



Part 1 : Study of the US Equities Markets FLASH CRASHES

In this two-part article, we shall study and analyze the ever-important issue of liquidity in the financial markets.



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Whether in absolute terms or relative terms, this particular issue is, or should be, paramount for all the players, whether investors, traders, asset managers or speculators.

In this first article, we will start by studying the last two occurrences of the so-called Flash Crashes in the US Equities Markets.

We will show that during the last few years the combination of the ever-growing popularity of certain securities (ETF for instance) and the new regulatory environment (particularly in the USA with Dodd Franck) have led to new market dynamics and behaviors.

And that under certain circumstances this can lead to serious liquidity problems when liquidity is much needed, i.e. when one wants to quickly exit an existing position.





HOW DID THE CONCEPT OF LIQUIDITY EVOLVE DURING THE LAST 10 YEARS?

- **Definition**

In order to study the evolution of liquidity on financial markets, we first need to define it precisely.

According to Investopedia, a broad definition of liquidity is:

Liquidity describes the degree to which an asset or security can be quickly bought or sold in the market without affecting the asset's price.

Market liquidity refers to the extent to which a market, such as a country's stock market or a city's real estate market, allows assets to be bought and sold at stable prices. Cash is considered the most liquid asset, while real estate, fine art and collectibles are all relatively illiquid.

Alternatively, another definition, more relevant to financial markets could be:

In business, economics or investment, **market liquidity** is a market's feature whereby an individual or firm can quickly purchase or sell an asset without causing a drastic change in the asset's price. Liquidity is about how big the trade-off is between the speed of the sale and the price it can be sold for. In a liquid market, the trade-off is mild: selling quickly a substantial volume will not reduce the price much. In a relatively illiquid market, selling it quickly will require cutting its price by some amount. Liquidity can be measured either based on trade volume relative to shares outstanding or based on the bid-ask spread or transaction costs of trading

Obviously, the term drastic should be defined with more accuracy as well. Indeed, some security holders might consider that a 3% variation for a supposed very liquid security is drastic enough...



- **US EQUITIES MARKETS FLASH CRASHES.**

By studying the most recent and famous flash crashes of the US stock markets :

- May 6th 2010
- August 24th 2015,

We will see that drastic can have a much more sinister meaning...

And by comparing these two events we will be able to conclude that these events are likely to recur given a structural change in market dynamics.

- **HISTORICAL REMINDER**

- ✓ FLASH CRASH v1.0 MAY 2010

On May 6th, 2010, financial markets experienced one of the most severe intraday declines in history. We'll call it "Flash Crash v1.0". For a brief history review, Wall Street was gripped by mounting anxiety about the Greek debt crisis. The market was still fragile less than 2 years after the GFC, but despite the quiet start to the trading day, US equity indices traded down a little over 2% by early afternoon; no one had expected the near 1,000- DJ points dive in share prices.

But what happened next revealed how much the market structure had already changed. In the following minutes of trading, the Dow Jones experienced its biggest intraday drop in history, instantaneously plunging 600 points — nearly 1000 points below the previous day's close (almost a 9% decline). Just thirty minutes later, however, the market had recovered most of the late-day decline to close 3% lower eventually.

Over the following months regulators had little explanation for what caused the rout, and even blamed it on a "fat finger" trade or even a cyberattack! Eventually, by the end of September, an official report by the two main US regulators faulted algorithmic trading, and to a \$4.1bn (€3.22bn) sell order instigated by a US mutual fund, said to be Waddell & Reed.



Le problème de la liquidité

At 2.32 pm, the mutual fund had used an automated algorithm trading strategy to sell contracts known as e-minis. It was the largest change in the daily position of any investor so far that year and sparked selling by other traders, including high frequency traders. The HFT then came into action, frenetically buying and then reselling the e-mini contracts while arbitrageurs were busy selling and then buying stocks. In the process some trades on single stocks were executed at totally irrational prices, as low as one penny on Procter&Gamble or as high as \$ 100,000 on Accenture for instance!

