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The 2014 Oil Bust: Causes and Consequences

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Abstract

This article suggests that the 2014 oil price collapse was possibly triggered by the falling Euro versus the US Dollar. Specifically, the USD/EUR exchange rate likely adjusted to the sudden economic growth outlook divergence between the US and the EU, as evident by the relative short term interest rate spread measures, and triggered a "strong dollar" trade, which is negative for the crude oil prices. Thus, in our view, the 2014 oil price bust is another episode of oil price inefficiency, similar to the 2008 oil bubble. The key argument presented in this article is that, as long as there are temporary economic growth divergences between the US and the EU, the resulting exchange rate volatility is likely to create the pricing inefficiencies in crude oil, which in fact are mean-reverting, as the economic growth divergences eventually dissipate.

Keywords: oil price, collapse, bubble, exchange rates, the Euro

1. Introduction

Crude oil prices dramatically collapsed in the second half of 2014 from nearly $110/barrel to just above $40/barrel, as illustrated in Figure 1. It is particularly interesting to note that the oil bust of 2014 was completely unexpected, since the price collapse was not preceded by the spike, as it was the case in 1991 and 2008 – the price of crude oil just simply collapsed from a gradually rising uptrend. Thus, it is very important to understand the potential causes and consequences of the 2014 oil price collapse, especially given that the literature documents significant linkages between the oil prices and the financial markets, the macroeconomic cycle, and more specifically inflation, (see Hamilton, 1983; Mork, 1989; Hamilton, 2003; Oladosu, 2009; Barsky and Kilian, 2004; Gómez-Loscos, Gadea, and Montañés, 2012; Defina and Taylor, 1993; Soucek and Todorova, 2013).

The financial media attributed the 2014 oil price collapse to an apparent glut in oil supplies, noting the possible demand slowdown in China, and relentless energy production from the US shale. Thus, the financial media assumed that the oil price efficiently responded to a newly released fundamental information in the second half of 2014. Yet, the academic research is inconclusive, at best, on whether oil prices behave efficiently. The empirical evidence shows that oil prices are generally efficient in some periods, while somewhat inefficient in certain sup-periods, with so-called structural breaks when oil prices clearly behave inefficiently, for example during the 2008 oil bubble (see Stevens and de Lamirande, 2014; Charles and Darné, 2009; Alvarez-Ramirez, Alvarez, and Rodriguez, 2008; Kristoufek and Vosvrda, 2014; Zhang, 2013; Wang and Liu, 2010; Ortiz-Cruz, Rodriguez, Ibarra-Valdez, and Alvarez-Ramirez, 2012; Shambora and Rossiter, 2007). Thus, the causes of the 2014 oil collapse must be evaluated beyond the assumption of oil price efficiency. Specifically, one has to consider the possibility that the 2014 oil price collapse was an irrational overreaction to a non-

fundamental trigger. In fact, in this paper we present our viewpoint that the 2014 oil price collapse was at least partly an irrational overreaction to a non-fundamental trigger - specifically the USD/EUR exchange rate. Our argument is consistent with The Bank of International Settlements report (BIS, 2015), which states that "changes in production and consumption fall short of a fully satisfactory explanation of the abrupt collapse in oil prices in 2014". Nevertheless, the surging production from the US shale producers provided a significant negative sentiment during the oil price downturn, and thus, contributed to the apparent overreaction to the downside.

Figure 1

2. Methods - The efficient market hypothesis framework

In an efficient market (see Fama, 1970; Fama, 1991), the price of oil reflects the balance between crude oil supply and demand, and possibly randomly fluctuates around the fundamental value (weak-from efficient market hypothesis). Likewise, the price of crude oil efficiently adjusts as the new publically available fundamental information emerges (semi-strong version of market efficiency), or even as the private information becomes available (strong version of market efficiency), see Figure 2.

Figure 2

Figure 3

In an inefficient market (see Shleifer and Summers, 1990; De Long, Shleifer, Summers and Waldmann, 1990), the price of crude oil does not always reflect the fundamental supply/demand information, and it reacts to certain non-fundamental information or triggers, which makes it possible to have the periods of significant and persistent deviations from fundamental values, defined as price bubbles to the upside, or overreactions to the downside (Figure 3).

Given the strategic and macroeconomic importance of crude oil, it is essential that oil markets remain as efficient as possible. Thus, it is important to understand the causes of significant oil price reactions, such as the price collapse of 2014, to detect any inefficiencies and to establish the regulatory framework to rule out similar inefficiencies in the future. In fact, the oil futures market has been more regulated in the aftermath of the 2008 oil bubble, with imposed position limits on speculators which took the major blame for the price bubble (see Collins, 2010; Cosgrove, 2009). Despite more regulations, another significant price move occurred in 2014, this time to the downside, and the question is whether this was another episode of market inefficiency (Figure 3) or possibly an efficient reaction to the newly released fundamental information (Figure 2).

An analysis of information related to the oil market supply/demand released sometimes during the mid-2014 is likely to provide insights on whether the 2014 oil price collapse is an efficient reaction to the sudden and unexpected change in oil price fundamentals or not. Note, a newly released information must be completely unexpected to justify the decline in oil prices in mid-2014. The lack of such fundamental information would open the door for investigation of potential non-fundamental triggers.

3. Results (Findings)

3.1.Evaluation of possible fundamental triggers

We look at the data for oil consumption (demand) and oil production (supply) during the volatile period from 2005 to 2013 (which includes the oil bubble of 2008) and estimated supply/demand data for 2014. The world oil consumption increased from about 85 mill barrels per day (mbpd) in 2005 to about 90 mbpd in 2013, which represents about 5%-6% increase (Table 1). However, almost the entire gain has been in China, which increased the oil consumption from 6.8 mbpd to over 10 mbpd.

