The impact of speculation in commodity markets

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Introduction.

The amount of investments in commodity futures markets has increased excessively in the last decade. Institutional investors have picked up more commodities in their portfolio to spread their risk.

According to Gorton and Rouwenhorst (2006) the reason for this was that the returns of commodity futures where high, correlation with stocks and bonds were mostly negative and commodity futures could be used to hedge against inflation. Erb and Harvey (2006) conclude as well that the return of a rebalanced portfolio of commodity futures can be similar to the return on equity or that it could even be higher. Furthermore, the findings of Greer (2000) and Erb and Harvey (2006) showed a negative correlation between passive long investments in commodity futures and returns to equity. Concluding the high returns, the negative correlation with stocks and bonds and the possibility to hedge against inflation, it is very interesting picking commodity futures contracts up in portfolios.

The results of Gorton and Rouwenhorst (2006) and Erb and Harvey (2006) made the institutional investors interested and made it for them a good reason to go to the commodity market and start investing their money in futures contracts. The amount of investments rises excessively. Basu and Gavin (2010) gave an example of the commodity future index funds that has increased from 20 million in 2002 to 250 million at March of 2008 before the market collapsed. So the increase in the amount of money is relatively very large.
Another crucial part was the Commodity Futures Modernization Act of 2000, signed into law on December 21, 2000. This new regulation gave pension funds and other institutional investors better possibilities to invest.

Until the last decade, the price, price volatility and correlation between commodities depended mainly on the supply and demand of the products. This is similar as the theory described by Keynes (1930). Studies in the last decade have shown another factor that has to be taken into account which is called the financialization of the commodity market, the institutional investors which are investing in commodity futures contracts. It is difficult to point out to the speculators that these events occur, because there are several other factors influencing the prices of commodities and results of research are not often significant. For instance, according to Tang and Xiong (2010) it became clear that speculation has an impact

on the events in the commodity markets. They believe that the prices and price volatility movements went together with the increase in investing in commodity futures market. But the extent to which part of the price movements the increase in investments is responsible is not clear.

The main problem is that several studies like Masters (2008), Gilbert (2009), Einloth (2009) are suggesting that financial investors drive commodity prices up. And so, they call the rise in price caused by these institutional investors in the years between 2006 and 2008 a bubble. They found empirical evidence to blame the institutional investors for this bubble. Contrary to this studies Stoll and Whaley (2009) does not link the increase of investments in commodities to the price increase and price volatility. In their paper they criticize a Staff Report by the U.S. Senate permanent Subcommittee on Investigation about their attack on the commodity index investing. Stoll and Whaley (2009) conclude that commodity index investing has little impact on futures prices and explain that inflows and outflows from commodity index investment do not cause futures prices to change. As well as other studies like Irwin and Sanders (2010), Krugman (2008), Pirrong(2008), Smith(2008) and Buyuksahin and Harris (2009) do not point to the institutional investors about who causes the bubble because of a lack of evidence.

To conclude there are different points of view about the changes in the commodity market and the impact of the investments in this market. It is of great importance to find out what the real position is of the institutional investors in the bubble of the commodity market. It is also important for policy makers to ensure that they know everything correctly before they can impose new regulations to limit the institutional investors, or even prohibit them to speculate. They cannot launch these new regulations just to find out what really causes the problem, because setting up new rules and laws is very costly.

This study will first introduce the commodity futures market followed by an introduction of the financialization of the commodity futures market. The effects that this financialization might have on the commodity futures market will be set up after that. Several papers will be discussed with their empirical results on commodity futures return, volatility and correlation between commodities. In the last section, the conclusions of the papers will be compared and our own conclusion will be made.

I. Commodity futures market.

Producers of commodities could protect themselves against price decreases by buying a futures contract. They do this by going ´short´ in a futures contract. They establish a price for which they sell their product on a particular time in the future. Consumers on the other hand, who want to eliminate the risk that they need to buy commodities at a very high price in the future ´go long´ to ensure a price for which they could buy their product. To protect you against these price risks is called ´hedging´. Investors can go ´long´ or ´short´ by speculating purely to make profit based on the price movements.

