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Market Facts

Is There Such A Thing As "Commodities?"

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After we came out of church, we stood talking for some time together of Bishop Berkeley's ingenious sophistry to prove the nonexistence of matter, and that every thing in the universe is merely ideal. I observed, that though we are satisfied his doctrine is not true, it is impossible to refute it. I shall never forget the alacrity with which Johnson answered, striking his foot with mighty force against a large stone, till he rebounded from it – "I refute it thus!" – Boswell, Life of Johnson.

The question of whether commodities constitute an asset class is not an academic one we should relegate to the navel-gazers of society; no, not with tens of billions of dollars already committed thereto and the promise of there being plenty more from whence that came.

And, like Dr. Johnson's famous refutation of the non-existence of matter, we can demonstrate the existence of tangible commodities better than we can of those derivatives on notional amounts which exist only in cyberspace. A trip to the gasoline station provides its own evidence of whether commodities exist and whether they can exercise a claim on our financial wherewithal.

But do they exist with the properties we should expect from an asset class? No such question can be asked seriously about most classes of fixed income: You have a group of bonds with similar exposure to common factors such as interest rates, embedded options, credit spreads, etc. Equities, too, famously rise and fall with systemic risk, their performance relative to an index, accounting for 80% or more of their return. Real estate? Yes, that, too, is an asset class beyond dispute even with the importance of location in its valuation.

What do all of these asset classes have in common? All have identifiable primal factors such as interest rates, the yield curve, expected earnings or rental values capable of exerting a statistically significant effect on prices each and every time. **As any scientist would note, results must be reproducible to be valid;** if one day we found bond prices rallying on higher yields we would be quick to question whether interest rates were part of a law about bonds' behavior.

We would also expect to find positive and stable covariance of returns amongst members of the purported asset class and some evidence of a near-unitary beta against an agreed-upon benchmark. We should not expect the correlations between key sub-indices to oscillate back and forth between positive and negative values. Finally, we should expect any and all correlation between various sub-indices to be causal and plausible even though twisted defenses of spurious correlation are far more entertaining.

It might not be asking too much for there to be an agreed-upon benchmark, something now absent in the world of commodities.

A correlation matrix of weekly average cash market returns for the current members of the Reuters-CRB index from 1983 onwards where data are available is presented on the following page. Natural gas and platinum joined the index at a later date. Orange juice's front-month futures are used in lieu of cash market prices as none are available in the desired format. Cash markets are used to avoid the discontinuities associated with futures markets.

Negative correlations are highlighted in red font on a yellow background; positive correlations in blue font on a green background. The bottom row presents a beta of each commodity against the CRB; betas less than one are red-on-yellow, while betas greater than one are blue-on-green.

Correlation of Weekly Average Cash Market Returns, Jan. 1983 - Apr. 2005

	C	CC	CL	CT	GC	HG	HO	JO	KC	LC	LH	NG	PL	S	SB	SI	W
Corn	1.000																
Cocoa	0.059	1.000															
Crude	-0.003	-0.011	1.000														
Cotton	0.155	0.088	-0.100	1.000													
Gold	0.030	0.119	0.154	-0.025	1.000												
Copper	0.023	0.067	0.055	0.101	0.194	1.000											
Htg. Oil	-0.021	-0.004	0.655	-0.045	0.123	0.040	1.000										
Or. Juice	0.110	0.017	0.045	0.038	0.041	0.022	0.022	1.000									
Coffee	0.083	0.102	0.004	0.038	0.048	0.067	-0.011	0.024	1.000								
Cattle	0.025	-0.018	0.047	-0.010	0.016	0.027	0.085	0.013	0.011	1.000							
Hogs	0.023	0.011	0.033	0.009	0.032	0.006	0.009	0.015	-0.032	0.129	1.000						
Nat. Gas	0.054	-0.069	0.129	0.016	0.091	0.008	0.206	-0.008	0.080	0.025	0.018	1.000					
Platinum	0.044	0.051	0.132	-0.029	0.490	0.144	0.100	0.044	0.108	0.052	0.007	0.080	1.000				
Soybeans	0.571	0.084	-0.012	0.166	0.132	0.110	0.018	0.095	0.078	0.046	0.016	0.028	0.060	1.000			
Sugar	0.100	0.090	-0.011	0.032	0.079	0.088	0.027	0.031	0.049	0.006	-0.016	0.013	0.083	0.100	1.000		
Silver	0.048	0.136	0.134	-0.003	0.677	0.198	0.098	0.030	0.082	-0.013	0.017	0.081	0.409	0.138	0.118	1.000	
Wheat	0.399	0.085	0.003	0.046	0.102	0.084	0.015	0.077	0.046	0.056	-0.031	0.025	0.121	0.323	0.120	0.093	1.000
CRB Beta	1.078	0.711	1.394	0.569	0.571	0.717	1.489	0.716	0.982	0.273	0.329	1.845	0.794	1.253	1.046	1.142	1.083

An Asset Class?

