THE IMPACT OF CRUDE OIL INVENTORY ANNOUNCEMENTS ON PRICES: EVIDENCE FROM DERIVATIVES MARKETS

Jian Yang, J. P. Morgan Endowed Chair, J.P. Morgan Center for Commodities, University of Colorado Denver

Coauthors:
Hong Miao, Sanjay Ramchander, Tianyang Wang, all from Colorado State University

MAIN FINDINGS AND CONTRIBUTIONS

- Perhaps the first study to examine the effect of crude oil inventory announcement on crude oil option prices, and the effect is more persistent than its effect on futures, but also largely driven by to the underlying changes in the futures prices.

- Significant evidence for crude oil inventory announcement impact on both oil derivative markets, even after allowance for effects of macroeconomic news announcements and other related energy storage news announcements (both of which are also significant in affecting oil futures and options!)

- No asymmetric response of futures returns to positive vs. negative inventory surprises, different from many other asymmetries observed on the oil market

- Considerable stability in the direction of the response of futures prices and options prices across various maturity but generally declining over maturities

- Oil futures and options prices respond in a manner that seem to "correctly" anticipate changes in oil inventory levels! (anticipatory trading apparently prevails)

DATA

Summary Statistics of Crude Oil Futures

The daily returns of the first six continuous crude oil futures contracts (CL1-CL6).

	Statistics	Contract					
		CL1	CL2	CL3	CL4	CL5	CL6
Observations		2146	2141	2142	2143	2142	2139
Open Interest	Mean	211130	186680	89155	59827	46565	40835
Volume	Mean	209436	109145	38695	18956	10879	8247
Return	Mean	0.05%	0.05%	0.05%	0.06%	0.06%	0.06%
	Std. Dev.	2.73%	2.39%	2.28%	2.29%	2.12%	2.06%

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Summary Statistics of Crude Oil Options - Calls

This table reports summary statistics on call options (sorted daily on relative moneyness, m=K/F, up to 2 years' maturity)

Moneyness	EXP	Obs	Days	Price	Return	σ^{imp}
DITM	1	41241	19.1	19.07	1.26%	57.9%
	2	49838	45.5	19.77	0.99%	49.3%
	3	147144	114.6	21.80	0.85%	43.9%
	4	199536	383.3	24.70	0.60%	38.1%
ITM	1	15377	19.0	5.90	1.72%	38.0%
	2	19235	45.6	7.02	0.82%	37.3%
	3	66553	116.9	8.77	1.04%	35.2%
	4	86817	361.3	11.71	0.80%	31.2%
NTM	1	13692	19.1	2.55	-0.86%	36.4%
	2	17416	45.7	3.98	-0.22%	36.3%
	3	61887	117.2	6.03	0.15%	34.8%
	4	82272	357.1	9.11	0.22%	30.9%
OTM	1	14955	19.6	0.96	-8.71%	36.9%
	2	20146	45.7	2.05	-2.05%	35.9%
	3	61653	114.5	3.92	-0.70%	34.8%
	4	73602	362.2	7.36	-0.24%	31.3%
DOTM	1	15723	22.8	0.44	-15.20%	50.9%
	2	51367	46.8	0.68	-7.35%	44.7%
	3	212729	115.3	1.40	-3.29%	41.5%
	4	316620	386.7	3.10	-0.99%	35.2%

Summary Statistics of Crude Oil Inventory Announcements (6/16/03-12/30/11)
This table reports the summary statistics on EIA crude oil inventory changes.

News	Obs	Statistics	Survey	Actual	Surprise	Std. Surp.
Panel A: Overall Sample						
All	446	Min	-7700.00	-10570.00	-9597.00	-3.16
		Max	3200.00	9390.00	9033.00	2.97
		Mean	187.62	112.34	-75.28	-0.02
		Std. Dev.	1622.85	3474.90	3040.70	1.00
Panel B: Subsamples Divided by Negative and Positive Inventory Surprises						
Negative	223	Min	-7000.00	-10570.00	-9597.00	-3.16
		Max	3200.00	2844.00	0.00	0.00
		Mean	168.99	-2284.88	-2453.87	-0.81
		Std. Dev.	1671.62	2655.69	1987.27	0.65
Positive	223	Min	-7700.00	-6453.00	11.00	0.00
		Max	3000.00	9390.00	9033.00	2.97
		Mean	206.24	2509.56	2303.31	0.76
		Std. Dev.	1576.11	2367.81	1793.80	0.59

