Comparing First, Second, and Third Generation Commodity Indices

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1. Introduction

Commodities are now treated as a mainstream asset class. As of April 2012, Barclays Capital reported that assets under management in commodity-based exchange-traded products, structured notes, and index swaps totalled a record high of $435 billion versus $100 billion of investment in 2006. This rise can be explained in part by the fact that commodities are now standard components of an investor's strategic asset allocation, due to the fact that they generate equity-like returns in the long-run, act as risk diversifiers,[1] and serve as inflation hedges (Bodie and Rosansky [1980], Erb and Harvey [2006], Gorton and Rouwenhorst [2006]). Recent research has made it clear that momentum and term structure strategies work well in commodity futures markets, suggesting that commodities should be part of the tactical asset allocation of investors as well (Erb and Harvey [2006], Gorton and Rouwenhorst [2006], Miffre and Rallis [2007], Fuertes, Miffre, and Rallis [2010] amongst others).

An easy way to gain exposure to commodities consists simply of tracking an index. Then one gets exposure to a broad range of commodities without concerns over rolling contracts, paying margin calls, posting collateral, or setting up complex futures trading processes. As the commodity market developed, new forms of indices were introduced. At present, the universe of commodity indices is split into three categories: i) the first generation indices, which are long-only and do not pay much attention to the fundamentals of backwardation and contango, ii) the second generation indices, which are also long-only, but attempt to lessen the negative effect on performance of contango while exploiting backwardation, and iii) the third generation indices, which are long-short and capitalize on both the price appreciation associated with backwardation and the price depreciation related to contango.

The purpose of this paper is to narrate the history of commodity indexing briefly, to introduce new developments, and to appraise the performance of the different generations. There are many choices of indexes to track. In fact, it takes a very informed and active investor to understand which passive index to choose. Therefore, the comparative investigation and performance evaluation implemented in this paper contribute to the literature on the recent proliferation of indices. This analysis extends the earlier works of Akey [2005] and Schneeweis, Spurgin, Das, and Donohue [2009], who focus on the first and second generations.

We conclude that the second generation indices outperform the first generation indices by minimizing harmful impact of contango on performance and by using active long-only signals based on momentum or roll-yields. Out of the three generations, the third generation stands out as offering the best performance for the lowest volatility. This outperformance is particularly obvious in periods of increased uncertainty, such as the months following the debacle of Lehman Brothers.

2. Fundamentals of Commodity Futures Pricing

The essence of commodity futures pricing comes down to the fundamentals of backwardation and contango. Broadly speaking, backwardation means that the futures price of a commodity is expected to appreciate as maturity approaches and contango means the opposite: the futures price is expected to drop. One can bring two rationales for these observed price evolutions. The first one relies on the hedging pressure hypothesis of Cootner [1960], as generalized in Hirshleifer [1988] and validated empirically in Bessembinder [1992], and Basu and Miffre [2012]. The second rationale relies on the theory of storage of Kaldor [1939] and Working [1948], as empirically supported by Gorton, Hayashi, and Rouwenhorst [2012].

The hedging pressure hypothesis relates backwardation and contango to the propensity of hedgers to be net short or net long. More specifically, backwardation occurs when hedgers are net short (namely, commodity producers are more prone to hedge than commodity consumers and processors), leading to the necessary intervention of net long speculators to restore equilibrium. Contango arises in the opposite case, when hedgers are net long (namely, consumers and processors of a commodity outnumber producers), leading this time around to the necessary intervention of net short speculators.

The theory of storage explains backwardation and contango by means of the incentive that inventory holders have in owning the spot commodity. When inventories are high, commodity futures markets are contangoed and the term structure of commodity futures prices is upward-sloping - to give incentive to inventory holders to buy the commodity spot (at a cheap price) and sell it forward at a profit that exceeds the cost of storage and the cost of financing the purchase of the spot commodity. When inventories are low, commodity futures markets are backwardated and the term structure of commodity futures prices is downward-sloping - as the benefits of owning the commodity spot (called convenience yield) then exceed the costs, giving incentive to inventory holders to own the spot asset even though its price exceeds that of the futures contract.

To summarize, a backwardated market (with a downward-sloping term structure or positive roll-yield) is characterized by net short hedging and scarce inventories, while a contangoed market (with an upward-sloping term structure or negative roll-yield) is characterized by net long hedging and abundant inventories. These fundamentals are essential to understanding the evolution of commodity futures indexing.