Let's add straightaway that the most part of these trades were CANCELLED. And by 3pm the share prices had returned to their pre-crash levels.

We display below 3 charts showing the incredible violence of the move.

First the SP500: Down 8.58% at one point.

SPX Index (S&P 500 Index)

Bloomberg



Then Apple: Down as much as 22.16%

AAPL US Equity (Apple Inc)

Bloomberg



And finally GE, down 17.12% on the low of the day.

GE US Equity (General Electric Co)

Bloomberg



Keen to show their authority, the regulators flexed their muscles and handed out 22 criminal counts for market manipulation.

The market regulators have since banned a famous HFT tactic named spoofing, where one place orders not destined to be filled, but which look real to all other participants incentivizing them to sell or buy before.

Circuit breakers to exchanges to limit large moves were also added.

One would reasonably think that markets learned their lesson and market authorities made necessary changes that should prevent these types of events from recurring. Surely something had to be done right? ... Obviously not!

✓ FLASH CRASH v2.0 AOUT 2015

This time around, panic struck due to an acceleration in the Chinese Yuan devaluation. On August 24th, the S&P 500 plunged by 5% in a matter of minutes to kick-start the trading day.

While the decline was less severe than in 2010, individual stocks and ETFs had much more pronounced drops, as we will see in the following charts.

First let's have a look at the S&P500 index, this is the 5 minutes chart:

SPX Index (S&P 500 Index)

Bloomberg



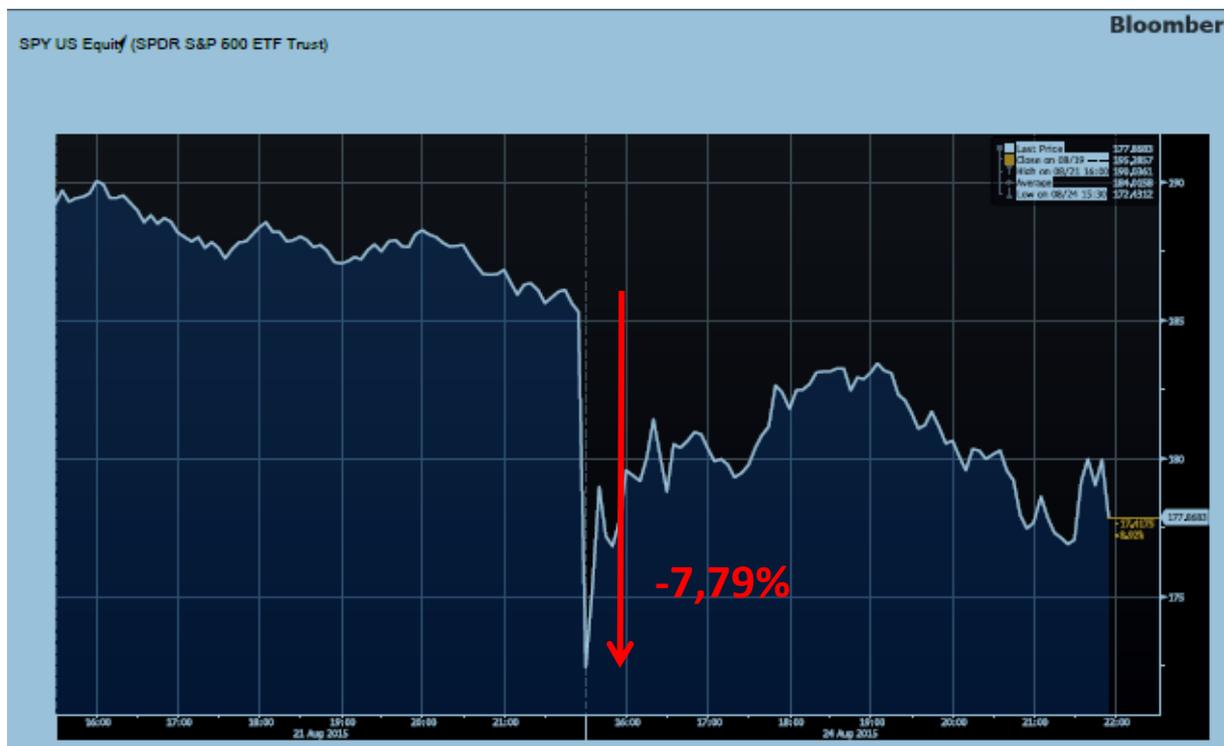
The low of the 24th: 1867.01 is 103.88 point lower than the previous close, i.e. a 5.27% fall.

