

The Morning Email: Correlations & R-Squared

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One contract may be correlating with another but does that mean there's causation? Is one causing the other?

That's what the R-Squared is for. Read R-Squared as follows: let's say, CLA and DJIA have an R-Squared of 0.44. That means there's a 44% chance that one is causing the market movement of the other.

You will always see a positive number for the R-Squared. If a correlation is a (negative) number, for example, (87.9) that means the two commodities are mirroring each other, not correlating. For example, today (which is 06/06/2007) the RBA and DJIA have a (87.9)% correlation. The R-Squared is 0.77. Therefore the two instruments are mirroring each other 88% of the time, and there's a 77% chance that one is causing the other.

Conditionally formatted cells have been added. If there's an R-Squared greater than 80%, then, the cell will turn BLUE. What that's telling us is that there's an 80% chance that one of the instruments is causing the other to move. I've also formatted the cells to change color if there's a negative R-Squared (then, the cell will turn red). That tells us the two instruments are mirroring each other. If the cell is any other color, just ignore it. Other colors are 'notes' for me. --Thanks, Jim

Want something added? Let me know: jgoulding@ghco.com

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Symbol	Daily Correlations US Cash Treasuries (Yield)				Daily Correlations US Bonds/Notes (CBOT)			
	2yr Yield	5yr Yield	10yr Yield	30yr Yield	ZT	ZF	ZN	ZB
5YR BASIS	(84.9)	(84.0)	(82.7)	(80.5)	71.8	74.0	73.4	70.7
10YR BASIS	(93.4)	(91.2)	(94.0)	(93.2)	86.3	86.1	85.8	88.0
30YR BASIS	(83.5)	(86.7)	(88.3)	(91.2)	78.2	81.0	82.2	82.4
2/10	(88.8)	(83.2)	(79.6)	(72.2)	80.6	79.6	77.1	72.8
2/5	(84.5)	(75.5)	(77.1)	(71.2)	76.5	72.9	70.6	72.6
2/30	(89.4)	(84.2)	(80.6)	(72.5)	81.8	81.0	78.4	73.6
5/10	(49.5)	(53.4)	(41.8)	(35.2)	45.3	50.0	48.3	34.2
5/30	(77.7)	(77.1)	(69.2)	(60.4)	71.8	74.0	71.6	60.9
10/30	(86.5)	(82.4)	(79.0)	(70.1)	80.5	80.0	77.5	71.8
TUF1^	(54.9)	(45.0)	(45.4)	(39.6)	35.4	33.5	31.2	31.9

^ See notes page

Symbol	Daily R-Squared US Cash Treasuries (Yield)				Daily R-Squared US Bonds/Notes (CBOT)			
	2yr Yield	5yr Yield	10yr Yield	30yr Yield	ZT	ZF	ZN	ZB
5YR BASIS	0.72	0.71	0.68	0.65	0.52	0.55	0.54	0.50
10YR BASIS	0.87	0.83	0.88	0.87	0.74	0.74	0.74	0.78
30YR BASIS	0.70	0.75	0.78	0.83	0.61	0.66	0.68	0.68
2/10	0.79	0.69	0.63	0.52	0.65	0.63	0.59	0.53
2/5	0.71	0.57	0.59	0.51	0.59	0.53	0.50	0.53
2/30	0.80	0.71	0.65	0.53	0.67	0.66	0.61	0.54
5/10	0.25	0.29	0.17	0.12	0.21	0.25	0.23	0.12
5/30	0.60	0.59	0.48	0.37	0.52	0.55	0.51	0.37
10/30	0.75	0.68	0.62	0.49	0.65	0.64	0.60	0.52
TUF1^	0.30	0.20	0.21	0.16	0.13	0.11	0.10	0.10