3. Data

Excluding sector specific indices, there were 71 commodity indices listed in Bloomberg as of April, 30 2012. Our dataset focuses on the 38 that have return history over the period May, 31 2008 - April, 30 2012. We limit our sample to indices with 4 years of data to ensure robust inference on performance and to enable comparison of performance across generations. We download excess return data at a monthly frequency. To avoid backfilling bias, only live data are used in the analysis. The cross-section is split into generations, with the first generation comprising of six indices, the second generation of twenty three indices, and the third generation of nine indices.

4. Empirical Results

First Generation Commodity Indices

Members of this category include Deutsche Bank Liquid Commodity Index (DBLCI),[2] Diapason Commodity Index (DCI), Dow Jones-UBS Commodity Index (DJ-UBSCI), Rogers International Commodity Index, S&P Goldman Sachs Commodity Index (S&P-GSCI), and Thompson Reuters-Jefferies/CRB Index. In spite of the recent proliferation of indices, the S&P-GSCI and the DJ-UBSCI are still considered as benchmarks for commodities investing and attract most of the assets under management.

Akey [2005] and Schneeweis, Spurgin, Das, and Donohue [2009] provide interesting and detailed accounts of first generation indices. These indices aim at being representative of a broad commodity market. They rebalance infrequently, sometimes as rarely as once a year. They are fully-collateralized, meaning that their total return depends on both futures returns and collateral yields (e.g., the 3-month T-bill rate). They are long-only and as such, they assume that commodity markets are solely backwardated. With the noticeable exception of DBLCI, they hold liquid contracts located at the front end of the term structure, rolling positions from the front to the second nearest contract. They tend to be heavily weighted towards energy; as a result, their performance is mostly driven by that sector. The number of constituents varies widely from one index to the next and as a result so do the diversification benefits, liquidity, and tracking errors.

Exhibit 1 reports summary statistics of the performance of first generation indices over a period common to all 38 indices here considered (May 31, 2008 - April, 30 2012). The first generation indices earn negative (albeit insignificant) annualised excess return, ranging from -9.54% (S&P-GSCI) to -2.64% (DCI). This is due to the impact of the financial and sovereign debt crises on the real economy. The measure of risks varies widely

	Annualized Mean Excess Returns		Annualized Standard Deviation	Sharpe Ratio	Skewness		Excess Kurtosis	
Deutsche Bank Liquid Commodity Index	-0.0735	(-0.56)	0.2646	-0.2779	-0.7286	(-2.06)	1.1820	(1.67)
Diapason Commodity Index	-0.0264	(-0.16)	0.3348	-0.0789	0.7988	(2.26)	5.0120	(7.09)
Dow Jones-UBS Commodity Index	-0.0713	(-0.64)	0.2235	-0.3192	-0.7739	(-2.19)	1.5059	(2.13)
Rogers International Commodity Index	-0.0421	(-0.33)	0.2530	-0.1664	-0.7928	(-2.24)	1.8861	(2.67)
S&P Goldman Sachs Commodity Index	-0.0954	(-0.67)	0.2863	-0.3333	-0.7234	(-2.05)	1.7479	(2.47)
Thompson Reuters-Jeffries/CRB Index	-0.0465	(-0.41)	0.2256	-0.2059	-0.7745	(-2.19)	1.8282	(2.59)
Average	-0.0592		0.2646	-0.2303	-0.4991		2.1937	

(*t*-statistic in parentheses)

Exhibit 1: Performance of first generation indices over the period May, 31 2008 - April, 30 2012
Source: Bloomberg and Author's Calculations

too, with standard deviations ranging from 22.35% to 33.48%, skewness ranging from -0.7928 to 0.7988, and excess kurtosis ranging from 1.1820 to 5.0120. It is interesting to note that all indices except DCI are negatively skewed and leptokurtic at the 5% level, indicating a high probability for large negative excess returns. At first sight, this might look puzzling given Gorton and Rouwenhorst [2006], who note that the skewness of commodity futures positions is positive. As reported in Rallis, Miffre, and Fuertes [2012], the negative skewness observed here comes from very poor index performance over the period July 2008 - February 2009, where this dramatic fall in prices was the result of a slowdown in worldwide economic activity triggered by the 2008 financial crisis.

