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**IMPACT OF THE EUROPEAN MARKET INFRASTRUCTURE  
REGULATION ON THE DERIVATIVES MARKET**

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## LIST OF ABBREVIATIONS

**AFP** Administradoras de Fondos de Pensiones

**BIS** Bank of International Settlement

**CCP** Central Counter Party

**CDS** Credit Default Swaps

**CFMA** Commodity Futures Modernization Act of 2000

**CME GROUP** Chicago Mercantile Exchange and Chicago Board of Trade Group

**CME Group** Chicago Mercantile Exchange Group

**CMECE CME** Clearing Europe Limited

**EMIR** (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories

**ERM** Enterprise Risk management

**ESMA** European Stability Market Authority

**ETD**-Exchange Traded Derivatives

**FC** Financial Counterparty

**FSB** Financial Stability Board members

**IRS** Interest Rate Swaps

**ISDA** International Swaps and Derivative Association

**LEI** Legal Entity Identifier

**MIC** Market Identifier Code

**NFC** Non-Financial Counterparty

**OTC** Over-The-Counter

**RTS** Regulatory Technical Standards

**SFTR** Securities Financing Transaction Regulation reporting

**SFTs** Securities Financial Transactions

**SIMEX** Singapore International Monetary Exchange

**TCE** Third Country Entities

**TR** Trade Repositories

**YoY** Year-of-Year

**YTD**-Yearly Traded Derivatives

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## INTRODUCTION

There seem to be two extremes on how the world perceives derivatives. Are derivatives risky per se? The majority considers: "Derivatives are financial weapons of mass destruction" (Warren Buffet). In contrast, some argue that "Derivatives in and of themselves are not evil. There's nothing wrong about how they're traded, how they're accounted for, and how they're financed, like any other financial instrument, if done properly" (Mr. James Chanos). In that regard, this thesis aims to resolve which of these two views prevails as well as to determine the overall justifiability of the global legislation on this topic.

Referring shortly to the background of the problem, the need to "reshape" and reregulate derivatives markets practically imposes itself. The key factor that led to the financial crisis of 2007-2008 was the so-called Credit Default Swaps. (hereafter: CDS) The instrument appeared in response to surging demand from large corporations, banks and other financial players in measuring and managing their credit exposure. Additionally, the popularity of this instrument was in part contributed by those who purchased CDS to preserve their assets value and an extensive part of the market purchased CDS to place bets against borrower's chances to default on their debt. Hence due to its popularity among the financial industry, CDS reached its peak as the most diversely spread financial instrument before the crisis. Understandably, in the period leading up to the Great Financial Crisis of 2007-2008, most of the available cash was placed in CDS. The overall value of CDS was estimated at a notional outstanding value of \$45 trillion, compared to half of that amount, \$22 trillion, backed up in their underlying assets. (BIS, 2008, p. 9, table 4) In 2008, the notional amount outstanding of CDS was estimated at roughly \$67 trillion, compared to \$15 trillion of their underlying assets attributed to U.S. corporate stocks. (Stout, 2011, p. 24) The mismatch between the notional of CDS derivatives and its underlying is an absolute indicator of speculative trading. In summary, it is the downfall of CDS trading that provides the possibility to contract several CDS agreements on a single bond, for example. However, even though speculative trading prevailed and it certainly played its role in the growth of this fragment of the market, it still cannot be claimed that the financial consequences generated were not created by a single investment bank. Even though the main trigger for the crisis was considered to be CDS on Lehman Brothers' debt. However, in reality, it is not clear whether it was CDS imposing risk themselves, or it was how they were traded that caused the crisis.

Ultimately, combining CDS with the extent and deficiencies of OTC market at the time, it presumably launched a chain-reaction of defaults among the financial industry and beyond. The deficiencies of the OTC market, due to its lack of transparency, imposed danger in a form of a spillover effect of the systematic risk throughout the market. Thus, the Global OTC derivatives market became the focus of the policymakers after the crisis. The above stated goes hand in hand as to why many critics pointed at derivatives as a cause of the last credit crisis. Derivatives most certainly played a significant role in the collapse of major financial players. It can be dated back to 1995, with the collapse of the Barings Bank, following the cases of Metallgesellschaft AG and its Hedging Program in the U.S, all the way to the Lehman Brothers collapse in 2008. However, in the case of Barings banks, derivatives were combined along with other factors. Shortly after a series of these undesirable events, at the Pittsburgh Summit in 2009, G20 leaders pledged to reform the OTC market in order to improve market transparency, prevent market abuse and reduce systemic risks.

Focusing on Europe, the European Union supported this vision to transform the infrastructure of trading on financial markets by developing and adopting European Market Infrastructure Regulation or formally known as (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories (hereafter: EMIR). The Regulation in reference aims to focus on three focal points. First, to increase transparency by establishing Trade Repositories (hereafter: TR). Second, to reduce counterparties credit risk by standardizing the OTC market and thus imposing an obligation of centrally clearing of transactions through Central Counter Parties (hereafter: CCP (European Commission, 2018)). And third, EMIR provisions an obligation of enforcing Risk mitigation techniques for non-centrally cleared derivatives, aiming to reduce operational risk. Enforcement of the given legal framework is under the surveillance of the European Stability Market Authority (hereafter: ESMA).

Legislation-wise, I will refer to EMIR as a benchmark for resilience of the European OTC derivatives market. For the stipulated reasons above, EMIR aims to complement the financial system more forcefully and transparently. However, in order to be able to enforce the provisioned clearing and reporting requirements, it is inevitable to harmonize the legislative framework across and between the member states of the EU. In essence, the central focus of this thesis is the re-regulation of the derivatives market, OTC market in particular. In that regard, the main objectives of this research are: (1) to determine effectiveness and progress on the implemented reforms; (2) companies' compliance with the Regulation, and (3) to conclude on the justifiability of the undertaken measures.

Regarding the overall set objectives, I will combine quantitative and qualitative analysis to determine whether the theory is applied in practice. Regarding the legislation implementation framework, both on a worldwide scale as well as on a European level, it is essential to align and compare it to the movements of OTC derivative classes. Otherwise stated, the goal is to observe how the legal boundaries affect the markets. For this reason, I will analyse the statistical data collected by the Bank of International Settlement (hereafter: BIS) and EMIR Trade Repository public data, as well as an in-depth analysis of the text of the Regulation.

I will focus on the BIS Reports and corresponding statistics available on derivatives traded OTC and ETD in order to determine the effectiveness and progress of the implemented reforms. Consequently, I will compare the size of the global OTC derivatives market to the ETD market (BIS, 2019a,2019b). Once I conduct a comparative analysis (by size, characteristics and structure) between these two segments of the market, I will carry out a brief introduction to the Regulation's legal framework. I will focus on the semi-annual data available, comparing 2017 and 2018, as well as the Financial Stability Board provided Progress Report on implementation, for that same quartile.

Two important trends emerge from the data analysis. A significant fall of the Credit Default Swaps market (hereafter: CDS), and a rise of the Interest Rate Swaps (hereafter: IRS). Hence, the steady growth of the IRS after the clearing obligation was introduced, it presents a positive market feedback on the effectiveness of the reforms undertaken. Once the trend of movement of derivative assets classes is determined, I will carry out a substantive analysis of the OTCD market, encompassing a time interval of 10 years. The analysis will reflect on the beginning of the crisis in 2008, when the global OTCD market reached its peak, then continue to the Pittsburgh Summit in 2009, concluding with EMIR and Dodd-Frank Act introduced in 2012 and 2010. These three base points for determining trade volumes on a global scale practically serve as a foundation for further analysis. This will be done by comparing global trends to European Derivative Market and finally

comparing them to the volume of cleared derivative transactions. Otherwise stated, I will try to determine whether the noted trends for IRD and CDS are also valid for the European derivative market and, if so, whether this might be related to the obligation of clearing.

As a follow up to the state of the Global OTCD market, I will inspect both OTC and ETD segments of the market to determine if the same trends are present on the European derivatives market. Consequently, I will be mainly guided by the methodology used in the published papers from two financial organizations; The 12th Progress Report on Implementation, conducted by the Financial Stability Board and the Statistical release on OTC derivatives from June 2017, by the Bank of International Settlement. Most importantly, to determine market compliance with the provisioned requirements of clearing, I will primarily refer to the ESMAs Annual Statistical Report on Derivatives Market 2018. In order to determine whether the business sector makes an effort to comply with EMIR requirements, or, on the contrary, it discredits the law, I will look into the volumes of cleared trades of three CCPs across 1Q19. Focus of the thesis is EUREX AG's volume of cleared trades, referring to the period before and after the new rules were introduced to the market. Data is collected on a monthly level for the interval of 1Q14 to 1Q19. Furthermore, I will refer to four Trade Repositories public data available, regarding the applicability of trade reporting obligation. Additionally, I will comparably inspect the volumes of trade reporting for IRD and CDS.

Lastly, I will determine the justifiability of the introduced Regulation by simultaneously conducting a comparative analysis of the case scenarios of "Metallgesellschaft AG MGRM's Marketing Program" and the Barings case. The arguments will be presented as a Cost and Benefits Analysis for the business sector. Furthermore, I will refer to the experience of Chile as an emerging economy in the use of derivatives as a hedging instrument prior to the financial crisis in 2008.

Finally, the main findings of this thesis are expected to stand in favour of the OTC regulative reforms. I will prove that it is not derivatives that increase the overall risk of the companies and thus impose a risk to the market. By the end of the thesis I will have answered the following research questions:

1. How consistent the structural reforms of EMIR regulation are and the impact of their implementation?
2. What do the regulative changes mean for the market players and how compliant they are with it?
3. Does derivatives use increase the overall risk of FC?

Accordingly, the first research question will be partially addressed in the first section of the thesis. Chapter 1 serves to familiarize readers with the background of the derivatives as well as different industries connected to it. This will be done by providing a theoretical overview of what derivatives essentially present and how and where they can be traded. Accordingly, once the size of OTCD markets is determined, opposed to the ETD market, I will further carry out a structural analysis of these market segments. Eventually, this chapter will provide an insight into the market structure in terms of financial sector market participants which majorly contribute towards the substantive growth of IRDs.

As stated earlier, the main danger imposed by OTC markets is the lack of transparency. It is the main reasoning behind the establishment of EMIR, and as such, it is precisely in line with the goal of the G20 summit. For this reason, the second chapter of this thesis named

EMIR, after the European Market Infrastructure Regulation, is further addressing the second research question. Concerning the impact of EMIR obligations, the second chapter aims to bring closer the very essence of how the market responds to the regulative changes of clearing and trade reporting. The central part of this research is EMIR Regulation itself and I will identify and analyse the clearing and margining requirements. Additionally, well-established departments of Risk and Collateral Management are a must-have for the companies. The most interesting section of this chapter displays the interconnection between the clearing and trade reporting requirements. To demonstrate the causal relationship between Central Counterparties and Trade Repositories, I will comparably investigate cleared volumes across three Central Counterparties. CCP's findings will serve as a tool to re-confirm the Trade Repositories' findings on trade volumes reported.

The last chapter of this thesis, will support the findings of the previous two chapters by providing additional feedback with practical examples. Are derivatives as deadly as presented, or should managerial incentives also be taken into consideration? What factors determine their "deadliness"? If derivatives are considered safe to use, then why are they related to most famous companies' failures and thus led to the financial crisis of 2008?

## **1 DERIVATIVES**

The primary purpose of the first chapter is to introduce the reader to derivatives and their progress throughout the years, starting at the very beginning, all the way up to 1970's and 1980's when they gained in popularity and became an innovation on the financial contracts market.

### **1.1 Theory of derivatives**

In order to properly understand derivatives, it is essential to go back to their origins. Derivatives are not a 21<sup>st</sup> century innovation; both derivatives and their regulations have been around for the past few centuries.

Derivatives may be used for hedging to reduce risk as well as to speculate. This, however, increases systematic risk and adds up towards market manipulation. Thus, a well-established common-law precedent, exercised both in America and the U.K, was used in order to minimize and control speculation. Namely, common law judges pledged against speculation by endorsing the implementation of the "Rule against difference contracts". However, the rule did not prevent wagers from placing bets or taking part in the contracts. The party in question needed to be able to demonstrate a real economic interest in contract's underlying asset. In other words, the concerned party had to demonstrate to the court, that it is directly economically affected by the outcome of the transaction. Further grounding its claims, that the main and only purpose of that transaction is to hedge against any risk imposed to the above stated economic interest (Stout, 1999a, p 718, 724-25). Notably, hedging serves as a sort of insurance and thus has a social purpose to reduce the risk. This isn't necessarily the case with speculating which is much more inexpensive. Meaning, speculators do not own the underlying; they do not buy the asset, nor do they intend to do so. Overall, they tend to predict the end-result and so profit on fluctuation in prices, interest rates or credit ratings. Even though the rule defined the boundaries, the given terms still left room for speculations. In other words, this great rule came with an exclusive exception.

In order to make speculators more aware of their counterparty, the precedent let them organize as a separate kind of exchange. To place bets, all the speculators had to do was pay entrance fees such as membership, margin and netting requirements. This was also the easiest way for the government to have this segment of the market under control. It, however, gradually increased its supervision over some exchanges by authorizing the Commodities Futures Trading Commission (CFTC) and the Securities Exchange Commission (SEC) to act on its behalf. (Stout, 1999b, p.7).

As the interest in speculative trading increased, the British government recognized the economic benefits of the industry by outlawing the rule against difference contracts and enacting the Financial Services Act of 1996. The new law dismissed any differences between speculative deals and those for hedging purposes; therefore making all financial derivatives lawful (Stout, 1999b, p.7). Following their example, the American authorities started slowly deregulating their legal barriers too and eventually validating all classes of derivatives as lawful. Initially, they created an ad hoc exemption, in the 1990s, for Currency Forward Contracts and Interest Rate Swaps. This was followed by a wholesale derivatives deregulation in the 2000s, with CFMA exempting all derivatives classes from regulatory oversight from both CFTC and SEC. This ultimately resulted in OTC market being of its superior size of \$600 trillion today. Naturally, liberating the markets of all legal restraints provided perfect settings for the comeback of speculation. Paradoxically, CFMA was given the authority to determine the true reason of legal entities placing bets on derivatives. This way, CFMA contested to show that derivatives should be used for hedging risk and not speculating to win huge profits.

According to BIS Statistic data, comparing the volume traded in CDS with their corresponding underlying asset, American bonds were traded in a proportion of 4:1 (Stout, 1999b, p.8). Meaning, several CDS were contracted on a single bond. This meant that derivatives market value was \$67 trillion, opposed to modest \$15 trillion value of bonds market. Mathematically speaking, it is speculation, not hedging, that drives the market. The notional value traded in derivatives is evidently much larger than the market value of its underlying. (Stout, 2011 p. 24)

Consequently, it is fair to note that the unleashed crisis of the last decade was not as unexpected and unpredictable as many economists perceived it to be. Evidently, it was the economists, not the lawyers who made such claims. Back in the 90's, some lawyers were able to foresee the crisis ahead of time and tried to raise public awareness about the questionably regulated derivatives. (Schmitt, 2009, p.40). In legal terms, the effects of market deregulation are evident from the enacted decision of the American Congress to enforce the Commodity Futures Modernization Act of 2000 (hereafter: CFMA), which essentially provoked the fatal consequences for the market. It is the lack of legal restraints that enabled some financial players into thinking of themselves "as "too big to "fail". This was the case with AIG in particular. They initiated the crisis by taking part in unsustainable speculative betting on CDS. Large amount of the CDS-trading "was naked", or purely speculative. Instead of hedging an actual risk that they were exposed to, some investors bet on the failure of the housing market loans (Munchau, 2010). Ultimately, the large volume of assets traded as well as the interconnectedness of the various financial companies led to what is called "systemic "risk", or the so-called "domino effect". (Acharya, 2009, p.225-226).