Macroeconomic News (29) and Other Energy Storage News Variables

Name	Bloomberg Ticker	Variable Name	Count
Macroeconomic Announcements			
Budget Deficit	FDDSSD Index	FDDSSD	102
Building Permits	NHSPATOT Index	NHSPATOT	102
Business Inventories	MTIBCHNG Index	MTIBCHNG	101
Capacity Utilization	CPTICHNG Index	CPTICHNG	102
Change in Nonfarm Payrolls	NFP TCH Index	NFP	102
Chicago Purchasing Manager	CHPMINDX Index	CHPMINDX	103
Construction Spending MoM	CNSTTMOM Index	CNSTTMOM	101
Consumer Confidence Index	CONCCONF Index	CONCCONF	103
Consumer Credit	CICRTOT Index	CICRTOT	101
Consumer Price Index	CPI YOY Index	CPI	103
Durable Goods Orders	DGNOCHNG Index	DGNOCHNG	102
Existing Home Sales	ETSLTOTL Index	ETSLTOTL	82
FOMC Rate Decision (Upper Bound)	FDTR Index	FDTR	69
Factory Orders	TMNOCHNG Index	TMNOCHNG	101
GDP	GDP PIQQ Index	GDP	103
Housing Starts	NHSPSTOT Index	NHSPSTOT	102
ISM Manufacturing	NAPMPMI Index	NAPMPMI	102
ISM Prices Paid	NAPMPRIC Index	NAPMPRIC	102
Import Price Index MoM	IMP1CHNG Index	IMP1CHNG	102
Industrial Production MoM	IP CHNG Index	IP	102
Initial Jobless Claims	INJCJC Index	INJCJC	446
Leading Index	LEI CHNG Index	LEI	102
New Home Sales	NHSLTOT Index	NHSLTOT	102
Personal Income	PITLCHNG Index	PITLCHNG	102
Producer Price Index	PPI CHNG Index	PPI	102
Retail Sales Advance MoM	RSTAMOM Index	RSTAMOM	102
Trade Balance	USTBTOT Index	USTBTOT	101
U. of Mich. Sentiment	CONSSENT Index	CONSSENT	103
Unemployment Rate	USURTOT Index	USURTOT	102
Announcements from the EIA Petroleum Report			
Natural Gas Inventory Change	DOENUSCH Index	DOENUSCH	446
Gasoline Inventory Change	DOEASMGS INDEX	DOEASMGS	415
Distillate Fuel Oil Inventory Change	DOESDIST INDEX	DOESDIST	442

# Daily Crude Oil Futures Returns and Volume around EIA Oil Announcements

Contract	Positive Shocks					Negative Shocks				
	-2	-1	0	+1	+2	-2	-1	0	+1	+2
Panel A: Returns										
CL1	0.21	-0.48	-0.17	0.19	0.14	-0.43	0.14	0.56	0.09	0.18
CL2	0.14	-0.33	-0.21	0.21	0.14	-0.44	0.10	0.51	0.12	0.19
CL3	0.14	-0.30	-0.16	0.21	0.12	-0.40	0.08	0.48	0.10	0.20
CL4	0.14	-0.37	-0.02	0.21	0.11	-0.38	0.07	0.44	0.09	0.19
CL5	0.14	-0.25	-0.10	0.21	0.10	-0.35	0.05	0.42	0.08	0.18
CL6	0.14	-0.23	-0.10	0.23	0.09	-0.33	0.03	0.42	0.08	0.16
Panel B: Volume										
CL1	189.97	192.16	216.15	218.98	214.80	205.65	205.84	223.22	226.44	205.73
CL2	99.59	105.16	105.17	113.43	109.24	104.82	109.64	115.54	120.33	111.13
CL3	34.64	35.25	37.39	41.25	39.76	37.38	37.96	40.85	43.74	40.24
CL4	17.28	17.57	19.16	21.33	20.47	17.66	16.97	19.06	20.49	20.54
CL5	9.28	9.17	10.39	11.33	10.41	11.19	10.82	11.94	12.62	12.05
CL6	7.43	7.24	7.56	7.91	8.07	8.49	8.08	9.19	9.55	9.49