^ See notes page

Symbol	Daily Correlations US Cash Treasuries (Yield)				Daily Correlations US Bonds/Notes (CBOT)				Exchange
	2yr Yield	5yr Yield	10yr Yield	30yr Yield	ZT	ZF	ZN	ZB	
2yr Yield	100.0	98.9	98.5	95.7	(97.1)	(97.1)	(96.4)	(95.0)	CME CME/eCbot Cash Market Cash Market Cash Market CME/NYMEX
5yr Yield	98.9	100.0	99.1	97.3	(97.6)	(98.6)	(98.4)	(96.1)	
10yr Yield	98.5	99.1	100.0	99.1	(97.8)	(98.2)	(98.2)	(98.0)	
30yr Yield	95.7	97.3	99.1	100.0	(96.2)	(96.7)	(97.3)	(98.3)	
ZT	(97.1)	(97.6)	(97.8)	(96.2)	100.0	99.5	99.3	98.7	
ZF	(97.1)	(98.6)	(98.2)	(96.7)	99.5	100.0	99.9	98.2	
ZN	(96.4)	(98.4)	(98.2)	(97.3)	99.3	99.9	100.0	98.6	
ZB	(95.0)	(96.1)	(98.0)	(98.3)	98.7	98.2	98.6	100.0	
emini SP	(2.4)	6.8	5.3	14.1	2.3	(2.9)	(6.4)	(4.7)	
Dow Futures	6.3	15.8	15.6	25.2	(8.2)	(13.1)	(16.8)	(16.6)	
USDJPY	94.1	90.8	91.5	88.9	(92.4)	(89.8)	(88.9)	(89.9)	
EURUSD	(62.5)	(58.4)	(60.8)	(56.5)	63.6	58.5	57.1	59.7	
EURJPY	66.8	66.9	65.1	66.9	(62.9)	(65.5)	(65.9)	(64.4)	
Crude	50.5	38.9	42.7	39.8	(43.8)	(38.6)	(37.1)	(43.5)	

Symbol	Daily R-Squared US Cash Treasuries (Yield)				Daily R-Squared US Bonds/Notes (CBOT)			
	2yr Yield	5yr Yield	10yr Yield	30yr Yield	ZT	ZF	ZN	ZB
2yr Yield		0.98	0.97	0.92	0.94	0.94	0.93	0.90
5yr Yield	0.98		0.98	0.95	0.95	0.97	0.97	0.92
10yr Yield	0.97	0.98		0.98	0.96	0.96	0.96	0.96
30yr Yield	0.92	0.95	0.98		0.92	0.94	0.95	0.97
ZT	0.94	0.95	0.96	0.92		0.99	0.99	0.97
ZF	0.94	0.97	0.96	0.94	0.99		1.00	0.96
ZN	0.93	0.97	0.96	0.95	0.99	1.00		0.97
ZB	0.90	0.92	0.96	0.97	0.97	0.96	0.97	
emini SP	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
Dow Futures	0.00	0.02	0.02	0.06	0.01	0.02	0.03	0.03
USDJPY	0.89	0.82	0.84	0.79	0.85	0.81	0.79	0.81
EURUSD	0.39	0.34	0.37	0.32	0.40	0.34	0.33	0.36
EURJPY	0.45	0.45	0.42	0.45	0.40	0.43	0.43	0.41
Crude	0.25	0.15	0.18	0.16	0.19	0.15	0.14	0.19



SYM NAME	Symbol	Daily Correlations US Cash Treasuries			Daily Correlations US Bonds/Notes (CBOT)			Symbol	SYM NAME	Exchange
		2yr	5yr	10yr	ZT	ZF	ZN			
Schatz(2Y)	DG	(89.97)	(86.91)	(89.65)	91.27	89.29	88.83	DG	Schatz(2Y)	EUREX
Bobl(5Y)	DL	(89.82)	(87.70)	(90.45)	92.07	90.32	90.17	DL	Bobl(5Y)	EUREX
Bund(10Y)	DB	(88.23)	(86.00)	(89.54)	90.97	89.01	88.95	DB	Bund(10Y)	EUREX