These futures contracts are traded on a futures exchange market. In a futures contract is described what the actual quality and quantity is of the underlying commodity or other asset. There are differences between futures contracts. They can call for physical delivery of commodities or other assets but can also be traded for cash without the physical product. Another possibility is to roll-over your futures contract. This means that one of the two parties closes the contract prior to maturity by taking the other side of the contract before expiration and then enters a new contract with a further expiration maturity. You should sell your contract if you currently hold a futures contract and buy a new one with a further expiration date. With rolling over a futures contract you will not take physical delivery of the commodity but you will continue holding your futures contract.

Advantages of these futures contracts are, in contrast to stock exchanges, that you only have to invest a small percentage of the actual value of a futures contract. You only need an underlying security to make sure you can pay eventual higher losses. A reason for trading in the commodity futures market instead of the spot market is that buyers of future contracts do not or do not yet want the physical product. When the physical product is bought now, while the product is actually needed over a period, the holder will meet storage costs. Another problem is that some of the commodities like food cannot often be stored for a longer period. Furthermore, some investors which are the case for institutional investors do not want the physical commodities, even not after expiration of the futures contract. They just want the profit made on their futures contract by rolling over the futures contract before expiration. So for them, trading in the commodity futures market is way better than trading in the commodity spot market.

Originally in the futures market there was the theory of normal backwardation (Keynes, 1930). This means that the futures price is lower than the spot price in the future. This results that the futures price will move towards the spot price at maturity and the excess return of the commodity future will then be positive (Erb and Harvey, 2006). This was for hedgers who wanted to avoid commodity futures risk and paid a premium for it. But normal backwardation is unobservable because the future spot price is impossible to know. The study of Kolb (1992) concludes that providing the existence of normal backwardation is difficult for individual commodity futures in previous years until 1992.

Futures prices are determined in different ways depending on the deliverability of the commodity. When there is enough supply of the commodity, the futures price is the expected futures value discounted at the risk free rate. This results in a riskless profit opportunity for investors. But there are other factors like storage costs, dividends, dividend yields, and convenience yields influencing the price of the futures contract. But the fact for commodities is that mostly there is not a plentiful supply of a particular commodity. When this is the case, commodity futures contracts are priced via expectation. Then the supply and demand is used to determine the price of the commodity future. When the demand of futures contracts is very high, the prices will rise.

Another important factor for the price and price volatility of commodity futures is the theory of storage (also known as 'the cost of carry arbitrage'). Gorton, Rouwenhorst and Hayashi (2007) show that the level of inventories in the economy determines the time-series variation and the cross-sectional variation in the commodity futures risk premiums. When futures prices and expected spot prices rise over time, the inventory holders will be compensated for the costs associated with storage. This will induce more storage. Commodity inventories are also able to absorb shocks in supply and demand which will reduce the prices and price volatility.

With this theory of storage, it is sometimes more profitable to hold the physical product and store it, instead of buying futures contracts. You can get a premium for holding the actual physical product. Because of irregular market movements, when perhaps the physical product is scarce and there is a high demand for it, the difference between your first purchase price and the price after an increase in price is the convenience yield. Increase in prices are called ´shocks´ and can arise from a drought, a bad harvest or political intervene, which will now and then occur in the commodity market. When this happens you have the benefit of

physically holding the commodity. The product can be sold with a premium because some buyers will pay more money because of the scarcity of the product and if they definitely need it. This is for investors an important factor to take into account to choose to buy the physical product instead of a futures contract on a particular commodity. We will not take this into account and our focus is on the futures contracts.

So the return of commodity futures mainly depends on the amount of demand and supply in futures contracts. When the demand side of futures contracts is higher than the supply side, prices will rise to reduce the demanded amount to pull the market to his equilibrium. From the other side, when the supply side exceeds the demand side, the prices will decline to get rid of all the futures contracts asked.

II. Financialization of the commodity futures market.

After we introduced the commodity futures market, it is clear that there changed a lot in this market in the last decade. Futures contracts in the commodity market, meant to reduce the risk of price changes for producers and consumers, started to become more and more interesting for others, called institutional investors. When they discovered the market, they started to buy futures contract. However the institutional investors did not come into the commodity futures market to buy the physical product, but purely to spread their risk on their portfolio, the demand side started to largely exceed the supply side. At his turn, this large increase caused a rise in price of the commodity futures contracts which made it more attractive to pick up futures. This increase in investments of the commodity futures market is called the financialization of the commodity market.

