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CRISIS ON THE WORLD DERIVATIVES MARKET

The main aim of this research is to analyse the global derivatives market, its current trends, volumes and prospects. We study the influence of derivatives on the world financial market, as one of its main and fast-developing parts, and mainly the correlation with the modern global financial crisis. We investigate the influence of trends of financial globalization on the international securities market.

Основною метою даного дослідження є аналіз світового ринку похідних, його поточних тенденцій, обсягів торгівлі та перспектив. У статті вивчається вплив похідних цінних паперів на світовий фінансовий ринок, в якості однієї з основних і динамічно розвиваючихся частин, і в основному кореляція із сучасною світовою фінансовою кризою. Ми досліджуємо вплив тенденцій фінансової глобалізації на міжнародний ринок цінних паперів.

Keywords: derivatives, world financial crisis, investors, trading, futures, options.

Over the last ten years, the development of derivative trading was very impressive. Volumes increased 7.8 times and grew even more rapidly than volumes on cash markets, especially between 2003 and 2007, when equity markets were bullish. The highest growth rate was observed for equity derivatives: volumes increased 13.5 times between 1998 and 2008 and in 2008 they accounted for 69% of the derivative trading volumes against 40% in 1998. The growth of equity derivatives has been stronger than the one of cash equity markets. The other products, namely interest rate, currency and commodity derivatives, also experienced rapid growth during this period: they grew respectively 5.7, 4.9 and 7.8 times. In the last ten years, the industry of stock exchanges saw many changes. So in this article we will turn our attention to crisis tendencies connected with derivatives [8].

General growth

All groups of products (defined by their underlyings) showed an increase in their trading volumes between 1998 and 2008. The smallest increase observed was for interest rate products with volumes increasing 3.6 times, while stock index options and futures showed the largest rise with volumes increasing 17 times. Part of the growth recorded for index derivatives is due to the tremendous success of KOSPI 200 options. 3.9 billion options on the KOSPI 200 index were traded in 2008, representing two thirds of the global volumes recorded by all derivative exchanges. Even though the notional value of individual KOSPI 200 options is lower than the average notional value of index options traded on other exchanges, the Korea Exchange also dominates in terms of the overall notional value traded. The case of KOSPI 200 options is so specific that it raises statistical difficulties. Therefore, we decided to present both figures, includ-

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ing and excluding the Korea Exchange when necessary [10]. When KOSPI 200 options are excluded, the growth of equity index derivatives appeared to be parallel to that of individual equity derivatives: both segments of the market show volumes traded increased eleven times, a growth that is lower than KOSPI 200 options, although it remains considerable.

Contribution of new exchanges

The following table shows the respective contributions to the overall growth of exchanges already offering in 1998 a given group of products on the one hand, and of exchanges newly offering these products on the other.

Table 1:
Contribution of existing and new exchanges to the growth of derivative trading
(millions of contracts traded)

Contribution of existing and new exchanges to the growth of derivative trading (millions of contracts traded)						
	Equity options	Equity futures	Index options	Index futures	LTIR options	LTIR futures
(1) Vol. in 1998	623	-	196	172	75	421
(2) Add. trading 2008/1998: (3) + (4) - (5)	3 745	1 059	3 881	2 114	96	900
(3) Of which ex. already present in 98	2 541	-	3 613	1 819	108	884
(4) Of which new exchanges	1 204	1 059	268	295	0	20
(5) Of which ex. that exit the market	-	-	-	-	12	4
(6) Vol. in 2008: (1) + (2)	4 368	1 059	4 077	2 286	171	1 322
Number of exchanges active in that market						
Number of exchanges in 1998	26	0	47	44	18	29
Number of exchanges in 2008	27	19	30	30	7	16

Equity options was the group of products with the largest volume of trading in 1998 and they were still in top position ten years later, in 2008. It is also for that group of products that new exchanges, which either did not exist in 1998 or included equity options in their offer between 1998 and 2008, contributed the most to the growth: of the 3.8 billion additional contracts recorded in 2008 as compared to 1998, one third were traded on new exchanges when compared to 1998. The largest is the International Securities Exchange founded in 2000 and where almost one billion equity options were traded in 2008. 27 exchanges offered equity options in 2008, close to the 26 exchanges already present in 1998. However, behind the stability of the number of exchanges, only 18 of them existed in 1998: the eight new exchanges were offset by the nine exchanges that exited the market or were integrated within groups of exchanges (such as NYSE Euronext). Equity futures show a very different picture, as they did not exist in 1998. This group of products is new for all 19 exchanges present in this segment.