Futures Cumulative Returns around EIA Oil Announcements (-2, +2 days)
The (◦) line – overall, the (ˣ) - positive surprises, the (Δ) line - negative surprises
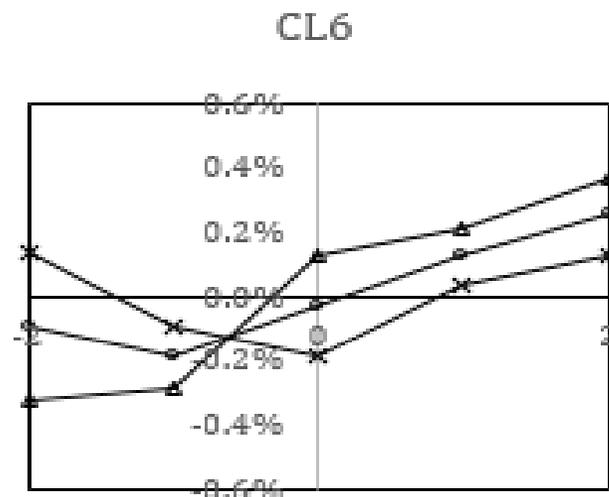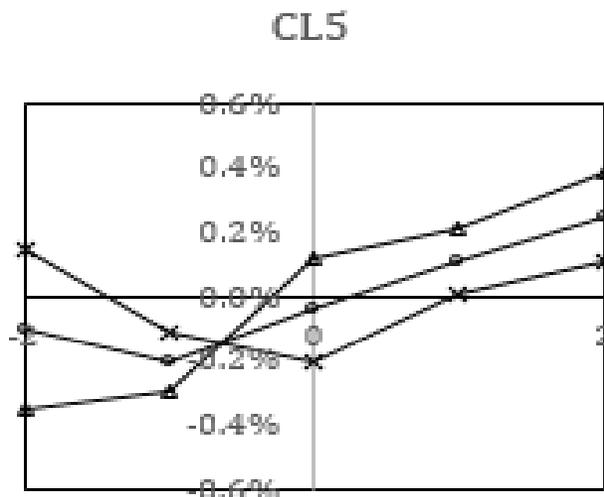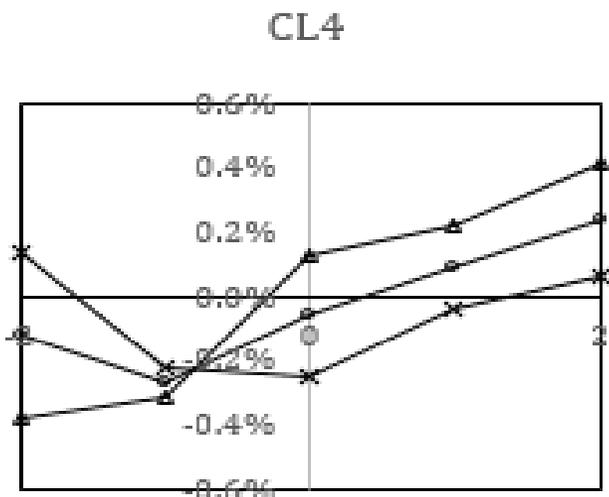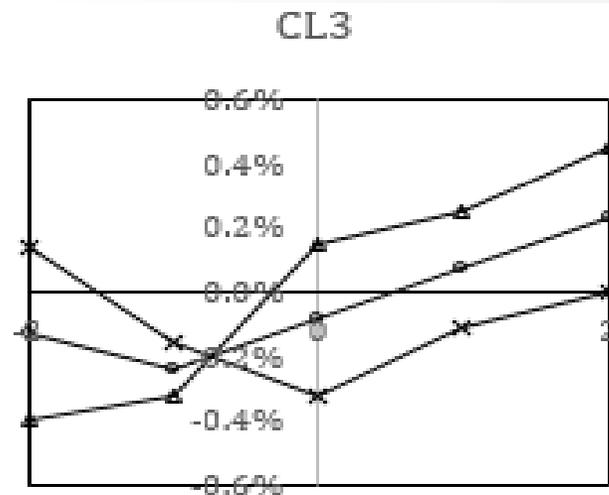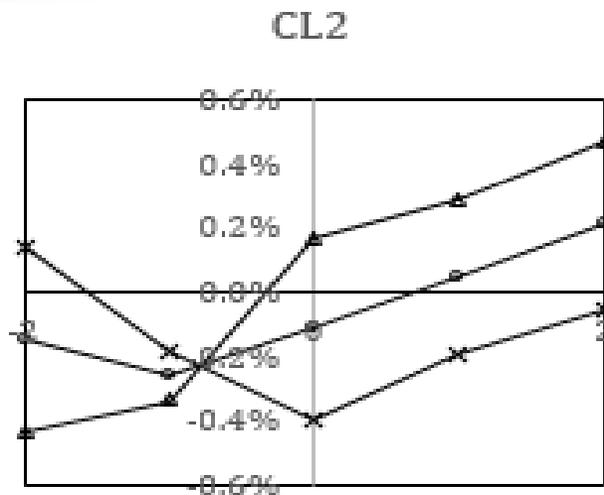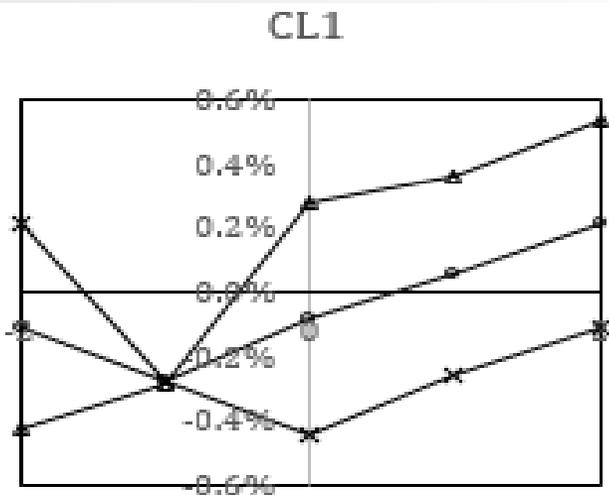
Call Option Returns Surrounding Oil Inventory Announcement