Gorton and Rouwenhorst (2006) have investigated the commodity futures contracts between July 1959 and December 2004 and concluded three important reasons what made it interesting for institutional investors to invest in those futures contracts. According to them, the returns of collateralized commodity futures have had an excess return over T-bills of 5% per annum. Thereby, the commodity futures risk premium was about the same as the historical risk premium of stocks and exceeded the risk premium of bonds. Measured by standard deviation, the commodity futures returns, when diversified, have slightly a lower risk than stocks and

furthermore, commodity futures have less downside risk because they are positively skewed to equity returns.

Gorton and Rouwenhorst (2006) concluded that the returns of commodity futures have been very effective for diversification of portfolios with stocks and bonds, mostly because the correlation was negative. As an explanation for the negative correlation for commodity futures with stocks and bonds they stated that commodity futures perform better in periods of unexpected inflation. At that time, stocks and bonds returns disappoint. Showing this reason, it is also interesting to invest in commodity futures for hedging inflation. Another reason for the negative correlation is that commodity futures diversify the cyclical variation in stock and bond returns.

Like Gorton and Rouwenhorst (2006), Basu and Gavin (2010) also explain the rise in investments of the commodity futures market and they give two reasons for this.
They explain that the first reason for this was that investors wanted more substantial yields in an environment with very low returns paid on safe assets. They also mention that investors moved to real estate derivatives for the same reason after 2000. When the real estate market started to show problems from 2003, investors of the real estate market went to the commodity futures market to secure their selves for a safe portfolio. This created a bubble.
As a second reason, Basu and Gavin explain that institutional investors think that commodities can be used to hedge equity risk. But they concluded that in fact, when the equity market collapsed in 2008 during the crisis, the negative correlated commodity futures also collapsed and the correlation became positive. So according to them, in times of crisis the commodity futures are not an asset to hedge equity.

Other studies draw their own opinion about the rise in investments in the commodity futures market which slightly conclude the same. Tang and Xiong (2010) state in their study that it all started when the equity market collapsed in 2000. The negative correlation between commodity futures returns and stock returns made investors believe that it could reduce portfolio risk. The results of the negative correlation went public and the investment banks successfully promoted commodity futures by investors as a new asset class. According to Stoll and Whaley (2009), the reason for this was that the returns of commodities were uncorrelated with other assets like stocks and bonds. This suggests better diversification for the institutional investors. Diversification for investors states that they invest in several

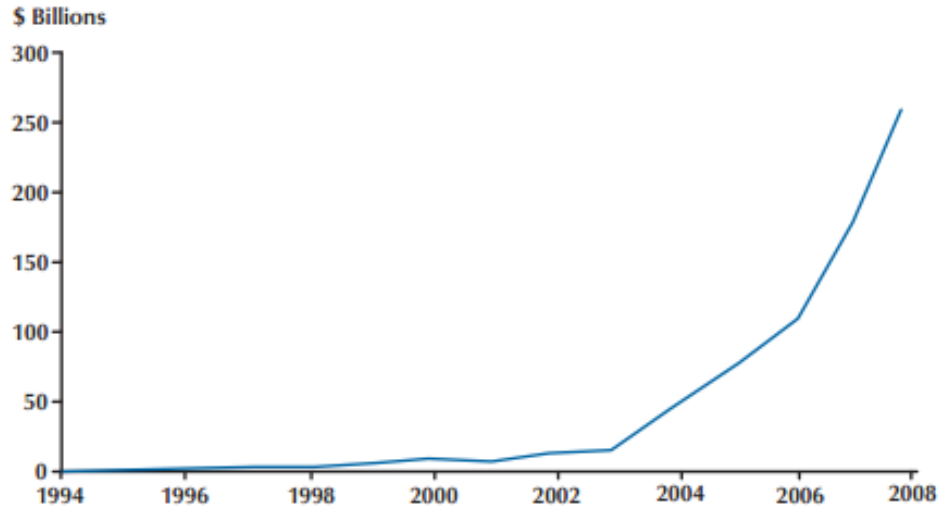
different assets to better spread their risk. More diversification is better because then investors are not dependent of a small group of assets they invest in which are also often correlated. This suggests for the institutional investors that picking up commodities in their investment portfolio would reduce the risk.

