0.0786	-0.0778	0.0366	0.0352	0.0860*	0.0971**	-0.00323	-0.00108
	(0.48)	(0.50)	(-1.59)	(-1.56)	(1.29)	(1.24)	(1.89)	(2.10)	(-0.11)	(-0.04)
Obs	1,647	1,647	1,676	1,676	1,685	1,685	1,669	1,669	1,675	1,675
Adj R^2	0.366	0.366	0.318	0.318	0.240	0.240	0.192	0.195	0.037	0.037

Industry Reactions to Copper Return in 2005-2012

- $$R_{Asian\_Stock,t} = b_0 + b_1 R^{NonOverlap}_{US\_Commodity,t-1} + b_2 R^{NonOverlap}_{S\&P500,t-1} + b_3 R_{Asian\_Stock,t-1} + \varepsilon_t$$

	Japan		Hong Kong		Shanghai	
	Coef	**t-stat**	**Coef**	**t-stat**	**Coef**	**t-stat**
Panel A: Copper						
Supply Industries						
Diversified Metals & Mining	0.113***	(4.58)	0.119***	(3.10)	0.402***	(8.54)
Consumer Industries						
Electrical Components & Equipment	0.105***	(4.68)	0.109***	(2.82)	0.0903**	(2.49)
Consumer Electronics	0.0523**	(2.23)	0.0450	(1.18)	0.0394	(1.18)
Semiconductors	0.0758***	(3.53)	0.0797***	(2.65)	0.0696*	(1.82)
Other Unrelated Industries						
Construction Materials	0.0929***	(4.03)	0.131***	(2.63)	0.0944***	(2.72)
Steel	0.167***	(5.55)	0.0984***	(2.72)	0.0650*	(1.80)
Industrial Machinery	0.101***	(4.24)	0.0490*	(1.73)	0.0855**	(2.35)
Auto Parts & Equipment	0.101***	(4.42)	0.0843***	(3.02)	0.0773**	(2.12)
Real Estate Activities	0.0587**	(2.47)	0.0656***	(2.69)	0.0473	(1.22)
Food and Beverage	0.0554***	(3.29)	0.0835**	(2.55)	0.0811**	(2.15)
Health Care	0.0432***	(2.65)	0.0664***	(2.77)	0.0554*	(1.66)
Software and IT Services	0.0429**	(2.16)	0.0500	(1.62)	0.0545*	(1.69)

Industry Reactions to Soybean Return in 2005-2012

- $R_{Asian\_Stock,t} = b_0 + b_1 R^{NonOverlap}_{US\_Commodity,t-1} + b_2 R^{NonOverlap}_{S\&P500,t-1} + b_3 R_{Asian\_Stock,t-1} + \varepsilon_t$

	Japan		Hong Kong		Shanghai	
	Coef	**t-stat**	**Coef**	**t-stat**	**Coef**	**t-stat**
Panel B: Soybeans						
Supply Industries						
Farming	-0.0157	(-0.86)	0.0994***	(3.35)	0.217***	(3.60)
Consumer Industries						
Beverage	0.000881	(0.04)	0.0658	(1.58)	0.136***	(3.42)
Food Processing	-0.00632	(-0.35)	0.0988***	(4.24)	0.209***	(3.41)
Other Unrelated Industries						
Construction Materials	0.0389	(1.23)	0.0721	(1.23)	0.151***	(3.68)
Steel	0.0746**	(1.97)	0.0888**	(2.16)	0.138***	(3.00)
Industrial Machinery	0.0460	(1.48)	0.0661**	(2.16)	0.182***	(3.71)
Auto Parts & Equipment	0.0525*	(1.74)	0.0771***	(2.73)	0.151***	(3.26)
Real Estate Activities	0.0167	(0.54)	0.0824***	(3.30)	0.117**	(2.45)
Health Care	0.0236	(1.13)	0.0750***	(2.83)	0.153***	(3.42)
Software and IT Services	0.0259	(1.08)	0.0786***	(2.62)	0.133***	(3.19)

Industry Reactions to Crude Oil Return in 2005-2012

- $R_{Asian\_Stock,t} = b_0 + b_1 R^{NonOverlap}_{US\_Commodity,t-1} + b_2 R^{NonOverlap}_{S\&P500,t-1} + b_3 R_{Asian\_Stock,t-1} + \varepsilon_t$

	Japan		Hong Kong		Shanghai	
	Coef	**t-stat**	**Coef**	**t-stat**	**Coef**	**t-stat**
Panel C: Crude Oil						
Supply Industries						
Oil Production Related Industries	0.0709***	(4.39)	0.0669***	(3.16)	0.116***	(2.63)
Consumer Industries						
Chemicals	0.0265	(1.54)	0.0159	(0.86)	0.00506	(0.16)
Transportation	0.0114	(0.79)	0.0225	(1.07)	-0.0463	(-1.55)
Other Industries						
Construction Materials	0.0176	(1.00)	0.0525	(1.32)	-0.00263	(-0.27)
Steel	0.0632***	(2.82)	0.0506	(1.54)	-0.0214	(-0.59)
Industrial Machinery	0.0337*	(1.79)	0.0280	(1.32)	-0.0164	(-0.50)
Auto Parts & Equipment	0.0239	(1.32)	0.0248	(1.10)	-0.0466	(-1.45)
Real Estate Activities	0.0176	(0.90)	-0.0129	(-0.62)	-0.0363	(-1.10)
Food and Beverage	0.0172	(1.17)	-0.0241	(-1.09)	-0.00994	(-1.38)
Health Care	0.0100	(0.73)	0.0213	(1.14)	-0.0276	(-0.96)
Software and IT Services	0.00584	(0.36)	0.0364	(1.33)	-0.0264	(-0.94)

Summary and Discussion

- We find significant and positive reactions of East Asian stocks to lagged overnight returns of US commodity futures in recent years
  - The results are particularly strong in copper and soybeans
  - broad reactions across supply, consumer, and unrelated industries
  - Positive reactions indicate that East Asian markets on average interpret commodity price fluctuations as demand shocks
  - Prices of crude oil might be contaminated by supply shocks

- The positive price reactions by East Asian stocks make it possible for noise in futures markets to feed back to real economy.

  - Futures price increases propelled by investment flows can stimulate commodity demands, which sustain high prices in short-term

  - Protecting information environment of commodity futures markets is important.