We should expect at the very least for members of an asset class to have positive and statistically non-zero correlation of returns. Three of crude oil's correlations – those for cotton (-.1), soybeans (-.012) and sugar (-.011) – are negative, and its correlations against coffee (.004) and wheat (.003) are near zero. If we mask out the joint product relationship to heating oil, we find five of crude oil's remaining 15 correlations against fellow CRB members are worthless. And yet it is a fair statement that the ongoing bull market in crude oil has led many to assert we are in a generic bull market in tangible commodities across the board.

Sub-Index Correlation Over Time

We all know the maxim about lies, damn lies and statistics, so let's expand the table above, which is a long-period snapshot of cash market returns. Would we see the same low and negative correlations if we used futures-based indices and rolled the correlation windows forward over time? **No: The problem becomes far worse.**

The main CRB index has six sub-indices. They, their components and the three-letter code used in the following charts are listed below:

Livestock (Liv)

- Live Cattle
- Lean Hogs

Precious Metals (Pre)

- Gold
- Silver
- Platinum

Industrials (Ind)

- Copper
- Cotton

Energy (Eng)

- Crude Oil
- Heating Oil
- Natural Gas

Softs (Sft)

- Coffee
- Sugar
- Orange Juice
- Cocoa

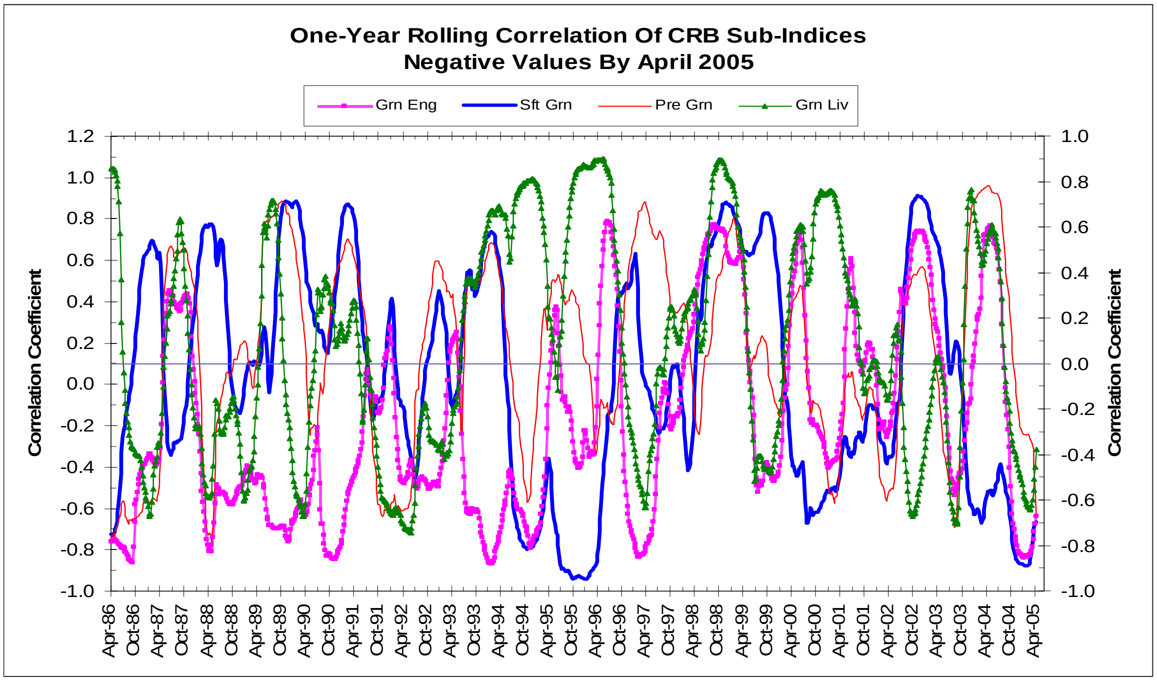
Grains (Grn)