Table 1

Global oil production had also increased from around 85 mbpd to around 90 mbpd from 2005 to 2013 (Table 2), which is also a 5%-6% increase, matching the oil consumption. However, almost the entire gain can be attributed to the United Sates, which increased the production from 8.3 mbpd to 12.3 mbpd.

Table 2

Thus, we develop a clear picture of global oil fundamentals and trends during the last decade:

- the primary driver of crude oil consumption during the volatile period from 2005 to 2013 has been China,
- while, the primary driver of crude oil production over the same period has been the United States.

Next, we evaluate the estimated fundamental data and other indications of oil market fundamentals in 2014 to determine if there were any sudden unexpected changes in oil supply/demand in mid 2014 that could justify the efficient adjustment of crude to a much lower level.

3.1.1 Oil demand in China in 2014

Based on estimated data for 2014, and certain news releases, the oil demand in China continued to grow during the entire 2014, and thus, cannot be the source of fundamentally relevant information that explains the 2014 oil collapse. Specifically, the (EIA 2015) report gives the monthly estimated data for China's consumption of liquid fuels in 2014, which shows steady consumption growth in year-over-year comparisons, with no indications of any drop in demand. Further, the (Bloomberg, 2014) report states that Chinese oil imports rose 7.8% from September of 2013, and the number of tankers sailing towards China surged to a 9-month high in September of 2014, suggesting that China has been increasing the reserves as crude oil became cheaper. Additionally, Chinese refiners processed 10.3 mbpd in September of 2014, which is 9.1% more that in September of 2013, and second highest number on

record. Based on these statistics, we can suggest that the 2014 oil price collapse cannot be attributed to the demand-side variables with respect to China.

3.1.2 U.S. Oil production in 2014

The estimated monthly data for 2014 by EIA (2015) shows a surging oil production in the United States in 2014. Specifically, the U.S. production of crude oil and liquid fuels supply increased from 12.09 mbpd in June of 2013 to 14.2 mbpd in June of 2014, a 17.4% increase. Thus, it does appear that the surging production in the United States could have caused a supply glut in 2014. However, the question of interest is whether the US oil overproduction could had been the primary cause of the 2014 oil price collapse. We believe that the surging U.S. production was expected given the production trends over the recent years, and thus, it cannot be defined as "unexpected", or "sudden" new information in mid-2014. Given the expectations of U.S. production capabilities, the efficient reaction of oil price would had been a gradual adjustment over the recent period, and not a sudden realization of the risks previously anticipated. Thus, while we do acknowledge the possibility of supply-side issues in 2014, we argue that the US oil overproduction was expected given the recent production trends, and cannot be the source of a sudden change in oil fundamentals to justify the sharp adjustment in oil prices in the second half of 2014. Nevertheless, the surging production from the US shale producers contributed to the negative sentiment on crude oil prices, which oil market participants suddenly chose to acknowledge to fundamentally justify the overreaction to the downside during the second half of 2014.

3.1.3 Fundamentals and the oil price collapse in 2014

It's difficult to argue that there were any sudden and unexpected changes in oil price fundamentals in mid-2014 to justify the 60% collapse in oil price. For example, on demand-

side one would expect to see an unexpected global recession, led by sharp landing in China, and/or on supply-side a significant and unexpected increase in oil production primarily from the OPEC and specifically the Saudi Arabia (as the clear signal of intentions to end the US oil production boom), to justify such a sharp downturn in oil prices. There is no evidence of any of these events in 2014. Thus, one has to consider the possibility that, especially in the aftermath of the oil bubble of 2008, the crude oil price collapse in 2014 was at least partly caused by a non-fundamental trigger, possibly aided by the negative sentiment already embedded in the oil price fundamentals. In fact, the Saudi Oil Minister Ali Al-Naimi agrees that "…oil is increasingly used as an asset class and this also impacts the price". Specifically addressing the 2014 oil price collapse, Al-Naimi states that "With the recent price drop, OPEC and Saudi Arabia have yet again been maliciously and unfairly criticized for what is, in reality, a market reaction." Further, when explaining the OPEC's (in)action during the 2014 oil price collapse, Al-Naimi simply states that "we try to avoid knee-jerk reactions to short-term market moves." (see Helman, 2015; and Brower, 2015).

3.2 Evaluation of possible non-fundamental triggers

The price of crude oil can be determined by the supply and demand factors, in a market populated by commercial buyers and sellers, along with liquidity providing speculators. However, crude oil markets are also populated by investors, who consider crude oil as a financial asset. Specifically, investors view crude oil as a financial tool for hedging inflation, and possibly as an uncorrelated asset to the stock market (see, Gorton and Rouwenhorst, 2006). Further, given that crude oil is internationally priced in US Dollars, investors can also use crude oil as an inverse USD bet – weaker (stronger) USD causes higher (lower) oil prices (see Reboredo and Rivera-Castro, 2013; Zhang, Fan, Tsai, and Wei, 2008).

Thus, we evaluated the exchange rate patterns in 2014, and noticed that there was almost a perfectly positive correlation between the USD/EUR exchange rate and crude oil prices.

Specifically crude oil prices broke the $100/barrel support as USD/EUR broke the 1.35 level, and subsequently, crude oil broke a very important longer term support at $70/barrel as USD/EUR broke the 1.25 level, after which both, crude oil and the Euro, entered the freefall stopping at near $40/barrel for crude oil at 1.10 for the Euro (Figure 4).