Moneyness	EXP	Positive Shocks					Negative Shocks				
		-2	-1	0	+1	+2	-2	-1	0	+1	+2
DITM	1	2.24	-0.93	-1.23	1.61	1.53	-0.23	0.87	3.26	2.60	3.28
	2	0.93	-1.08	-0.11	1.52	1.02	-0.07	1.37	3.30	2.12	1.49
	3	1.35	-0.83	0.04	1.22	1.03	-0.24	0.49	2.28	1.44	1.66
	4	0.96	-0.34	0.16	0.80	0.63	0.05	0.48	1.64	0.60	1.00
ITM	1	3.29	-2.64	-2.00	2.14	2.29	-2.36	1.14	6.34	5.01	4.15
	2	1.45	-2.15	-1.21	1.56	1.30	-2.03	1.70	5.08	2.26	0.86
	3	1.79	-0.90	-0.40	1.85	1.32	-0.72	1.19	3.15	1.72	1.29
	4	1.50	-0.37	0.18	1.45	0.87	-0.10	0.84	1.89	0.73	0.90
NTM	1	0.66	-6.23	-5.74	0.01	1.11	-9.08	-1.52	6.18	3.50	2.56
	2	0.38	-3.53	-2.66	1.14	0.46	-4.68	0.94	5.44	1.13	0.10
	3	0.79	-1.94	-1.20	1.03	0.38	-2.14	0.63	2.75	0.83	0.19
	4	0.75	-0.85	-0.18	0.83	0.33	-1.09	0.24	1.62	0.18	0.22
OTM	1	-8.20	-14.65	-14.45	-6.68	-4.48	-21.61	-7.74	-0.91	-4.45	-2.72
	2	-1.60	-5.54	-5.16	-0.05	-1.06	-7.88	-0.05	4.63	-0.88	-1.88
	3	0.24	-2.61	-2.17	0.17	-0.82	-3.68	0.09	2.35	-0.46	-0.39
	4	0.29	-1.04	-0.73	0.35	-0.41	-1.85	0.21	1.25	-0.58	-0.11
DOTM	1	-15.85	-21.36	-20.48	-10.84	-14.44	-32.93	-5.75	-7.20	-17.59	-5.54
	2	-9.55	-9.60	-11.50	-4.75	-7.78	-15.71	-2.88	0.57	-6.07	-4.26
	3	-3.48	-4.67	-5.13	-2.12	-4.32	-8.27	-0.46	0.55	-3.12	-2.34
	4	-0.76	-1.59	-1.45	0.24	-2.06	-3.63	0.30	0.96	-1.59	-0.56