First generation indices suffer from the pitfall of assuming that commodity futures markets are solely in backwardation. In other words, they do not take the shape of the term structure into account. Since markets tend to switch between backwardation and contango, based on hedging demand or inventory levels, for example, the first generation indices perform poorly in contangoed markets. Further, contracts closer to maturity tend to be more contangoed than more distant contracts. Contracts closer to expiration are also known to be the most volatile (Samuelson [1965], Daal, Farhat, and Wei [2006]), as they are more sensitive to supply/demand shocks. Second generation indices challenge these issues by investing in contracts further out on the term structure of commodity futures prices.

Second Generation Commodity Indices

Exhibit 2 considers what happens when a position is rolled from a near *(n)* to a more distant *(d)* contract. If the market is in backwardation (continuous curve), the term structure is downward-sloping and the roll yield (defined as a function of the price differential between the nearby contract n that is closed out and the distant contract d that is rolled into) will then be positive. In other words, investors rolling positions in backwardated contracts earn positive roll-yields. However should the market be in contango (dashed curve), the term structure is then upward-sloping, resulting in a negative roll yield. To put this differently, rolling positions in contangoed markets can have a very damaging impact on the total returns of commodity indices.

The second generation indices were introduced to mitigate the impact on performance of these potentially disastrous negative roll-yields. These indices, instead of rolling from the front to the second nearest contracts as would their first generation counterparts, attempt to reduce the losses incurred when roll yields are negative by considering the whole price curve, while simultaneously bearing in mind liquidity requirements. Within our cross section, we could identify the following rolling techniques (see also Tsui and Dash [2011]):

(i) Enhanced roll: These indices choose per commodity

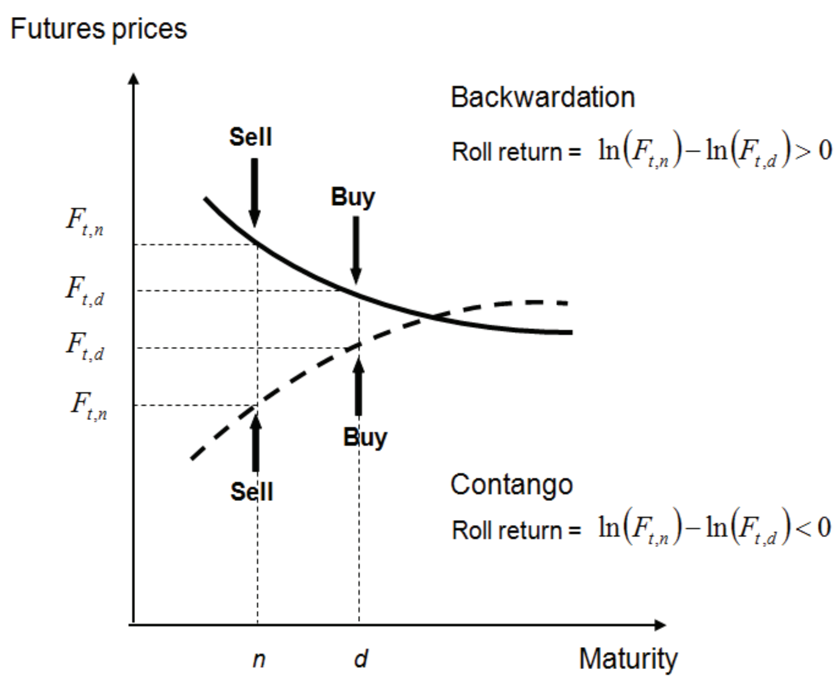

Exhibit 2: Term structure of commodity futures prices

a relatively liquid contract located in the mid to far end of the futures curve and hold it until it nearly matures. It follows that the cost of rolling in contangoed markets is incurred less often than with first generation indices, where front contracts are held continuously. Since contracts are traded less often, the cost of replication is also reduced. Longview Extended Commodity Index and S&P GSCI Enhanced Index are structured using this strategy.

(ii) Constant maturity: Instead of choosing a single futures contract, these indices invest in a number of contract months across the futures curve, in order to achieve a targeted maturity. They can also hold all contracts on the futures curve up to a certain target maturity. JPMorgan Commodity Curve Index and UBS Bloomberg Constant Maturity Commodity Index use this strategy.