Apart from these reasons, which made it interesting for the institutional investors, there was another crucial factor for the financialization of the commodities futures market. This factor is the change in regulation by The Commodity Futures Modernization Act (CFMA) of 2000 which gave the institutional investors the exposure they needed. The CFMA allowed to trade look-a-like products of futures outside of the exchange. (Boons et al, 2012) This was for the institutional investors a good opportunity to invest in the commodity futures market which became promoted by investment banks.

As a result of the change in regulation and the large amount of interested institutional investors, the commodity futures contracts that were traded increased from 0.6 billion in 1998 to 3.5 billion in 2008 (Boons et al. (2012)) and the commodity index-fund investments increased from 20 billion in 2002 to 250 billion at June of 2008 (Basu ans Gavin (2010)) (Figuur 1A).

Figure 1A

Commodity Index-Fund Investment (year-end)



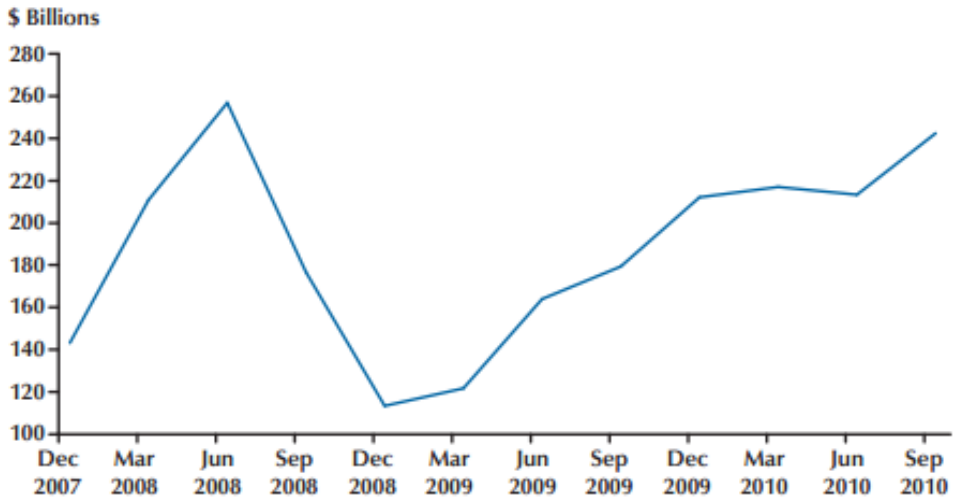
NOTE: 2008 data are through March only.
SOURCE: Masters (2008, Chart 1).

After the spike in June 2008, the commodity futures market collapsed and the index-fund investments declined rapidly to about 112 billion in December 2008. After the immediate decline the institutional investors came back and started investing in commodity futures again

and the same trend as started in 2002 occurred (figure 1B). This resulted in 340 billion dollars of index-fund investments in May 2011. After that, we see again a small decline to 300 billion dollars in March 2012 (U.S. Commodity Futures Trading Commission).

Figure 1B

Notional Long Positions Invested in Commodity Futures Index Funds



SOURCE: CFTC.

As earlier shown in figure 1A, the amount of money invested until 2003 in the commodity index-fund was very small. The commodity futures contract was not very well-known by institutional investors. Investing in the commodity market was very complex. The market was difficult to understand and data was often not available in large amounts. After the year 2000 it became easier to understand the market and data became available in much larger amounts. According to Basu and Gavin (2010) it was not only the commodity futures market were investments increased largely, in the same time, in all other derivative markets there is shown an upward trend of investments.

There are several different commodity index investors who are responsible for the increase in investments as shown above. Stoll and Whaley (2009) stated that about 24% were index funds, 42% institutional investors, 9% sovereign wealth funds and 25% were retail investors.
They invest big amounts of money in futures contracts to spread the risk of their portfolio.

III. Impact of financialization.

As a result of the increase in investments in the commodity futures market by institutional investors, the prices of commodity futures could start to rise. Even so the price volatility will then be higher, because the prices will start to fluctuate more, dependent on the speculators. Furthermore, a possible effect is that commodities start to correlate more. There are several studies that mention different causes about how speculating can influence the price, price volatility and correlation.

One of the causes that could increase futures prices is that with the large amount of futures contracts, institutional investors might create an artificial scarcity. Hedgers know this and for them it becomes more attractive to hedge their commodities and the amount of hedging will increase. So when the amount of speculators increases, the amount of hedgers will also raise.