Figure 4

Next, we look at the relationship between the price of crude oil and the Euro over the period from 2007 to 2010, and also notice a very high positive correlation, particularly during the 2008 oil bubble (Figure 5), which also has been confirm by the empirical studies (Chai, Guo, Meng and Wang, 2011). During the first half of 2008, US was entering a deflationary recession, and the US central bank was beginning to actively lower the interest rates, which put a significant pressure on the US Dollar. Normally, one would expect that a recession would cause lower energy demand, and thus, lower oil prices. Yet, as the 2008 recession started, the price of crude oil increased from around $100/barrel to nearly $150/barrel over the next 6-7 months, while the USD fell versus the Euro from 1.30 to 1.60. Subsequently, the price of oil collapsed to nearly $30 barrel by the end of 2008, while the Euro fell to a below 1.30 level (see Tokic, 2010). McMasters (2008) testified that investment flows in crude oil caused the 2008 oil bubble. As a result, the regulators took the steps to limit the speculation in crude oil, specifically to prevent another similar episode of crude oil market inefficiency. However, we notice that the price of crude oil continues to be highly correlated with the Euro leading to the 2014 collapse, and especially during the 2014 crude oil price collapse. Thus, it appears that crude oil continues to be traded as a financial asset, despite the regulations post the 2008 oil bubble. In fact, the empirical evidence supports the argument that it has been more beneficial to hold crude oil as a financial asset, rather than as a commodity (Kolodziej, Kaufmann, Kulatilaka, Bicchetti, and Maystre, 2014). The Saudi Oil Minister Ali Al-Naimi

also acknowledges that "…oil is increasingly used as an asset class and this also impacts the price", (Helman, 2015)

Figure 5

In fact, we relate the 2008 oil bubble and the 2014 oil collapse, and note the potential mirror image scenario. Specifically, in 2014 the European Union was in the same situation as the United States in 2008 – the ECB was significantly lowering the interest rates and starting the Quantitative Easing program to combat the deflationary forces and potential recession, while the Fed has been ending the QE program and contemplating the first interest rate hike. Thus, the Euro faced the significant headwinds during the entire 2014, but held on until mid-2014, when it began to collapse, which we believe triggered the sell signal for crude oil. In 2008, the situation was very similar, just with reversed roles, as the collapsing USD likely triggered a buy signal for crude oil. The common theme in both episodes is the divergence in global economic growth outlooks, specifically between the US and the EU, which is reflected in increased volatility in USD/EUR exchange rate, which potentially triggers certain hedging mechanism embedded in investment portfolios, and consequently affects the efficient pricing of crude oil.

The divergence in economic growth outlook between the US and the EU is best evident in the spread between the respective short term interest rates. Specifically, short term interest rates are heavily influenced by central banks, and as such, indicate the monetary policy tools to reach economic growth objectives. Thus, to support our arguments, we computed the spread between the 3-month LIBOR (London Interbank Offering Rate) rate on EUR and the USD, and plotted it against the price of crude oil. Figure 6 shows that in 2006/2007 the short term interest rates were more that 2% higher in the US than in the EU. Subsequently, as the Fed started to aggressively cut the interest rates in response to the recessionary forces, while the

ECB stayed relatively put, the short term rate in the EU turned more that 2% higher than the US short term rate by mid-2008, which significantly weakened the USD. Note, there was almost a perfect correlation between the EU-US LIBOR interest rate spread and the upturn of the 2008 oil bubble, which peaked at the interest rate spread peaked. Due to the overall lower level of interest rates in the EU and the US recently, Figure 6 does not clearly show the relationship between the LIBOR spread and crude oil prices in 2014. However, when we zoom in to the recent period in Figure 7, we clearly notice the LIBOR spread is highly correlated with crude oil prices. Specifically, the 3-month LIBOR rate on EUR was about 0.05% higher than the 3-month LIBOR rate on EUR in early part of 2014. However, in the middle of 2014, the spread turned sharply negative and eventually reached -0.25%, as the ECB embraced extreme monetary policy measures, while the Feb contemplated the first interest rate hike. Consequently, the collapsing LIBOR spread boosted the USD versus the Euro as a clear indication of the economic growth divergence. Figure 8 perhaps best illustrates the effect of the LIBOR spread on the 2014 oil price collapse, as we compute the one-year percentage change in the LIBOR spread, and plot it against crude oil prices. Clearly, the 2014 oil price collapse was likely triggered by the sudden relative economic growth outlook divergence, as evident by the sudden changes in the relative LIBOR measures (Figures 6 and 7) and the exchange rates (Figure 4). The fact that these financial changes were "sudden" and "unexpected", justified the sharp reaction of crude oil when valued at least partly as a financial asset. However, these changes were not directly related to crude oil supply/demand fundamentals, as previously explained (although the negative sentiment embedded in oil supply issues likely supported the price downturn). In fact, the stronger US economy, and the efforts to boost the EU economy, fundamentally should have had more of a positive effect of crude oil demand, which is counterintuitive to the 2014 oil price collapse.

Figure 6

Figure 7

Figure 8

4. Discussion

The price of oil generally reflects the fundamental supply/demand variables, as well as common economic fundamentals (Fattouh, Kilian, and Mahadeva, 2013). However, it appears that during the episodes of oil price inefficiency, the speculative pressures excessively feed of the sentiment provided by the fundamental variables and distort the price. For example, Kaufmann (2011) states the price spike and collapse of 2007–2008 were driven by both, changes market fundamentals and speculative pressures. In fact, Kilian and Lee (2014) attempt to find out how many dollars of the inflation-adjusted price of oil must be attributed to speculative demand during the spikes in oil prices and find that the speculative demand contributed up to 14 dollars in mid-2008, up to 13 dollars during the Libyan crisis in 2011, and up to 9 dollars during tensions with Iran in 2012.

We suggest that the 2014 oil price collapse was another episode of oil price inefficiency, where the fundamental variables, particularly related to the surging oil production by the US shale producers (and possibly to the OPEC's inaction), provided an important sentiment for the direction of crude oil prices, while the actual trigger was more influenced by the non-fundamental variables related to the USD/EUR exchange rate and broadly to the divergence in economic growth outlook between the US and the EU.