### 1.1.1 Types of instruments and underlying asset

By definition, derivatives are financial contracts whose value (price) is derived from the value of an underlying asset (e.g. equity, bond or commodity) or market variable (e.g. interest rate, credit risk, exchange rate or stock index) (European Central Bank, 2016). Depending on the level of engagement to the trade, derivatives fall in two classes: whether the party is obliged to commit to it or at least one of the parties can pull back from the trade. As such, derivatives in the first group are classified as forwards, futures and swaps, whereas derivatives in the second group are known as options. In other words, the two fundamental blocks which form all financial derivatives, even the most complex ones, are options and forwards. Options offer their owners the right to buy (call) or sell (put) an underlying asset at a pre-defined price at a certain date in the future. In contrast, forwards are a contractual obligation to do so (Menachem, 2002, p.680).

#### 1.1.1.1 Forwards

As a relatively simple derivative, forwards are contracts mostly used for speculative and hedging purposes. This contract enables two parties on the present date (today), to agree upon the stated price and quantity of a contract that will be executed sometime in the future. In terms of the future execution of the contract the delivery price is marked with **K**. In which case, one side of the contract takes the long position, committing to purchase the underlying asset at a specified time in the future, for the specified price. Whereas, the other side of the contract, taking the short side, commits to sell the underlying asset for the agreed price. It is important to mention is that no collateral is deposited when the deal is negotiated. Forward contracts are a typical financial derivative transaction traded on the OTC market. They are mostly traded between two financial institutions, or a financial institution and some of its clients. In essence, it is a privately negotiated transaction, hence it is less liquid because it is not traded on an exchange, but “behind closed doors”. Thus, in case one of the contract parties defaults on its obligation, the counterparties losses are big, which exponentially increases the risk when it comes to such contracts. Both spot and forward foreign-exchange traders are commonly found trading for massive financial players, mostly banks. Moreover, forwards are popular exchange-traded contracts and are mostly traded between two financial institutions or between a financial institution and some of its clients (Hull, 2015, p.6).

#### 1.1.1.2 Futures

In contrast to the forwards which are OTC, futures are contracts standardized by the exchange. In essence, they function on the same principal as forward contracts when it comes to the agreed future price. Unlike forwards, futures show much better performance in terms of reduced risk of the transactions, as they are quite rigidly systematized by the exchanges (Hull, 2015, p.8). The fact that they are commonly found on exchanges, makes them subject of certain regulations, as contracts are standardized, and transactions are centrally cleared. With standardization the contract parameters (price and quantity) are predetermined and the fact that they are traded on a stock exchange floor means that they are more liquid. Additionally, credit default risk is avoided with the involvement of Clearing Houses as intermediates of the transactions. Therefore, both counterparties are obliged to deposit collateral in a form of margin requirement, depending on the risk associated with the transaction. As a result, the Clearing house sets itself as an intermediate between the two parties by taking the opposite position of each side of the trade. Therefore, should any party of the contract default on its obligation-the clearing house is responsible for the settlement of the trade.

### *1.1.1.3 Options*

Options are financial derivatives that give buyers the right, but not an obligation, to buy or sell an underlying asset at an agreed-upon price during a certain period. However, if the options payoff at the time of expiration is negative, the holder of the option retains the right not to exercise it as well. Instead, they can just let it expire at maturity. This privilege, however, comes at a cost called premium, as an upfront payment. Two main types of options are: call and put options. A holder of a call option, has the right to buy an underlying asset for a predetermined price, at a specified date in the future, whereas the holder of the put option has the right to sell it under the same conditions respectively. Interestingly, options can further be divided into American and European options (important to note that other types of divisions are also available). Although practically the same, they are characterized by one important distinction. The key difference relates to when the options can be exercised. American options can be exercised at any time their holder finds it profitable to do so. In contrast, holders of European options can exercise their right to buy or sell only at maturity. (Hull, 2015, p.8-9)

### *1.1.1.4 Swaps*

Swaps present an OTC agreement between two counterparties to exchange future cash flows. Swaps are widely accepted among investors, ever since their first appearance on the market. The first formalized currency swap agreement happened between IBM and the World Bank back in 1981. Since then, swaps have proven to be extraordinarily useful because they provide an opportunity for both sides of the contract to benefit from different segments of markets as well as foreign markets. It provides market possibilities that would otherwise be inaccessible for either party alone.

Looking at the current fragmentation of OTC markets, it is impossible to neglect the fraction that swaps take. Following the deregulation of global markets, in order to impose mandatory clearing of trades and the market turbulence caused by Credit Default Swaps (CDS) from 2008; it resulted in a decreased demand for CDS, whereas the demand for IRS grew significantly. (Hull, 2015, p.152)

### *1.1.2 Purpose and benefits of derivative use*

Derivatives markets are doing exceptionally well and that is mostly to do with the types of traders they attract, which in terms adds up toward derivatives market liquidity. What makes this market especially attractive for investors is how effortlessly easy it is to find a match. To find a counterparty willing to take the offer. Therefrom, the market distinguishes between three categories of investors: hedgers, speculators, and arbitrageurs. Simply put, they differentiate between one another in their motives to take a part in a transaction. For example, hedgers use derivatives to minimize the risk from a potentially undesired move in a given market variable. In other words, to eliminate the risk related to the price fluctuation as they are directly affected by it. Speculators, on the other hand, strive to profit from the movement in that exact variable, by predicting in which direction the price is going to go. Finally, arbitrageurs' profit from taking offsetting positions in two or more instruments (Hull, 2006, p.19). They mostly profit on the art of information asymmetry and their capability to benefit on the difference in price. There is a window of time, lasting only a few seconds, during which same assets have different prices on separate markets. The arbitrageurs must use this window if they want to exploit the opportunity for arbitrage. With this in mind, it is evident that hedge funds gain massively by exploring all three types

of positions and it is not surprising that even the hedge fund managers tend to go for an arbitrage or a speculative position too. (Hull, 2006, p.12).

#### *1.1.2.1 Hedging*

As noted earlier, derivatives were originally used to hedge the value of a portfolio when a decline in the market is expected, or to enhance the portfolio value during other market conditions. Essentially, derivatives enable capturing opportunities in fast-growing markets. Overall, there are several opposing views when it comes to the role that derivatives play when hedging risk. Many condemn credit derivatives to be the cause of the last credit crisis, due to its complexity and opaqueness. Many others, however, oppose this idea. The 19th century regulation, for example, stood in favour of derivatives used for hedging, as it found hedging to have a social purpose. Hedging is indeed socially beneficial if both counter-parties enter the transaction with the same intention, to hedge. In this case, derivatives add value in terms of risk management because the equal or opposite risk of the two parties of the contract cancel each other out. This ensures both safety of the transaction as well as economic stability.

#### *1.1.2.2 Arbitrage*

Arbitrage involves locking in a riskless profit by simultaneously entering transactions in two or more markets (Krawiec, 1998, p. 4). Therefore, arbitrageurs are another important group of participants in futures, forward, and options markets. Arbitrageurs efficiency depends on their capacity to discover and take advantage of market inefficiencies. Derivatives are their prime tool due to their high level of flexibility and customization (Ingersoll, 1984, p.1022-1023). On the one hand, The main externalities from this activity are a higher liquidity level in the derivatives markets and a higher market efficiency, but, on the other hand, if we examine the financial markets through the lens of the Chicago School, it can be stated that market inefficiencies corrupt projective investment models (Fama, 1998, p.7-9). Considering the fact that accurate pricing of financial assets is essential for global investment, it can be considered that arbitrageurs provide a non-zero sum service to society.

#### *1.1.2.3 Speculating*

While hedgers tend to shield themselves against potential market threats and prevent movements in an unwanted direction, speculators prefer to take advantage of the price fluctuations. This can be either an upward or downward kind of movement. Speculators are not exposed to the included asset before the investment is made. However, they do have a say on its future development. Thus, speculators use financial instruments to get exposure to the included asset. In theory, hedgers that buy and sell could naturally offset each other. In practice however, it is usually the speculators who take the other end of the deal. Speculation is often compared to financial market gambling, nevertheless this activity fills the very much needed liquidity in the market and alongside arbitrage helps determine the market prices for assets (Geczy, 2006, p.30-34).

Overall, derivatives can be used for different purposes, many of which can be valid reasons for authorities to be concerned. In reality, managers are often witnessed to transform from hedgers to speculators, usually because they are driven by favourable circumstances and a chance to earn abnormal returns. A fair example of this is the trade deal undertaken by Jerome Kerviel, working for Societe General. Mr. Kerviel used his knowledge of bank's procedures to speculate and put large bets on the direction in which the indices would

move. He managed to cover his speculative activities up by only appealingly arbitraging. It is no surprise that he did not manage to keep this up for too long, since the unhedged part of his position rose to amount of EUR4.9 billion. Hence, instead of making a substantial profit on the price inconsistency of indices, Societe General lost a fortune. Nevertheless, Mr. Kerviel did manage to bet on the direction of indices movement and managed to do so for quite a while.

#### *1.1.2.4 Benefits of derivatives*

The most important benefit of derivatives is that it allows individuals and organizations to win an income that they would otherwise not be able to earn. Even so, it would be excessively costly. Another crucial advantage of derivative instruments is that they make the collateral assets market more efficient. For instance, derivatives markets generate plenty of data. In many countries, the only trustworthy information regarding long-term interest rates is gathered from swaps because this market is liquid and more attractive compared to the bond market. On the plus side, derivatives allow investors to trade based on information that otherwise would have been extremely expensive (Gogoncea & Paun, 2013, p. 12).

In addition to this, credit derivatives allow individuals to decrease their exposure to credit risk, without the need to remove physical assets in the financial reports. For instance, any sale without using a credit derivative instrument usually asks for notification and consent from the client. In contrast, a credit derivative instrument represents a confidential transaction, in which the client should neither be a part of nor have outstanding knowledge of it. This way, the relational management decisions and risk management decisions are separated (Gogoncea & Paun, 2013, p. 13). Similarly, the positions in the areas like accounting or taxation within an organization may establish a crucial obstacle to the sale deal. Nowadays, CDS are used to avoid the negative outcome of accounting or taxation. The insufficient liquidity is most often a result of external factors. The secondary market for CDS is not very advanced and in some cases, a couple of types of insurance deals may not even exist.

#### 1.1.3 Where can derivatives be traded?

When it comes to investing in a particular derivative product, it's good to have some knowledge of the financial markets. Therefore, derivatives can be traded in two segments of the market, either as exchange-traded derivatives (ETD) or Over-The-Counter traded derivatives (OTC). Measured on a global scale, the derivative market reached recording levels of \$650 trillion. Shortly, the distinction between these two segments of derivative markets is mostly in the legal nature of the products and how they are traded. While many market participants are operating in both of these segments, the OTC market seems to be more attractive for investors and therefore more dominant. Yet, trading with Option and Futures contracts is mainly located on a specialized trading floor. Starting from Chicago Mercantile Exchange and Chicago Board of Trade (hereafter: CME Group), European EUREX AG based in Frankfurt to Korean Exchange, ranked as top six according to Wall Street Journal.

## **1.2 Derivatives market research**

In order to understand the controversy that was brought up with the financial crisis in 2008 and the derivatives debacles that followed; I will carry out a comparative analysis of the

characteristics of OTC and ETD segments of the market by casting a light onto its size and structure.

### 1.2.1 Characteristics of derivative markets

Most certainly, the OTC market dimension is defined by the market sectors present on it. Namely, it is the wholesale sector that directs the volume of trades. Meaning, it is the big players that lead the game. For example: commercial corporations, large insurance companies, mutual funds, pension funds, governmental bodies, banks, individuals with significant assets, and other financial institutions. These types of financial players are trading in high-volume large trades, while the ETD market must adjust for all the sizes of trades available. This is mainly due to the fact the exchange-traded market is accessible for both the wholesale market as well as the retail market. In that regard, referring to the possible customization of contract features (price and quantity) and trade volumes that the wholesale market players execute; it is fair to assume that there is comparable knowledge and expertise between the parties. Meanwhile, on the ETD markets, there is a significant information asymmetry between market participants, which may serve as an arbitrage opportunity for some.

Generally, there are two sides of the flexibility that OTC markets provide in terms of: trading products at different prices, levels of maturity, settlement procedures, and corresponding risk profile. OTC markets leave an open door for companies to access kinds of products, that would otherwise not be available on exchanges. Even if they were exchange-available, they would burden the companies with excessive costs or needless degree of standardization. Either way, it will restrain smaller companies from entering new transactions. Additionally, OTC markets provide the necessary infrastructure for companies that either don't meet the capital requirements to access exchange-platforms or do not trade on a regular/daily basis. This is the case where bilateral agreements are particularly useful.

In contrast, the endless customization of contract features may also lead to secondary effects. It is this kind of adverse effects that imposes a need for a more appropriate regulation of OTC markets. The lack of standardization of contracts, or the ability to tailor them to specific needs, gives little to none insight into the price traded. Dealers on this segment of the market, enable their counterparties to buy or sell at the bid and ask prices they quote. These prices are not automatically published daily, as it is the case with the ETD market. Contrarily, the exchange-floor publishes the prices in real-time, which contributes towards price transparency and determines the liquidity of the products traded (Duffie, Li & Lubke, 2010.p 10).

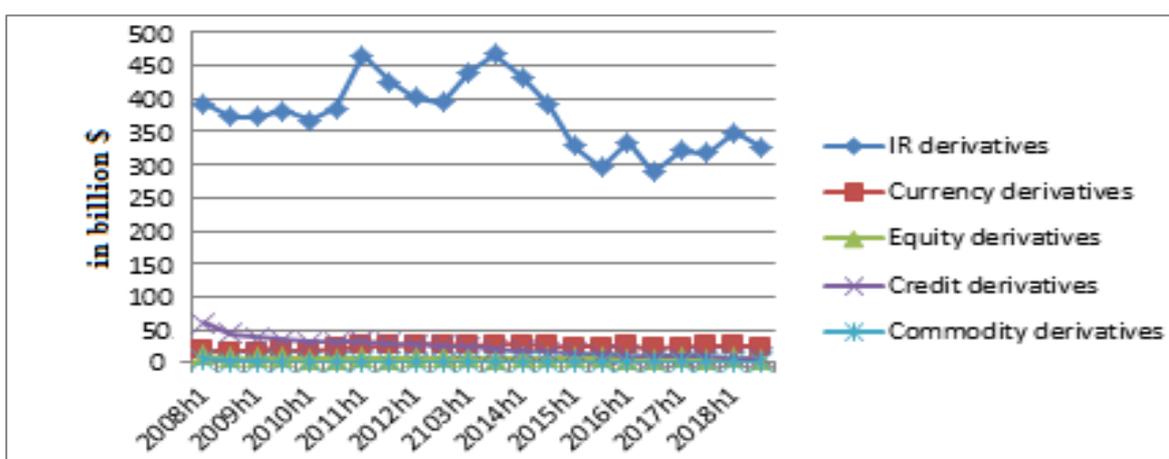
The shortcomings of OTC markets became noticeably apparent during the economic crisis in 2008. The lack of price discovery and liquidity made trading challenging and hence deterred investors from jumping into deals. Perhaps if pre-trade transparency was enforced earlier, it might have led to a different outcome. Pre-trade transparency itself means that real-time access to pre-trade pricing information needs to be provided. This helps investors better evaluate their assets, make better business decisions, and improves risk management (Chen & Zhng, 2012 p. 1). Pre-trade transparency reduces traders' transaction cost of bid-ask spreads. As a result, smaller bid-ask spreads cause more traders to participate and therefore lead to an increased market liquidity. There is a clear benefit and need for a greater pre-trade transparency in OTC markets. Besides, both regulators and practitioners view pre-trade transparency as equally important for post-trade transparency in OTC trading.

For all of the reasons stipulated above, reforms that aim to reduce the systemic risk in the financial sector and improve the overall regulatory oversight should be put in place.

### 1.2.2. Comparative analysis of the Global OTC and Exchange Traded derivatives market, by size and structure

Looking at the derivatives statistics data, provided by the Bank of International Settlement, it is fairly obvious that the derivative market has experienced tremendous variation throughout the past decade. Analysing the period from 2008-2018 semi-annually, the legislative time framework covers the period from G20 Pittsburgh Summit to the enforcement of the American and European regulative reforms. I will align the time-framework of those acts with the variability of the market at specific periods. More specifically, referring to the variability of derivative classes.