According to Olivier de Schutter from the United Nations who investigates the food prices, institutional investors can provoke increase in prices by gambling on price increases. Kaufmann and Ullman (2009) state that the increase in demand and a stagnated supply resulted in a higher price to clear the market. When the speculators recognized this event, they start taking their positions in the futures market what causes the price to rise even further. Masters(2008) accuses the big impact on the commodity market to the insensitivity of the index speculators when they buy large amounts of futures contracts at a time. Even so, the capital market is much larger than the commodity market. Investing several billions will therefore have a much bigger impact on the commodity futures market than on the capital market. Furthermore, Masters (2008) states that the rise in prices at his turn attracts more institutional investors to invest in commodities. So the rise in price and the raise in investments drive each other up. However, Smith (2008) declares that the only reason why speculators can cause a rise in the oil price is when they scare off other market participants which then will hold commodities off the market. This because speculation does not ask for the physical product and has no influence on future prices by itself.

Einloth (2009) stated that the problem in 2008 was that speculators added even more to inventory while the demand was high what has driven up the price even further to a price of $140 before the market collapsed. Actually, speculators should store oil if the price of oil exceeds the cost of storage. This will reduce the volatility of the price and the impact on the

price will be less. This is all explained in the paper of Working (1949). Einloth explains about this that it is important to store enough oil above the ground to react on the price fluctuations.

Apart from the rise in price and price volatility, speculation could have effect on the correlation of commodity futures. When the correlation between commodities will be higher, the rise in price of one commodity will be more sensitive for another commodity. This is not only dependent if the commodities are substitutes from each other, but a crucial reason of the rise in correlation is that the institutional investors hold portfolios with different commodity futures in it.

An important influence by the rise in future prices, stated by Irwin and Sanders (2010) is that if speculators are able to drive futures prices up, the current spot price will also rise in order to maintain equilibrium in the inventories. This argues that a high demand of futures contracts and preventing a shortage in the future will not only raise the futures prices, but will also drive the spot price up. As well, Masters (2008) told in his testimony that According to the CFTC and spot market participants, commodities futures prices are the benchmark for the prices of actual physical commodities, so when index speculators drive futures prices higher, the effects are felt immediately in spot prices and the real economy.

Also according to Hamilton (2009), futures prices contain information for spot prices and Kaufmann and Ullman (2009) give even a further explanation. They state that until 2004 the spot prices of commodities contained information about the futures prices. But they declare it changed after 2004 whereby the future prices started to explain partly the spot prices. The futures prices are mainly determined by speculators. By spot prices it are the market fundamentals that mainly determine them. When this occurs, the events in futures prices flow then through in spot prices and otherwise, the events in spot prices flow through in futures prices. As the maturity of the futures contract expires, the futures price and the spot price will then move to each other.

Further concluded by Kaufmann and Ullman is that a high demand of futures contracts will make producers think there will be a shortage which will raise the price of the future but also flows then through in the spot price. Einloth (2009) declares that speculation is transmitted to spot price through inventory. So by a high demand of speculators, the price of futures can rise. The prices of spot prices will then also rise because of an eventually shortage in the future.

When the prices on the futures market and spot market increases, these prices will then influence the prices on the local markets. The prices where normal consumer buys their products in the stores and gas stations will increase as a result of speculation by institutional investors. This is the point when speculating should be limited: Poor people will not be able to buy their own food anymore and normal people are suffering from it.

IV. Empirical findings.

There are several studies which have investigated commodity prices and the impact of speculation. Some of them conclude that speculation has impact on the commodity futures market but others cannot find significant evidence or point out speculation because they are not trading in physical products. Several studies will be discussed in this paragraph.

According to Olivier de Schutter from the UN, the cause of the rise in food commodity prices are partly the crop failures and the growth of the world population, but the institutional investors made it worse because of their large financial influence. He concludes this out of study where he compares the market share spikes of speculators in the commodity futures market with the price spikes of commodity futures. Both trends run together and peak at the same time. The price spikes are too large to be created only by crop failures and an increase in demand.

Pirrong (2008) sharply reacts on these kinds of assertions of what many people say about the speculators. Pirrong reacts in his study on statements of the Congress made by Sen. Joseph Lieberman and Rep. Bart Stupak who assert that institutional investors caused a rise in the oil price of about $70 per barrel. For that, they want the Congress to prevent pension funds and other financial institutions to invest large amounts in the commodity futures market. Pirrong rejects this assertion and states that they would only harm consumers and producers by preventing the market from big investments. The oil price would not reduce if the speculators are pulled out of the market. Pirrong tells that there is also nothing seen like manipulation in the market. And if speculators would have manipulated the market, the effects on the commodity prices would not last long.