Index options are the products that showed the most growth, with a contract volume increasing 21 times between 1998 and 2008. Here, new entrants contributed no more than 7% to the overall growth. However, a single player, the Korea Exchange is the main contributor responsible for the increase in the number of contracts to 3.9 billion (2.7 billion more options traded on the KOSPI 200 index in 2008 than in 1998). The Korea Exchange accounted for 16% of global volumes in 1998, and more than two thirds in 2008. Excluding Korea, the contribution of new entrants would represent 23% of the growth. Index options are the most frequently listed products in the world with 30 exchanges including them in their offer. Nine new exchanges appeared in this segment, the largest in 2008 being the National Stock Exchange of India. However, the consolidation of the industry reduced from 47 to 30 the number of exchanges recording trading volumes in 2008.

Volumes of index futures increased 13 times between 1998 and 2008. The contribution of new exchanges is of the same order of magnitude as for index options. But the contribution of exchanges already present in 1998 was lower for index futures (2.1 billion contracts) than for index options (3.9 billion contracts). The average size of index futures contracts is higher than that of index options, and the overall notional value of traded index futures was 10% higher than that of index options. Finally, there were as many exchanges offering index futures (30) as index options in 2008. However, both lists of exchanges are not completely identical: reflecting the split of jurisdictions between options and futures, four US exchanges list index options without listing index futures. Symmetrically, four relatively small exchanges are present in the index futures segment, and not on the index options, the largest being the Turkish Derivatives Exchange (40 million contracts in 2008).

Finally, the long term interest rate segment could be considered as a more mature segment, although the number of options traded doubled while the number of futures traded tripled, reflecting an industry that was still growing, at least until 2007. All exchanges active on LTIR options in 2008 already existed in 1998 and the recorded volumes are the smallest among all groups of products. The number of exchanges offering LTIR options decreased from 18 in 1998 to 7 in 2008. The withdrawal of exchanges from this market had little impact (negative 12 million) contracts on the global activity in this group of products. In other words, those exchanges already recorded low volumes in 1998. The number of exchanges offering LTIR futures also decreased, from 29 to 16 in the last ten years. Six new exchanges introduced LTIR futures contracts in their offer (the largest volumes being recorded by the Korea Exchange in 2008), but nine other exchanges with relatively low levels in 1998 withdrew. However, it should be noted that the size of LTIR contracts is much higher than that of equity-linked derivatives. As a result, LTIR options record the highest notional value of trading among all groups of products (280 000 billion US dollars in 2008).

Regional developments

The main region that contributed to the growth of equity options over the last ten years was the Americas, and more specifically the United States. The Americas increased their dominance at the expense of the Europe, Africa, Middle East region. Part of this trend can be explained by the growth of ETF options in the United States, products that, in many instances, are substitutes for index options: if ETF options were not taken into account, the relative weight of the Americas in global equity option trading would be 80% instead of 83%. The Asia Pacific region grew at a pace similar to that of the Americas but starting from a much lower level (see in Table 2). The main contributors to growth in that region were Hong Kong Exchanges. In Europe, the Compound Annual Growth Rate (CAGR) was not as strong as in the other two regions, but it was still high (14%). The main contributor to growth was Eurex.

Table 2:
Stock options volumes (millions of traded contracts)

Stock options volumes (millions of traded contracts)					
	Volumes traded in 1998	Volumes traded in 2008	Compound Annual Growth Rate (CAGR)	Regional breakdown in 1998	Regional breakdown in 2008
Americas	439	3646	24%	70%	83%
Asia Pacific	10	84	23%	2%	2%
Europe, Africa, Middle East	174	638	14%	28%	15%
Total	623	4 368	21%	100%	100%

[9]

The most striking phenomenon when we look at the development of index options is the sharp increase of Asia through KOSPI 200 options in Korea, which allowed the Asia Pacific region to represent three-quarter of global volumes (refer to Table 3).