Figure 1: Global OTCD market by size



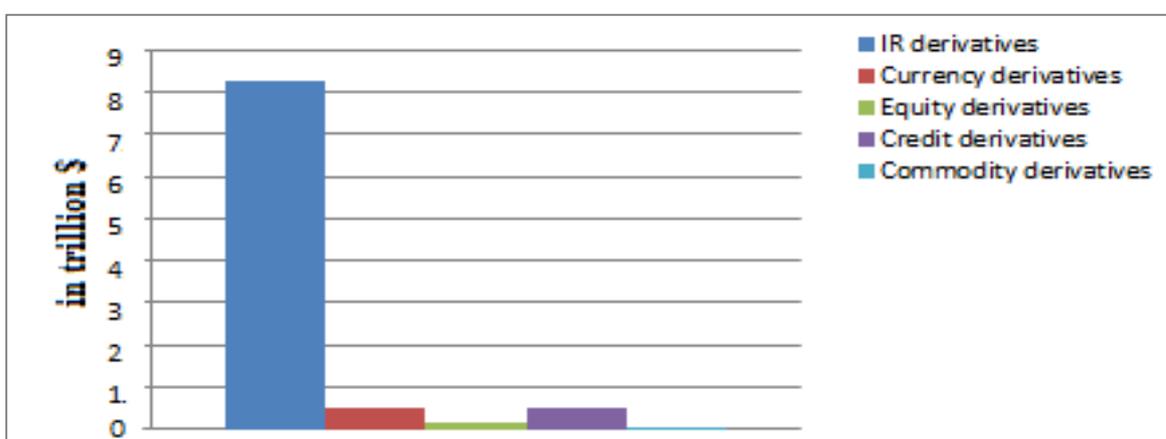
Source: BIS (2019a).

As noted in Figure 1, after the G-20 conference, the OTCD market is on a decline overall. Evidently, IRD has displayed quite a graphic volatility across the entire time framework. This also holds true for Currency derivatives, which were registered in is a somewhat smaller amount of trades, but still followed along the same trend of doing trades as IRD. Since IRD takes 89% of the share of OTCD market, it can be taken as a representative of the same, demonstrating trade volatility. Assessing the time frame line in two stages, as of 2010 and 2014, the market presents different tendencies. Notably, in the period before the Dodd-Frank Act enforcement in America in 2010, IRD operates at a decreased but stable volume.

Surprisingly enough, despite the regulative changes, the market manages to reach a peak level of trading in H1 2011. Two things need to be considered in this context. Primarily, it is important to note that the American market has a dominant share of the Global OTCD market Secondly, considering the implementation process from the point the law is passed in the American House of Representatives to the date when it is effective, it does not imply that the law is enforced by default. It is important to distinguish among these notions because of the implementation phase. The subsequent initiatives of the Republicans to partially or completely repeal the Dodd-Frank Act is not the subject of this paper, hence I will not go further into that. However, it is important to note that the market is responding to the regulatory changes when it comes to the amendment version of the Pittsburgh Summit Agreement just as expected. It is very understandable to note a slight fall in

activity ahead of new regulative changes, especially when it comes to this fragment of the market. Contrarily to this, prior to the enforcement of the European reforms, the IRD market has already reached peak levels- followed with a steep fall in the upcoming period. The decreased activity in volumes traded, has likely to do with the regulative adjustment and adapting to the new forms of trading. Namely, a sharp decline in IRD trades is noted every second semester from H2 2015 to H2 2018. As evident in Figure 1, a fall of the market activity for IRD is detected in continuance for every second semester, looking from H2 2015 onwards, yet it gradually increases in the last two years. And so, the notional outstanding for IRD contracts of \$296 trillion in H2 2015, decreases to \$289 trillion for H2 2016. IRD traded volumes followed an activity of \$318 trillion in H2 2017 and \$326 trillion for H2 2018 respectively. Although the market is recovering, the noted values of IRD traded closing H218 are still evidently lower compared to \$392 trillion in 2008.

Figure 2: Aggregated sum notional from H1 2008-H2 2018



Source: BIS (2019a)

Commodity derivatives, with a corresponding share of the market of less than 1%, might be linked to the failure of the Metallgesellschaft Marketing program and their relation to trades with crude oil. I will refer to this in more depth in the 3rd chapter. Equity derivatives, even with a share of 1.66% out of the total notional value of OTCD market, managed to gain some popularity among market participants. In particular, clearing houses report positively on their Equity Clearing Services, which seemingly is what drives their profits up.

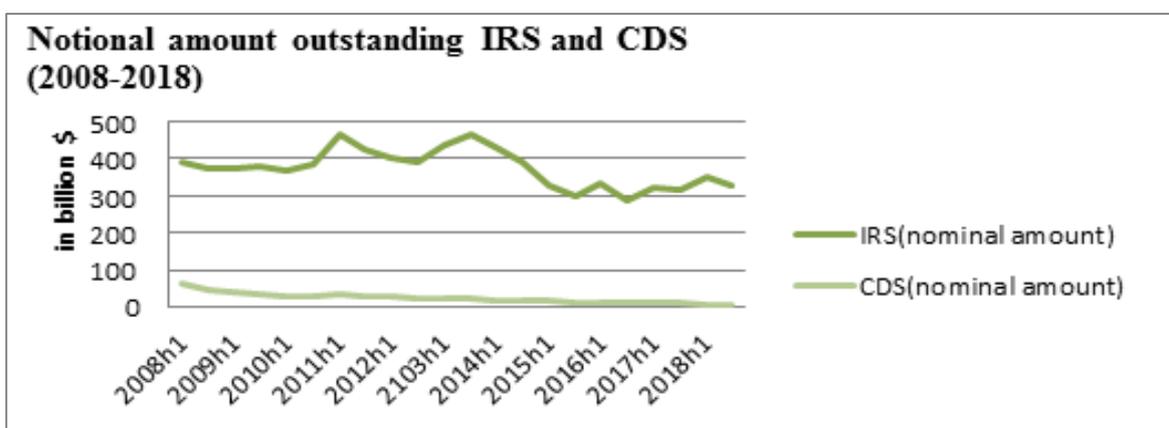
Finally, the scenario is very different when it comes to credit derivatives. If graphically represented on their own, they have the steepest line of declining. The decline is especially accelerated after the Dodd-Frank Act enforcement, which massively decreased the volume of trades on American ground. The credit crisis of 2008 has certainly given the Credit derivatives a reputation as one of the riskiest derivative classes for hedging. Yet again, the strict regulative oversight in terms of trading this derivative class is what helps it remain well-positioned with a share of 5.54% of the total derivatives traded OTC, for the observed period.

Concluding on the overall state of OTCD market, IRS note volatile yet increasing volumes of trading. In contrast, CDS mark the steepest degree of decline among all derivative classes. For this reason, I will examine for possible correlation between those two derivative classes.

### 1.2.2.1 Correlation CDS-IRS

Namely, there are two points to be noted before testing for correlation. Primarily, the data needs to be graphically presented in a format of a scatterplot, in order to determine the direction of the data. Secondly, some statisticians say that only a correlation value of +0.5 or -0.50 displays strong linear relationship. In this manner, the data is presented for two data series on a scatterplot. As presented, the data has an upward vertical direction with a linear relationship found in one segment. By further testing for correlation, the coefficient  $r$  is 0.37 which demonstrates a positive yet weak linear relationship. The corresponding p-value of 1.20856E-17 demonstrates high statistical significance of the correlation. Considering these results and as graphically presented in Figure 3, a display of weak linear correlation is therefore practically insignificant and does not imply present correlation among IRD and CDs.

Figure 3: Correlation CDS-IRS, measured in notional amount outstanding from 2008-2018



Source: BIS (2019a)

### 1.2.3 Current status of derivatives market (focus on IRS)

Seemingly, the market is in a redundant movement. Ever since 2008 onwards, all derivative classes, more or less, follow the same pattern of movement, except for credit derivatives for the observed period. To capture the size and structure of OTCD market most accurately, I will briefly focus on H2 2018. Furthermore, I will present market volatility by comparing it Year-over-Year (hereafter: YoY), as well as to the previous six months (H1 2018).

Accordingly, the share of commodity derivatives contracts are still decreasing, with less than 1% share of the total OTCD. Even though Credit derivatives are still slightly declining, they are positioned third, closing H2 2018. This, however, might be noted as a positive remark, giving regard to legislator's initial willingness to put the CDS market under control. Equity derivatives mark the same decline in trades as the previous classes. Nevertheless, they managed to gain some popularity closing H2 2018.

Closing H2 2018, IRD derivatives represent an 89% share of the total market, with \$326.690trillion. They mark a positive positive rise of +2.46% YoY, which presents an improved performance of \$ 8trillion comparing to the last year. However, the market for IRD decreased for \$23 trillion in just six months. Even though the change in volume traded is not that drastic, all derivative classes detect the same pattern without exceptions.

Due to the size of IRD and FX markets, these two segments of the market need to be further examined in terms of concentration and representation of the type of counterparties trading. Focusing on the market concentration, the threshold determined by the United States Department of Justice will be used as a rule of thumb in interpreting the HHI Index. In that regard, summing the square of the market share of all market participants, it will produce a value ranging from 1-10.000. Depending on this score markets are divided accordingly. Based on the HHI, there are three types of markets:

- un-concentrated Market:  $HHI < 1500$
- moderately concentrated markets:  $HHI$  between 1500 and 2500
- highly Concentrated:  $HHI > 2500$ .

#### 1.2.3.1 FX derivatives market concentration and counterparties representation

Currency-FX are second most traded derivative contracts with a share of 6.78% of the total OTC market. Even though its value declined, similar to the above stated derivative classes, this segment of the market is found to be highly concentrated in Europe closing 4Q17. Moreover, it is red-flagged. According to the HHI Index calculated by BIS statistics, the global currency market is quite the same.

Considering the market concentration, I will shortly refer to the notional size of this market as well as currency denomination of contracts. In terms of currency denomination, the \$90 trillion contract structure of this segment of the market traded with Forward, Swap, or Options contracts, gives away that FX are mainly used for hedging. The fact that \$53 trillion fall on the Outright Forwards or so known FRA contracts, shows that they are simply used to hedge against adverse fluctuations. This makes up for 70% share of the market, followed by \$24 trillion of Currency Swaps contracts also used for hedging. Lastly, Option contracts notional amount outstanding amounts to \$11 trillion. Similar to the previous two types of contracts, option buyers also wish to hedge on risk exposure by limiting their downside, but with a slight difference in terms of contract execution.

Furthermore, in terms of contracts denomination, it can be noted that the distribution among 4G currencies is quite diverse. \$80 trillion of USD denominated contracts represents a share of 88% of the total currencies. Next are EUR denominated FX contracts and ultimately GBP and JPY denominated contracts with a share of 16% and 12% respectively. The share of CHF denominated contracts is somewhat better with FX contracts than it is with IRD, amounting to a 4% share of total currency contracts

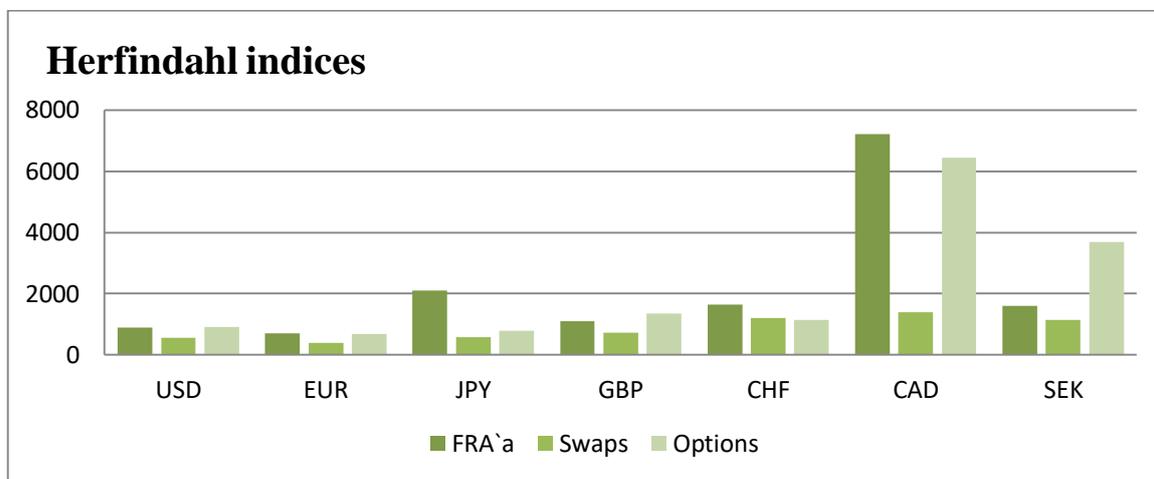
Lastly, looking for concentration among individual sectors present on FX market, it can be noted that, despite ESMA's finding on highly concentrated European derivative market, on a global scale the market is fairly dispersed. This is due to the HHI of below 1500 being considered a non-concentrated market. Notably, it is important to point out that given options contracts tend to rise to 1500, in terms of contracts denominated in SEK and CAD with scores of 1100, and JPY and GBP scoring above 1200.

#### 1.2.3.2 IRD market concentration and counterparties representation

As previously stated, a market with HHI above 1500 is considered to be concentrated. As graphically presented in Figure 4, FRA traded contracts with an interest rate as their underlying present moderate concentration across currencies. This is valid with exception to USD and EUR denominated FRA contracts. Swaps and Options contracts, on the other

hand, showcase this kind of tendency on contracts denominated in CAD and SEK. Overall, CAD denominated Forwards and Options contracts appear to be a highly concentrated market.

Figure 4: IRD market concentration by currency



Source: BIS (2019a).

Subsequently, short term contracts certainly drive the ETD market with a share of 90% for both future and option derivative contracts, taking interest rates for underlying. As with IRD traded OTC, the same trend is present with exchange-traded Futures and Options derivative contracts. The U.S market takes over the lead. It is then followed by the European market and Asia and Pacific located exchanges come in last. In conclusion, short-term IRD contracts are widely traded, with exception to the Asian market, notably prevailing with long-term contracts.

The open interest as of December 2018 amounts to almost \$39 billion notional outstanding for both short-term and long-term interest for all exchanges traded, indicating a growth of 18% YoY. For the same month, the open interest of currency denomination of Futures contracts is majorly denominated in USD contracts, with a share of 63% amounting to \$24.384 billion, EUR 5.9 billion and GBP 2.65 billion. (BIS Statistics, Table D3 Exchange-traded futures by currency)

Figure 5: ETD IR Options by location of exchanges, Open interest as of December 2018



Source: BIS (2019b)

Figure 6: ETD IR Futures by location of exchanges, Open interest as of December 2018



Source: BIS (2019b).

Lastly, referring to the Options market taking interest rates for an underlying, this segment of the market also notes positive growth of \$55 billion. It is a doubled growth in size comparing to \$26 billion as of December 2017. Notably, the structural denomination of exchange-traded Options is very much alike the exchange-traded Futures contracts (see Figure 5.) Exchange-traded Options are majorly denominated in USD with \$42 billion notional outstanding and \$24 billion notional outstanding for USD Futures respectively. Followed by Futures denominated in EUR and GBP. Apart from long-term contracts which are characteristic for the Asian market, short-term contracts are consistently traded for ETD as for OTC traded derivatives.

Lastly, when it comes to the Options market taking interest rates for an underlying, this segment of the market also notes positive growth of \$55 billion. If compared to \$26 billion as of December 2017, this represents a double growth in size. Notably, the structural denomination of exchange-traded Options is very much alike the exchange-traded Futures contracts (see Figure 5.) Exchange-traded Options are majorly denominated in USD, with \$42 billion notional outstanding and \$24 billion notional outstanding for USD Futures respectively. USD denominated futures are followed by Futures denominated in EUR and GBP. Apart from long-term contracts which are characteristic for the Asian market, short-term contracts are consistently traded for ETD as for OTC traded derivatives.