SYM NAME	Symbol	Daily R-Squared US Cash Treasuries			Daily R-Squared US Bonds/Notes (CBOT)			Symbol	SYM NAME
		2yr	5yr	10yr	ZT	ZF	ZN		
Schatz(2Y)	DG	0.81	0.76	0.80	0.83	0.80	0.79	DG	Schatz(2Y)
Bobl(5Y)	DL	0.81	0.77	0.82	0.85	0.82	0.81	DL	Bobl(5Y)
Bund(10Y)	DB	0.78	0.74	0.80	0.83	0.79	0.79	DB	Bund(10Y)

How does this work on the ROLL? Formula's track the highest volume individual contract. For example, if we are rolling from Dec 2007 to March 2007, for the eCBOT, then, the day up to the 'top step change' Dec07 will be the highest volume traded contract. On the day of the switch, Mch08 will be the highest volume traded contract.

The formula will mix Dec07 and Mch08 until we've reached the 10th day of the change over. We always roll on the last trading day of the month. In this case it would be November 30th. So, by the tenth trading day of December the formula will have tracked the Mch08 contract entirely.

However, it doesn't matter. All that I'm concerned with is the highest volume contract and that's what the formulas track.

Furthermore, it works the same way for the Bund, Bobl, and Schatz; whatever contract is the highest volume contract, that's the contract the formula will take its data from.

Energies

Daily Correlations					
Symbol	CLA	HOA	RBA	NGA	Sym Name
CLA	100.0	93.7	98.5	40.5	Crude Oil
HOA	93.7	100.0	95.0	19.8	Heating Oil
RBA	98.5	95.0	100.0	31.8	unleaded Gas
NGA	40.5	19.8	31.8	100.0	Nat Gas
DJIA	(19.6)	(38.9)	(16.0)	26.2	Dow Cash
SPC5	(23.7)	(40.6)	(20.2)	14.1	S&P 500 Cash
EURUSD	(23.7)	(50.0)	(28.5)	51.6	€ / \$
EURJPY	57.9	47.9	64.8	27.6	€ / ¥
USDJPY	55.8	71.8	64.1	(25.5)	\$ / ¥
GCA	16.2	(16.8)	6.4	46.6	Gold

Energies

Daily R-Squared						
Symbol	CLA	HOA	RBA	NGA	Sym Name	Exchange
CLA		0.88	0.97	0.16	Crude Oil	CME Nymex
HOA	0.88		0.90	0.04	Heating Oil	CME Nymex
RBA	0.97	0.90		0.10	unleaded Gas	CME Nymex
NGA	0.16	0.04	0.10		Nat Gas	CME Nymex
DJIA	0.04	0.15	0.03	0.07	Dow Cash	NYSE (Cash)
SPC5	0.06	0.16	0.04	0.02	S&P 500 Cash	Cash
EURUSD	0.06	0.25	0.08	0.27	€ / \$	Cash
EURJPY	0.34	0.23	0.42	0.08	€ / ¥	Cash
USDJPY	0.31	0.52	0.41	0.07	\$ / ¥	Cash
GCA	0.03	0.03	0.00	0.22	Gold	Comex

Currencies

Daily Correlations					
Symbol	EURUSD	EURJPY	USDJPY	GBPEUR	Sym Name
EURUSD	100.0	9.3	(77.8)	(60.9)	€ / \$
EURJPY	9.3	100.0	55.3	13.0	€ / ¥
USDJPY	(77.8)	55.3	100.0	59.5	\$ / ¥
Euro	99.8	6.0	(79.7)	(61.1)	€
Yen	76.9	(55.4)	(99.0)	(59.3)	¥
Swiss Fr	89.2	(28.2)	(91.8)	(67.1)	CHF
Canadain \$	46.5	13.1	(30.4)	(65.7)	C\$

Currencies

Daily R-Squared						
Symbol	EURUSD	EURJPY	USDJPY	GBPEUR	Sym Name	Exchange
EURUSD		0.01	0.60	0.37	€ / \$	Cash
EURJPY	0.01		0.31	0.02	€ / ¥	Cash
USDJPY	0.60	0.31		0.35	\$ / ¥	Cash
Euro	1.00	0.00	0.63	0.37	€	CME/Globex
Yen	0.59	0.31	0.98	0.35	¥	CME/Globex
Swiss Fr	0.79	0.08	0.84	0.45	CHF	CME/Globex
Canadain \$	0.22	0.02	0.09	0.43	C\$	CME/Globex

