Table C.22: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	0.952	0.3296	0.1614	0.688
$OI \nRightarrow h_{Wheat\ 1}$	0.0525	0.8189	7.4658	0.0064***
$OI \nRightarrow h_{Wheat\ 2}$	0.0911	0.7629	5.3703	0.0207**
$OI \nRightarrow h_{Wheat\ 3}$	0.3573	0.5503	4.0102	0.0456**
$OI \nRightarrow h_{Wheat\ 4}$	0.1912	0.6621	2.1772	0.1405
$h_{S\&P500} \nRightarrow OI$	0.2511	0.6165	1.0504	0.3057
$h_{Wheat\ 1} \nRightarrow OI$	0.1043	0.7468	0.1124	0.7375
$h_{Wheat\ 2} \nRightarrow OI$	0.1039	0.7473	0.0746	0.7848
$h_{Wheat\ 3} \nRightarrow OI$	0.0021	0.9636	0.0198	0.888
$h_{Wheat\ 4} \nRightarrow OI$	8e-04	0.9776	0.0606	0.8057

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

[*] $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.23: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	0.3736	0.5413	0.0184	0.8921
$OI \nRightarrow h_{KC\ Wheat\ 1}$	0.0788	0.7791	3.1162	0.0779*
$OI \nRightarrow h_{KC\ Wheat\ 2}$	1.7841	0.1822	3.3738	0.0666*
$OI \nRightarrow h_{KC\ Wheat\ 3}$	2.3984	0.122	3.1167	0.0779*
$OI \nRightarrow h_{KC\ Wheat\ 4}$	4.0417	0.0449**	2.3293	0.1273
$h_{S\&P500} \nRightarrow OI$	0.3248	0.569	0.0759	0.7831
$h_{KC\ Wheat\ 1} \nRightarrow OI$	1.2452	0.2649	0.2053	0.6506
$h_{KC\ Wheat\ 2} \nRightarrow OI$	0.7483	0.3874	0.3625	0.5473
$h_{KC\ Wheat\ 3} \nRightarrow OI$	0.57	0.4506	0.2586	0.6112
$h_{KC\ Wheat\ 4} \nRightarrow OI$	0.2813	0.5961	0.2126	0.6449

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

* $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.24: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	2.4562	0.1176	1.5696	0.2106
$OI \nRightarrow h_{Corn\ 1}$	0.0098	0.9211	0.1647	0.685
$OI \nRightarrow h_{Corn\ 2}$	0.026	0.8718	0.4045	0.5249
$OI \nRightarrow h_{Corn\ 3}$	0.3554	0.5513	0.995	0.3188
$OI \nRightarrow h_{Corn\ 4}$	0.7293	0.3935	0.0103	0.9192
$h_{S\&P500} \nRightarrow OI$	0.576	0.4482	0.04	0.8416
$h_{Corn\ 1} \nRightarrow OI$	1e-04	0.9919	1.0215	0.3125
$h_{Corn\ 2} \nRightarrow OI$	0.039	0.8436	1.2701	0.2601
$h_{Corn\ 3} \nRightarrow OI$	0.0065	0.9356	1.1206	0.2901
$h_{Corn\ 4} \nRightarrow OI$	0.3576	0.5501	1.3215	0.2507

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

[*] $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.25: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	2.2067	0.138	0.9554	0.3286
$OI \nRightarrow h_{Soybean\ 1}$	4.5714	0.0329**	0.4233	0.5155
$OI \nRightarrow h_{Soybean\ 2}$	3.0447	0.0815*	0.3907	0.5321
$OI \nRightarrow h_{Soybean\ 3}$	1.7153	0.1908	0.1895	0.6635
$OI \nRightarrow h_{Soybean\ 4}$	1.2625	0.2617	0.1107	0.7395
$h_{S\&P500} \nRightarrow OI$	0.6247	0.4296	0.862	0.3534
$h_{Soybean\ 1} \nRightarrow OI$	4.1923	0.0411**	0.0014	0.9702
$h_{Soybean\ 2} \nRightarrow OI$	0.0189	0.8907	0.105	0.746
$h_{Soybean\ 3} \nRightarrow OI$	1.9137	0.1671	0.0729	0.7872
$h_{Soybean\ 4} \nRightarrow OI$	0.3187	0.5726	0.1442	0.7043