Let us then have a look at the father of all ETF; SPY the SPDR S&P500 ETF Trust. SPY replicates the SP500 index. It was already the largest ETF in the world with daily traded volumes of \$279 M. The traded volume that day will climb to \$666 M, 10% of those being exchanged in 10 minutes at the beginning of the dive.

Early on the 24th it traded as low as 171.7613, down 14.5301 points from the 21st of August close of 186.2914. See 5 minutes chart below.

This represents a fall of 7.79%.

Therefore the difference, percentage-wise, with the Index is 2.52%. This percentage represents the cost of liquidity. A cost which seems already quite substantial for an ETF which was at that time the biggest in the world...





Le problème de la liquidité

But there was far worse. Exchange Traded Funds (ETFs) are known for their liquidity advantage over mutual funds.

They did play a significant and crucial role in the declines that day.

As you can see below on their respective 5 minutes charts, these two large cap ETFs traded down over 20%—materially more than their underlying markets.

The iShare CORE SP 500 ETF which, like the SPY, replicates the SP500 index, traded down as much as 25.95%; compared to the above mentioned 7.79% fall of the SPY.

And the Vanguard High Dividend yield ETF, following the FTSE High dividend yield index (US Stocks), was down 25.51% at one point in the morning.

IW US Equity (iShares Core S&P 500 ETF)

Bloomberg



VYM US Equity (Vanguard High Dividend Yield ETF)

Bloomberg



So, let's now focus on some individual stocks and some Volatility ETFs.

The two companies below, JPM and GE, both highly liquid, and members of the above indices, traded down close to 21% in early trading. See their 5 minutes charts below.

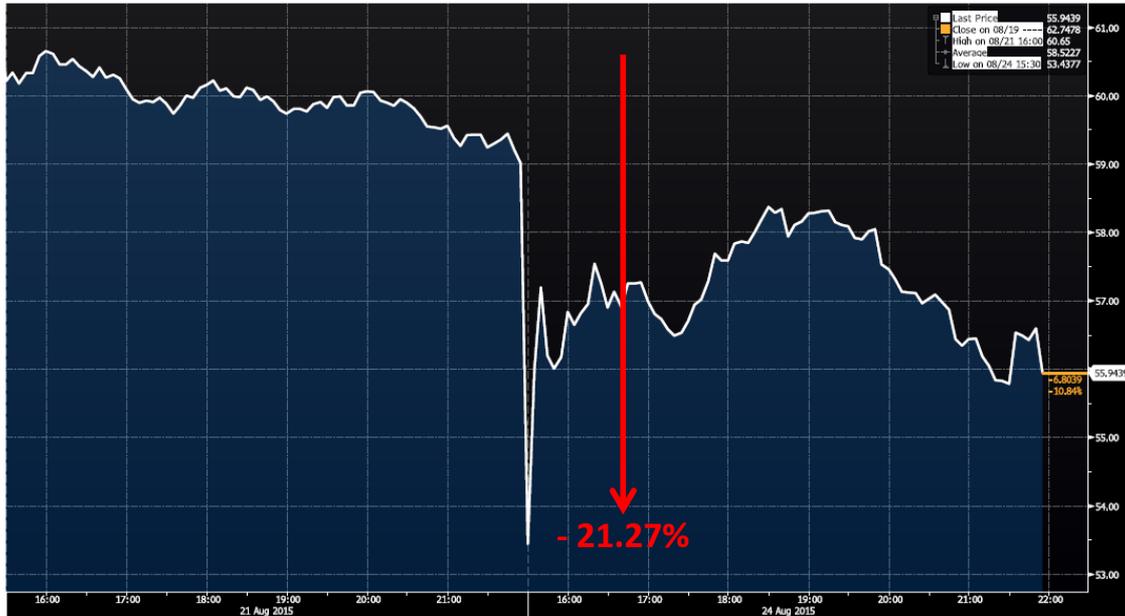
More precisely: -21.22% for GE and -21.27% for JPMorgan.