### 1.3 End of self-regulation

Completed reforms and measures of the financial regulation are about to be implemented as a response to the crisis of 2008. The main objectives are to increase regulators' capability to oversee and deal with the dangers imposed on financial stability. This should enhance the prudential monitoring and resolvability of SIFIs as well as strengthen the capability of the markets and their subsequent financial infrastructures to absorb shocks.

To help regulators better forecast and get ready for dangers encountering the stability of the financial system, authorities have imposed central banks and other regulatory agencies to adopt a macroprudential approach to monitoring and regulation. Subsequently, in order to decrease the probability of disastrous financial crisis, such measures enhance the resilience of the markets and its financial infrastructure. *Thus*, the requirements of the derivative regulation increase transparency and stability of the OTC derivatives markets. They also improve the monitoring of financial market services. However, as presented

below, any implemented reform is followed by different types of costs as well as many uncertainties.

## **2 EUROPEAN MARKET INFRASTRUCTURE REGULATION (EMIR)**

Two institutions of the European Union introduced the objectives of the EMIR Regulation: the European Commission and European Security Market Authority (hereafter: ESMA). However, since the initial text of EMIR was insufficiently defined, the private sector struggled with implementing the provisioned obligations. This resulted in the European Commission bringing the Guidance on the implementation of Regulation on OTC derivatives, central counterparties and trade repositories in force (in the further text: Guidance on the implementation of the Regulation), alongside substantial technical rules as well. In 2014, ESMA released a document on Frequently Asked Questions on EMIR in order to bring more clarity to the nature of the law. Several Frequently Asked Questions on EMIR are concerning the timing and scope of the Regulation. The publications are referring to the work and requirements of clearing and reporting obligation, by referring to CCPs and TRs respectively. ESMA is responsible for timely and frequent publications of FAQ's as well as guidelines reflecting different aspects of the scope of the EMIR regulation. As a direct link between the public and private sector, and by directly addressing the questions and issues, ESMA makes the regulation easier to implement. Besides the FAQs, ESMA publishes yearly Reports on Q&A's on EMIR focusing on its regulation implementation. Namely, the purpose of ESMA's Q&A on implementation of the EMIR Regulation is to provide clarity on the Regulation in terms of its requirements for all parties involved; market participants, authorities but also to make it clear for the general public. In addition to these publications, an entire legislative framework has been gradually developed to enable a practical application of EMIR.

### **2.1 Overview of the Regulation framework and objectives**

The focus of this thesis is the assessment and review of EMIR. The Union established a new set of rules on derivatives trading by taking into account the two major difficulties that the financial market has to deal with: lack of or counterparty risk management and lack of transparency of OTC traded derivatives.

Aiming to reconcile the European derivatives market, EMIR took the responsibility to enforce the objectives of Clearing, Risk Mitigating and Trade Reporting. In summary, EMIR imposed an obligation for all standardised OTC derivative contracts to be cleared through a CCP and reported to a TR respectively. Accordingly, the clearing obligation is binding only if FC and NFC are above the clearing threshold within the scope of the Regulation. Otherwise, non-cleared derivatives that are below the clearing threshold are required to collateralise their positions. Otherwise stipulated, the Regulation responds to the appointed difficulties above by enhancing the importance of Clearing Counterparties (hereafter: CCP) also known as Clearing Houses and Trade Repositories (hereafter: TR). The concepts of the objectives will be individually elaborated in more depth, later in this chapter.

In regards to the implementation of the regulation objectives, an extensive legislative framework is developed to supplement the enforcement of EMIR, along with technical

regulatory standards as a source of the legislation in force. Hence, EMIR's legal framework is consisted of the following:

- Text of the EMIR Regulation (EU) No 648/2012 of the European Parliament and of the Council of 4 July 2012 on OTC derivatives, central counterparties and trade repositories
- Commission Implementing Regulation (EU) from No 1247/2012 to No 1249/2012 of 19 December 2012
- Commission Delegated Regulation (EU) No148/2013 to No 153/2013 of 19 December 2012 (hereafter: Commission Delegated Regulation)
- ESMA's guidelines on EMIR
- ESMA's Questions and Answers in Implementation of the Regulation (EU) No 648/2012 on OTC derivatives, central counterparties and trade repositories (EMIR), (hereafter: ESMA's Q&A on EMIR)
- European Commission Frequently Asked Questions on EMIR
- EMIR Refit Regulation 2019/834 amending EMIR of 17 June 2019

Starting from top-down, it is evident that the original text of EMIR is noticeably extended. Namely, the incompleteness of the initial text of EMIR made it significantly costly and challenging to implement and enforce. Many entities within the business sector were caught in a "cross-fire", because the Regulation wasn't specific enough in terms of providing practical application of its norms. This was especially evident when it comes to FC's and small NFC's uncertainty of whether they are under the scope of the Regulation or not. Considering that the clearing requirement, for instance, was only lightly defined, thus it was unclear who falls under the requirement to clear and report its transactions? What types of contracts and underlying assets are under the scope of clearing? What are the minimum details on the data to be registered and reported? Are all NFC obliged to clear and if not, how should their derivative transactions be regulated? Likewise, the Regulation lacked clarity regarding the duration of the temporary exemptions for other larger entities, like Pension Funds. However, despite the appointed shortcomings from the very beginning, the European Commission refused to radically alter the core requirements set in objectives of the EMIR Regulation. Instead of abolishing the Regulation as a whole (EMIR), the European Commission made an effort to introduce detailed legislative guidelines to ensure practical and consistent application of EMIR's rules.

The competent authorities along with TRs and CCPs also faced major difficulties to cope with the clearing and reporting requirements. Speaking of the reporting requirements in particular, the regulatory technical standards from the scope of TR's operation were defined only later. More precisely, it was only after the enforcement of the Amendment version of the Commission Delegated Regulation (EU) No 151/2013 that the regulatory technical and operational standards for TR were stated. It simplified TR's operation in terms of: information to be provided in the application form for registration of TR's; format of records to be maintained; operational standards for aggregating, comparing and accessing data as well as the data that needs to be made publicly available.

Commission Delegated Regulations and Commission Implementing Regulations are simply referred to as Regulatory Technical Standards (hereafter: RTS). Each of them provides technical guidelines, specifying the details needed to perform any operational

activity at all. In this thesis, I will point these standards out in order to demonstrate how they supplement and hence enable the impeccable implementation of EMIR Regulation.

It is important to point out that the implementation of Regulations is firmly established and rigid, unlike the flexible implementation of Directives. In terms of achieving the end-goal, regulations are enforced in a strictly defined way. Hence, it is very understandable that it takes time for the business sector to adopt and implement these provisions. Outlining the overall framework of EMIR, I will highlight the benefits of ESMA's Q&A in particular. It is a type of interactive communication between the reformers and the business sector. These (ESMA's Q&A) publications are continuously updated and released, as ESMA seeks to ensure an excellent performance of EMIR.

Ultimately, the entire legislation established "around" EMIR practically serves to find a more adequate way for the market to comply with the Regulation. Hereafter, an amendment version of the initial text of EMIR Regulation will be referred to as EMIR Refit. This new legislation (EMIR Refit) is easier to comprehend and therefore easier to implement. EMIR Refit addressed some relevant issues in terms of transparency and compliance costs. For instance, one of the open issues and a subject of debate was FC's and NFC's exemption from clearing and reporting requirements. Namely, it was uncertain when NFC's are considered "systematically relevant" to be subject to the mandatory requirements. In this regard, EMIR Refit introduced a new category called smaller financial counterparties (hereafter: FC-), with reduced clearing and reporting requirements. Likewise, the same rules apply on NFC's (Sykes & Karsten, 2019).

### 2.1.1 Scope and Equivalence decision

Aside from FC/FC- NFC, Third Country Entities are also included under the scope of EMIR (hereafter: TCE). All of the indicated categories are subject to the requirement of mandatory clearing, reporting and risk mitigation technique. EMIR requirement is somewhat different for NFC (NFCs that are under the clearing thresholds, thus exempt from mandatory clearing). NFC's are, nevertheless, subject to reporting obligation and a narrowly defined risk mitigation technique constructed of portfolio reconciliation and compression, timely confirmation and dispute resolution processes and procedures. As previously noted, the initial text of EMIR Regulation did not go into the technicalities nor defined the scope of the portfolio for reconciliation. For example, it did not define terms of eligible assets or what constitutes a dispute in terms of dispute resolution. These technicalities were additionally specified and defined with the Commission Delegated Regulation supplementing EMIR, along with Regulatory Technical Standards (RTS) on risk mitigation techniques for OTC derivatives not cleared by a central counterparty (CCP).

Alongside FC/FC-, NFC/NFC- and TCE as market participants, TRs and CCPs are also under the scope of EMIR, as key pillars of EU's financial stability. In this light, CCPs provide stability to the financial market by reallocating counterparty credit risk. Namely, by positioning itself as inevitable third party to all options and futures contracts, they provide a very much needed "safety net" so that trades can trade freely. By facilitating trades this way, CCPs practically lead to a more liquid market. Finally, referring to the second key pillar, TR guarantee the performance of reporting obligations under EMIR, hence enhancing transparency of the derivatives market. As previously mentioned, TRs are obliged to make certain data available to the public and relevant authorities, but primarily they serve to collect and maintain records of Securities Financial Transactions (hereafter SFTs) (ESMA, n.d).

Finally, before presenting the significance of equivalence decisions for the purpose of EMIR implementation, it is vital to address the relevance of TCE. Namely, TCE is a non-EU entity as it is established outside the EU. However, similar undertakings established in the EU are subject to the EMIR requirements. Understandably, EMIR does not refer to OTC derivative trades undertaken between two TCEs, unless such trade evades EMIR rules and causes a direct effect on the EU. This being said, TCEs are subject to EMIR's clearing, risk mitigation and reporting rules when the other counterparty of the derivative contracts is an FC or NFC based in the EU (Bates, 2014, p. 4).

Accordingly, equivalence refers to one of the countries decision to admit another country's lawful requirements for conducting a specific service or product. In practice, this indicates that the holder of the instrument has to follow only the rules of one country in both states. Equivalence decisions are usually introduced and applicable to areas that are very specific and detailed. The most famous example of its usage is in the regulation of financial services or financial instruments, such as derivatives markets.

Regarding this, it is important to mention an essential example of mutual recognition already established and it is within the EU single market. This example is also accompanied by crucial "harmonisation", as a process where all the contradictory rules or legislatives are replaced by prevalent European ones. Namely, the EU has accepted legislation of non-EU or EEA countries as correspondents in areas such as data adequacy, financial services and airline security, among others. Otherwise stated, it is a recognition of non-European financial frameworks. Namely, prior to granting equivalence to a TCE "candidate country", the Commission undergoes an equivalence assessment procedure, preferably resulting on a positive note. On those terms, the European Commission regularly updates the list of adopted equivalence decisions in a form of overview table. Regarding this, it is inevitable to refer to the outcome of BREXIT. Despite the numerous speculations on the "BREXIT deal" shared recognition may not be possible considering the UK's newly implemented decision to cease free movement of individuals and to terminate the jurisdiction of the European Court of Justice that administers the rules and standards of the single market. (Barnier, 2017). The optimal scenario in the UK would be the implementation of equivalence decisions, in fields that are allowed by EU legislation. This way, UK will be able to retain some entitled rights to access the EU market.

Switzerland, for example, was refused equivalence and entry rights to its share markets by the EU because of a deadlock in negotiations for other areas.

EU allows equivalence decisions. For instance, the majority of financial services constitutions add for equivalence. This emphasises the fact that while some fields of investment banking and insurance are able to accomplish equivalence, retail banking and reinsurance cannot. Because the UK was a member of the single market, it followed many EU standards already, thus it might be achievable to agree on equivalence in different fields. This would eventually demand brand-new EU legislation to upgrade the present frameworks for equivalence which is being considered by the EU. It can be provided for equivalent decision by EU legislation currently, but they don't create a procedure for managing this equivalence by themselves. Of course, it needs to be additionally and specifically negotiated and the Commission has a crucial role here.

Ultimately, there is not a single strict timeframe for developing or implementing an equivalence decision. It can be created very quickly as in the case of US data equivalence, or it can take up to a couple of years if the negotiations are for more extensive areas. The EU established equivalence to a couple of third countries when the legislation settled in,

which in turn could be a beneficial path for negotiations on the UK's future relationship with the EU.

## **2.2 Reporting obligation (TR)**

Article 9 of EMIR stipulates trade reporting obligations for both counterparties of the trade and as such is a source of transparency for the market. Therefore, FC and NFC exceeding the given clearing thresholds under EMIR, need to report trade details to a given Trade Repositories. The obligation also refers to CCPs, as they off-set transactions in case of a default of one of the counterparties. More precisely, CCPs offset transactions by being a buyer to every seller and vice versa. Therefore, CCPs are obliged to report upon any modification or termination of contract as it may affect the evaluation of the trade. Exempting individuals from the reporting obligation is practically fictional, as the regulator found a way to broaden out its authorities towards individuals (small businesses). Namely, since individuals either take the buying or selling side of the transaction, the counterparty on the other side is normally an FC obliged to report on given parameters of the trade.

Reporting obligation was enforced as of February 2014. At the time, there were six European Trade Repositories for data collection under EMIR, recognised by ESMA. Due to the lack of specification on what needs to be reported and in which format, the submitted data, at the time, was inconsistent in terms of quality. Hence, it made it difficult for authorities to review the data because of the detection of outliers. As TR also received historical data from FC, referring to trades that took place before the enforcement of trade reporting obligation, ESMA had to separate them from the data collected after the reporting obligation took place. This limited the usefulness of the data provided. Major part of the outliers was the initially prescribed double-sided reporting. As defined earlier, the scope of Article 9 obligation refers to both sides of the trade, the buying and the selling counterparty. Therefore, under double-sided reporting, both counterparties of the trade need to report separately, regardless if the trade takes place OTC or is exchange-traded. Double-sided reporting initiated much controversy on the market, as some major institutions were in favour of a single-sided reporting obligation. Namely, the International Swaps and Derivative Association (hereafter; ISDA) along with other financial parties stepped forward, as they found double-reporting inefficient. Seemingly, it only doubles the same information and secondly it includes small businesses that use derivatives for hedging purposes. Considering the notional outstanding of small NFC trade volumes, it is unnecessary to report them.

Despite this effort, the lack of unification when it comes to reporting rules made data processing difficult for a long time, as it delayed the overall publication of collected information. In EMIR's Report No.4, ESMA, overruled adopting the single-reported trading and, once again, confirmed its preference towards double-sided reporting (ESMA, p.17, pp. 89). Evidently, double-sided reporting provides guarantee of the real value of the transaction. It is exactly this that contributes towards required degree of transparency in the long run. When processing a high amount of heterogeneous data, detecting outliers within it is especially vital as they are bias. Processing data collected under EMIRs reporting obligation resulted in numerous mismatches and technical issues when the TRs were processing it. For example, an error in the reported information can originate from reporting either a wrong value, asset class or wrongfully converting a currency from the trade side. (ESMA, 2018, p. 22-23). For this reason, the data needs to be reviewed thoroughly, erroneous data needs to be detected and appropriately handled in the analysis.

### 2.2.1 Data intake and selection

The legislators efforts towards improving the data quality kept moving forward. As of November 2017, ESMA set in force its RTS and thereby implemented technical standards. The given RTS referred to the trade reporting obligation of derivatives in particular, by further increasing the number of reporting fields from 89-129. It now addressed collateral collection and the process of transaction reporting itself. All this was done in order to enhance the quality of data collected (European Commission,2017, Annex tbl.1). Another update was the introduction of the **CFI code**, standing for a Classification of Financial Instrument, as a six-digit code in accordance to ISO 10962, MiFID. (European Commission,2017, Annex, tbl.2) Again MiFID is part of the legislative framework under EMIR, intending to guide the market participants in implementing their obligations. Additionally, **Legal Entity Identifier** (hereafter: LEI) was introduced, to enable identification of counterparties reporting their trades (TRAction Fintech, n.d). As a result, the implemented provisions caused a structural difference in data between the first three quarters of the year and 4Q18. To present comparability of the data and process an amount of 400 million records provided by the TR`s, ESMA processed only pre-aggregated trade state data for the period of 24 February-27 October for EEA, for its Annual Statistical Report on Derivatives Market 2018, (ESMA, 2018, p. 21).