Table 3:
Index options volumes (millions of traded contracts)

Index options volumes (millions of traded contracts)					
	Volumes traded in 1998	Volumes traded in 2008	Compound Annual Growth Rate (CAGR)	Regional breakdown in 1998	Regional breakdown in 2008
Americas	75	310	15%	38%	8%
Asia Pacific	40	3057	54%	20%	75%
Europe, Africa, Middle East	81	710	24%	41%	17%
Total	196	4 077	35%	100%	100%

If the Korean figures are removed then the Asia Pacific region is still the one with the highest growth rate by far (look at Table 4). Asia has almost caught up with Americas thanks to the tremendous growth of the National Stock Exchange of India and of TAIEX in Taiwan. However, as mentioned above, part of the decrease in the United States market share in index options is offset by the growth of ETF options in that country. In Europe, the CAGR has also been very strong over the last ten years. The growth in Europe was mainly driven by the Dow Jones STOXX 50 options traded on Eurex, where 84% of the European index options were traded in 2008.

Table 4:
Index options volumes, excluding Korea (millions of traded contracts)

Index options volumes, excluding Korea (millions of traded contracts)					
	Volumes traded in 1998	Volumes traded in 2008	Compound Annual Growth Rate (CAGR)	Regional breakdown in 1998	Regional breakdown in 2008
Americas	75	310	15%	46%	24%
Asia Pacific	8	290	44%	5%	22%
Europe, Africa, Middle East	81	710	24%	50%	54%
Total	164	1 311	23%	100%	100%

Index options trading also increased rapidly in Europe.

Index futures trading developed in all the geographical zones. The most rapid growth was recorded in the Americas, where the CME Group maintains an overwhelming domination following the merger with CBOT. The two other regions grew at a similar and rapid pace. The main contribution to growth came from Eurex in Europe and from the National Stock Exchange of India and Osaka Stock Exchange in Asia (see in Table 5).

Table 5:
Index futures volumes (millions of traded contracts)

Index futures volumes (millions of traded contracts)					
	Volumes traded in 1998	Volumes traded in 2008	Compound Annual Growth Rate (CAGR)	Regional breakdown in 1998	Regional breakdown in 2008
Americas	53	941	33%	31%	41%
Asia Pacific	49	583	28%	29%	26%
Europe, Africa, Middle East	70	761	27%	41%	33%
Total	172	2 286	29%	100%	100%

LTIR derivative trading grew slower than equity-linked products in the last ten years. It remains marginal in Asia, where only two exchanges, the Tokyo Stock Exchange and the Australian Securities Exchange, still include LTIR options in their offer.

In Europe the concentration process has been dramatic: 16 exchanges active in LTIR options trading in 1998 were replaced by only one in 2008 (Eurex). This trend has been accompanied, or was the result of a concentration of trading on derivatives with German underlyings, the other government debts being highly correlated to the German one. The Johannesburg Stock Exchange is the only other remaining player in the region. But this region is the only one where LTIR option trading grew in the same order of magnitude as other derivatives [2].

In the Americas, the growth of LTIR futures has been more than twice as strong as options. That region gained market share for the latter products, while it lost its overwhelming dominance for the latter. The CME group emerged as the largest player in the Americas, followed by the Montreal Stock Exchange and Mexder (refer to Table 6).

Table 6:
Long term interest rate options volumes (millions of traded contracts)

Long term interest rate options volumes (millions of traded contracts)					
	Volumes traded in 1998	Volumes traded in 2008	Compound Annual Growth Rate (CAGR)	Regional breakdown in 1998	Regional breakdown in 2008
Americas	53	98	6%	83%	57%
Asia Pacific	3	4	4%	4%	2%
Europe, Africa, Middle East	8	69	24%	13%	40%
Total	63	171	10%	100%	100%

Over the last ten years, the development of derivative trading was very impressive. Volumes increased 7.8 times and grew even more rapidly than volumes on cash markets, especially between 2003 and 2007, when equity markets were bullish.

The highest growth rate was observed for equity derivatives: volumes increased 13.5 times between 1998 and 2008 and in 2008 they accounted for 69% of the derivative trading volumes against 40% in 1998. The growth of equity derivatives has been stronger than the one of cash equity markets. The other products, namely interest rate, currency and commodity derivatives, also experienced rapid growth during this period: they grew respectively 5.7, 4.9 and 7.8 times [5].