The divergence in global economic growth outlook is based, at least in the short term, on notion of expected economic growth decoupling. Specifically, the baseline expectations in 2014 were that the US economy would be able to decouple from the deflationary forces in the EU, which boosted the value of USD versus the Euro. Similarly, in early 2008, expectations were that the EU economy would be able to decouple from the recession in the US, which

boosted the value of the Euro vs the USD. However, the 2008 oil bubble shows that the EU economy was not able to decouple form the US economy, as reflected in the USD/EUR exchange rate, and the relative LIBOR spread measures. Thus, within the 2014 scenario, it is reasonable to expect that the US economy would eventually be affected by the EU economic crisis (given the economic and trade linkages) and that the economic growth divergence between the US and the EU would dissipate, which would likely reverse the exchange rate dynamics, or weaken the USD versus the Euro. Consequently, we believe the risk for crude oil is to the upside, in a potential V-shape or U-shape recovery. Thus, the 2014 oil price collapse is likely to have only temporary effects on US shale production, depending on how quickly the oil price recovers. Nevertheless, the key argument in this article is that, as long as there are temporary economic growth divergences between the US and the EU, the resulting exchange rate volatility is likely to create pricing inefficiencies in crude oil similar to 2008 and 2014.

With respect to regulations, the 2008 oil bubble caused stricter regulation of oil traders, investors, and speculators because higher oil prices were highly politically undesirable, and caused negative effects on consumption via higher gas prices, food prices, and other commodity prices. For example, Matesanz, Torgler, Dabat, and Ortega (2014) observe a persistent increase in the degree of co-movement of the commodity prices from mid-2008 to the end of 2009, particularly for metals, oil, grains, and oilseeds, and Bahel, Marrouch, and Gaudet (2013) find high correlation between oil prices and food prices. The 2014 oil price collapse showed that these regulations failed to prevent inefficient oil price reactions to non-fundamental factors, yet, it's unlikely to have any further tightening of regulations, simply because the oil price collapsed, which actually had a positive effect on general consumption. Yet, the 2014 oil bust suggests that investors and speculators continue to significantly influence oil prices in response to global macroeconomic variables. Additionally, oil

continues to be highly correlated with other commodities (not necessarily regulated), which generally declined up to 15% during the second half of 2014 (Baumeister and Kilian, 2015)

In our view, the current regulatory framework has been overly focused on oil traders/speculators, and yet, a variety of other oil-market specific developments can also distort the oil prices. For example Domanski, Kearns, Lombardi, and Shin (2015) suggest that the oil price collapse of 2014 was also potentially caused by the significantly increased leverage of oil firms over the recent period - the debt of oil and gas sector increased from $1 trillion in 2006 to $2.5 trillion in 2014. Thus, the regulators should consider a more comprehensive regulatory framework that includes all participants in oil markets, which is a topic that deserves a considerable attention in the future research.

5. Conclusion and policy implications

In this article we suggest that the 2014 oil price collapse is another episode of inefficiency in crude oil pricing, caused primarily by the volatility in USD/EUR exchange rates, due to temporary divergent economic growth outlook between the US and the EU. Our key point is that crude oil continues to trade as a financial asset making it susceptible to market inefficiencies, such as the 2014 oil price collapse. Thus, as long as there are temporary economic growth divergences, the resulting exchange rate volatility will create pricing inefficiencies in crude oil. Our arguments have significant regulatory implications, as it is clear that the post 2008 oil bubble regulatory framework fails to ensure the oil price efficiency.

Note, the arguments presented in this paper are based on qualitative evaluation. However, the existing body of empirical literature generally supports our key arguments. For example, Brahmasrene, Huang, and Sissoko (2014), Uddin, Tiwari, Arouri, and Teulon (2013), Bénassy-Quéré, Mignon, and Penot (2007), Chen and Chen (2007) find that the US dollar exchange rate affects the oil price in short run, while the causality reverses in the long run.

Thus, as Brahmasrene, Huang, and Sissoko (2014) summarize: “crude oil price movements always come after currency fluctuations in the short run, while currency fluctuations always follow crude oil price movements in the long run.” These studies provide support to our view that the 2014 oil price collapse was possibly triggered by collapsing EUR/USD exchange rate. However, note that some studies find that in the short term the causality also runs from the real oil prices to real effective U.S dollar exchange rate (Benhmad, 2012). Thus, more empirical research would be needed to firmly establish the cause(s) of the 2014 oil price collapse, and more broadly on how financial and commodity markets react to common economic factors and what are the dynamics of contagion during the episodes of market inefficiencies.