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

* $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.26: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	0.9213	0.3375	0.7435	0.3888
$OI \nRightarrow h_{Soybean\ oil\ 1}$	5.2408	0.0224**	0.4153	0.5195
$OI \nRightarrow h_{Soybean\ oil\ 2}$	9.6199	0.002***	0.3493	0.5547
$OI \nRightarrow h_{Soybean\ oil\ 3}$	15.3022	1e-04***	0.1907	0.6625
$OI \nRightarrow h_{Soybean\ oil\ 4}$	17.0198	0***	0.0951	0.7579
$h_{S\&P500} \nRightarrow OI$	0.08	0.7775	1.066	0.3021
$h_{Soybean\ oil\ 1} \nRightarrow OI$	0.399	0.5279	0.0116	0.9142
$h_{Soybean\ oil\ 2} \nRightarrow OI$	0.356	0.551	0.0685	0.7936
$h_{Soybean\ oil\ 3} \nRightarrow OI$	0.222	0.6377	0.0687	0.7933
$h_{Soybean\ oil\ 4} \nRightarrow OI$	0.3741	0.541	0.0218	0.8827

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

[*] $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.27: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	0.2887	0.5913	0.1042	0.7469
$OI \nRightarrow h_{Oats\ 1}$	1.3283	0.2496	17.6011	0***
$OI \nRightarrow h_{Oats\ 2}$	1.1429	0.2855	11.7368	6e-04***
$OI \nRightarrow h_{Oats\ 3}$	0.8783	0.3491	12.8425	4e-04***
$h_{S\&P500} \nRightarrow OI$	5e-04	0.9816	0.2252	0.6352
$h_{Oats\ 1} \nRightarrow OI$	0.1472	0.7014	0.6503	0.4202
$h_{Oats\ 2} \nRightarrow OI$	0.8846	0.3474	2.4182	0.1203
$h_{Oats\ 3} \nRightarrow OI$	1.3758	0.2413	1.0666	0.302

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

* $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.28: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{SP500}$	0.433	0.5108	0.7982	0.3719
$OI \nRightarrow h_{MPLS\ Wheat\ 1}$	1.5237	0.2177	1.2992	0.2547
$OI \nRightarrow h_{MPLS\ Wheat\ 2}$	1.8491	0.1746	1.0832	0.2983
$OI \nRightarrow h_{MPLS\ Wheat\ 3}$	0.716	0.3979	0.8397	0.3598
$OI \nRightarrow h_{MPLS\ Wheat\ 4}$	1.2602	0.2622	2.2819	0.1313
$h_{SP500} \nRightarrow OI$	0.0076	0.9304	0.1263	0.7224
$h_{MPLS\ Wheat\ 1} \nRightarrow OI$	1.1131	0.292	0.5838	0.4451
$h_{MPLS\ Wheat\ 2} \nRightarrow OI$	1.2754	0.2593	0.1404	0.708
$h_{MPLS\ Wheat\ 3} \nRightarrow OI$	1.3173	0.2517	0.5078	0.4763
$h_{MPLS\ Wheat\ 4} \nRightarrow OI$	0.3829	0.5364	0.5225	0.47