What Pirrong (2008) declares is that the future market is misunderstood. Speculators do not ask for the physical products unless they want to build up inventory, what is not likely in most of the cases. Speculators do not exercise the actual delivery of a product, so the demand for physical oil does not increase by speculators. If speculators step out of the market, the price would not reduce but the producers who want to trade futures contracts cannot easily sell them because there are not much speculators who want them. So the market would be less efficient and the price of hedging risk will be much more expensive for the producers. This will be calculated in the price of for example oil and so the price will stay high in the future. The actual causes are the growing demand in oil, the supply does not grow enough and the dollar is losing value against other currencies. But the problem of Pirrong's statements is that they are not sustained by empirical evidence and it appears that he only gives his thoughts in this case.

Like Pirrong (2008), Smith (2008) tells that speculators do not play a role in the physical market by trading futures contracts and that they are not the cause of the price. It is a matter of supply and demand but Smith declares the shortage in supply better than Pirrong. The demand quantity for oil raised in the last 2 decades. OPEC, an organization where a lot of oil producers are connected with, produced less than the growing demand. OPEC is the main price maker for oil and for them, this was a commercial choice. In the years from 1975 till 2008, the demand has grown with 80 percent while the production of oil has grown only with 24 percent. Furthermore, non-OPEC production decreased with 23 percent since 2003, while in those years the demand grew with 33 percent.

According to Smith (2008), the problem of the oil market is that the OPEC does not produce at full capacity because they think it is better to not produce oil than to keep it off the market. The oil production of OPEC producers stayed at a level of 34 million barrels since 1973 while non-OPEC producers raised their production with 69 percent since that year. It is difficult to expand it in a short time, because OPEC did not invest in new capacity and they are not able to intercept demand shocks. But on the other side, building up inventories is expensive, therefore also not a solution.

Interesting against the study of Smith is Masters (2008). He has another point of view than Smith. Masters blames the institutional investors which he calls the index speculators. He states that the supply of commodities is adequate and the prices of commodities have doubled or even tripled in 5 years. In his study he explains that there is not a supply crisis like in

earlier price shocks. Masters then points at the demand side which should have increased by a large amount, but the fact is that there are still enough commodities to consume. With analysing futures and index investments by speculators, Masters finds that commodity prices rise at the same time and structure as the index investments. With this moderate evidence, Masters points at the speculators causing a demand shock.

According to Masters, the biggest problem is that index speculators only buy futures. Traditional speculators provide liquidity by buying and selling futures contracts. On the other hand, index speculators only consume this liquidity by buying future contracts and 'roll' them, but they almost never go short in futures contracts. This does not benefit the commodity market. Masters conclude that index speculators damage the commodity market and drive the prices up which harms the normal consumers of the physical products. Consumers have to pay higher prices which will become more and more difficult for poor people. He wants the Congress to intervene in the commodity futures market to protect the society.

Like Masters (2008), Gilbert (2009) easily excludes fundamental factors with just the simple reason that they are not big enough for the tremendous rise in price. According to Gilbert, the economic growth in upcoming markets like China, the growing demand of biofuels and the declining of the dollar against other currencies cannot be the major cause. Gilbert has a strong analysis to sustain his opinion about speculators.

Gilbert uses a sample of seven commodities (oil, three metals and three grains) to investigate the impact of index investments on commodity futures prices. The data he used comes from the CFTC's supplementary Commitments of Traders Reports. He constructs a quantum index of total net index-related futures position since 2006 and creates with his data a Corazzolla index. He compares this with a Granger-causality analysis to the logarithmic changes of the seven daily commodity futures prices. With this analysis he finds significant evidence that his three non-ferrous metal and oil prices are Granger-caused by index investments. His other three agricultural prices have limited evidence to conclude the same results. With the estimated price impact, Gilbert estimates that the index-based investments have raised the commodity futures prices with about 5-10% and even to 15% at the beginning of 2008.