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Figure 1. Crude oil prices

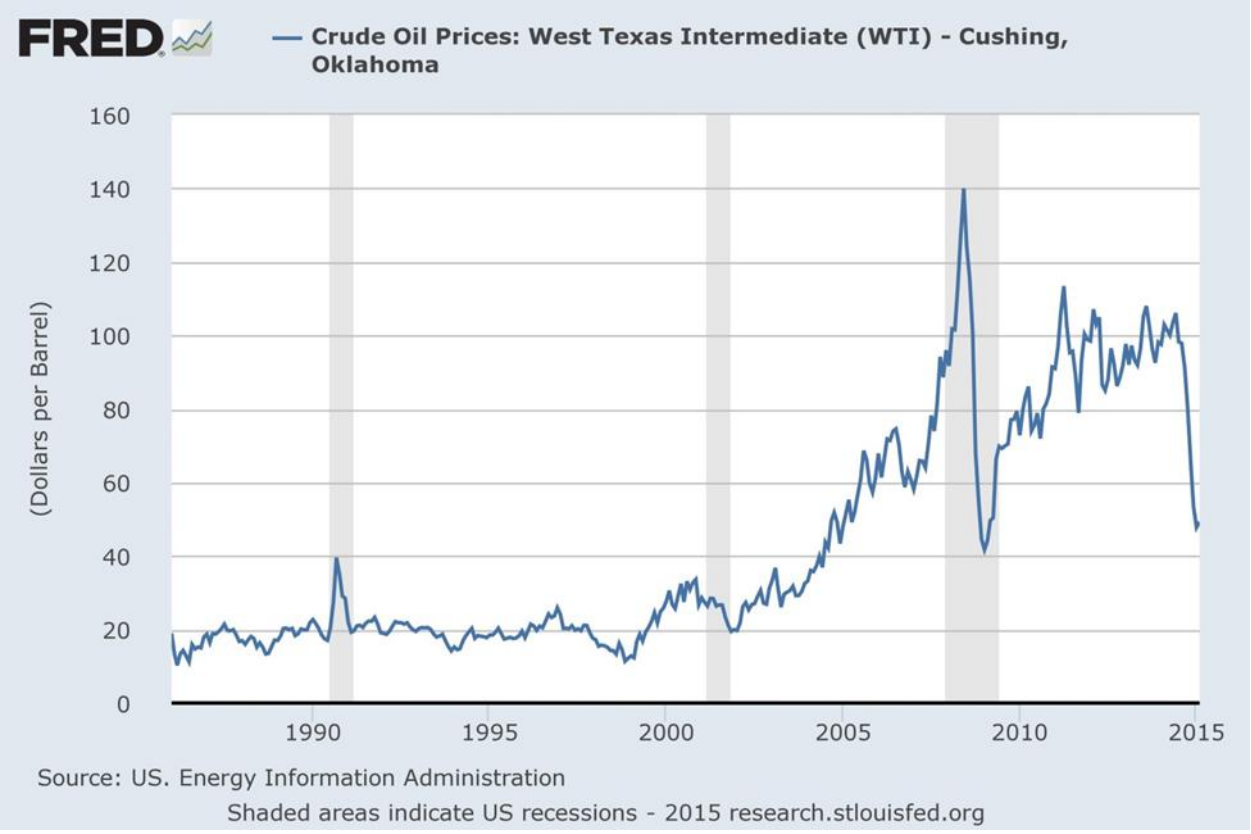

Figure 2. Efficient Market Hypothesis

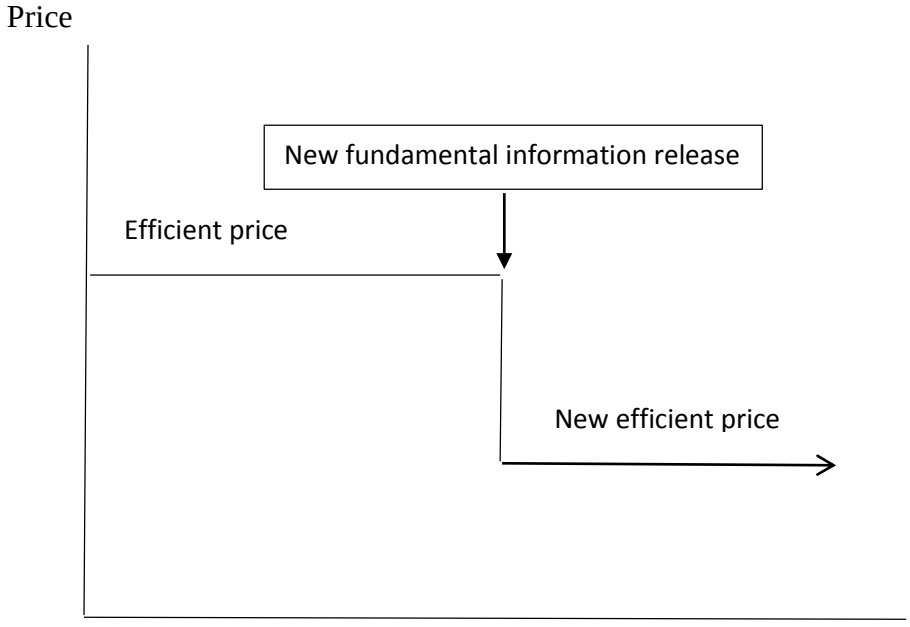

Figure 3. Inefficient market - overreaction to a non-fundamental information to the downside

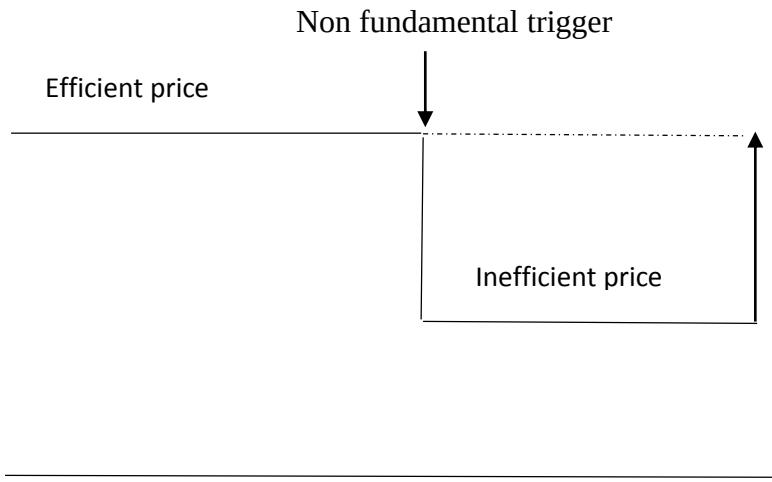

Table 1: Total Petroleum Consumption (Thousand Barrels Per Day)