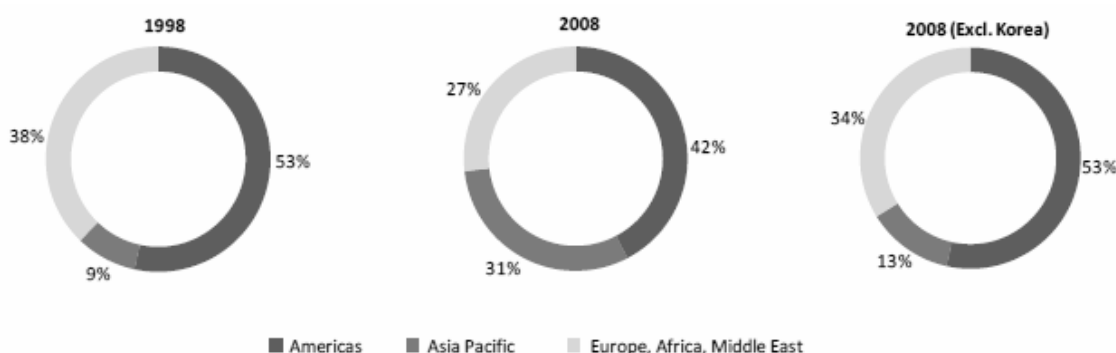


Figure 1: Breakdown of equity and LTIR derivatives volumes by geographical zone

Regarding regional development of derivative trading, the most striking phenomenon is the tremendous growth of Asia with the impressive development of KOSPI 200 Options. Apart from

this particular product, Asia Pacific region also developed with the arrival of new stock exchanges. In Americas, equity options were very successful, particularly with options on ETFs and in Europe, index options experienced a strong growth mainly driven by Eurex.

In ten years, the industry of stock exchanges saw many changes. There have been a lot of mergers and acquisitions involving the biggest stock exchanges and new exchanges appeared.

In the recent years, electronic trading has gained an increasing share of the trading activity. Nevertheless, the analysis of the velocity of trading demonstrates that the increase of derivative trading was not mainly generated by the development of algorithmic trading. The growth of derivative markets is driven by an increasing use of its products by investors and other economic agents. Further developments are expected following the demand for safer markets by investors, market players and regulators, which should result in a transfer of a significant part of OTC trading to on-exchange trading [1].

17 billion derivative contracts were transacted in 2008 on exchanges worldwide (7.8 billion futures and 9.3 billion options). These figures are apparently positive as they represent a new historic record. However, we will show below that these figures hide wide disparities between products and between the first three quarters of the year and the last quarter, Lehman Brothers' collapse marking a profound break in the activity of the derivatives markets.

The pace of growth in 2008 (+13%) was significantly below the two previous years. Although futures declined the most, their growth is still superior (+14%) to that of options (+11%). Futures growth is the lowest for six years and that for options is similar to 2005 and 2006. Again, the break of September triggered a much stronger slowdown, especially for futures.

The global activity of derivatives exchanges is heavily influenced by the weight of the Korea Exchange in equity index options trading. When KOSPI 200 options traded on the Korean market are excluded from statistics, the growth rate of options trades is the weakest since 2003.

Exchange and products trends [13]:

- In 2008, the growth rate in the volume of equity derivatives was more than halved compared to 2007, even if KOSPI 200 options are taken into account or not.
- For the first time since 2003, negative growth rates were observed on all groups of interest rate products.
- The growth rate of currency derivatives was ten times lower compared to 2007.
- Commodity derivatives, driven by Chinese markets, seem to be the only segment that has not been affected by the financial crisis.

After several years of rapid growth, the pace of development of all derivative markets segments, except commodity futures, slowed down in 2008. It turned negative on interest rate products [3].

Although a sharp downturn has been observed since Lehman Brothers collapse, equity products are resisting, and their share in total derivatives trading increased from 65% to 69%.

Crisis tendencies on derivatives market (refer to table 7):

- For the first time trading in equity options has exceeded trading in equity index options. However, the financial crisis was still producing its negative effects at the beginning of 2009 and growth seems to be at least provisionally frozen on a majority of exchanges.
- Index options and futures were also hit by the financial crisis. However, a huge increase in KOSPI index options was observed in February 2009: more than 200 million contracts were traded during that month alone (against 140 million in February 2008).
- The fledgling market of equity futures again showed a very impressive rate of growth and there were again new exchanges that introduced equity futures trading in Asia.
- Growth of all segments of interest rate derivatives turned negative, short term like long term products, options like futures.