(iii) Implied roll yield: A dynamic approach is used first to determine implied roll yields for all contracts up to a given maturity and then to choose the contract with the maximum implied roll yield. Examples in this category include DBLCI Optimum Yield and DCI BNP Paribas

	Annualized Mean Excess Returns		Annualized Standard Deviation	Sharpe Ratio	Skewness		Excess Kurtosis	
Panel A: Enhanced Roll								
Longview Commodity Index	0.0255	(0.22)	0.2327	0.1097	-0.7377	(-2.09)	1.0945	(1.55)
Longview Extended Commodity Index	0.0208	(0.19)	0.2218	0.0939	-0.7820	(-2.21)	1.2486	(1.77)
S&P GSCI Enhanced Index	-0.0491	(-0.37)	0.2670	-0.1838	-0.8992	(-2.54)	2.0446	(2.89)
Average	-0.0009		0.2405	0.0066	-0.8063		1.4626	
Panel B: Constant Maturity								
JPMorgan Commodity Curve Index	-0.0445	(-0.37)	0.2390	-0.1864	-0.9180	(-2.60)	1.7457	(2.47)
UBS Bloomberg Constant Maturity Commodity Index	-0.0104	(-0.09)	0.2230	-0.0466	-0.9674	(-2.74)	1.9671	(2.78)
UBS Bloomberg SPGSCI Constant Maturity Composite	-0.0395	(-0.30)	0.2607	-0.1515	-0.8147	(-2.30)	1.7428	(2.46)
Average	-0.0315		0.2409	-0.1282	-0.9000		1.8185	
Panel C: Implied Roll Yield								
Barclays Index Pure Beta	0.0085	(0.07)	0.2359	0.0360	-1.0433	(-2.95)	2.3593	(3.34)
DB Commodity Booster	-0.0346	(-0.25)	0.2741	-0.1263	-0.6269	(-1.77)	1.6949	(2.40)
DBLCI-Optimum Yield	-0.0314	(-0.24)	0.2568	-0.1222	-0.6347	(-1.80)	1.1640	(1.65)
DBLCI-Optimum Yield Balanced	0.0080	(0.07)	0.2287	0.0350	-0.9601	(-2.72)	2.2855	(3.23)
DBLCI-Optimum Yield Broad	-0.0099	(-0.08)	0.2461	-0.0402	-0.8564	(-2.42)	2.1758	(3.08)
DCI BNP Paribas Enhanced Index	-0.0189	(-0.17)	0.2283	-0.0826	-0.9981	(-2.82)	2.1332	(3.02)
Average	-0.0130		0.2450	-0.0500	-0.8533		1.9688	
Panel D: Other Roll Methodologies								
Barclays Commodity Curve Allocation Index	0.0378	(0.32)	0.2378	0.1590	-0.9459	(-2.68)	1.9436	(2.75)
Merrill Lynch Commodity Index eXtra	-0.0497	(-0.37)	0.2677	-0.1857	-0.7627	(-2.16)	2.0415	(2.89)
RICI Enhanced Index	-0.0152	(-0.14)	0.2246	-0.0679	-0.9163	(-2.59)	1.8064	(2.55)
Average	-0.0091		0.2434	-0.0315	-0.8750		1.9305	
Panel E: Signal-based Enhancements								
Bache Commodity Index	-0.0079	(-0.10)	0.1580	-0.0498	-0.1833	(-0.52)	0.4344	(0.61)
BNP Paribas COMAC Long Only	0.0107	(0.11)	0.2019	0.0530	-1.3428	(-3.80)	3.0155	(4.26)
BNP Paribas Oscillator Commodities	0.0074	(0.12)	0.1237	0.0599	-0.6146	(-1.74)	0.1983	(0.28)
CYD Long-Only	-0.0118	(-0.12)	0.1943	-0.0608	-0.5248	(-1.48)	1.2765	(1.81)
CX Commodity Index	0.0096	(0.08)	0.2272	0.0421	-0.5828	(-1.65)	1.6926	(2.39)
DBLCI-Mean Reversion	-0.0368	(-0.29)	0.2533	-0.1451	-0.6169	(-1.74)	-0.1564	(-0.22)
Morningstar Long/Flat Commodity Index	0.0368	(0.51)	0.1439	0.2554	-0.6355	(-1.80)	1.2678	(1.79)
Morningstar Long-Only Commodity Index	-0.0186	(-0.16)	0.2319	-0.0803	-0.7790	(-2.20)	1.7465	(2.47)
Average	-0.0013		0.1918	0.0093	-0.6600		1.1844	
Panel F: Averages								
First generation	-0.0592		0.2646	-0.2303	-0.4991		2.1937	
Second generation	-0.0093		0.2252	-0.0298	-0.7888		1.6053	

(*t*-statistic in parentheses)

Exhibit 3: Performance of second generation indices over the period May 31, 2008 - April 30, 2012
Source: Bloomberg and Author's Calculations

Enhanced Index.