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

[*] $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.29: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	1.4838	0.2237	0.394	0.5304
$OI \nRightarrow h_{Soybean\ meal\ 1}$	11.7353	7e-04***	1.426	0.2328
$OI \nRightarrow h_{Soybean\ meal\ 2}$	14.4519	2e-04***	2.7373	0.0984*
$OI \nRightarrow h_{Soybean\ meal\ 3}$	10.1701	0.0015***	2.0962	0.148
$OI \nRightarrow h_{Soybean\ meal\ 4}$	6.3841	0.0118**	3.0246	0.0824*
$h_{S\&P500} \nRightarrow OI$	0.325	0.5688	1.0296	0.3106
$h_{Soybean\ meal\ 1} \nRightarrow OI$	1.0726	0.3008	1e-04	0.9918
$h_{Soybean\ meal\ 2} \nRightarrow OI$	3.807	0.0515*	0.1847	0.6675
$h_{Soybean\ meal\ 3} \nRightarrow OI$	3.0927	0.0792*	0.15	0.6987
$h_{Soybean\ meal\ 4} \nRightarrow OI$	2.0841	0.1494	0.1329	0.7155

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

* $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.30: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \not\Rightarrow h_{SP500}$	2.3679	0.1245	1.2272	0.2683
$OI \not\Rightarrow h_{Rough\ rice\ 1}$	0.2124	0.6451	0.0051	0.9433
$OI \not\Rightarrow h_{Rough\ rice\ 2}$	8.7537	0.0032***	0.9045	0.3419
$OI \not\Rightarrow h_{Rough\ rice\ 3}$	4.663	0.0313**	0.1035	0.7477
$h_{SP500} \not\Rightarrow OI$	0.0844	0.7716	0.0353	0.8511
$h_{Rough\ rice\ 1} \not\Rightarrow OI$	0.1239	0.7249	0.0846	0.7712
$h_{Rough\ rice\ 2} \not\Rightarrow OI$	0.411	0.5217	1.2572	0.2625
$h_{Rough\ rice\ 3} \not\Rightarrow OI$	0.2245	0.6359	3.6329	0.057*

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

[*] $\not\Rightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.31: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	1.0932	0.2962	1.0804	0.2989
$OI \nRightarrow h_{Coffee\ 1}$	0.9603	0.3275	0.9008	0.3428
$OI \nRightarrow h_{Coffee\ 2}$	1.2353	0.2668	0.9127	0.3397
$OI \nRightarrow h_{Coffee\ 3}$	0.8542	0.3558	0.8116	0.3679
$OI \nRightarrow h_{Coffee\ 4}$	0.7041	0.4018	0.6121	0.4342
$h_{S\&P500} \nRightarrow OI$	2.5862	0.1084	0.0146	0.9038
$h_{Coffee\ 1} \nRightarrow OI$	0.108	0.7425	0.4942	0.4823
$h_{Coffee\ 2} \nRightarrow OI$	0.1518	0.697	0.6242	0.4297
$h_{Coffee\ 3} \nRightarrow OI$	0.7746	0.3792	0.7679	0.3811
$h_{Coffee\ 4} \nRightarrow OI$	0.7071	0.4008	0.6658	0.4148

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. *h* and *OI* represent conditional volatility and open interest respectively.

[*] $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.32: Granger causality test between conditional volatility and open interest

| | Pre-financialisation | | Financialisation | |
Null Hypothesis	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	1.2469	0.2646	0.5585	0.4551
$OI \nRightarrow h_{Sugar\ 1}$	2.6045	0.1071	6.9653	0.0085***
$OI \nRightarrow h_{Sugar\ 3}$	0.1485	0.7001	6.1301	0.0135**
$OI \nRightarrow h_{Sugar\ 4}$	0.1425	0.7059	7.216	0.0074***
$h_{S\&P500} \nRightarrow OI$	0.2008	0.6543	0.1372	0.7112
$h_{Sugar\ 1} \nRightarrow OI$	0.2529	0.6152	0.187	0.6656
$h_{Sugar\ 3} \nRightarrow OI$	0.4412	0.5068	0.0238	0.8774
$h_{Sugar\ 4} \nRightarrow OI$	0.0015	0.9692	0.5785	0.4471