INVENTORY & MACRO NEWS AFFECT OIL FUTURES PRICES

- The crude oil inventory announcement effect on oil futures prices remains equally significant, after allowance for control for the possible influence of macroeconomic and other energy inventory news releases.

- Extending Kilian and Vega (2011) also using daily return, 11 out of 29 macro news variables and 2 out of the three related energy inventory news in this study are found to have some (significant at least at the 10% level) influence on the daily returns of crude oil futures, with particularly strong effect (even at 1%) of the following 7 news items: Initial Jobless Claims, ISM Manufacturing (not included in KV) , ISM Prices Paid (not included), Durable Goods Orders, Factory Orders, Construction Spending MoM (not included), plus Gasoline Inventory Change.

- The importance of Gasoline (and to a lesser extent distillate fuel oil) inventory news but not other energy storage news is in line with the intraday evidence of Wolfe, Kurov, & Kucher (2014) based on the event window from 5 minutes before to 10 minutes after the announcement time (e.g., recent decoupling between natural gas and crude oil)

Futures Market Regressions with Additional Factors

	CL1	CL2	CL3	CL4	CL5	CL6
α	0.087	0.084	0.083*	0.078	0.077*	0.075*
	[1.48]	[1.61]	[1.65]	[1.58]	[1.65]	[1.69]
R_{t-1}	-.102***	-.081***	-.081***	-.070***	-.072***	-.063***
	[-4.94]	[-3.93]	[-3.92]	[-3.48]	[-3.47]	[-3.00]
R_{t-2}	-.072***	-0.024	-0.021	-0.021	-0.008	-0.005
	[-3.44]	[-1.13]	[-1.00]	[-1.00]	[-0.36]	[-0.21]
R_{t-3}	0.045**	0.035*	0.044**	0.027	0.049**	0.049**
	[2.26]	[1.65]	[2.08]	[1.49]	[2.32]	[2.30]
SSI_t	-.542***	-.516***	-.472***	-.408***	-.372***	-.377***
	[-4.31]	[-4.66]	[-4.45]	[-3.90]	[-3.79]	[-3.94]
INJCJC	-.391***	-.288***	-.280***	-.345***	-.325***	-.318***
	[-3.11]	[-2.62]	[-2.71]	[-3.42]	[-3.42]	[-3.39]
CPI	-0.162	-.381*	-0.330	-0.205	-0.253	-0.267
	[-0.61]	[-1.79]	[-1.51]	[-0.93]	[-1.24]	[-1.38]
NAPMPMI	-.420*	-.570***	-.655***	-.597***	-.604***	-.505**
	[-1.85]	[-2.71]	[-3.20]	[-2.90]	[-2.99]	[-2.57]
NAPMPRIC	0.651***	0.633***	0.656***	0.677***	0.722***	0.693***
	[3.19]	[3.40]	[3.62]	[3.63]	[3.93]	[3.86]
IMP1CHNG	-0.401	-.391*	-.479**	-.431**	-0.304	-.386*
	[-1.52]	[-1.71]	[-2.14]	[-1.96]	[-1.45]	[-1.95]
CPTICHNG	0.629*	0.668*	0.677**	0.492	0.582*	0.619**
	[1.65]	[1.79]	[2.06]	[1.42]	[1.82]	[2.03]
DOEASMGS	-.289**	-.313***	-.306***	-.310***	-.302***	-.310***
	[-2.19]	[-2.72]	[-2.79]	[-2.88]	[-2.99]	[-3.14]
DOESDIST	-.210*	-.214*	-.230**	-.225**	-.205**	-.193**
	[-1.67]	[-1.95]	[-2.15]	[-2.18]	[-2.14]	[-2.05]
LEI	-0.339	-.462**	-.408*	-.425**	-.458**	-.426**
	[-1.28]	[-2.10]	[-1.92]	[-1.98]	[-2.23]	[-2.15]
DGNOCHNG	-.515**	-.481**	-.501***	-.482**	-.552***	-.422**
	[-2.10]	[-2.37]	[-2.59]	[-2.56]	[-3.20]	[-2.45]
CNSTTMOM	0.464**	0.443**	0.504***	0.479**	0.572***	0.486***
	[2.05]	[2.18]	[2.73]	[2.53]	[3.27]	[2.75]
TMNOCHNG	-0.370	-.484**	-.510***	-.569***	-.542***	-.512***
	[-1.61]	[-2.42]	[-2.74]	[-3.29]	[-3.04]	[-2.85]
ETSLTOTL	0.379	0.492*	0.469*	0.502*	0.453*	0.443*
	[1.38]	[1.84]	[1.80]	[1.91]	[1.82]	[1.84]
Adj-R^2	0.039	0.040	0.045	0.041	0.048	0.043