	2005	2006	2007	2008	2009	2010	2011	2012	2013
North America	25242.81	25048.28	25210.11	23936.39	23035.37	23555.57	23316.9	22939.89	23445.98
United States	20802.16	20687.42	20680.38	19497.96	18771.4	19180.13	18882.07	18490.21	18961.13
Central & South America	5612.481	5776.527	5918.853	6141.656	6215.739	6568.068	6674.035	6835.46	7028.995
Brazil	2171.224	2197.029	2296.548	2441.478	2459.303	2698.951	2776.564	2864	3097
Europe	16394.44	16393.1	16226.94	16151.75	15371.42	15330.77	14911.44	14446.85	14295.98
France	1990.888	1991.143	1978.969	1944.377	1868.07	1833.447	1793.204	1771.791	1767.204
Germany	2620.666	2638.923	2406.689	2533.447	2434.471	2466.927	2392.202	2389.133	2403.156
Netherlands	1021.384	999.4767	1111.233	1068.726	1005.201	1019.788	1019.215	1011.312	987.4364
Spain	1607.258	1588.17	1611.205	1546.976	1467.517	1441.006	1385.319	1300.928	1205.012
United Kingdom	1819.463	1805.921	1750.644	1721.661	1634.229	1620.316	1578.231	1528.307	1507.799
Eurasia	4097.322	4134.391	4259.878	4199.794	4065.797	4246.228	4584.884	4688.291	4690.577
Russia	2785.136	2803.468	2885.101	2981.919	2888.534	3081.824	3352.108	3395.109	3320
Middle East	5988.452	6247.44	6523.069	7033.476	7240.839	7372.838	7624.12	7870.867	8029.711
Iran	1613.44	1762.915	1826.301	1979.823	1958.641	1811.006	1781.848	1790	1870
Iraq	541.0284	532.9929	567.3507	584.033	623.8105	677.2514	691.8672	740	769
Saudi Arabia	1963.644	2020.021	2094.33	2236.988	2436.116	2579.733	2760.911	2861	2925
United Arab Emirates	497.0148	529.1722	578.6909	605.8683	585.638	615.488	650.352	669	698

					2	1	1		
Africa	3003.8	3069.433	3110.899	3263.848	3314.555	3494.042	3399.346	3520.726	3574.01
Asia & Oceania	24350.73	24940.9	25474.55	25318.76	25728.09	27290.33	28288.98	29419.03	29313.94
Australia	1027.613	1035.117	987.7175	996.7773	988.9474	1005.469	1048.239	1073.606	1082.731
China	6795.444	7263.328	7479.921	7697.132	8069.821	8938.357	9504.048	9980	10116.64
India	2550.25	2701.63	2888.055	2957.302	3067.781	3115.45	3280.983	3450	3509
Indonesia	1279.15	1246.765	1268.299	1308.844	1341.342	1441.819	1559.235	1600	1660
Japan	5327.945	5197.4	5009.208	4769.605	4362.794	4429.236	4442.446	4694.756	4530.825
Korea, South	2191.337	2179.904	2240.481	2142.318	2188.487	2268.518	2259.383	2321.622	2324.013
Singapore	868.9481	962.798	1011.563	1003.285	1024.198	1149.369	1216.005	1240	1292
Taiwan	939.4891	959.9064	1034.385	978.0004	971.1302	1017.538	937.0023	925	974
Thailand	1007.58	1030.26	1031.66	1002.238	1058.557	1128.108	1179.943	1249.342	1005.388
World	**84690.03**	**85610.08**	**86724.31**	**86045.67**	**84971.75**	**87857.84**	**88799.71**	**89721.11**	**90379.19**

Table 2: Total Oil Production World (Thousand Barrels Per Day)

	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
North America	15205.34	15320.81	15418.25	15091.67	15449.71	16115.92	16685.79	17911.14	19324.47
Canada	3096.329	3292.592	3448.563	3343.577	3318.829	3441.73	3597.333	3856.44	4073.868
Mexico	3784.067	3711.898	3500.29	3184.164	3000.791	2978.599	2959.989	2936.009	2907.834
United States	8324.942	8316.323	8469.403	8563.926	9130.085	9695.589	10128.47	11118.69	12342.77
Central & South America	7243.074	7295.848	7270.366	7463.842	7525.382	7687.315	7857.205	7801.07	7925.281
Europe	6166.141	5774.7	5445.582	5194.005	4983.423	4646.759	4265.032	3974.366	3792.753
Russia	9511.242	9677.398	9878.389	9797.153	9933.827	10156.91	10239.16	10396.97	10533.74
Middle East	25693.32	25341.29	24785.35	26116.49	24830.74	25975.7	27361.49	27599.61	27179.95
Africa	10093.69	10199.94	10490.5	10603.37	10461.35	10717.44	9319.878	9971.298	9353.059

Asia & Oceania	8533.456	8573.34	8569.842	8733.348	8791.759	9196.905	9052.383	9085.928	9003.94
World	**84701.22**	**84665.07**	**84607.68**	**85763.73**	**84951.21**	**87580.61**	**87870.71**	**89758.74**	**90136.02**

Figure 4: The relationship between crude oil prices and USD/EUR (2011-2015)