(iv) Other roll methodologies: This section covers methodologies such as forward roll, which shifts the asset allocation to contracts with a given maturity;[3] e.g., 3-month (Barclays Commodity Curve Allocation Index) and methodologies that choose one representative contract each month along the curve (Merrill Lynch Commodity Index).

Mouakhar and Roberge [2010] present evidence that the implied roll yield methodology does improve performance relative to being long front contracts; Rallis, Miffre, and Fuertes [2012] draw the same conclusion, but with respect to the forward roll strategy. It should be noted however that while decreasing the risk of potential losses in contangoed markets, many of the strategies mentioned above (e.g., enhanced roll, constant maturity, forward roll) mitigate the potential gains that come from rolling in backwardated markets equally well. This comes from the fact that, as mentioned in Exhibit 2, the curve is less steep in the mid to far end in both states of nature: backwardation and contango. Besides, the benefits of using commodity contracts with longer maturities must be carefully weighed against the lack of liquidity of distant contracts. Rallis, Miffre, and Fuertes [2012] show that liquidity is concentrated in the front-end of the futures curve and thus that part of the performance of the forward roll strategy is in fact a compensation for the lack of liquidity of distant contracts.

While many second generation indices use advanced rolling techniques to mitigate the cost of negative roll yields, others differentiate themselves from their first category counterparts by using momentum and term structure signals in a long-only framework, where these signals have been shown to add value (2.10% alpha) beyond mere replication of the S&P-GSCI or DJ-UBSCI (Rallis, Miffre, and Fuertes [2012]). Examples in the category include: Bache Commodity Index and Morningstar Long-Only Commodity Index amongst others. Another signal that is often used is based on mean reversion. The widespread use of this signal follows from the seminal papers of Gorton and Rouwenhorst [2006] and Erb and Harvey [2006], which show that investors can earn equity-like returns by rebalancing monthly to equal-weights the constituents of a long-only portfolio of fully-collateralized commodity contracts. Within our cross section, this strategy is followed by DBLCI-Mean Reversion. Liquidity is yet another signal used to ease replication and thus enhance net performance (CX Commodity Index).

Exhibit 3 presents summary statistics on the performance of second generation indices, with Panels A to D focusing on the four roll methodologies mentioned above and Panel E on enhancements based on e.g., momentum, term structure, or mean reversion signals. Exhibit 3, Panel F compares the performance of first and second generation indices over a period that is common to both: May, 31 2008 - April, 30 2012.

The performance of second generation indices over the period 2008-2012 is better than that reported in Exhibit 1, Panel B for first generation indices. Even though none of the second generation indices earn positive mean excess return at the 5% level in Panels A to E, their average excess returns in Panel F, which stands at -0.93% a year, exceeds that of first generation indices by 5% a year. With the exception of constant maturity strategies that tend to underperform (-3.15% a year in panel B), the performance of the other strategies is found to be close to that of the average second generation index in Panel F. As distant contracts tend to be less volatile than nearby contracts, the annualized standard deviation of second generation indices is on average smaller than that of their first generation counterparts (22.52% a year versus 26.46% for first generation). As a result, the performance of second generation indices stands out on a risk-adjusted basis: their Sharpe ratios average -0.0298 versus -0.2303 for first generation indices. As in Exhibit 1, the distribution of second generation indices is negatively skewed and leptokurtic. Second generation indices fare worse than first generation in terms of skewness (-0.7888 versus -0.4991), but this result is mainly driven by DCI, which has positive and significant skewness in Exhibit 1. Excluding DCI, the average skewness in Exhibit 1 falls to -0.7586 and is thus similar to that reported for second generation indices. This suggests that both generations suffer severely during deep downturns.