INVENTORY ANNOUNCEMENT EFFECT ON OIL FUTURES: SYMMETRY, PERSISTENCE AND ANTICIPATION

- No evidence of asymmetry in the relationship between inventory shocks and oil futures returns: oil futures prices significantly respond to both positive and negative inventory shocks and with equal magnitude.

- Different from many asymmetries observed on oil market response (e.g., asymmetric response to OPEC announcements)
  - Schmidbauer and Rösch (2012) found that only OPEC production increase does not affect WTI daily spot price volatility
  - Wang, Wu and Yang (2008) found that only OPEC production increase affects WTI futures (weekly average of daily realized) volatility

- No persistence of the impact of inventory news announcements on the futures price beyond the announcement day.

INVENTORY ANNOUNCEMENT EFFECT ON OIL FUTURES: SYMMETRY, PERSISTENCE AND ANTICIPATION (CONT.)

- Oil futures market seems to anticipate the inventory surprises correctly one day before the announcement day, but not two days before (actually with significantly wrong guess, as it is highly significant but with the opposite/wrong sign) , in line with the findings regarding OPEC announcement effect on volatility (e.g., Horan, Peterson, and Mahar, 2004; Schmidbauer and Rösch, 2012; Wang, Wu and Yang, 2008), which nevertheless arguably could have a possible venue for informational leakage.

- Similar evidence is now also reported on natural gas inventory announcement. More research is much needed to understand the issue in more depth.

Futures Response Regressions with Lag and Lead Inventory Surprises

Panel B: $R_t = \alpha + \sum_{i=1}^{3} \beta_i R_{t-i} + \sum_{j=-2}^{2} \gamma_j SSI_{t-j} + \sum_{k=1}^{32} \theta_k SSM_{kt} + \varepsilon_t.$

	CL1	CL2	CL3	CL4	CL5	CL6
α	0.088	0.080	0.082*	0.079	0.080*	0.079*
	[1.50]	[1.53]	[1.65]	[1.62]	[1.72]	[1.79]
R_{t-1}	-.108***	-.078***	-.080***	-.073***	-.068***	-.064***
	[-5.24]	[-3.77]	[-3.91]	[-3.59]	[-3.24]	[-3.08]
R_{t-2}	-.067***	-0.013	-0.013	-0.018	-0.006	0.003
	[-3.19]	[-0.59]	[-0.62]	[-0.84]	[-0.26]	[0.16]
R_{t-3}	0.047**	0.040*	0.047**	0.03	0.046**	0.049**
	[2.43]	[1.94]	[2.29]	[1.59]	[2.22]	[2.37]
SSI_{t-2}	-0.055	-0.017	-0.033	-0.055	-0.003	-0.027
	[-0.42]	[-0.15]	[-0.31]	[-0.53]	[-0.03]	[-0.28]
SSI_{t-1}	-0.07	-0.03	-0.038	-0.004	0.031	0.046
	[-0.56]	[-0.26]	[-0.35]	[-0.04]	[0.30]	[0.47]
SSI_t	-.535***	-.517***	-.475***	-.413***	-.384***	-.383***
	[-4.33]	[-4.73]	[-4.49]	[-3.99]	[-3.91]	[-4.03]
SSI_{t+1}	-.236*	-.253**	-.267***	-.268***	-.236**	-.221**
	[-1.95]	[-2.33]	[-2.64]	[-2.68]	[-2.48]	[-2.40]
SSI_{t+2}	0.307***	0.259**	0.258***	0.248***	0.230**	0.215**
	[2.63]	[2.52]	[2.66]	[2.59]	[2.49]	[2.42]
Adj-R^2	0.046	0.045	0.051	0.042	0.053	0.048