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

[*] $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.33: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \not\Rightarrow h_{S\&P500}$	0.5891	0.4431	4.1681	0.0415**
$OI \not\Rightarrow h_{Cocoa\ 1}$	1.3733	0.2417	12.1902	5e-04***
$OI \not\Rightarrow h_{Cocoa\ 2}$	1.4307	0.2322	5.5113	0.0191**
$OI \not\Rightarrow h_{Cocoa\ 3}$	2.0001	0.1578	4.3951	0.0363**
$OI \not\Rightarrow h_{Cocoa\ 4}$	2.3657	0.1246	7.6871	0.0057***
$h_{S\&P500} \not\Rightarrow OI$	1.512	0.2193	0.6542	0.4188
$h_{Cocoa\ 1} \not\Rightarrow OI$	0	0.998	0.4622	0.4968
$h_{Cocoa\ 2} \not\Rightarrow OI$	0.0177	0.8941	0.0329	0.8561
$h_{Cocoa\ 3} \not\Rightarrow OI$	0.0694	0.7924	0.065	0.7988
$h_{Cocoa\ 4} \not\Rightarrow OI$	0.2145	0.6434	0.0631	0.8017

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

[*] $\not\Rightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.34: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	3.0042	0.0836*	1.0473	0.3064
$OI \nRightarrow h_{Cotton\ 1}$	0.0826	0.774	1.04	0.3081
$OI \nRightarrow h_{Cotton\ 2}$	0.1465	0.702	0.6253	0.4293
$OI \nRightarrow h_{Cotton\ 3}$	0.5488	0.4591	0.9743	0.3239
$OI \nRightarrow h_{Cotton\ 4}$	0.0516	0.8204	1.1012	0.2943
$h_{S\&P500} \nRightarrow OI$	0.6947	0.4049	0.1433	0.7051
$h_{Cotton\ 1} \nRightarrow OI$	0.2146	0.6434	0.0119	0.9133
$h_{Cotton\ 2} \nRightarrow OI$	1.6563	0.1986	0.203	0.6525
$h_{Cotton\ 3} \nRightarrow OI$	0.4739	0.4915	0.0085	0.9264
$h_{Cotton\ 4} \nRightarrow OI$	0.1582	0.691	0.5488	0.459

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

* $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.35: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \not\Rightarrow h_{S\&P500}$	2.479	0.1159	1.0315	0.3101
$OI \not\Rightarrow h_{Orange\ juice\ 2}$	2.7236	0.0994*	0.111	0.7391
$OI \not\Rightarrow h_{Orange\ juice\ 3}$	2.1045	0.1474	0.2609	0.6096
$OI \not\Rightarrow h_{Orange\ juice\ 4}$	3.2219	0.0732*	7e-04	0.9792
$OI \not\Rightarrow h_{Orange\ juice\ 5}$	2.323	0.128	0.0762	0.7826
$h_{S\&P500} \not\Rightarrow OI$	0.7787	0.3779	0.2706	0.6031
$h_{Orange\ juice\ 2} \not\Rightarrow OI$	0.0599	0.8068	0.0018	0.9663
$h_{Orange\ juice\ 3} \not\Rightarrow OI$	0.0385	0.8444	0.1466	0.7019
$h_{Orange\ juice\ 4} \not\Rightarrow OI$	0.0043	0.9476	0.0652	0.7985
$h_{Orange\ juice\ 5} \not\Rightarrow OI$	0.5113	0.4749	0.025	0.8744

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

* $\not\Rightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.36: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	0.066	0.7974	0.7267	0.3942
$OI \nRightarrow h_{Lumber\ 1}$	7.8277	0.0053***	0.0597	0.807
$OI \nRightarrow h_{Lumber\ 2}$	3.6335	0.0571*	0.0309	0.8606
$h_{S\&P500} \nRightarrow OI$	0.9803	0.3226	1.952	0.1627
$h_{Lumber\ 1} \nRightarrow OI$	0.0011	0.9738	4.5545	0.0331**
$h_{Lumber\ 2} \nRightarrow OI$	0.0757	0.7834	2.4704	0.1164