Currently, ESMA has authorised nine European TRs to collect, process and maintain derivative record data. TR`s processed data is further separated into EMIR public data available and data reported to the Authorities. As TR`s give the final signal from the market, they provide an insight into market structure. Meaning that TRs accurately present which segments of the industry clear the most trades and whether there are any interconnections between given counterparties. Interconnections shed light on the concentration levels in an industry branch or within it. Detecting for market concentration is essential in accurately and rightfully assessing systematic risk and thereby preventing a possible spill over effect.

In line with EMIR Public Reporting requirement, when it comes to data that needs to be publicly available, TRs publicly present the data provided by their clients into:

1. Aggregated open positions per derivative class,
2. Aggregated transaction volumes per derivative class,
3. Aggregated values per derivative class.

Each of the segments is than separated into three parts: depending on the venue where the trade took place, whether it is OTC reported, ETS or named under “Listed derivatives” traded off exchanges. It is important to note that OTC traded derivatives are focal points of EMIR. Even though ETD derivatives are not explicitly named, they are still found under its scope for comparative purposes. Lastly, when it comes to the category of “Listed derivatives”, exchanges traded off are not taken in consideration. This category is not identified with a Market Identifier Code (hereafter; MIC) as per the ISO 10383 MifiD, which is common for ETD. It isn`t identified with a unique code either, populated with XXXX, common for OTC trades as a venue of execution, as provisioned under Common data, filed 10 under RTS (ESMA, 2016, pp. 70). TR`s requirement related to the publication of data is very briefly elaborated in ESMA`s Final Report Draft and thus technical standards on data are to be made publicly available by TRs under article 81 of EMIR as of 10/07/2017.

Guided by the First Annual Statistical Report of Derivatives market 2018 by ESMA, the following formula was applied. This was done as a way to provide a fair estimate of cleared volumes in a notional amount, which, for the note, is consisted of notional non-cleared amount of the corresponding asset class:

$$\text{Cleared notional (\%)} = \frac{\text{Notional cleared}}{\text{Notional uncleared} + (\text{Notional cleared})} \quad (1)$$

It is important to remember that, within the publicly available data presented by TRs, there is no separation in the notional volumes of cleared and non-cleared derivative asset classes, although provisioned under point 107 and 109. Nevertheless, what is presented are simply the trades that clients have reported to the given TR (ESMA, 2017a).

Furthermore, as majority of cleared trades are reported twice. This means that what is reported to the TR is dual-sided but the provided data is not straightforward and needs to be paired and reconciled. Therefore, in order to avoid duplication, separate aggregation should be provided per derivative as single-sided EEA. In that case, both counterparties fall under reporting obligation under EMIR, however only one counterparty reports the trade (ESMA, 2018 p.22). These kinds of reported trades do not need to be paired and reconciled. Whereas, on the other hand, Single-sided non-EEA reported trades are not a problem, as one counterparty, domiciled in the EEA, reports the trade, while its counterparty doesn't fall under trade reporting obligation under EMIR. Yet again, TRs avoid duplication so that when Dual-sided trade reports are processed, only the seller-side of the trade is registered. This avoids and inconsistencies as it creates only one record. This however doesn't eliminate the problem of double-sided reporting of cleared trades with clearing houses.

In conclusion, the overall quality of the "raw" data provided by TRs seems to be quite bad. In regard to the methodology related issues in processing data, there is more than one reason justifying ESMA's one-year delay in publishing the ARDM. In order to guide the market in further implementation of EMIR requirements, ESMA has introduced two new Acts in a direction of improving the quality of the data. These are aimed towards all the market participants under EMIR, such as: Credit rating agencies, TRs, third country central counterparties, and third country central security depositories. The new rules are a practical guideline on how the overall data provided to authorities needs to be adjusted for the double-counted standards of reporting, and ultimately, to pair and reconcile the data.

Because it is impossible to repeat the research conducted by ESMA for 2018, this thesis will strive to examine the progress of reporting obligation under EMIR. Mainly it is so because the publicly available data provided by TRs lacks in quality in terms of completeness and separation between cleared and non-cleared trades. For this purpose, I will graphically represent the sum of total trades reported (Single-sided EEA, Single-sided non EEA and Dual-sided), for OTC and exchange-traded IRD and CDs comparably. The research will be driven under EMIRs public reported trades, consisted of four TR's comparably. This will be done by taking the sum of the new trades reported for the period across 13 weeks, closing 1Q19. Once again, it is an attempt to follow the progress on trade reporting obligation, considering the number of new trades reported for the evaluated period of 01/01/2019 to 26/03/2019. The number of new trades reported per week, is taken from the table sheets of Aggregate transaction volumes per derivative class for CME Group, UnaVista, DTCC and Regis-TR. My goal is to compare the concluded reports per

derivative class as of 4Q17 in order to conclude whether those trends are still present on the market as per earlier reports by the four above mentioned TR`s. It must also be noted that TR`s data is not a representation of the notional cleared volumes of EEA, but rather a sum of trades reported to the given TR.

## 2.2.2 Trade Repositories Derivatives Data Availability GAPS

As delivered in the IFC Report on central banks and trade repositories derivatives data 2018 Survey (hereafter; Survey), data availability varies across jurisdictions. As anticipated, Financial Stability Board members (hereafter; FSB) are most compliant with the given requirements. This is not surprising considering FSB`s policy to promote international financial stability. This is in line with the pledge of the G20 leaders. FSB member states impose this obligation for domestically founded entities as well as for those under foreign control. Meaning, the provision is binding for non-resident institutions within the country too. As expected, this piece is less by a half in NFSB member states (Garralda & Tissot, 2018, p.12).

In this regard, the EU developed a legislative framework imposing mandatory reporting for OTC derivative trades for all residing counterparties in the EU. The latest findings of the Survey note some legal shortcomings in terms of efficiency of trade reporting implementation and data availability in particular. These legal deficiencies are noted in two different aspects. From a perspective of what is provisioned but not available to the general public. For example, data with statistical significance for researches isn`t publicly available or it is highly demanding to acquire it. Secondly, seen from a perspective of Central Bank`s access to TRs data bases, Central Banks authorisation majorly varies across different member states. Otherwise stipulated, Central Banks are not equally entitled to access and surveil the data (referring to the volumes reported to TRs). Additionally, this entitlement is somewhat restricted in terms of quality of the data sent to Central Banks by TRs, as more than 70% of central banks reported difficulties in aggregating transaction-level data at the firm level (Garralda & Tissot, 2018, p. 21).

Regarding Central Banks authorisation to collect OTC derivatives data and concerning their access to non-public data reported to TRs, it was found that: in over 50% of the cases OTC data is collected by TRs as a separate institution, outside CB`s jurisdiction. In 40% of the cases, Central Banks are constituted within the same jurisdictions as TR`s, which eventually makes data transfer easier, as no special authorisation is required. Lastly, in the remaining 22% of cases, the CB`s are directly processing this sort of data. Overall, TR data are very confidential, which de facto limits access to Central Banks that are not directly tasked with collecting them.

Moreover, admission to this sort of data is even more difficult when the recognised TRs are seated outside the Central Bank`s jurisdiction. This however is understandable, considering that both institutions (even though stately founded) enjoy sovereignty in running their core operations. A possible solution can be found among further legislative incentives to encourage cooperation between TRs and Central Banks. This should also enhance their integration as independently commanded institutions. In addition to Central Banks access to non-public data, it is worth noting that they have fairly good access to data, overall. As indicated, over 60% of the data available is a type of microdata, which is significant for assessing market participant`s systematic risk. A substantial amount of almost 77% of this data, is disaggregated which provides fairly good insights for CB`s onto the market. This provides “pure” micro information, in sense of details about the transactions undertaken (Garralda & Tissot, 2018, p. 14-16).

Lastly, in terms of granularity of TR`s data, its confidentiality is understandable. As micro-data is processed on a transaction level, it must involve some degree of confidentiality. Otherwise, it makes it easy to identify the counterparties as well as all sensitive specifics of the transaction. Simplest example is that, unlike EMIR`s implementing institution which put in force the word of the Regulation, ESRM and ESMA logically do have authorised access to the whole dataset. As an example of contrast, the Dutch authorities can gain access to this sort of data only if one of the counterparties of the transaction is a Dutch resident or the underling is referred to as Dutch.

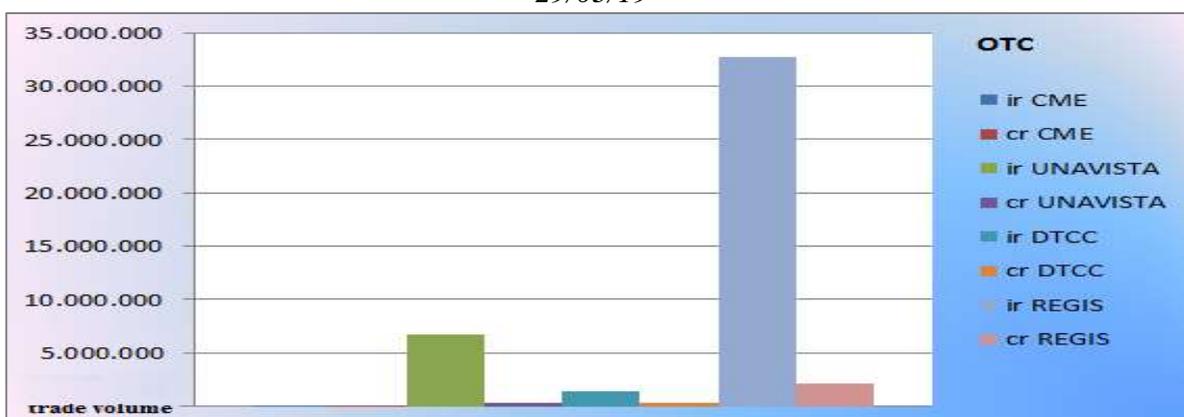
### 2.2.3 European derivative market structure on trade reporting

To determine the volume of TRs activity and in this respect applicability of the trade reporting obligation, I will comparably inspect TRs statistics on IRD and CD trades reported. In this regard, market participants were presented with the possibility of delegated reporting, under point 1 of the RTS on the minimum details of the data to be reported to TRs. Delegated reporting was introduced to make trade reporting more flexible for market participants. It positively stimulated the number of trades reported, because under the initial EMIR requirements, counterparties had to report on their contracts individually (European Commission, 2013). The supplemented provision of delegated reporting allows for counterparties to delegate this obligation to third counterparties. This means referring to CCP as a services provider, which in turn resulted in CCPs dictating the greatness of certain TR`s. This was the case with Regis-TR and UnaVista TR. With that being said, it is most practical to present the interconnection between CCPs and TRs under EMIR. Namely, with the variability of cleared volume of CCPs over 1Q19, it is expected to see the same consequent trend line with TR`s activity.

### 2.2.4 OTC IR and Credit derivatives

Comparably presented bellow are the aggregated transaction volumes, more precisely, the new trades registered per week in over a 13-weeks period, closing 1Q19 for Regis-TR, UnaVista, CME and DTCC trade repositories. Accordingly, the first graph displays the new trades registered simultaneously for IRD and Credit derivatives, traded OTC.

Figure 7: OTC trade reporting volumes for IR and Credit Derivatives across 4 TR`s, as of 29/03/19



Source: TR`s (2019).

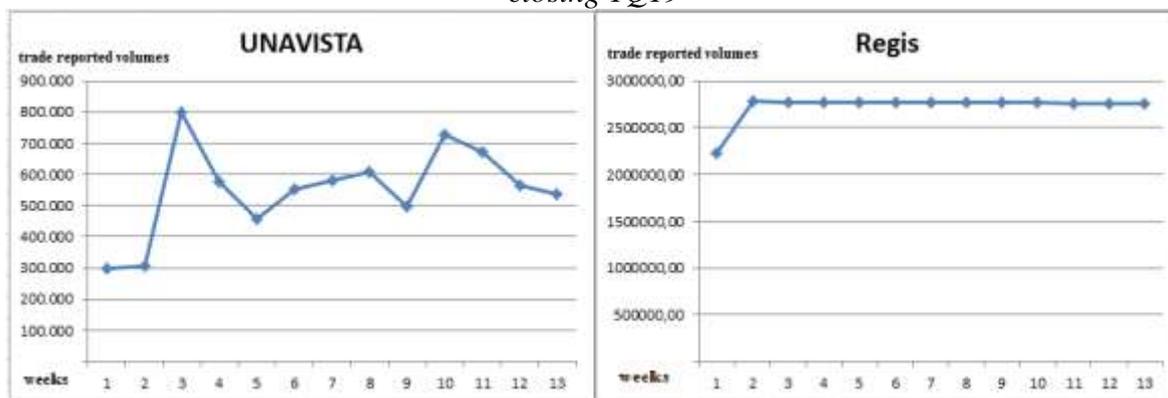
As evident from Figure 7, Regis-TR and UnaVista have the highest amount of aggregated transaction IRD contracts, and that is due to the choice of their clients. Primarily referring to Regis-TR with 32.682 million of IRD OTC traded reported and double more exchange-traded IRD contracts, amounting to 67.192 million. Namely, what contributes to Regis-TR

recording volumes, is that as a German seated TR is a TR of choice of Clearnet and EUREX AG, both parts of Deutsche Borse. (Regis-TR, 2018).

Furthermore, as the situation ahead of the BREXIT deal by the end of March starts to “heat up”, the German stock-exchange managed to establish a collaboration with London based clearing house- LCH Ltd in order to shift clearing of euro-denominated trades to Frankfurt as its business centre. However, this question remained open in terms of anticipated 2020 date as a start for Securities Financing Transaction Regulation reporting. (Hereafter: SFTR) For this purpose, Regis-TR is strategically guided to possibly collect UK based clients, as a number one clearing house right ahead of the vote on BREXIT on 29th of March. Regis-TR announced establishing a UK based TR as of the 1st working business day, after the UK leaves the European block (Regis-TR, 2019). The goal is to attract LCH as a CCP, in order to offer assisted reporting to their clients clearing trades through LCH Swap Clear services. However, the outcome of this vision will be postponed as UK’s negotiations with the Union are still not finalised.

Secondly placed TR for the 1Q19 is UnaVista, with EUR 6.676 million of IRD OTC traded reported. Even though it is almost five times less than the volume reported to Regis-TR, it is impossible to neglect that as of May 2019, it is the TR of choice for the giant LCH Repo services. This will certainly drive their volumes up in the upcoming period (LSEG, 2019). Furthermore, graphically examining the line of movement for OTC IRD contracts traded for Regis-TR and UnaVista, (Figure 8) it presents a moderate fluctuation as a drop in the amount of trades reported by UnaVista. This fluctuation of IRD reported OTC was similar to the slight drop in the volumes of cleared trades. Still the fall is something milder and almost looks steady for Regis-TR. Notably, Regis-TRs decline corresponds accurately with the negative 4% drop marked by EUREX AG European interest rate derivatives.

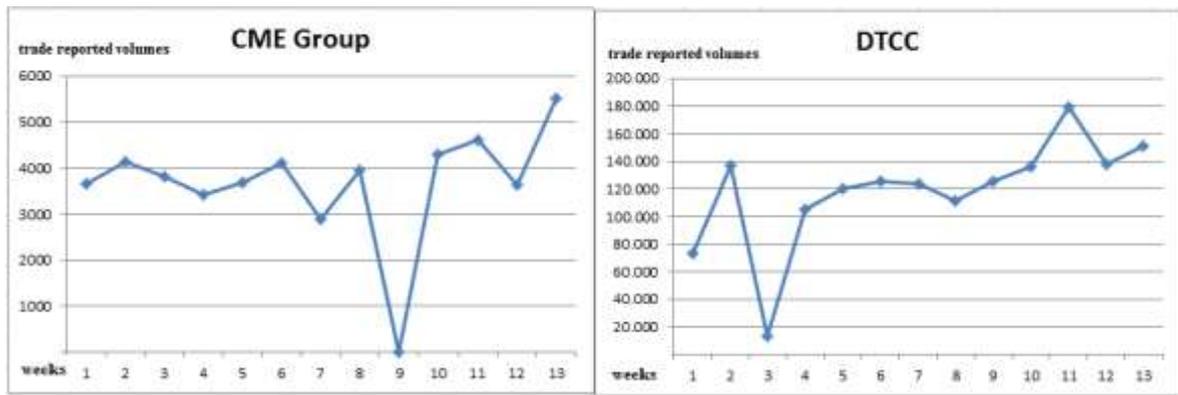
*Figure 8: Trade reporting volumes for Unavista and Regis-TR, across 13-week period, closing 1Q19*



*Soruce: TR`s (2019).*

The decreased trades volumes reported to UnaVist can possibly be linked to their clearing counterparties members reporting their trades to another TR. Namely, there is a second based TR in London-CME TR and additional DTCC TR, based in Ireland. Notably, the volume of trades reported to these two TRs mark an opposite trend of activity, just a week before UK’s withdrawal on 29th of March.