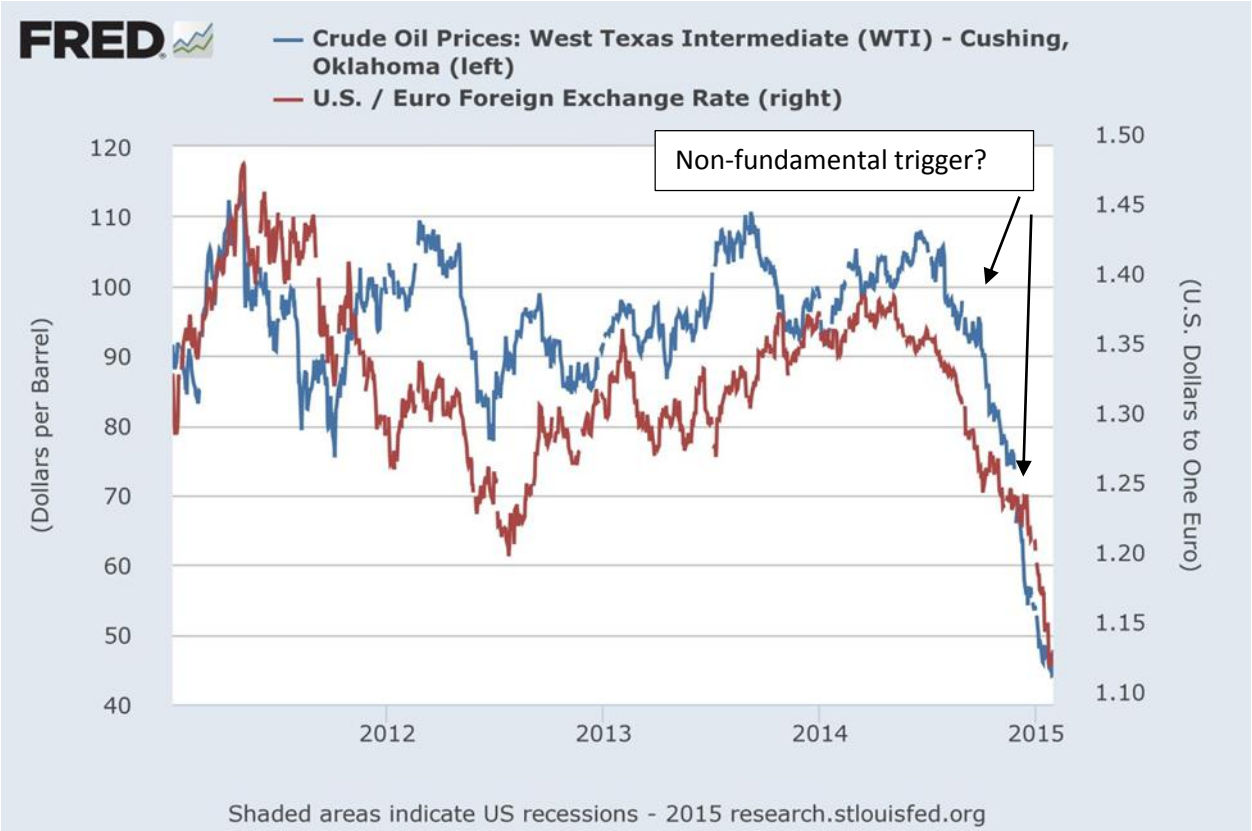

Figure 5: The relationship between crude oil prices and USD/EUR (2007-2010)

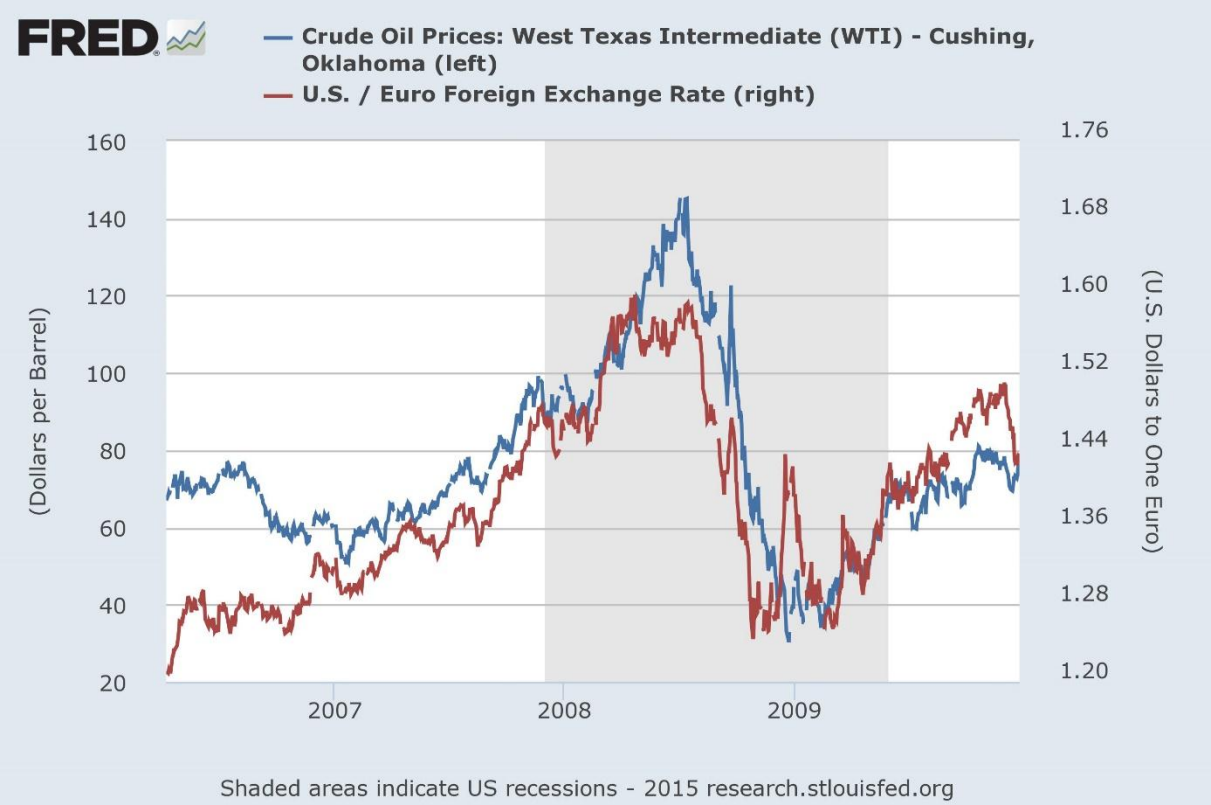

Figure 6: The relationship between crude oil prices and the EUR-USD LIBOR spread (2005-2015)