Third Generation Commodity Indices

The high volatility observed in long-only commodity indices and the recognition of the importance of contango following the 2008 downturn in commodity futures prices were major factors initiating the creation of third generation indices. These long-short indices take long positions in backwardated commodities (with low inventory and net short hedgers) whose prices are expected to appreciate and short positions in contangoed commodities (with high inventory and net long hedgers) whose prices are expected to depreciate. As compared to the previous long-only generations, the dynamic long-short indices are designed to perform well both in up and down markets and also to capture the risk premium of commodities futures contracts, by applying more active investment approach.

Backwardation / contango in turn can be modelled via different signals that have been shown by academics to work well in commodity futures markets. These include: momentum (Erb and Harvey [2006], Miffre and Rallis [2007], Shen, Szakmary, and Sharma [2007], Szakmary, Shen, and Sharma [2010]) and the slope of the term structure (Erb and Harvey [2006], Gorton and Rouwenhorst [2006], Fuertes, Miffre, and Rallis [2010]). Macroeconomic and financial factors, geopolitical situation, supply/demand, and technical analysis are also used as signal to add value for commodity selection. In our sample, we have nine third generation indices categorized into the following strategies:

(i) Momentum: These indices use price continuation to determine long or short positions. Indices in this category include Mount Lucas Management Commodity Index and Morningstar Long/Short Commodity Index.

(ii) Term structure: These indices define positions based on the shape of the futures curve, taking long positions in the most backwardated commodities with the highest roll yields and short positions in the most contangoed ones with the lowest roll yields. CYD Long Short is a good example in this category.

(iii) Market neutral: These indices enter simultaneous long and short positions so as to be market neutral. CYD Market Neutral Plus is included in our cross section as an example.

(iv) Fundamental/Rule-based: These indices are based on a quantitative approach that combines fundamental forecasts and technical signals to design optimum commodity weights. For example, Barclays Capital CORALS defines asset allocation by combining technical signals (momentum) and fundamental analysis (inventory data, roll yield, and unemployment data, for example). Other methodologies in this group base index weights on recommendations from an outside specialist. An example here is BNP Paribas COMAC Long Short, which works jointly with Tiberius Group.[4]

Exhibit 4 presents summary statistics for third generation indices in Panel A, alongside with the average performance of first, second, and third generation indices in Panel B. Over the period May, 31 2008 - April, 30 2012 that is common to all three generations, the third generation indices stand out as offering the highest mean excess returns (at 3.02% on average versus -5.92% and -0.93% for the first and second generations, respectively). There is no clear tendency for one strategy to

	Main Strategy	Annualized Mean Excess Returns		Annualized Standard Deviation	Sharpe Ratio	Skewness		Excess Kurtosis	
Panel A: Third-generation: Individual performance									
Mont Lucas Management Commodity Index	Momentum	0.0731	(0.81)	0.1797	0.4067	0.9186	(2.60)	5.3399	(7.55)
Morningstar Long/Short Commodity Index	Momentum	0.0397	(0.56)	0.1423	0.2791	-0.4445	(-1.26)	0.9958	(1.41)
Morningstar Short/Flat Commodity Index	Momentum	0.0090	(0.22)	0.0819	0.1095	1.4523	(4.11)	4.6297	(6.55)
Morningstar Short-Only Commodity Index	Momentum	0.0261	(0.24)	0.2206	0.1185	0.9387	(2.65)	1.8896	(2.67)
CYD Long Short	Term structure	-0.0026	(-0.06)	0.0817	-0.0318	0.2115	(0.60)	-0.2041	(-0.29)
CYD Market Neutral Plus	Market neutral	0.0137	(1.12)	0.0245	0.5583	0.1413	(0.40)	0.4795	(0.68)
CYD Market Neutral Plus 5	Market neutral	0.0343	(1.12)	0.0615	0.5576	0.1614	(0.46)	0.4732	(0.67)
BNP Paribas COMAC Long Short	Fundamental/Rule-based	0.0644	(0.53)	0.2436	0.2644	-0.1148	(-0.32)	-0.4176	(-0.59)
CORALS/Barclays Index	Fundamental/Rule-based	0.0141	(0.17)	0.1658	0.0853	-0.8577	(-2.43)	0.6344	(0.90)
Panel B: Averages									
First generation		-0.0592		0.2646	-0.2303	-0.4991		2.1937	
Second generation		-0.0093		0.2252	-0.0298	-0.7888		1.6053	
Third generation		0.0302		0.1335	0.2609	0.2674		1.5356	