But at least they never ceased trading...

Let's note straight away that contrary to the May 2010 Flash Crash NONE of these trades have been cancelled by the market authorities.

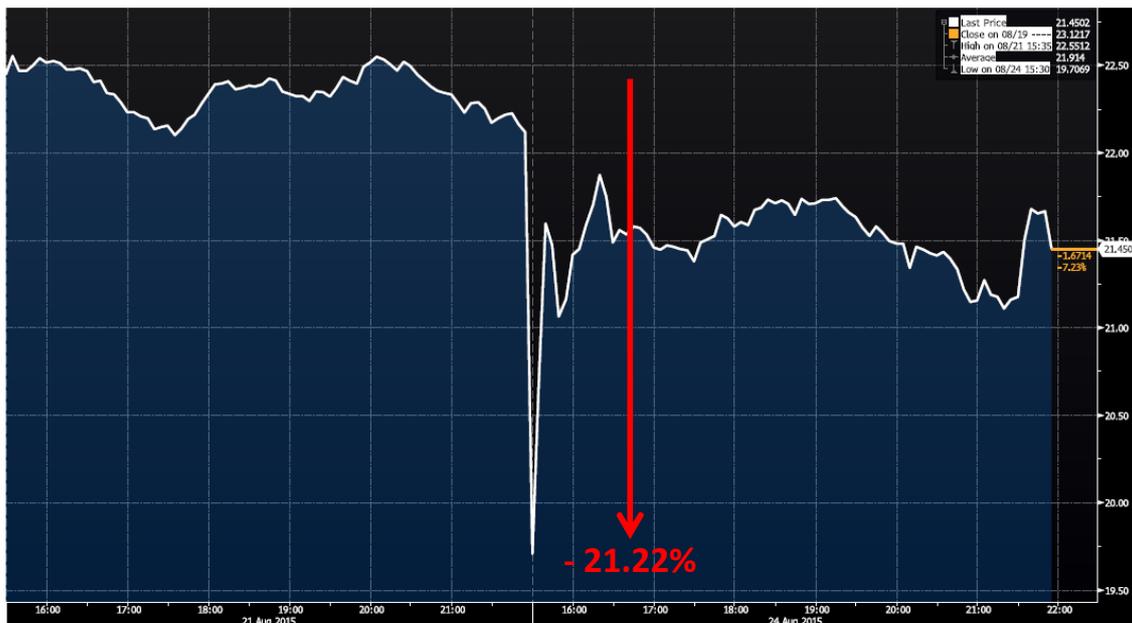
JPM US Equity (JPMorgan Chase & Co)

Bloomberg



GE US Equity (General Electric Co)

Bloomberg



- The problem this time was that many individual stocks were frozen from trading that morning.
- This caused ETF liquidity providers to widen bid/ask spreads for these products.
- Typically, when there are large sell orders for ETFs, these liquidity providers/market makers are able to buy the ETFs and hedge through the underlying stocks they hold.
- With this option not available, the US equities ETFs went into a free-fall!