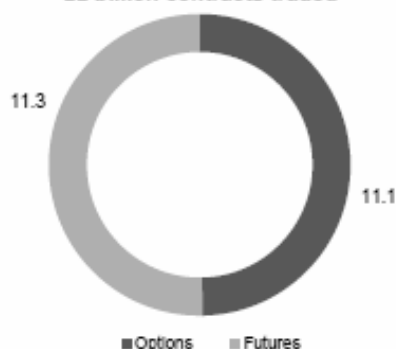
- Futures on short term interest rate products suffered the worst decline. The growth of this segment had already shown a slowdown in 2007. But half of the decrease in 2008 is due to a technical change on Mexder, where a short term contract has been replaced by a long term contract with a much lower velocity of trading.
- The growth of currency derivatives had been exceptional in 2007. It remained strong but slowed down in 2008. However, it should be noted that the pace of growth of currency options did not weaken in 2008.
- The growth of commodity derivative markets, driven by Chinese markets, seems to be the only one that has not been affected by the financial crisis.

Table 7:
2008/2007 derivatives trade volumes

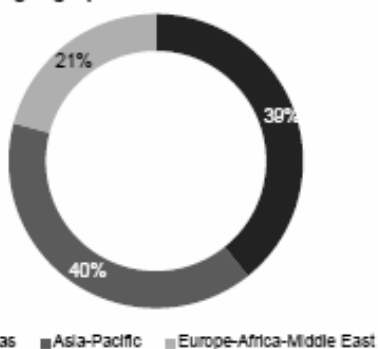
2008		Single Stock	Stock Index	STIR	LTIR	Currency	Commodities
Millions of contracts traded	Options	4 368	4 077	439	171	50	154
	Futures	1 059	2 286	1 243	1 322	332	1 545
Growth rate of contracts traded	Options	17%	9%	-6%	-9%	17%	16%
	Futures	66%	34%	-18%	-14%	4%	38%
2007		Single Stock	Stock Index	STIR	LTIR	Currency	Commodities
Millions of contracts traded	Options	3 729	3 745	469	188	43	132
	Futures	638	1 706	1 522	1 530	320	1 121
Growth rate of contracts traded	Options	35%	18%	21%	6%	79%	22%
	Futures	122%	46%	13%	20%	52%	19%

We think that the year 2008 can hardly be discussed without distinguishing the trends before and after worsening of the crisis triggered by Lehman Brothers’ collapse. The period that began in the fourth quarter of 2008 is characterized by a very marked decline in liquidity. Due to increased volatility and regulatory restrictions on short selling, spreads quoted by market makers increased while, in some cases, some market makers were unable to fulfill their obligations. For example, spreads on individual equity options increased 40% on average compared to the third quarter of 2008, and by about 100% compared to the fourth quarter of 2007 in the US. Simultaneously, the depth of order book diminished everywhere. Trading volumes fell to levels lower than the same period of 2008, while their growth had been continuous throughout all the previous years. First releases relating to March 2009 volumes indicate that derivatives volumes are still significantly lower than in March 2008 [7].

2010 worldwide derivatives volume
22 billion contracts traded



Breakdown of volumes by geographical zone in 2010



Trading in derivatives contracts on regulated exchanges worldwide surged 25% in 2010 (look at Figure 2). 22.4 billion derivative contracts were traded on exchanges worldwide (11.3

Figure 2: 2010 worldwide derivatives volume and Breakdown of volumes by geographical zone in 2010

billion futures and 11.1 billion options) against 17.9 billion in 2009. The share of futures in the total number of traded contracts nearly doubled between 2005 and 2010. In 2010, the number of futures traded surpassed for the first time the number of options (see in Figure 3).

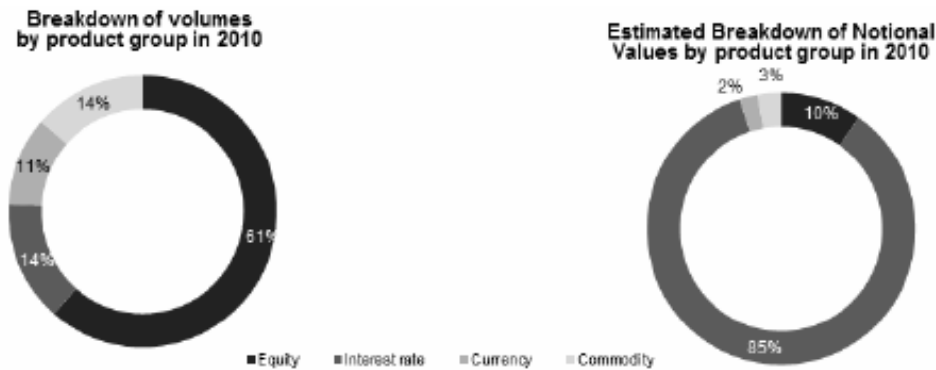


Figure 3: Breakdown of volumes by product group in 2010

of the highest observed since 2005. The number of futures traded increased faster (+36%) than options (+16%).