(t-statistic in parentheses)

Exhibit 4: Performance of third generation indices over the period May 31, 2008 - April 30, 2012
Source: Bloomberg and Author's Calculations

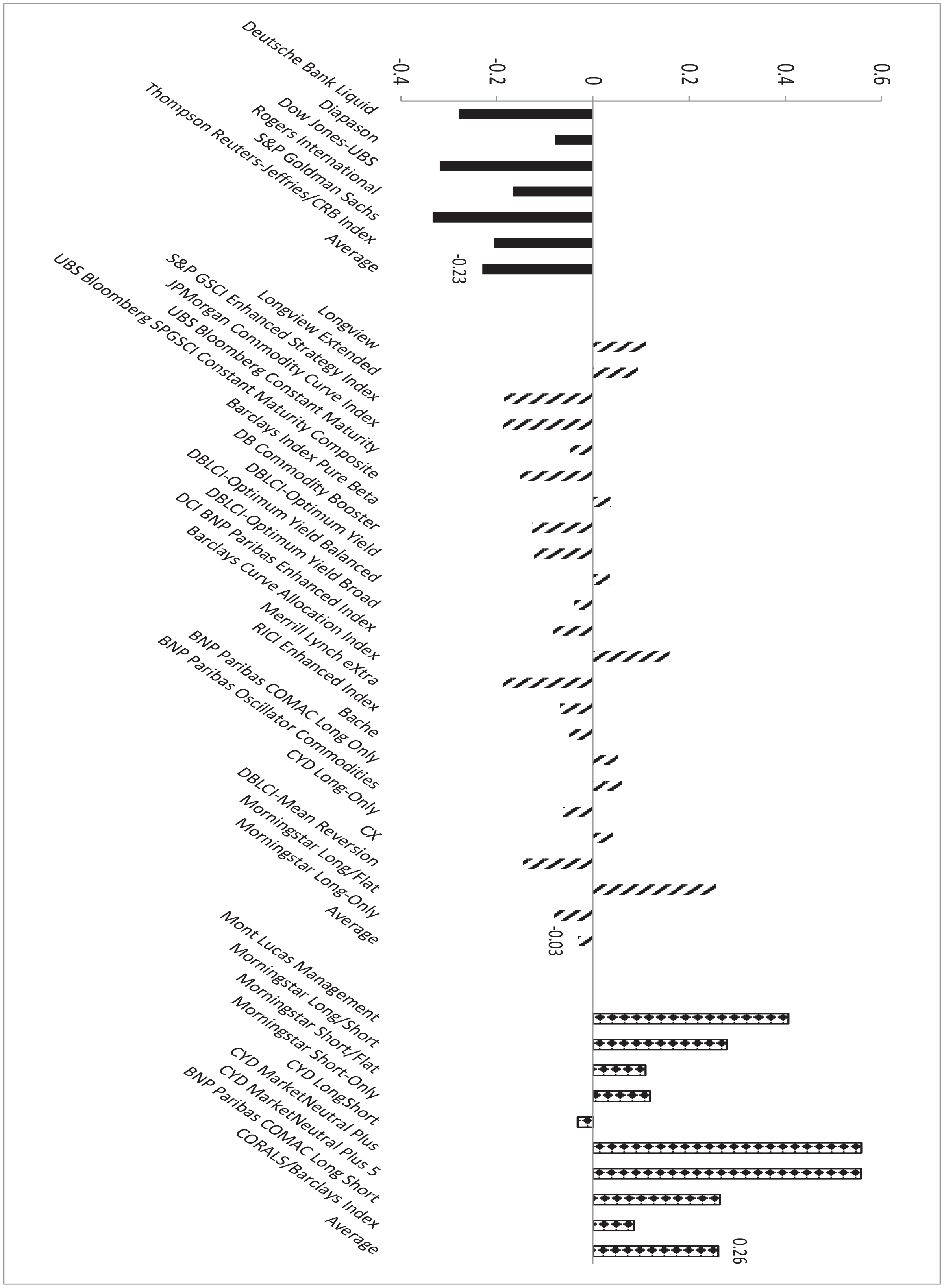

Exhibit 5: Sharpe ratios of first (solid line), second (diagonal line), and third (diamonds) generation indices (May 31, 2008 - April 30, 2012)
Source: Bloomberg and Author's Calculations

Exhibit 6: Mean excess returns of first (solid line), second (diagonal line), and third (diamonds) generation indices in October 2008 or following the debacle of Lehman Brothers
Source: Bloomberg and Author's Calculations

outperform the other ones. This suggests that the signal used is no guarantee of outperformance and that other parameters such as index constituents, rebalancing frequency, diversification constraints, or weighting scheme are likely to impact performance too.