Note:
The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

* $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.37: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	0.0953	0.7577	1.2871	0.2569
$OI \nRightarrow h_{Live\ cattle\ 1}$	6.4407	0.0114**	1.082	0.2986
$OI \nRightarrow h_{Live\ cattle\ 2}$	0.778	0.3781	0.2793	0.5973
$OI \nRightarrow h_{Live\ cattle\ 3}$	1.248	0.2644	0.0212	0.8844
$OI \nRightarrow h_{Live\ cattle\ 4}$	1.8763	0.1713	0.0364	0.8487
$h_{S\&P500} \nRightarrow OI$	0.0185	0.8918	0.015	0.9026
$h_{Live\ cattle\ 1} \nRightarrow OI$	1.3633	0.2435	0.1431	0.7053
$h_{Live\ cattle\ 2} \nRightarrow OI$	0.2914	0.5895	1.4382	0.2308
$h_{Live\ cattle\ 3} \nRightarrow OI$	0.03	0.8625	1.8626	0.1727
$h_{Live\ cattle\ 4} \nRightarrow OI$	0.0662	0.797	2.992	0.084*

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. *h* and *OI* represent conditional volatility and open interest respectively.

* $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.38: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	1.5449	0.2144	2.0882	0.1488
$OI \nRightarrow h_{Feeder\ cattle\ 1}$	5.3263	0.0214**	12.1523	5e-04***
$OI \nRightarrow h_{Feeder\ cattle\ 2}$	1.5214	0.2179	2.4375	0.1188
$OI \nRightarrow h_{Feeder\ cattle\ 3}$	1.4977	0.2215	2.4633	0.1169
$OI \nRightarrow h_{Feeder\ cattle\ 4}$	0.1468	0.7018	0.8339	0.3614
$h_{S\&P500} \nRightarrow OI$	1.8361	0.1759	0.4634	0.4962
$h_{Feeder\ cattle\ 1} \nRightarrow OI$	0.1623	0.6872	0.5735	0.4491
$h_{Feeder\ cattle\ 2} \nRightarrow OI$	0.4915	0.4836	0.0212	0.8844
$h_{Feeder\ cattle\ 3} \nRightarrow OI$	0.0122	0.912	0.0953	0.7576
$h_{Feeder\ cattle\ 4} \nRightarrow OI$	0.0283	0.8665	7e-04	0.9795

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

* $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.39: Granger causality test between conditional volatility and open interest

	Pre-financialisation		Financialisation	
Null Hypothesis	F Statistic	p-value	F Statistic	p-value
$OI \not\Rightarrow h_{S\&P500}$	1.9773	0.1602	0.5977	0.4397
$OI \not\Rightarrow h_{Heating\ oil\ 1}$	0.0199	0.8877	5.1484	0.0235**
$OI \not\Rightarrow h_{Heating\ oil\ 2}$	0.4411	0.5069	4.7949	0.0288**
$OI \not\Rightarrow h_{Heating\ oil\ 3}$	0.1865	0.666	4.5947	0.0324**
$OI \not\Rightarrow h_{Heating\ oil\ 4}$	0.0501	0.823	4.5008	0.0342**
$h_{S\&P500} \not\Rightarrow OI$	1.3402	0.2475	0.9503	0.3299
$h_{Heating\ oil\ 1} \not\Rightarrow OI$	0.1004	0.7515	1.2138	0.2709
$h_{Heating\ oil\ 2} \not\Rightarrow OI$	0.0386	0.8443	1.6144	0.2042
$h_{Heating\ oil\ 3} \not\Rightarrow OI$	0.0144	0.9045	1.1496	0.2839
$h_{Heating\ oil\ 4} \not\Rightarrow OI$	0.0359	0.8499	1.2189	0.2699