Currencies

Daily Correlations					
Symbol	Euro	Yen	Swiss Fr	Canadain \$	Sym Name
Euro	100.0	78.6	90.0	53.0	€
Yen	78.6	100.0	93.6	33.5	¥
Swiss Fr	90.0	93.6	100.0	56.8	CHF
Canadain \$	46.6	29.4	52.6	100.0	C\$

Currencies

Daily R-Squared						
Symbol	Euro	Yen	Swiss Fr	Canadain \$	Sym Name	Exchange
Euro		0.62	0.81	0.28	€	CME/Globex
Yen	0.62		0.88	0.11	¥	CME/Globex
Swiss Fr	0.81	0.88		0.32	CHF	CME/Globex
Canadain \$	0.22	0.09	0.28		C\$	CME/Globex

Notes:
 EURUSD, EURJPY, USDJPY, & USDGBP are all cash market products.
 Euro, Yen, Swiss Fr, Canadain \$, & BP are all CME products.

1) ALL Correlations are based on 10 day historical
 2) CQG quotes prices in 32nds. That means you won't see ""32" on the end of my equations. I don't need to multiply by 32 to see the correct quote.

TUF1 = Cash2yr Yield - 5 Year Futures
 CQG Equation = $\text{SHARESCALE}(\text{BUSP02}-(\text{FVA?}*.5), \text{INTEGER1}) * 32$? Where FVA? is the 5yr electronic lead month futures contract.

FYT1 = $(\text{FV} * 1.5) - \text{TY}$
 CQG Equation = $((\text{FVA?} * 1.5) - \text{TYA?})$
 Where: FV = 5 yr electronic futures; TY = 10 yr electronic futures

FYT2 = $(5 \text{ yr cash} - (\text{TY} * .7))$
 CQG Equation = $(\text{BUS05P} - (\text{TYA} * .7))$
 Where: 5 yr cash = OTR; TY = 10 yr electronic futures

NOB1 = $(10 \text{ yr cash} - (\text{US} * .7))$
 CQG Equation = $(\text{BUS10P} - (\text{USA} * .7))$
 Where: US = 30 yr electronic futures; 10 yr cash = OTR

NOB2 = $(\text{TY} - (\text{US} * .7))$
 CQG Equation = $(\text{TYA} - (\text{USA} * .7))$
 Where: TY = 10 yr electronic futures; US = 30 yr electronic futures

FAQ

Q: Why do I have a column titled 'q' in certain places?

A: Those are q formulas I use within CQG. CQG is the engine behind my morning emails. They provide the quotes, I provide the formulas.

Q: Why are certain cells colored?

A: They help me identify what formula's need to be changed by hand and which are automated. There are over 9,000 formula's working behind the scenes to deliver the morning emails. I need some kind of system assist me in identifying certain formula's that need to be adjusted on new issues, rolls etc. I also use a color pattern for the treasuries to help with quick visual interpretation.

Sym Name = Symbol Name

BASIS is conversion factor.

Basis = Cash Price - (Futures Price * Conversion Factor)

Daily Correlations Treasury Basis^			
	5YR BASIS	10YR BASIS	30YR BASIS
emini SP	(19.7)	(3.4)	(39.2)
Dow Futures	(23.2)	(12.4)	(47.2)
USDJPY	(77.2)	(88.3)	(75.2)
EURUSD	45.7	60.5	40.0
EURJPY	(61.3)	(60.4)	(66.4)
Crude	(37.4)	(52.7)	(25.4)
TUF1^	76.3	67.7	46.9
2/10	78.0	77.7	58.1
2/5	71.6	83.0	55.9
2/30	77.0	77.7	57.2
5/10	48.6	25.8	31.3
5/30	68.1	58.2	48.0
10/30	71.6	74.3	52.8
ZT	71.8	86.3	71.8
ZF	74.0	86.1	74.0
ZN	73.4	85.8	73.4
ZB	70.7	88.0	70.7