Exchange and products trends (refer to Figure 4):

- Equity derivatives grew rapidly (+14%) in 2010. Asia Pacific region experienced the highest growth rate (+20%) followed by the Americas (+10%) and Europe Africa Middle East region (+8%).

- Interest rate segment that had been the most heavily hit by the financial crisis grew substantially (+29%), but did not reach again pre-crisis volumes.

- Currency derivatives, with 2.4 billion contracts traded in 2010, remain the smallest segment of organized markets. Nevertheless, driven by the Indian exchanges that accounted for 71% of the volumes traded in 2010, they have experienced triple-digit growth rates in 2010 (+142%). When the Indian exchanges are excluded from statistics, the growth rate of traded volumes in 2010 was still very strong (+36%).

- Commodity derivatives continued to grow rapidly in 2010 (+33%). Chinese exchanges accounted for 51% of the traded volumes [12].

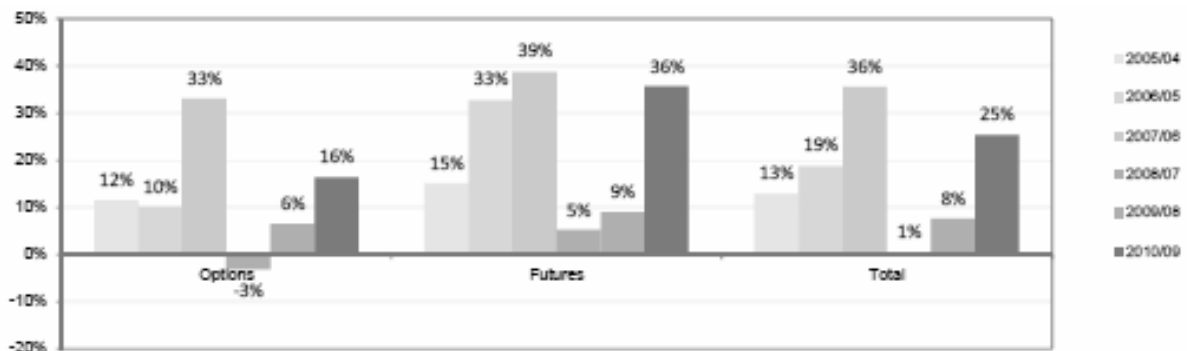


Figure 4: Derivatives volume growth rate

Conclusions: Finally, we think that the period that began in the fourth quarter of 2008 is characterized by a very marked decline in liquidity. Due to increased volatility and regulatory restrictions on short selling, spreads quoted by market makers increased while, in some cases, some market makers were unable to fulfill their obligations.

The financial crisis had triggered a marked slowdown of derivatives markets in 2008. The crisis continued and deepened for certain types of contracts in 2009. Index futures had only star-

The highest growth rate (+41%) was observed in the Asia-Pacific region and for the first time volumes traded in this geographical zone were higher than in the two other zones.

The growth rate (+25%) is one

ted to slow down at the fall of 2008, the year 2009 ended with a negative performance of 16%. LTIR derivatives have plunged in an even more acute crisis with trading volumes declining by one third and open positions being dramatically reduced. On the contrary, commodity futures continued to grow rapidly in 2009 as in 2008 [4].

2010 was a remarkable year for on-exchange derivatives. After a net decrease of volumes growth in 2008-2009, derivatives volumes are back to their pre-crisis growth rate + 25% in 2010.

This performance is due to the overall better market conditions that prevailed in 2010. It is also a sign of confidence in the on-exchange infrastructure. At a time where systematic risks still a major issue, the on-exchange environment providing price transparency and central counterparty offers a valuable framework to mitigate risk and improve efficiency.

Obviously, all OTC products will not be eligible to the on-exchange environment, but the vast majority of OCT derivatives exposures are sufficiently standardized to be applicable to both SEFs and CCPs (90% according to Tabb Group).

The major regulatory changes taking place in the US and in the EU may provide the relevant framework to mitigate systemic risk and encourage the migration to the the on-exchange multilateral paradigm and its associated benefits. Several successful initiatives from various exchanges and clearing houses in various products (interest swaps, CDS, flexible options...) have shown how some OTC products can benefit from an on-exchange environment which can address the some of the OTC needs.

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