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

[*] $\not\Rightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.40: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	0.4654	0.4954	2.8531	0.0916*
$OI \nRightarrow h_{Natural\ gas\ 1}$	0.1916	0.6618	1.4089	0.2356
$OI \nRightarrow h_{Natural\ gas\ 2}$	0.0093	0.9232	2.0155	0.1561
$OI \nRightarrow h_{Natural\ gas\ 3}$	0.0587	0.8086	0.1356	0.7127
$OI \nRightarrow h_{Natural\ gas\ 4}$	9e-04	0.9757	0.6812	0.4094
$h_{S\&P500} \nRightarrow OI$	2.2207	0.1367	1.0663	0.3021
$h_{Natural\ gas\ 1} \nRightarrow OI$	0.2495	0.6176	0.0419	0.8378
$h_{Natural\ gas\ 2} \nRightarrow OI$	1.3936	0.2383	0.3054	0.5807
$h_{Natural\ gas\ 3} \nRightarrow OI$	0.0102	0.9195	0.4527	0.5012
$h_{Natural\ gas\ 4} \nRightarrow OI$	0.7107	0.3996	0.1859	0.6665

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

[*] $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.41: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	1.8766	0.1713	0.4471	0.5039
$OI \nRightarrow h_{Gold\ 1}$	6.2685	0.0126**	0.8588	0.3544
$OI \nRightarrow h_{Gold\ 2}$	6.4416	0.0114**	2.3746	0.1237
$OI \nRightarrow h_{Gold\ 3}$	7.167	0.0076***	1.211	0.2715
$OI \nRightarrow h_{Gold\ 4}$	8.1137	0.0046***	0.8839	0.3474
$h_{S\&P500} \nRightarrow OI$	8.0916	0.0046***	0.0219	0.8823
$h_{Gold\ 1} \nRightarrow OI$	0.3408	0.5596	0.0086	0.9259
$h_{Gold\ 2} \nRightarrow OI$	0.3281	0.567	0.054	0.8163
$h_{Gold\ 3} \nRightarrow OI$	0.152	0.6967	0.0099	0.9206
$h_{Gold\ 4} \nRightarrow OI$	0.4835	0.4871	0.0034	0.9539

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. *h* and *OI* represent conditional volatility and open interest respectively.

* $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.

Table C.42: Granger causality test between conditional volatility and open interest

Null Hypothesis	Pre-financialisation		Financialisation	
	F Statistic	p-value	F Statistic	p-value
$OI \nRightarrow h_{S\&P500}$	4.608	0.0322**	2.359	0.1249
$OI \nRightarrow h_{Copper\ 1}$	0.1547	0.6943	0.0379	0.8456
$OI \nRightarrow h_{Copper\ 2}$	0.3026	0.5825	0.0591	0.808
$OI \nRightarrow h_{Copper\ 3}$	0.3856	0.5349	0.0962	0.7565
$OI \nRightarrow h_{Copper\ 4}$	0.605	0.437	0.0598	0.8068
$h_{S\&P500} \nRightarrow OI$	0.7109	0.3995	0.0136	0.9073
$h_{Copper\ 1} \nRightarrow OI$	0.3632	0.547	0.7193	0.3966
$h_{Copper\ 2} \nRightarrow OI$	0.7207	0.3963	0.4317	0.5113
$h_{Copper\ 3} \nRightarrow OI$	0.9234	0.337	0.4901	0.4841
$h_{Copper\ 4} \nRightarrow OI$	1.6225	0.2033	0.8154	0.3668

Note:

The table reports the results of the Granger causality test between the first difference of conditional volatility and the first difference of open interest during pre-financialisation period and financialisation period. h and OI represent conditional volatility and open interest respectively.

[*] $\nRightarrow$ means "does not Granger-cause ". ***, **, and * denote statistical significance at 1%, 5%, and 10% level.