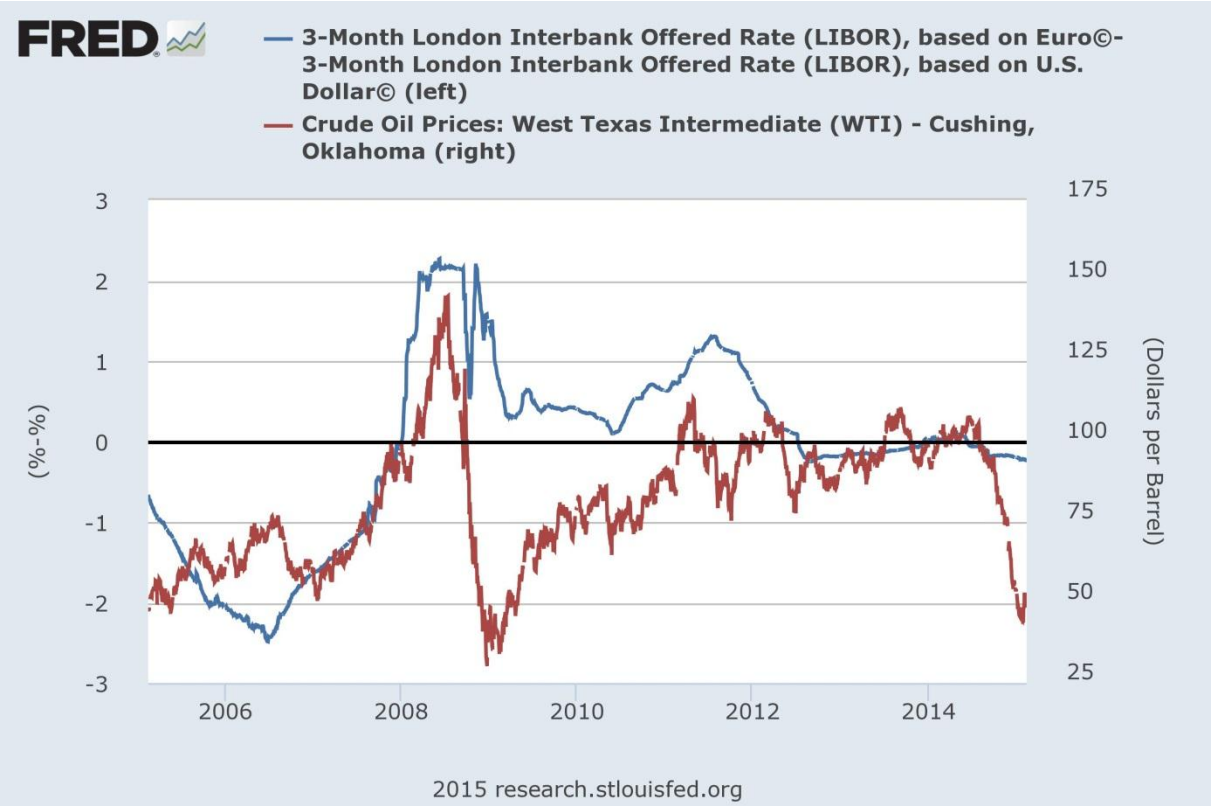

Figure 7: The relationship between crude oil prices and the EUR-USD LIBOR spread (2014-2015)

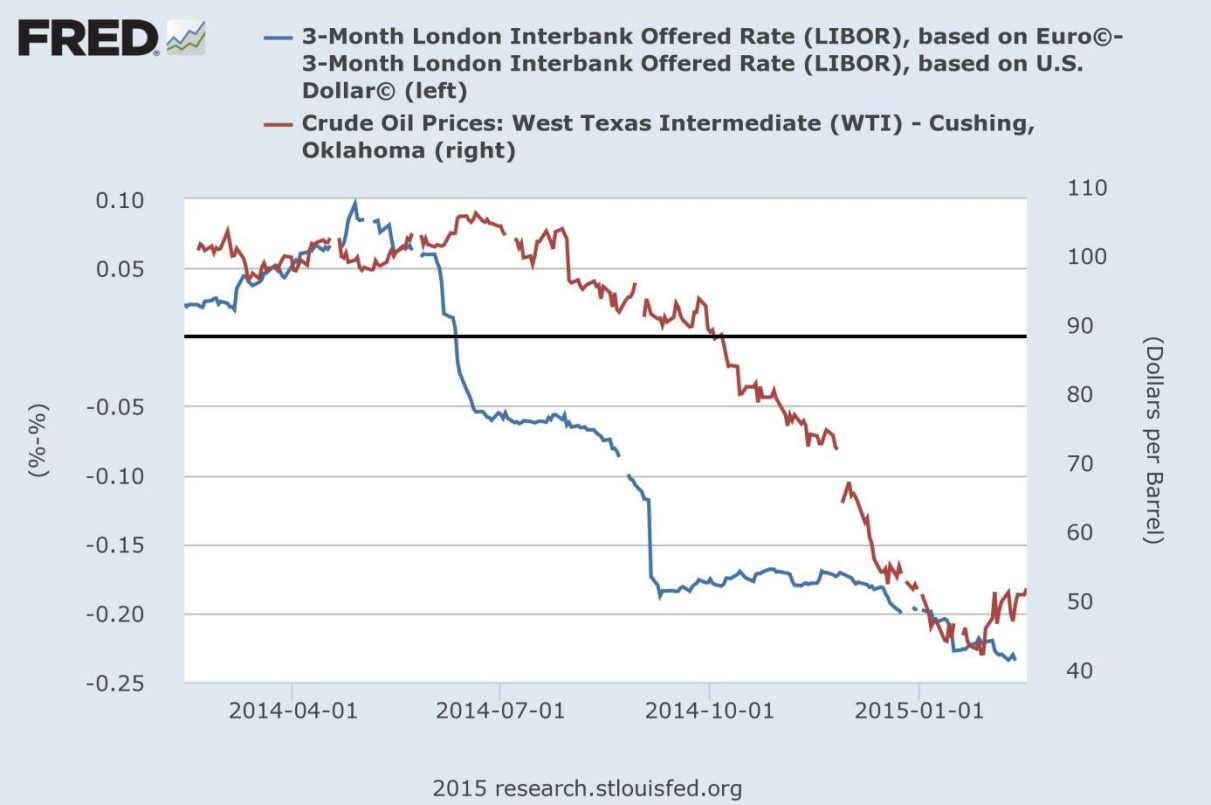

Figure 8: The relationship between crude oil prices and 1 year percentage change in the EUR-USD LIBOR spread (2010-2015)