Figure 9: Trade reporting volumes for CME Group and DTCC TR across 13-week period, closing 1Q19

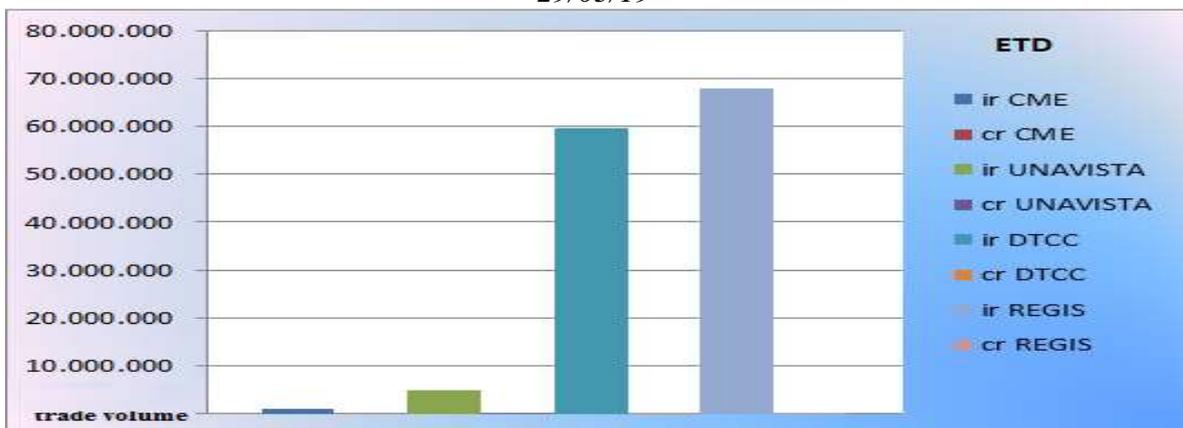


Source: TRs (2019).

### 2.2.5 ETD IR and CDs

The graphical representation of Figure 10 in continuance, presents the new trades registered simultaneously for IRD and Credit derivatives, ETD reported across four TRs. Overall, the given review discloses three main findings. Primarily noting that CME European Trade Repository, has an almost incomparable share of the market to the remaining three TRs. This, again, is very expected bearing in mind that CME has a market clearing share of a humble 0.2%, closing 4Q18. Credit derivatives trades reported are also as much smaller when compared to IRD trades reported, for both segments of the market, OTC and exchange-traded (ESMA, 2018).

Figure 10: ETD trade reporting volumes for IR and Credit Derivatives across 4 TRs, as of 29/03/19



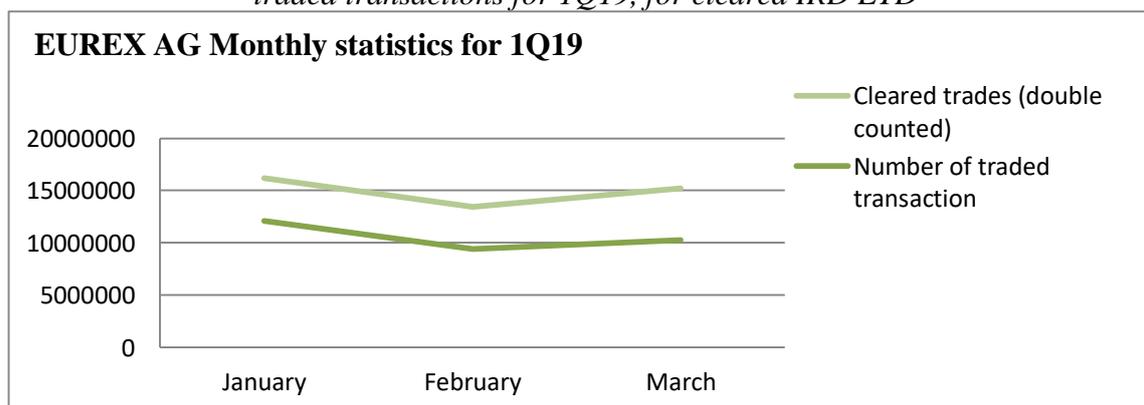
Source: TR`s (2019).

Referring to Regis-TR, it might be surprising to find that more than double of its IRD trades are registered on its exchange-traded side. The size of exchange-traded IRD trades are amounting to EUR 67.943million, which is double of the OTC IRD trades reported. The same trend is seen when it comes to DTCC TR. Nevertheless, ESMA`s research remarks claim otherwise, indicating that slightly over 90% of IRD are traded OTC, in which case this graph proves to be inconsistent. There are several findings to be considered in this regard:

1. As noted earlier, public reports or publicly available data provided by TRs does not distinguish on cleared and non-cleared trades reported, which then makes it difficult to conclude on the apparent contradiction;
2. Four out of nine TRs are taken as representative samples. Baring in mind the above-stated arguments on restricted access and public availability of data, one can argue that this sample size is not representative in terms of trade reporting obligation for the European derivatives market. Nevertheless, the sample does cover the most dominant and representative TRs of the market, notably complimenting the progress on trade reporting of OTC traded derivatives, and evidently presenting the advantage of ETD;
3. Referring to the shifting observed between Single-sided and Double-sided reporting, it occurs in all table sheets for aggregated transaction volumes, values and open positions. In that manner and under the given terms, it is very likely that market participants have shifted their trades from OTC to exchange-traded market. This is due to the certainty that this segment of the market provides, opposed to the uncertainty from the BREXIT outcome, which is a potential difficulty for IRD traded OTC;
4. Finally, the market recovered visibly after BREXIT was prolonged from 29th of March, displaying an overall positive upward trend. This can be seen from EUREX AG`s volume of cleared trades. Despite the decreased activity during February and even March, EUREX closed the first quarter with overall positive results. Ultimately, regardless of the volumes cleared on OTC and on ETD market, it is important to note that cleared volumes keep growing upwards. The positive trend is a reliable indicator that both markets are disciplined with EMIR requirements in terms of clearing trades.

In conclusion, as presented in Figure 11, the notional volume in EUR (billions) for exchange-traded IRD is also larger compared to the notional volume for OTC IRD, with accumulated EUR 21billions and EUR 8billions respectively, closing 1Q19. Referring to the slight fluctuation on the market for 1Q19, the slight drop can also be observed from the overlap in terms of Cleared trades (double counted) and the number of trade transactions in the second month. The gap between those two variables is due to double counting of OTC cleared trades, which if adjusted to single-counting of contracts cleared instead of double counted, displays a complete overlap between the two variables.

*Figure 11: EUREX AG Monthly statistics for cleared trades and corresponding number of traded transactions for 1Q19, for cleared IRD ETD*



*Source: EUREX AG (2019a).*

### 2.3 Clearing obligation (CCP)

Points 15 and 16 from EMIR Regulation set the criteria for different classes of OTC derivative contracts which are subject to a clearing obligation. The given provisions are

further specified with the Draft RTS, enforced by ESMA. The purpose of the Draft RTS is to define the main characteristics of the classes of contracts, including the type of their enforcement and their implementation framework. For the given purpose, ESMA founded a Public Register for the Clearing Obligation. The register contains all classes of OTC derivative contracts that are subject to clearing obligation, along with their date of application.

A central focus of this thesis is clearing obligation as initially imposed by Article 4, from EMIR Regulation. According to the article in reference, FCs, NFCs and entities established in third countries (TCE), are subject to clearing. The obligation is valid for given derivative classes traded OTC, when they exceed the corresponding clearing thresholds. Article 4 further refers to the scope and timing of clearing. It specifies the conditions that need to be met for a derivative contract to be cleared through a CCP. (ESMA, n.d) As provisioned, the contract needs to be concluded between:

*Table 1: Counterparties under the scope of clearing obligation*

<b>FC</b>	<b>FC</b>
<b>FC</b>	<b>NFC</b>
<b>NFC</b>	<b>NFC</b>
<b>FC/NFC</b>	<b>3<sup>RD</sup> Country Entity</b>
<b>3<sup>RD</sup> Country Entity</b>	<b>3<sup>RD</sup> Country Entity</b>

*Source: EMIR (2012).*

This means that the clearing requirement is not mandatory for all NFC. The requirement is also not mandatory to all TCE, which if established in the EU, would be subject to the clearing obligation. In summary, mandatory clearing is enforceable for the numbered group of entities trading certain classes of derivatives OTC, but only if they are over a given clearing threshold. This is further clarified by Article 10 (1)(b) from EMIR. Nevertheless, the same article states that an NFC can be exempt from clearing, as stated in Article 4 from EMIR. To legally exercise the right on an exemption, the party must demonstrate to the authorities that its average rolling position in over 30 working days does not go over the stated clearing threshold.

Concerning the legislative process regarding Interest Rate Swaps (hereafter; IRS) clearing, ESMA proposed classification of the provisions on mandatory clearing, per derivatives product type. In this manner, products are divided into four groups:

1. Fixed to Float IRS, also known as plain vanilla IRS
2. Float to Float IRS, referred as basis swaps
3. Forward Rate Agreement (FRA)
4. Overnight Index Swaps (OIS)

In addition to the product types, ESMA assigned further characteristics to the product to determine its class. The floating reference index can be based either on LIBOR or EURIBOR. It further defines the settlement currency and the currency type depending on whether the contract is based on a single or several currencies. Finally, the notional amount type can further be marked as constant, variable, or conditional.

Referring to the currency type in particular, upon ESMA's proposal, it was essential to specify in which currency can each of the given product types be denominated. Thus,

ESMA proposes the usage of four currencies, also known as 4G currencies, consisted of EUR, USD, UKP and JPY (ESMA, 2018). Upon ESMA's proposition, the already established group of currencies was additionally supplemented with an additional three: SZK, HUF and SEK. Finally, it was made possible to denominate contracts in NOK, PLN and SEK as well. This document proposed for a clearing obligation for both Fixed-to Float interest rate swaps and FRA's denominated contracts in the additional group of currencies, referred to as non-4G currencies: NOK, PLN and SEK. ESMA's Public Register for the Clearing Obligation details the specification of OTC derivative classes subject to mandatory clearing denominated in all the currencies (ESMA, 2020a).

Following Article 88(1) under EMIR, CCPs are divided into European CCPs and third country CCPs authorized to offer its services in the Union. Accordingly, the second category is considered as CCPs established in foreign countries, yet wishing to provide its services to European based entities. The List of both kinds of CCPs authorized to offer services and activities in the Union, is published by ESMA's Public Register for clearing obligation under EMIR (ESMA, 2020b). Namely, the rules and procedures for providing clearing services are somewhat different in terms of CCPs based in a third country. Principally because they are subject to Equivalence decisions granted by the European Commission. (ESMA List of third-country central counterparties, 2020) One example is CME Clearing Europe Limited (hereafter: CMECE), as an authorized CCP to provide its clearing services in Europe. It is operated by the Chicago Mercantile Exchange Group (hereafter CME Group). However, as of October 2017, CMECE has revoked its status, an authorized CCP under article 20 of EMIR.

Consequently, only 3 Clearing Houses operate as authorized CCPs at the moment. The authorization is valid to clear all IRD classes denominated in all 9 currencies, 4G and non-4G currencies. EUREX AG Clearing as European based CCP, CME (USA) as a recognized Third Country CCP and finally LCH Ltd UK (ESMA, 2020c). Concerning the BREXIT deal and Unions interest in euro-denominated interest rate derivatives, LCH Ltd is still recognized as a European CCP. The granted Equivalence decision enforcement is prolonged until the UK's withdrawal from the Union is finalized. More about LCH and the BREXIT's effect over the IRD market will be provided as a follow-up.

### 2.3.1 European Market Clearing Structure and Trends (focus on IRS)

Closing 4Q17 ESMA, ESMA reported worth of EUR 660 trillion gross notional value of the European Derivatives market. This refers to both segments of the market; ETD and OTC traded derivatives (ESMA, 2018). As estimated, the same trend is present on a global scale. According to BIS Derivatives Statistics, OTC derivative trades majorly dominate the markets. Presenting the European market in a more fragmented manner, OTC derivative trades prevail with a share of over 85%, whereas ETD trades consist of around 17% of the trades. It is worth mentioning that the share of ETD trades has increased over 2017, from 13% to 17% in 4Q17. Regarding the market structure, IRD and Credit derivatives fairly prevail both in notional value as in clearing rate.

The clearing rate for the given derivative class shifted with differences of 18%. Namely, the clearing rate of 40% in the first Quarter 2017, rose to 58% in 4Q2017 respectively. The traded volume was almost cleared in full by CCPs with 96% in the last Quarter. Clearing rates of CDS were also increased by 2%. It initially cleared 25% in the first Quarter, opposing to a 27% rate in the last Quarter of the same year. This presents CDS as entirely cleared by CCPs, with around 60% of reported cleared volume. Furthermore, it reported clearing volume of currencies with unenviable 3%, and ultimately commodity and equity

with less than 1%. According to this data, almost no central clearing takes place for these two derivative types.

The Reasoning behind the rising trend of clearing rates, is mostly guided by several market forces. Beginning with the increasing costs for market participants to keep up with the regulative demands, concerning both capital and collateral requirements but also adding the initial and variation margin as pricy risk management techniques. This is certainly in line with EMIRs call for more resilient markets. ESMA demanded market participants to act in line with the implementation timeline of clearing and trade reporting obligation. Authority's effort to push market participants towards central clearing makes clearing business in high demand. The economic logic of high demand raises the rates as a result. However, from CCP point of view, two contradictory movements occur. The increased demand for clearing increases the clearing rates, whereas going around single netting transaction drives the clearing rates down. Therefore, rather than setting individual transactions among different parties separately, they can be settled all together. This can be done instead of the so-called multilateral netting, resulting in lower levels of clearing of the CCPs. It is also worth mentioning that using multilateral netting as a compressing mechanism is found to be a practical solution for companies functioning on an international level. It is also practical for counterparties frequently involved in transactions with one another as it is time efficient and avoids duplicating of bank fees and provisions (Kenton, 2020). The increased number of clearing members at clearing houses is what ultimately drives the scale of clearing volumes. In particular, EUREX AG currently marks 221 clearing members, which practically complements ESMA's findings that 96% of the counterparties fall on insurance agencies and credit institutions. LCH's and EUREX AG number of client trades and notional cleared values of its SwapClear services, most practically present the increased share of clearing trades for both IR and Credit derivatives, with 58% and 27% respectively for 4Q17. LCH's SwapClear and CDSClear services, reporting a notional cleared of \$1.077 trillion and \$612 billion respectively, are an excellent example of that. Individually presented, LCH's SwapClear service marks an increase of 23% YoY, whereas its CDSClear service marks an increase of 11% in cleared trades YoY. (LCH, 2018, p.3).

Table 2: *LCH Annual Report and Consolidated Financial Statement for the year ended 31 December 2018*

	<b>2018</b>	<b>2017</b>
<b><i>Swap Clear</i></b>		
<i>Notional Cleared (US\$ trillion)</i>	<i>1,077</i>	<i>874</i>
<i>Client trades('000)</i>	<i>1,487</i>	<i>1,227</i>
<b><i>CDSClear: notional cleared (EUR billion)</i></b>	<i>612</i>	<i>549</i>

*Source: LCH (2018)*

In regard to EUREX AG, it also marks increasing in notional cleared and number of trades. However, as noted earlier, there is an evident difference between the single-sided and double-sided recording of clearing trades, differentiating across OTC and Exchange-traded IRD. The difference in cleared volumes OTC opposed to ETD market is obvious.