INVENTORY ANNOUNCEMENT EFFECT ON OIL OPTIONS: SYMMETRY, PERSISTENCE AND ANTICIPATORY TRADE

- The crude oil inventory announcement affects oil (futures) option price, even after allowance for the set of macroeconomic and other energy inventory news (but the impact of the latter seems to be less significant) .

- The effects of inventory surprises on OTM and NTM call options are relatively larger than for ITM and DITM options, and the effects on near-term call options are more pronounced than corresponding calls with longer maturity. Less clear-cut for put.

- The pre-announcement (i.e., Day -1) prices for both calls and puts also move in a manner that seems to anticipate the impact of the impending inventory surprise.

- In contrast to futures contracts, there is some evidence of return persistence to the announcement in the options market beyond the announcement day (2 days after).

- The observed response of both call and especially put options may be much attributed to the underlying influence of movements in the futures prices.

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Call Option Market Regression with Lag and Lead Inventory Surprises

	Expiration									
	1					2				
	DITM	ITM	NTM	OTM	DOTM	DITM	ITM	NTM	OTM	DOTM
α	1.409***	2.011***	-.891***	-9.83***	-16.2***	1.175***	1.071***	-0.015	-1.92***	-6.65***
	[24.96]	[10.79]	[-3.04]	[-27.4]	[-44.4]	[25.65]	[8.91]	[-0.10]	[-10.7]	[-51.7]
R_{t-1}	-.041***	-.043***	-.055***	-.054***	-.091***	-.050***	-.035***	-.028***	-.016**	-.023***
	[-8.63]	[-5.42]	[-6.42]	[-6.40]	[-11.3]	[-11.2]	[-4.89]	[-3.72]	[-2.24]	[-5.23]
R_{t-2}	-.012**	-.037***	-.050***	-.057***	-.025***	-.015***	-.023***	-.028***	-.023***	0.008*
	[-2.53]	[-4.58]	[-5.64]	[-6.54]	[-3.05]	[-3.23]	[-3.16]	[-3.65]	[-3.19]	[1.70]
R_{t-3}	-.058***	-.058***	-.077***	-.089***	-.019**	-.045***	-.043***	-.043***	-.034***	0.010**
	[-12.4]	[-7.26]	[-8.64]	[-9.91]	[-2.17]	[-10.4]	[-6.05]	[-5.73]	[-4.80]	[2.39]
SSI_{t-2}	-1.66***	-2.21***	-2.84***	-3.85***	-7.47***	-.720***	-0.348	-0.494	-0.125	-1.97***
	[-13.7]	[-5.28]	[-4.29]	[-5.05]	[-11.0]	[-7.01]	[-1.32]	[-1.40]	[-0.31]	[-7.26]
SSI_{t-1}	-.470***	-1.70***	-2.38***	-2.49***	-0.546	-.306***	-0.384	-0.198	0.141	0.358
	[-4.14]	[-4.36]	[-3.86]	[-3.46]	[-0.81]	[-3.09]	[-1.46]	[-0.56]	[0.35]	[1.26]
SSI_t	-1.99***	-4.13***	-5.89***	-6.34***	-6.18***	-1.82***	-3.46***	-4.52***	-5.19***	-5.12***
	[-17.5]	[-10.9]	[-9.88]	[-9.11]	[-9.86]	[-18.1]	[-13.0]	[-12.8]	[-13.1]	[-19.1]
SSI_{t+1}	-.820***	-1.87***	-2.08***	-2.26***	-3.98***	-1.16***	-2.08***	-2.52***	-3.03***	-3.57***
	[-7.13]	[-4.76]	[-3.40]	[-3.19]	[-6.15]	[-12.7]	[-8.41]	[-7.63]	[-8.23]	[-14.3]
SSI_{t+2}	1.541***	3.710***	5.886***	7.368***	6.739***	0.753***	2.004***	2.648***	3.196***	2.694***
	[13.55]	[9.39]	[9.54]	[10.21]	[10.50]	[8.56]	[8.52]	[8.47]	[9.12]	[11.28]
Adj-R^2	0.076	0.065	0.065	0.065	0.087	0.057	0.052	0.05	0.046	0.062