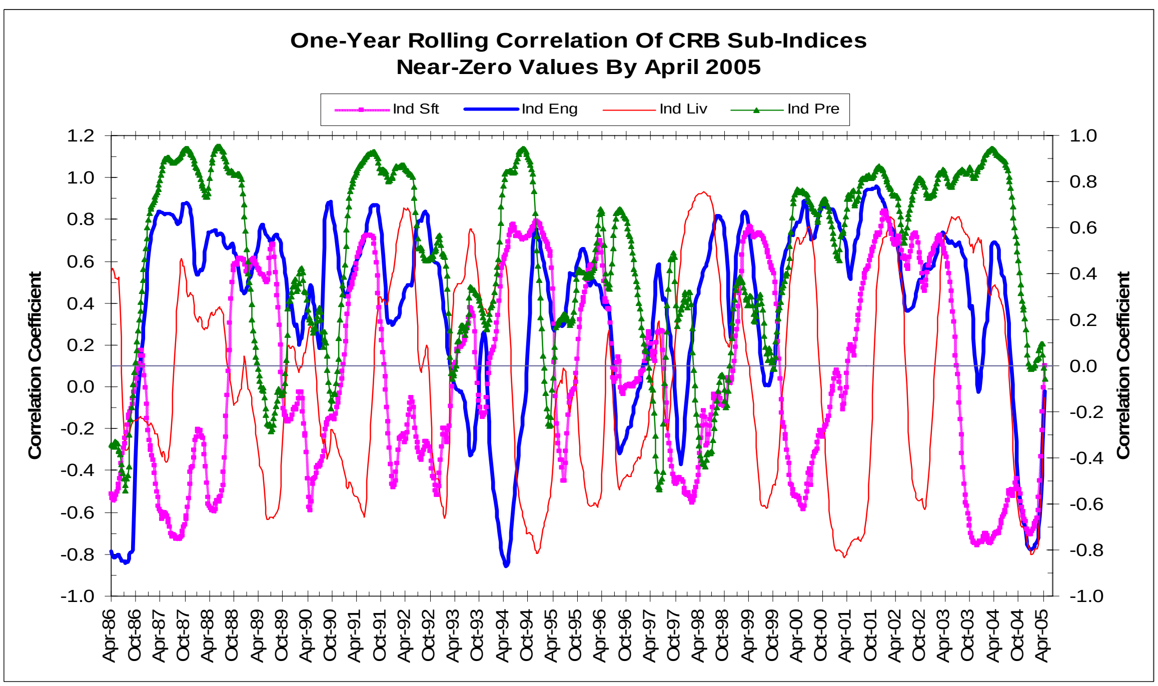
- Wheat
- Corn
- Soybeans

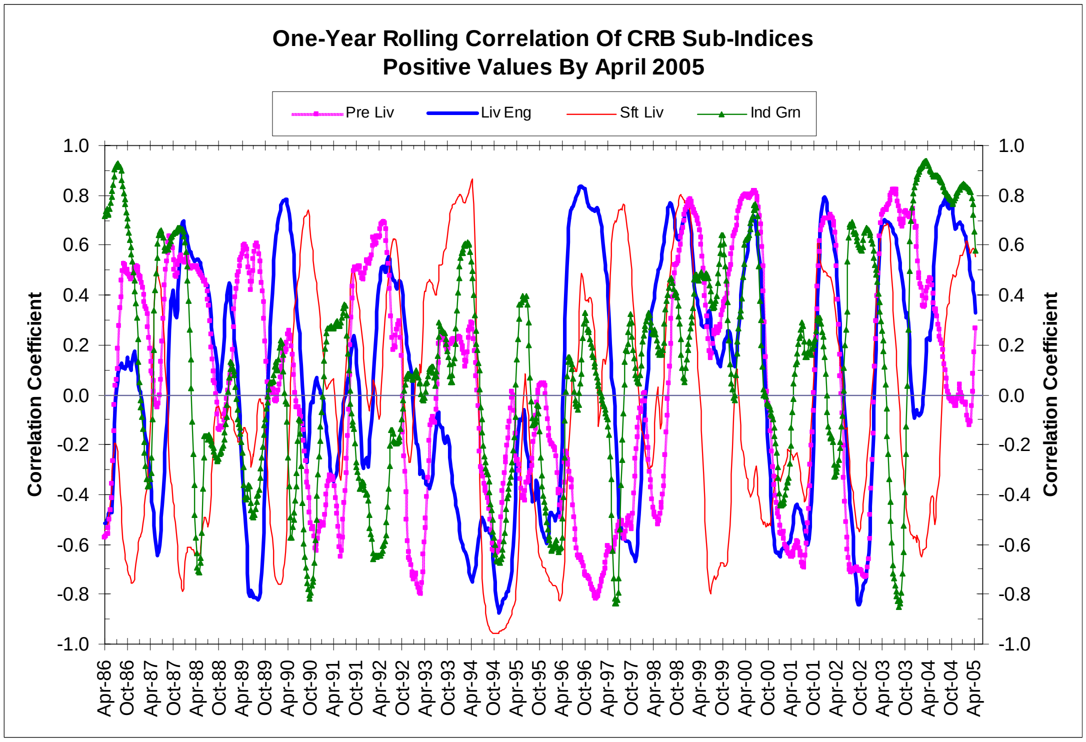
Weekly data for the sub-indices going back to April 1985 were correlated over one-year windows ending with April 8, 2005. The 15 resulting correlation pairs were sorted by their ending values into four logical if arbitrary groups: Those whose ending correlations were negative, near-zero, positive and strongly positive.