Irrespective of the risk measures considered, the third generation indices stand out as being less risky, since they have noticeably smaller volatility, higher skewness, and lower excess kurtosis - all three characteristics are welcome features to risk-averse investors. Most noticeably, the long-short indices present volatilities that are on average 50% (59%) less than those of second (first) generations. This is to be expected, as the indices are often fully-collateralized (i.e., unlevered), with the shorts (longs) providing a partial hedge against the risk that the longs (shorts) may depreciate (appreciate) in value, thereby reducing overall volatility. As a result and as pictured in Exhibit 5 the Sharpe ratios of third generation indices (in green) at an average of 0.26 clearly stand out as being much higher than those of first generations (at -0.23 on average in blue) and second generations (at -0.03 on average in red).

The benefits of third generation indices are particularly clear in Exhibit 6, where we plot the excess returns of the different indices sorted per generation in October 2008, or right after the debacle of Lehman Brothers (dated September, 15 2008). Both first and second generation indices (as modelled in blue and red, respectively) performed poorly in this severely volatile market condition. However, the third generation long-short commodity indices performed exceptionally well, benefiting fully from contango and market downturn through the shorts, thereby increasing performance and maintaining low overall volatility. This result confirms the results presented in Miffre [2011], which highlight the outperformance of long-short (over long-only) commodity strategies, such as those implemented by CTAs in periods of high volatility in equity markets. Altogether, Exhibits 4, 5, and 6 suggest that third generation commodity indices could become serious contenders to CTAs that merely replicate strategies based on momentum and term structure.

5. Conclusions

The rising interest of institutional investors for commodities since the early 2000s prompted remarkable financial engineering in the commodity index space that is now in its third generation. This article reviewed this evolution and provided an assessment of index performance. Given recent proliferation of indices, it has become increasingly puzzling for investors to choose a specific index.

We conclude that the second generation indices are superior to their first generation counterparts. This improvement comes from their systematic attempt to minimize the harmful impact of negative roll yield (or contango) on performance, or from their use of active long-only signals based on momentum or roll-yields. Yet, second generation indices suffer from two major drawbacks. First, many of them hold distant contracts that are less liquid and thus are costly to trade; second, and most importantly, as they are long-only, they cannot fully benefit from the price depreciation associated with contango. We propose as an interesting alternative the third generation indices that accurately take into account the fundamentals of commodity futures markets by going long backwardated assets and short contangoed ones, simultaneously reducing overall volatility. In their design, they are closer to actively managed commodity trading strategies than they are to first or second generation indices. Besides, they offer good performance in periods of market downturn, good diversification to equity investors, high liquidity and full transparency at a low cost. As such, they might become serious contenders to commodity trading advisors that merely replicate strategies based on momentum or term structure.

Second and third generation indices regrettably only started trading recently, thus the live dataset that may be used to appraise their performance might be too small to draw clear inferences. It will be interesting to revisit the evidence once more data is made available.

Endnotes

1. Recently however the diversification benefits of commodities have been put into question. Not only Daskalaki and Skiadopoulos [2011] question whether commodities should at all be part of optimally diversified portfolios but also the correlations between stock and commodity returns has been shown to have risen dramatically since the debacle of Lehman Brothers (see for example, Büyükşahin and Robe [2010], Miffre [2011], Tang and Xiong [2011]).

2. Because of its early inception date (February 2003), DBLCI is often considered as a first generation index

(Akey [2005]). As it holds distant metals and agricultural contracts and thus performs well in contangoed markets, it could equally well be treated as second generation.

3. As the term structure of commodity futures prices tends to be less steep in the mid to far end, the cost of rolling in contangoed markets is then reduced.

4. Other examples include Credit Suisse (Goldman Sachs) which designs an index based on the views of Glencore (Clive Capital). These indices are not included as their return history is too short.

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