*Table 3: EUREX AG ETD YTD Interest Rate Derivatives for 2017/2018*

<b>ETD YTD Interest Rate Derivatives</b>	<b>2018 (single counted)</b>	<b>2017 (single-counted)</b>
Notional volume in billion EUR	88.175	83.149
Number of trade transactions (in thousands)	60.531	56.436

*Source: EUREX AG (2019c)*

Closing 4Q17 of the yearly traded notional volume for IRD traded OTC (single-counted) marked EUR 1.402147 million with corresponding 24.088 of cleared trades. A year later the notional volume traded jumped to EUR 14.747.928 billion and corresponding 73.178 cleared trades (double-counted), closing 4Q18.

*Table 4: EUREX AG OTC YTD Interest Rate Derivatives for 2017/2018*

<b>OTC YTD Interest Rate Derivatives</b>	<b>2018 (double-counted)</b>	<b>2017 (single-counted)</b>
Notional volume in million EUR	14.747.928	73.178
Cleared trades	1.402.147	24.088

*Source: EUREX AG (2019c)*

Finally, regarding the denomination of the European derivatives market, derivative contracts as well as IRD are majorly denominated in 4G currencies, with a slight difference in dispersion. The four main currencies designated in the foreign-exchange market are the USD, EUR, GBP and JPY. Namely, derivative contracts are mostly denominated in USD as a leading currency with 33%, followed by EUR and GBP denominated contracts with 28% and 11%, respectively. USD influence of 37% is slightly larger in terms of denomination of IRD contracts, followed by EUR and GBP denominated contracts with 31% and 10% respectively and lastly a fraction of 4% denominated in JPY (ESMA, 2018, p. 8).

ESMA's findings can be backed up in two ways. Primarily, by comparing the notional outstanding by currency denomination of LCH, EUREX AG and CME, as a representative sample. Secondly, by comparing those findings to Clarus Financial Statistics on individual CCP's share of IRD and CDS markets. Accordingly, the only exception from the sample is EUREX AG, as EUR is this CCP's main currency of denomination, followed by USD denominated contracts. However, measured on a global scale, EUREX AG clears only 1.1% of the total trades, closing 4Q18, which represents a rise of 37% compared to 2017. The clearing leader in EUR denominated contracts is LCH, with a market share of 98.7% compared to 98.4% YoY. In contrast to the growing clearing shares of LCH and EUREX AG, CME registers decreased clearing activity of -40%. Speaking in terms of CME, though USD denominated contracts are represented with just slightly over 94% of the notional outstanding of cleared trades, CME clear 8.5% of the total trades on a global scale. The remaining 91.5% in notional terms, is cleared by LCH (Khwaja, 2019). Therefore, it is understandable why LCH's notional outstanding structure by currency is fairly similar to the individual share of currencies into the structure of European Derivative

Market. Accordingly, 39.5% of LCH cleared trades are denominated in USD, followed by EUR, GBP and JPY denominated contracts with 25.8%, 12.3% and 3% respectively.

Regarding the USD denomination of CDS contracts, it must be noted that CME finalized its last trades by March. Meaning, in the second quarter of 2018 the market was entirely up to ICE's divisions: ICE Clear Credit and ICE Clear Europe with 97.9% and 1.2% respectively. An insignificant share of less than 1% is cleared by LCH clearing service - CDS Clear. Considering the uncertainty of the outcome of BREXIT, it is foreseeable that the forthcoming year will introduce additional completion in the segment of cost clearing.

Despite LCH's negligible share in clearing CDS, they have established themselves as a dominant clearing house in terms of IRD. This London's Stock Exchange CCP clears over 90% of IRD on a global scale through its well-known Swap Clear Program. Moreover, they centrally clear 75% of EUR denominated IRD. As Britain is about to withdraw its membership from the Union, all EUR denominated derivatives are about to change seat from London to Frankfurt (Roubanis, 2018). Even though, in one statement, EUREX AG challenged the claims around clearing costs rising, the Deutsche Boerse shifted half of its business from London to Frankfurt in the same year (2018) (Storbeck, 2018). EUREX AG Clearing, gave its contribution towards making the process easier for the EU27 buy-side firms. They did this by launching a Partnership Program as well as EUREX AG Clearing Lending CCP, as an innovative solution for the Securities Lending Market. In short, the idea behind the program is to create integrated solutions for customers in order to provide them with possible capital gain and operational efficiencies.

In terms of EUR denomination of contracts, it is important to note that ESMA found a high concentration in currency trades. Their findings also reveal that it is investment firms and credit institutions that majorly represent this market segment. (ESMA, 2018, p. 11). Concentration represents the type and the number of counterparties involved in given types of transactions. It also affects the competition on that market segment. Namely, the higher the concentration, the larger are the entry barriers, thereby only one or several market participants dominate the market. Concentration is also mirroring the risk that a given business entity or a group of entities are exposing themselves to on the market. However, the effect on the rest of market participants cannot be neglected. It is important to note the size and volume of LCH ForexClear service, which as of 4Q18 has reached \$17.238 billion, showcasing an increase of 54% in comparison to the last Quarter of 2017 (LCH, 2018 p.3). Furthermore, the fact that LCH has a 100% share in FXO and over 97% share in NDF on a global scale should draw market authorities' attention towards this segment of the market (Khwaja, 2019). As apparent, LCH has a monopoly in clearing currency trades. Even though LCH undertakes the most rigorous risk management and risk assessment measures, the possibility of spill-over effect should never be underestimated.

### 2.3.2 EUREX AG Clearing volume of cleared trades (focus on IRS)

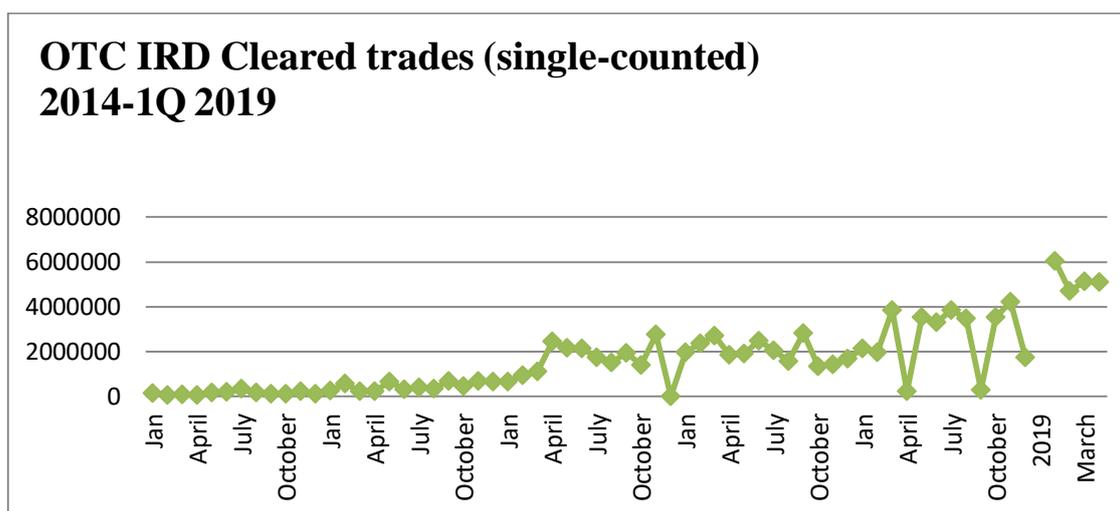
This section provides a closer insight into the YTD cleared volumes of IRD, traded on both segments of the market as OTC and ETD. I will present the graphs separately, focusing on the quarterly OTC cleared volumes for 1Q 2019 and pairing it up with ETD cleared trades. Note: Jan/April/July/October indicate the beginning of each Quarter, from 2014-2019.

When it comes to EUREX AG statistical data available, a steady growth of cleared volumes of IRD traded OTC is noted. When clearing and reporting obligations were enforced, the growth rate moves steadily for 1Q14, closing with 1Q19. The stable period of growth was suddenly accelerated as of January 2018, and the cleared volumes rose sharply.

Namely, the cleared volumes measured as notional amounts outstanding switched from millions to billions. This was due to a shift from single-sided to a double-sided recording of the clearing trades.

Considering the double-counting of OTC cleared trades as an underlying cause for the accelerated growth, the volume of cleared trades is adjusted to single-counted. The adjustment is made for ETD cleared trades so that the data can be compared.

Figure 12: EUREX AG Clearing Volume for IRD cleared trades OTC, 1Q14-1Q19



Source: EUREX AG (2019b).

A compression cycle in December caused a drop of 16% of the total outstanding nominal value of OTC traded IRD, closing 4Q18. Understandably, this figure was much larger for LCH Swap Clear as they operate a much larger portfolio. Accordingly, for the 4Q 2017 LCH managed to reduce their exposure in notional outstanding of OTC traded IRS, for an amount of \$1.76 quadrillions (LCH, n.d). Portfolio compression, as a term, was initially defined and introduced by MiFIR in order to serve towards risk reduction. More precisely, the number of contracts is reduced with portfolio compressions, however, an equal economic exposure remains as from initial transaction (Glowacki, n.d). Overall, compression can be done either on a bilateral or multilateral basis. Meaning that two or more market participants can offset their derivative positions with each other, either fully or partially by substituting the primarily contracted derivatives with new derivatives contracts. As a result, the cut down in the notional value of the new contract is scaled down in opposition to the original number of contracts and its notional values (Derivatives Documentation, 2015). This way portfolio compression contributes towards capital efficiency as it reduces leverage ratios as well as CCP’s exposure.

LCH, the biggest clearing house worldwide, agrees on these terms too, as they see compression technique as the right tool to scale down operational risk and costs. Moreover, it is very practical in case of client’s default as it provides a possibility to manage clients’ transactions more efficiently. The International Organization of Securities Commissions supports this view, along with EUREX’s Head of Sales Initiatives finding that: “With the EUREX AG OTC Clear for IRS volumes continuing to grow at an impressive rate, the launch of our compression services with triReduce are an important part of our overall value proposition” (Scragg, 2016).

A fall of 16% in December was followed by a recovery of 28% in the following quarter. When it come to the notional values, this was an increase of EUR 225 million, compared to EUR 1.564 trillion in January 2019. However, despite the high start in January, the flowing months, February in particular, saw a major drop in clearing activity. The notional value decreased to EUR 1.243 trillion. Namely, the volatility of IRD market in March, just ahead of the BREXIT deal, made quite an impact on both clearing houses. As anticipated, LCH and EUREX AG noted a substantial drop in the notional outstanding of IRD, with EUR 4.5 trillion and a fall of approximately EUR 800 million for EUREX AG respectively. In reference to point 2.3.3 from this Chapter, the decrease in clearing activity was followed by reduced trade reporting activity, as TRs marked quite similar trends. Despite the circumstances, EUREX AG managed to enter the 2Q19 closing with overall positive remarks. Short-term recovery of the market at the end of March was once again followed by a repeated fall.

Nevertheless, the good results were mainly driven by the equity derivatives, marking a rising number of traded contracts as well as a record in open interests marked both daily and monthly. Namely, this CCP (EUREX AG), as part of the German Exchange Group, marked an 8% increase resulting in EUR 160.8 million, compared to EUR 148.7millions recorded in April (YoY). Most trading was done in European Equity index derivatives, with recording growth of EUR69.5 million or 16% growth YoY and half less in European equity derivatives, with +8% respectively. It is also important to mention the negative remarks on IRD trades, with a drop in 4% or EUR 37.3 million, opposed to EUR 38.9 million in April 2018 (EUREX AG, 2019e).

*Table 5: EUREX AG traded contracts for financial derivatives, comparatively for April 2018/April 2019*

<b><i>Financial derivatives: Traded contracts EUREX AG Exchange</i></b>	<i>April 2019</i>	<i>April 2018</i>
European equity index derivatives (million)	<i>69.5</i>	<i>60.0</i>
European interest rate derivatives(million)	<i>37.3</i>	<i>38.9</i>
European equity derivatives (million)	<i>54.0</i>	<i>49.8</i>
Tota (million)	<i>160.8</i>	<i>148.7</i>

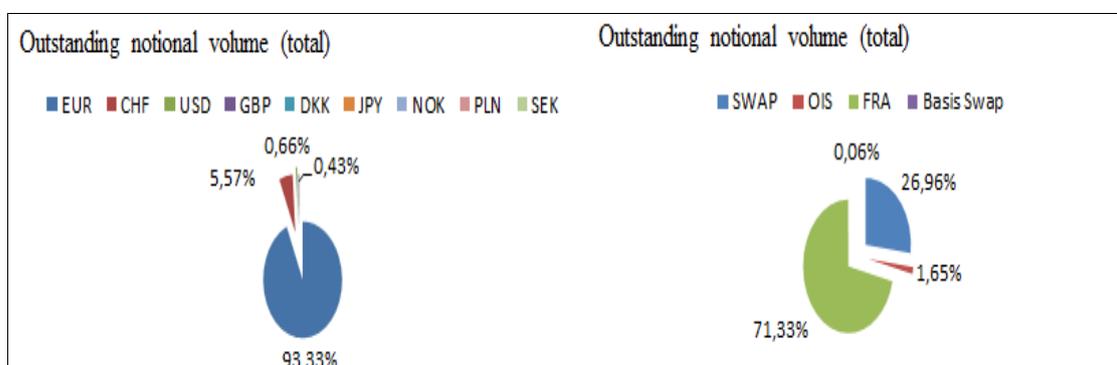
*Source: EUREX AG (2019e)*

As of April 2014, EUREX AG is authorized to clear all IRD classes denominated in all nine mandatory currencies under EMIR. Noticeably, Figure 13 shows that, when it comes to EUREX AG's clearing structure of IRD by class or product and currency, most of the clearing trades are conducted in 4G currencies. EUR denominated contracts take the lead, followed by CHF, USD and lastly GBP but also DKK as a new currency under the mandatory clearing provision. According to the data available, there is no evidence of any clearing done in NOK, PLN and SEK, as the remaining three types of currencies provisioned under mandatory clearing.

The graphical representation of products by currency, shows that IRD clearing is mainly predominated in EUR denominated IRD classes. The EUR line moves in the same way as the total outstanding notional volume of the remaining currencies. Furthermore, when it comes to the total outstanding notional volume by product and currency, FRA's positions

are the most cleared IRD class, followed by IRS, OIS and finally Basis Swaps. In comparison, this structure is the same for LCH as the most dominant CCP.

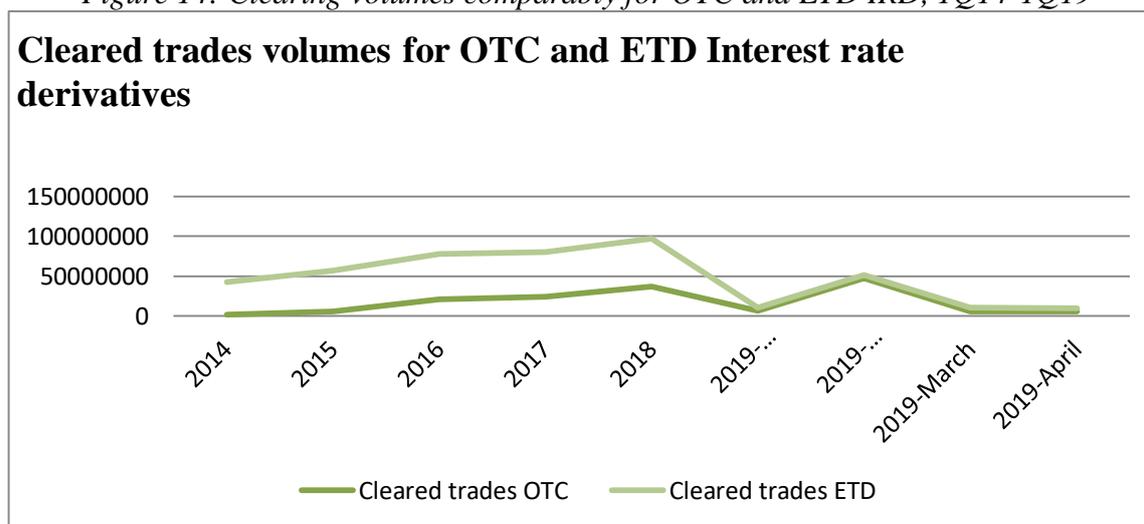
Figure 13: EUREX AG notional outstanding volume per currency and product, closing 1Q19



Source: EUREX AG (2019b).