Like Gilbert, Einloth (2009) has also evidence to blame speculators for the rise in prices but concludes this with a whole other study. He used a new methodology using inventories of oil and the convenience yield imputed from futures prices to detect the influence of speculation on storable commodity West Taxed Intermediate (WTI) and Brent prices. If speculation plays

a role in price increases, the convenience yield should decline over that period. The convenience yield gives a good determination because it controls for non-speculative factors that can influence inventory. His evidence is inconsistent with the rise in price till $100 because the marginal convenience yield increased while the price also increased. This suggests an unanticipated demand growth. But to the price of $140 a barrel the marginal convenience yield sharply decreased what shows that speculators were building inventory and so driving the prices up.

Furthermore, Einloth (2009) Finds that the collapse in price was not caused by the speculators which bring out their stored oil to the market (prices and marginal convenience yield both decreased) but it was a result of the decline in demand of the commodities. The price of oil will increase again when the oil demand will grow and if other new energy sources will stay away. About this event, Einloth noted that if the demand had risen, speculators would have moderated the price volatility by bringing inventory to the market. So, speculation does in general not always causing a higher volatility.

Einloth (2009) does not test for other commodities. He states that some of the other commodities can be explained the same with the convenience yield, and for some other commodities it is difficult to explain. Perhaps gold, which has no big storage costs and for other commodities storage costs have no effect because some commodities have to be consumed immediately and cannot be stored.

Another point of view from a different study on oil is from Krugman (2008). He comes with a simple rule about supply and demand in the oil market. When the price is higher there is an excess of supply because it exceeds the demand side. In the last decades the price has been above the equilibrium, what means an excess of supply. However the price of oil is very inelastic, according to Krugman -0.06 (short run), so the price should not respond that much on a shortage when demand sharply increases because normally there is an excess of supply that flows into inventories. Krugman states that if it is so that demand exceeds supply, there should be disappearing a lot of oil in inventories, but that is not the case, in fact, not shown in the OECD inventory data. With this, Krugman states that speculation has not to be taken into account for creating a price bubble, but he gives no further explanation and does not create evidence to support his opinion.

The same as Krugman (2008), Irwin, Sanders and Merrin (2009) complain about other studies, but in a complete other way. They argue that most of the results of tests by others

who blame speculators are insignificant. By using a granger causality test Irwin, Sanders and Merrin (2009) conclude significant results for not more than 5 out the 30 results. They criticize the granger causality test which is used by several studies (Bryant, Bessler and Haigh (2006), Gorton, Hayashi and Rouwenhorst (2007) and other studies) because it has limited power when data is only available on a weekly or monthly basis. This makes it difficult to match the cause and effect. Even daily data does not often provide significant evidence and when they are, the impact of the evidence is small.

Irwin, Sanders and Merrin also state that in times of high prices and price fluctuation, speculation has often been criticized. In some of the cases new regulation where made to limit speculation. But it is never seen that limiting speculation caused the high commodity prices to decrease.

Like Tang and Xiong (2010), Irwin, Sanders and Merrin (2009) also state that the price boom and bust of the commodity market has just little evidence to be created by a speculative bubble but they point, with more confident, at the emerging markets as better explanation. The strong demand from China, India and other large upcoming markets drives the prices up because of an excessive demand. And for oil the production is leveling out and the prices will react immediately. Sharing this view is Hamilton (2009) who investigated the oil market. He mentioned the problem that emerging economies were asking for more and more oil. China was asking more oil at an annual rate of 7% each year for the last two decades, but the world oil production stagnated. With a big increase of a large country as China, it has a big impact and supply will not be longer in equilibrium with the demand of oil.

Smith (2008) declares the same that in the early 2000s, the demand from emerging economies like China gave the market a supply shortage and the growing production costs has also driven the price of oil up. But he states it cannot explain the massive increase to $140 per barrel. The price of oil is very inelastic, so a small physical oil shock has an impact of ten times as big on the price. The major price shock was in the first half of 2008. Smith explains this of all the happenings in that period like shutting down pipelines and burning oil fields in several parts of the world.

Smith (2008) states that it is easy to blame the speculators because they picked up a bigger market share since 2004. But Smith says that hedging and speculation has no significant effect on the current oil price because futures contracts which not trade the physical product do not

cause an increase in demand. The only reason that speculators scare off other market participants, which then will hold oil off the market, has also not been seen during the price spike of 2008. The conclusion of Smith is that the major cause of the price spike is the price fixed by the OPEC and their miscalculating about the oil supply that is needed.

