

# **Commodity Exchange Traded Funds and Exchange Traded Commodities – An Analysis**

Master's Thesis  
in  
Corporate Finance  
at the  
**Swiss Banking Institute**  
**University of Zurich**

advised by  
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Handed in: 9 July 2008

## **Executive Summary**

Historically, commodity investments have long been limited to either physical engagements or over the counter (OTC) and futures markets. Where physical investments are attainable for storable goods such as gold or silver, commodities such as lean hogs or live cattle force financial investors to obtain exposure via OTC or futures markets. Both ways, OTC and futures, go hand in hand with minimum deposits and operational requirements such as special accounts and a mark-to-market system, which realizes gains or losses on a frequent basis. Especially for retail investors, these requirements may aggravate an investment in commodity markets.

## **Problem Description and Objective**

Nowadays, investors have the opportunity to gain commodity exposure by purchasing exchange traded commodities (ETCs) or exchange traded funds (ETFs) on commodities. Both ETCs and commodity ETFs target to replicate the performance pattern of commodity underlyings. This provides an investor with full transparency as ETCs and commodity ETFs are supposed to equal the performance of the commodity underlying less a publicly available management fee. Besides these management fees that compensate for managing ETCs and commodity ETFs, implicit costs have been subject of scientific research; in particular, return deviations from the underlying index designated as tracking error and extensive bid-ask spreads, which both may diminish the performance. As a consequence, one of the main issues within this thesis is to conduct a performance analysis of ETCs and commodity ETFs listed on European exchanges by evaluating tracking error, bid-ask spread and volume measurements.

Commodity underlyings constitute either single commodities or commodity indices. ETCs and commodity ETFs on single commodities obtain exposure either via futures contracts or physical purchase. With regard to construct a commodity index, manifold decisions have to be made. This reaches from number of commodities included over weighting engine to the number of rolling days for a futures contract. As a consequence, a vast range of flexibilities allows commodity index constructors to create different return characteristics.

## Methodology

The thesis is structured into four chapters. The first chapter provides an introduction and describes motivation and goal of the thesis. The second chapter gives an insight into the universe of mutual funds, index funds, ETFs and index certificates. In a further step, this universe is narrowed down to ETCs and commodity ETFs. In order to illuminate characteristics and mechanics of commodity futures markets, we provide two theories that aim at explaining futures term structures. Moreover, we describe sources of return related to commodity investments, illustrate ETC and ETF market participants and explain in detail the investment costs due.

The third part is devoted to empirical analysis of commodity indices, ETCs and commodity ETFs. First, we descriptively analyze differences between eight popular commodity indices by means of answering several identification questions. Subsequently, we calculate yearly returns and compute Sharpe Ratio as the risk-adjusted performance measure. In a further part, we conduct an analysis of tracking error, bid-ask spreads and volume for 214 ETCs issued by ETF Securities and listed on London Stock Exchange (LSE), Deutsche Boerse, Euronext Paris, Euronext Amsterdam and Borsa Italiana. Moreover, we perform the same analysis for 26 ETCs issued by UBS and listed on Swiss Stock Exchange (SWX); for 4 ETCs issued by Lyxor Gold Bullion Securities and listed on LSE, Deutsche Boerse, Euronext Amsterdam and Borsa Italiana; for 4 commodity ETFs issued by Zürcher Kantonalbank (ZKB) and listed on SWX; for 12 commodity ETFs issued by Lyxor and listed on LSE, Deutsche Boerse, Euronext Paris, Borsa Italiana and SWX; for 16 commodity ETFs issued by Market Access and listed on Deutsche Boerse, Euronext Amsterdam, SWX and Wiener Boerse, and for 9 commodity ETFs issued by EasyETF and listed on Deutsche Boerse, Euronext Paris, Borsa Italiana and SWX. The last chapter concludes the obtained results.

## Results and Preview

In terms of assets under management (AuM), ETF industry accounts for a small fraction of market share comparing to mutual fund industry. This fraction is even less for ETCs and commodity ETFs. Within the analysis of commodity indices, we determine six identification factors responsible for the magnitude of commodity indices' prevailing

returns: commodity composition, futures contracts specification, weighting engine, rebalancing frequency, rolling methodology and maturity of futures contracts. Among all indices, we document different factor characteristics; however, one finding suggests that all indices include a significant basis of same specific futures contracts. In return analysis, we notice highly different yearly returns and corresponding Sharpe Ratios. This may partly be attributed to a past outperformance of commodity indices that exhibit longer average maturities of futures contracts. In conclusion, how much each factor contributes to return differentiation is highly dependent on the respective market environment.

In the empirical analysis conducted on ETCs and commodity ETFs, we find evidence for differences in NAV-to-index and price-to-index tracking errors. Where NAV tracking errors are comparably small, calculated tracking errors based on last prices are on average significantly larger. Furthermore, we document that based on last prices most of the ETCs and commodity ETFs exhibit neither significant under- nor overperformance, but an underproportional sensitivity to return changes in the underlying. In general, regression analysis for price-to-index tracking errors reports a highly mixed result and is partly evidence for poor data quality of some samples. In conclusion, we find evidence for different tracking errors, bid-ask spreads and volumes that may be attributed to the commodity underlying, the market exchange or the issuer.