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Daily R-Squared Treasury Basis			
	5YR BASIS	10YR BASIS	30YR BASIS
emini SP	0.04	0.00	0.15
Dow Futures	0.05	0.02	0.22
USDJPY	0.60	0.78	0.57
EURUSD	0.21	0.37	0.16
EURJPY	0.38	0.36	0.44
Crude	0.14	0.28	0.06
TUF1^	0.58	0.46	0.22
2/10	0.61	0.60	0.34
2/5	0.51	0.69	0.31
2/30	0.59	0.60	0.33
5/10	0.24	0.07	0.10
5/30	0.46	0.34	0.23
10/30	0.51	0.55	0.28
ZT	0.52	0.74	0.52
ZF	0.55	0.74	0.55
ZN	0.54	0.74	0.54
ZB	0.50	0.78	0.50

^See Notes Page

Daily Correlations											
US Cash Treasuries Spreads (Yield)											
Symbol	2/10	2/5	2/30	5/10	5/30	10/30	NOB1^	NOB2^	TUF^	FYT1^	FYT2^
2/10		91.5	99.3	62.8	88.5	93.4	12.1	(55.1)	71.7	94.6	72.8
2/5	91.5		90.5	26.1	64.5	84.3	1.7	(69.3)	79.0	85.7	66.5
2/30	99.3	90.5		63.1	90.9	97.0	12.5	(54.5)	68.9	96.1	71.2
5/10	62.8	26.1	63.1		87.6	61.0	25.7	1.9	19.2	61.0	45.9
5/30	88.5	64.5	90.9	87.6		91.6	20.8	(30.0)	46.4	88.5	62.7
10/30	93.4	84.3	97.0	61.0	91.6		12.8	(50.9)	60.2	94.8	64.9
NOB1^	12.1	1.7	12.5	25.7	20.8	12.8					
NOB2^	(55.1)	(69.3)	(54.5)	1.9	(30.0)	(50.9)					
TUF^	71.7	79.0	68.9	19.2	46.4	60.2					
FYT1^	94.6	85.7	96.1	61.0	88.5	94.8					
FYT2^	72.8	66.5	71.2	45.9	62.7	64.9					

Daily R-Squared											
US Cash Treasuries Spreads (Yield)											
Symbol	2/10	2/5	2/30	5/10	5/30	10/30	NOB1^	NOB2^	TUF^	FYT1^	FYT2^
2/10		0.84	0.99	0.39	0.78	0.87	0.01	0.30	0.51	0.89	0.53
2/5	0.84		0.82	0.07	0.42	0.71	0.00	0.48	0.62	0.73	0.44
2/30	0.99	0.82		0.40	0.83	0.94	0.02	0.30	0.47	0.92	0.51
5/10	0.39	0.07	0.40		0.77	0.37	0.07	0.00	0.04	0.37	0.21
5/30	0.78	0.42	0.83	0.77		0.84	0.04	0.09	0.21	0.78	0.39
10/30	0.87	0.71	0.94	0.37	0.84		0.02	0.26	0.36	0.90	0.42
NOB1^	0.01	0.00	0.02	0.07	0.04	0.02					
NOB2^	0.30	0.48	0.30	0.00	0.09	0.26					
TUF^	0.51	0.62	0.47	0.04	0.21	0.36					
FYT1^	0.89	0.73	0.92	0.37	0.78	0.90					
FYT2^	0.53	0.44	0.51	0.21	0.39	0.42					

^ See notes page

q	
6	5YR BASIS
2	10YR BASIS
9	30YR BASIS
45	2/10
47	2/5
46	2/30
48	5/10
49	5/30
44	10/30
4	TUF1^
50	FYT1^
3	FYT2^
1	NOB1^
33	NOB2^