In the paper of Tang and Xiong (2010) it is concluded that the investments of commodity index investors has not only an impact on the price and price volatility, but also on the correlation between commodities. In their study they differentiate the indexed commodities from the off-indexed commodities because indexed commodities are significantly more pronounced and so they can analyse the difference between them. For the indexed commodities they looked at the Goldman Sachs Commodity Index (GSCI) and the Dow-Jones UBS Commodity Index (DJ-UBS) because those are the two most popular commodity indices. They use futures prices because those are centralized traded en therefore more liquid and more available than spot prices. These prices are connected with the large inflow of index investments.

Tang and Xiong (2010) refer to the growing demand from emerging economies like China as the factor that partly has his influence. They noticed that for some commodities which are heavily traded in China the same fluctuations in price as in the US. For other commodities which were not often traded, they see just a stable normal line in price. Furthermore, the futures contracts that are traded in both China as the US also differ a lot in correlation. In China it circled around 0.2 but in the US it increased to almost 0.6. That concludes that the growing demands in emerging markets like China do not drive the whole the boom and bust.

Tang and Xiong (2010), conclude about correlation that between indexed commodities and oil, the commodity which is traded the most; the correlation started increasing after 2004. Before 2004 the correlations of cotton, live cattle and copper with oil had been in the range of -0.1 and 0.2, mostly around zero. But after 2004, Tang and Xiong (2010) showed that the correlation with oil rises to 0.5, 0.4 and 0.6 respectively in 2009. This was the same time that investors mainly started picking op commodities in their portfolio. A point that supports their conclusion about index investing is that the correlation between off-indexed commodities increased to 0.2 but the correlation between indexed commodities increased to a further level of 0.5.

But the results Tang and Xiong (2010) are contradictive to studies of Buyuksahin, Haigh and Robe (2009) and Silvennoinen and Thorp (2010). They attribute the rise in correlation

between commodities futures to the crisis. Tang and Xiong (2010) won't because in their study they see the increase in commodity return correlations starting long before the crisis.

Like Masters (2008) and Gilbert (2009), other market fundamental factors like inflation and the adoption of biofuel are also excluded by Tang and Xiong (2010). The inflation stayed on a normal basis in the last decennia. Biofuel could increase the price of some commodities which are related to each other, but out of the study of Roberts and Schenkler (2010) appears that it could not be that much. Even so, the increase of unrelated commodities would not be explained.

V. Conclusion.

In the early 2000's it became more and more attractive for institutional investors to invest in the commodity futures market to reduce their portfolios risk. The three main reasons for this were the high returns of commodity futures, the negative correlation with stocks and bonds and the possibility to hedge against inflation. Also important was the Commodity Futures Modernization Act of 2000, which gave investors a better opportunity to invest. Institutional investors started speculating and picking up commodity futures in their portfolio which resulted in the financialization of the commodity futures market.

The prices and price volatility of commodity futures started to rise excessively. The question rose if it was the cause of the institutional investors or it were just market fundamentals which were driving up the prices. Several studies have investigated this subject with different outcomes. Masters (2008), Gilbert (2009), Einloth (2009) find empirical evidence to blame the institutional investors by creating a bubble in the commodity futures market by speculating. Several other studies like Irwin and Sanders (2010), Krugman (2008), Pirrong (2008), Smith (2008) and Buyuksahin and Harris (2009) do not blame the institutional investors for causing the bubble because of a lack of evidence.

Both the market fundamentals and speculation should be taken into account. In the several studies about the commodity futures market and speculation it has been seen that it is hard to find significant evidence. Several studies investigated the commodity futures market and index investments in a different way. Some studies used Granger causality test, convenience yield or other methods, and other papers criticize others by their conclusions on this major

subject. But what we can conclude is that the growing demand of emerging markets like China has a large impact. Also the oil market, because it is widely the largest traded commodity, has a big impact on other commodities. With the large increase in oil demand and the stagnated supply, the prices increased to maintain equilibrium in inventories. With this, oil partly influences other commodities.

The large increase of index investments of the institutional investors also has its impact. It made the prices of commodity futures increase even further. The correlation also started to rise because several different commodities were picked up in portfolios. But it is hard to find clear evidence to see how large the impact of just speculation is. Because of this lack of evidence it is also difficult to conclude if speculation should be limited or not.

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