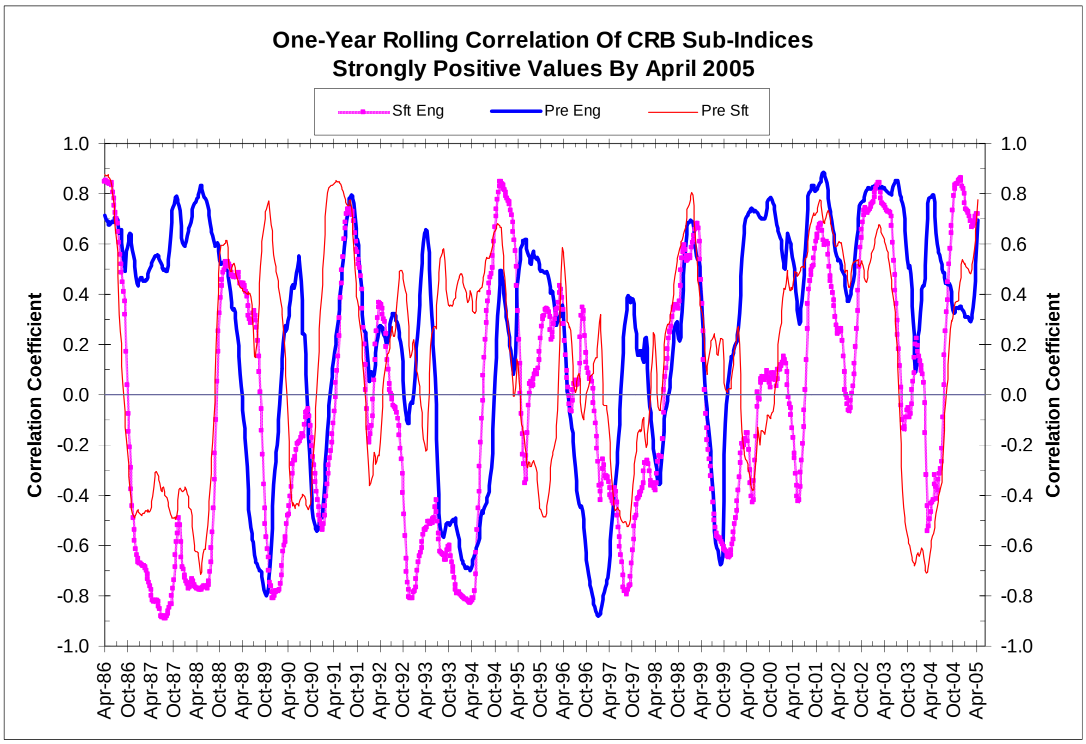
What is astonishing in the data is just how variant the correlations are over time. Many of the pairs move from values near 1.00 or -1.00 to the opposite extreme several times over the 20-year history. **This is prima facie evidence of unstable correlation over time.**

The four classification graphs of the correlation pairs are presented without further comment below.









Conclusion

Diversification is a laudable goal for investors, but the literature is notably silent on whether an index should be internally diversified. This is implied by the numerous negative correlations within the CRB index: No investor can be certain whether a long position in this index contains a number of components working against the overall position, nor can an investor be certain of any internal stability within the index portfolio.

Given this refutation of an index' existence, we recommend those who wish to partake in any bullish move in a commodity trade that commodity as such. A long position in crude oil can stand on its own merits unencumbered by cocoa or orange juice.

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