We cannot resist the temptation to show you how bad the situation was for the POWERSHARES S&P500 LOW VOLATILITY ETF (SPLV) holders. This ETF replicates the SP500 LOW VOLATILITY index which is constituted by the 100 LEAST volatile stocks of the SP500. This so-called low volatility ETF was down at one stage a staggering 45.8%! All the ETF holders who had placed “Stop Loss orders” sold their positions in apocalyptic conditions. They suffered huge losses, only to see the index, and their ETF, recover during the day....

SPLV US Equity (Invesco S&P 500 Low Volatility ETF)

Bloomberg



In the meantime, the main ETF tracking the SP500 Volatility index, the VIX Proshare ETF (VIXY, chart below) was up at most 36.62%.....

VIXY US Equity (ProShares VIX Short-Term Futures ETF)

Bloomberg



Another factor adding to the lack of liquidity was the new bank regulations. Bank regulations have limited the ability of banks to be liquidity providers, as they typically have in the past.

These institutions, due to financial regulation, have been required to strengthen their balance sheets and limit or in many cases stop proprietary trading activity.

This no doubt makes banks safer, but it also limits trading activity and increases the magnitude of downside during highly volatile periods.

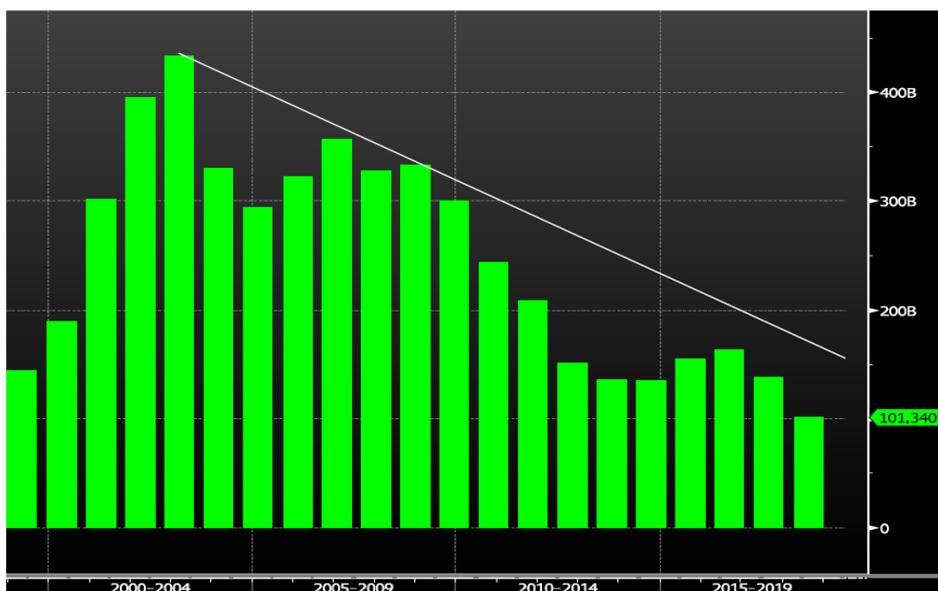
Furthermore, holding riskier assets (like stocks) requires more reserve capital, which makes these activities less profitable.

This has led to much lower equity (and fixed income as we'll see in Part 2) risk taking by trading desks, which limits the ability for banks to act as the buffer they have been historically.

As you can see below, although the US equity market kept climbing, the trading volumes for the S&P 500 has significantly eroded over the last several years, decreasing from a top above \$400bn in 2002 to between \$100bn and \$150bn a year currently.

SPX Index (S&P 500 Index)
SPX Index (S&P 500 Index)

Bloomberg





Le problème de la liquidité

Another aggravating factor is the following: when a whole bunch of panicky investors calls up to redeem/sell their ETF, there will be no bids for ALL the stocks components of the underlying index.

But these ETFs are required to pay redemptions, so they'll have to sell their still trading shares at whatever price will be available (remember GE and JPM examples above). Remaining investors will be stuck with an increasingly illiquid portfolio, which will drop even faster, creating a real vicious circle...

We'll examine in details how this could affect, as well, virtually ALL of the Credit ETFs in the part 2 of this study.