Call Option Market Regression with Lag and Lead Inventory Surprises(contd.)

	Expiration									
	3					4				
	DITM	ITM	NTM	OTM	DOTM	DITM	ITM	NTM	OTM	DOTM
α	0.929***	1.141***	0.264***	-.529***	-2.68***	0.637***	0.840***	0.295***	-.115***	-.659***
	[43.89]	[25.16]	[4.90]	[-8.43]	[-64.6]	[48.94]	[32.09]	[10.13]	[-3.42]	[-30.3]
R_{t-1}	-.035***	-.032***	-.035***	-.010**	0.018***	-.025***	-.035***	-.058***	-.043***	-.015***
	[-13.6]	[-8.26]	[-8.84]	[-2.45]	[8.49]	[-11.5]	[-10.5]	[-16.8]	[-11.8]	[-8.55]
R_{t-2}	-.008***	-0.001	-.008*	0.006	0.037***	0.021***	0.019***	0.009**	0.039***	0.069***
	[-3.18]	[-0.17]	[-1.94]	[1.47]	[16.75]	[9.58]	[5.58]	[2.48]	[10.38]	[38.75]
R_{t-3}	-.033***	-.028***	-.025***	-0.003	0.022***	-.006***	-0.003	-0.005	0.023***	0.027***
	[-13.0]	[-7.34]	[-6.11]	[-0.82]	[9.87]	[-2.91]	[-0.85]	[-1.41]	[6.28]	[14.94]
SSI_{t-2}	-.615***	-.200**	-0.068	-0.22	-1.19***	-.262***	0.019	0.055	0.012	-.518***
	[-13.4]	[-2.03]	[-0.57]	[-1.59]	[-13.6]	[-9.17]	[0.34]	[0.86]	[0.17]	[-11.2]
SSI_{t-1}	-.382***	-.377***	-.459***	-.267*	-.173*	0.099***	0.259***	0.062	0.260***	0.467***
	[-8.83]	[-3.87]	[-3.99]	[-1.95]	[-1.94]	[3.59]	[4.56]	[0.98]	[3.57]	[9.84]
SSI_t	-1.28***	-2.10***	-2.28***	-2.77***	-3.09***	-.874***	-1.29***	-1.27***	-1.30***	-1.34***
	[-28.6]	[-21.3]	[-19.6]	[-20.3]	[-35.4]	[-31.7]	[-22.6]	[-20.2]	[-18.1]	[-29.2]
SSI_{t+1}	-.630***	-1.11***	-1.38***	-1.56***	-2.34***	-.519***	-.824***	-.819***	-1.02***	-1.24***
	[-14.3]	[-11.5]	[-12.0]	[-11.6]	[-27.5]	[-19.0]	[-14.7]	[-13.1]	[-14.4]	[-27.4]
SSI_{t+2}	0.950***	1.413***	1.562***	1.864***	1.907***	0.401***	0.803***	0.928***	0.872***	1.155***
	[22.42]	[14.89]	[13.81]	[14.03]	[22.47]	[15.07]	[14.60]	[14.80]	[12.38]	[25.72]
Adj-R^2	0.060	0.046	0.042	0.044	0.060	0.048	0.040	0.040	0.047	0.060

Thank you!