In addition to the presented clearing rates for IRD traded OTC, I will present the cleared trades of ETD IRD for comparison. The purpose of this is to conclude whether it was EMIR reforms that struck the OTC market in terms of IRD traded or the market was shaken in general.

Figure 14: Clearing volumes comparably for OTC and ETD IRD, 1Q14-1Q19



Source: EUREX AG (2019c).

It is clear that the size of the ETD market is undeniably larger when compared to OTC cleared trades until April 2019. It is also important to note the progress of cleared OTC trades. As noted above, OTC cleared trades are almost the same size of ETD cleared trades as from January 2019. Considering that the cleared volumes of IRD dropped to almost the same density for both segments of the market, it is useful to further examine IRD structure in order to further understand the problem.

### 2.3.2.1 1Q 19 IRD Clearing Structure

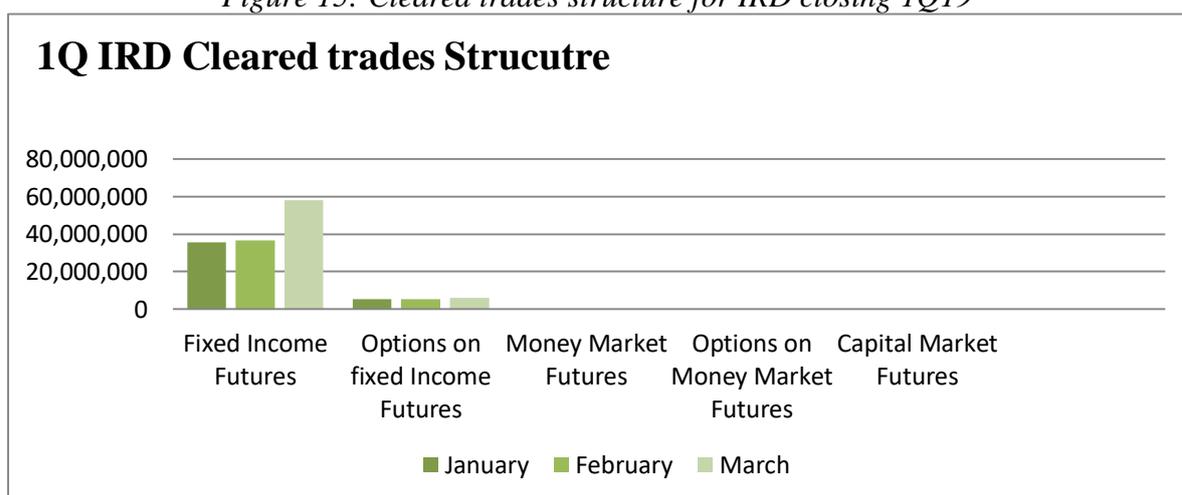
In terms of EUREX AG Structure of offered IRD categories and products, IRD are divided in three categories:

1. Fixed Income Derivatives;
  - Fixed Income Futures
  - Options on fixed income Futures
2. Money Market Derivatives;
  - Money Market Futures
  - Options on Money Market Futures
3. Capital Market Derivatives
  - Capital Market Futures (LDX IRS Constant Maturity Future).

As evident, each of the categories can further be traded on Futures and Options of given bonds or indexes, that way forming a wide range of products, 65 in total. Capital Market Derivatives are an exception though, as they are traded only on the LDX IRS Constant Maturity Future. This forms a total of 29 products, as Futures can be traded for maturities from 2-30y. However, it should be mentioned that not all the products are equally traded and this will be the subject of research from this point onwards.

Normally, products that aren't traded for longer periods of time are delisted. This means that new products are introduced every quarter. However, in this case, according to EUREX AG Monthly Statistics tables, there is no evidence of contracts traded on either IRS EUREX AG Products, LDX IRS Constant Maturity Future, or on the Euro Swaps. However, considering the investment and logistics behind LDX IRS Constant Maturity Futures, it is very unlikely that these products will get delisted, despite their zero shares towards IRD volumes at the end of 1Q19. Consequently, I will further examine the structure of IRD to conclude which classes are second graded and contribute towards IRD volumes traded. I will first present the share of each of the three categories traded on Futures and Options products graphically. I will then represent the same, focusing on the structure of the categories that grant towards the size of IRD. An assessment is conducted over a three-month period, closing 1Q19, in order to determine their individual representation.

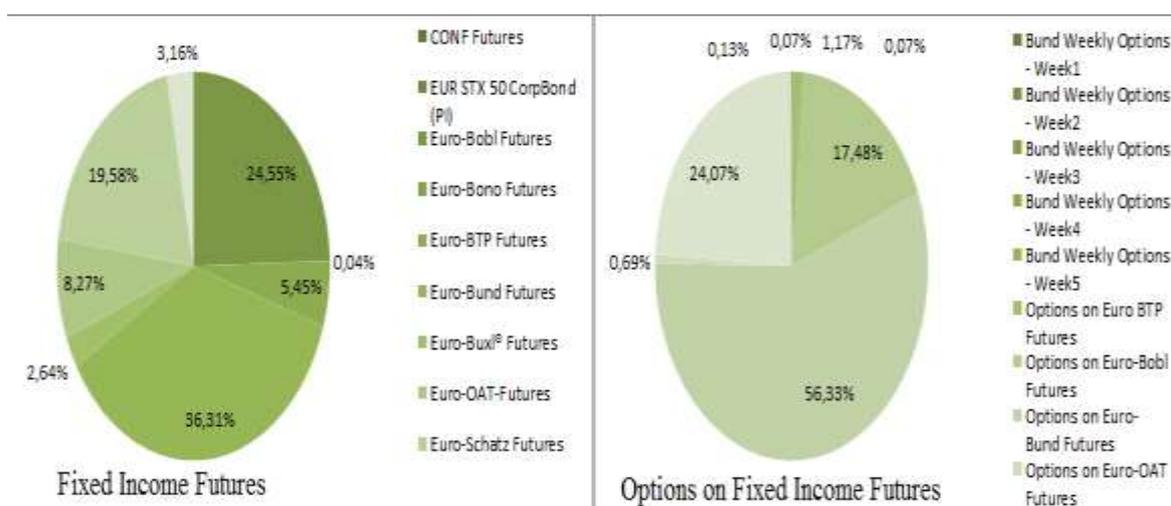
*Figure 15: Cleared trades structure for IRD closing 1Q19*



*Source: EUREX AG (2019d).*

Noting the zero trade of the Euro-Swaps Futures, which as a Fixed Income Future product is listed under Fixed Income derivatives, I will talk about the remaining Futures products of the Fixed Income Derivatives structure, since they contribute up to 75% of total IRD cleared trades.

Figure 16: Fixed Income Derivatives cleared structure, closing 1Q19



Source: EUREX AG (2019d).

Usually, Fixed Income Derivatives, have an underlying that pays a fixed interest rate swap, which can either be a bond or fixed rate swap. Hence the name “fixed income”. Accordingly, Euro-Schatz, Euro-Bobl and Euro-Bund Futures are futures contracts that fall under the fixed income category. Their underlying are German government bonds that pay fixed interest rates. On a worldwide scale, the Schatz, Bobl and Bund are most traded fixed income derivatives, whereas on the German stock-exchange they have the prefix Euro. This is due to its EUR denomination of the German Federal debt. Fundamentally, EUREX AG trades European based derivatives, and therefore the future contracts are traded under the given specifications:

- Euro-Schatz (FGBS)- a short-term future contract with an underlying based on a short-term bond with maturities from 21-27 months. On EUREX AG’s platform traded under FGBS as a future and correspondingly under the symbol OGBS as an Option on Euro-Schatz Future.
- Euro-Bobl (FGBM), a medium-term future contract, with maturities ranging from 4.5 years to 5.5 years, based on a medium-term German debt. Options on Euro-Bobl are noted under the OGMB symbol.
- Euro-Bund (FGBL) –based on a long term Bonds of the German Federal Governments, with maturities from 10-30 years, equivalent to the American Treasury Bond (Ganti A, 2019).

Hereby, Euro-Bunds Futures are out of primary importance as they stand with 36% and 56% share respectively from the total structure of Fixed Income Futures and Options on Fixed Income Futures traded. They are followed right by Euro-Bobl Futures, with a trading percentage of 25% for Fixed income Futures and correspondingly 17% for Options on Fixed Income Futures. Lastly, Euro-Schatz Futures are ranked third with a share of 20% and 24% respectively, over traded Futures and Options of the given Future product.

Figure 17: Fixed Income Derivatives Structure across 1Q19 for Futures and Options contracts traded on Euro-Schatz, Euro-Bobl and Euro-Bund

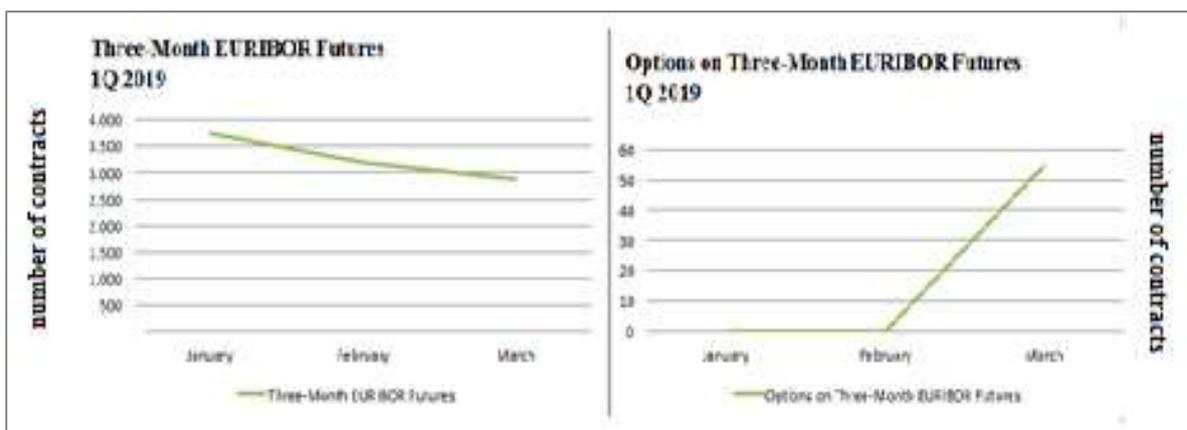


Source: EUREX AG (2019d).

If we take February as a reference month, even on the global scale, the volumes of IRS traded drop heavily in comparison to the high start in January 2019. The same tendency is reflected among the listed products traded OTC as well as exchange traded, with a slight trade-off between them. Namely, following the decline in February, Euro-Bobl Futures managed to recover nicely, both traded as a Future contract and as an Option Euro-Bobl Future. The number of Euro-Schatz Futures traded almost doubled in size at the end of March. However, the Option traded Euro-Schatz Future decreased sharply with a drop of 23%, comparing to the drop of 3.8% YoY.

Turning to Money Market Derivatives and especially focusing on the Three Month EURIBOR Future, it can be noted that this category is very much on the downfall. Secondly, 50 Options contracts traded on EURIBOR Futures at the end of March only insignificantly contribute towards the improvement of the state of given Future contracts.

Figure 18: Futures and Options contracts on Three-Month EURIBOR Futures, across 1Q19



Source: EUREX AG (2019d).

By graphically comparing the chosen three products across the 1Q19, the overall structure of IRD indicates that Futures based bonds and indexes drive the IRD structure. This tendency is equally represented on the global OTCD market as well.

### 2.3.3 LCH Clearing volumes of cleared trades

LCHs, once known as LCH Clearnet, rebranded itself under the currently present name in 2016. The name is derived from a merger that took place back in 2003, when the London Stock Exchange Clearing House formed a partnership with a French Clearing House, eventually forming LCH Clearnet (LCH Group, n.d). The current LCH group is divided between LCH Ltd. London and LCH SA. Aside from clearing repo, equity and commodity trades, the London seated part of the company is primarily in charge of governing SwapClear. It has the biggest influx of profit due to prevailing interest in interest rates swaps. LCH SA- the French seated part of the Company, offers clearing services for CDS, under CDS Clear Programme. From the data provided, the difference in clearing trends of IRS for European and American seated Clearing Houses can be easily determined.

LCH Clearnet has aligned itself well with G20 requirements in terms of clearing rules for OTC derivatives market (LCH, 2012). Namely, the imposed obligation of mandatory clearing practically assisted LCHs Swap Clear Programme to accomplish significant results. By further expanding the Swap Clear Programme towards Europe and the US markets, it increased the number of clearing members from 11 to 72. (LCH, 2012, p.10). An open interest of \$339.9 trillion was registered in the given year in particular, comparing to \$331 trillion at the end of the 3Q12 (LCH, 2012). The growth of almost \$9 billion serves as good feedback from the market on participant's compliance towards the commanded regulatory framework. The notional of \$339.9 trillion merely endorses LCH's leadership position on the global market. LCH clears 54% of IRS contracts denominated in 17 currencies, across 15 jurisdictions. According to its Annual Report, one of the highlights that marked 2012 for LCH Clearnet was certainly an increase of 69% in the number of IRS trades cleared, which in turn contributed to 28% of the registered revenues from Clearing services.

When it comes to the end of September 2012, LCH Clearnet processed \$36 trillion of IRS, for this month. This shows an increase of 43% comparing to September 2011. The total notional outstanding of cleared IRS by currency indicates that EUR denominated contracts are mostly cleared with 43%, followed by USD denominated IRS contracts with 33%. The chart will be differently dispersed with the American seated CCP.

Regarding the volumes and open interest of LCH Clearnet for 2012, its CDS Clear program displays itself with enviable progress as well. Namely, CDS Clear cleared a gross notional of EUR 104.2 billion, gaining an open interest of EUR 12 billion, which resulted in a jump of 77% CDS notional cleared compared to the previous year. It is also important to state the obvious and bear in mind the credits linkage with the last credit crisis which ruined their popularity among market traders (LCH, 2012, p.4,10).

Lastly, it is impossible to disregard LCH's competence in leading the bankruptcy of its clearing member - the Lehman Brothers. Namely, in the account of LCH's unrivalled risk and default management, this clearing house managed to hedge Lehman Brothers outstanding debt of \$9 trillion notional IRS portfolio in just three weeks. They managed to do this without causing a financial loss for the clearing house itself. This accomplishment speaks for itself as it demonstrated the credibility of LCHs business figures. However, collateral management is vital for solidly segregating collateral assets held by the CCP.

LCH repeatedly confirmed its well-established position in clearing OTC traded derivatives, by marking impressive figures for 2018. In reference to Swap Clear, the size of IRD notional outstanding is a fair signal for the cleared share of IRD contracts traded OTC.

Accordingly, the volume of total notional IRS cleared and the number of client trades will serve as a good financial indicator for well-performing business. Namely, closing 4Q18, Swap Clear registered \$1.077 quadrillion of notional outstanding, which is a rise of 23% compared to \$874trillion of national outstanding closing 4Q17. Consequently, the impressive outcome is a result of 487000 client trades concluded, which is a rise of 21% compared to 4Q17 with 1.228000 client trades respectively. The above stated results in Swap Clear reach new heights of client clearing trades, hence Swap Clear reports client clearing revenues of \$259trillion for the calendar year of 2018. Additionally, LCH collects a significant share of OTC cleared derivatives revenues from charging its members an annual or lower clearing fee with variable fees. This presents the prime source of revenues for LCH, whereas compression services are additionally charged to the clearing members. Accordingly, LCH registers \$325 million revenues from clearing fees, whereas Swap Clear service contributes to the total revenues with 75% or \$255.7 million. Notably, Swap Clear numbers serve as a showcase of market compliance after all (LCH, 2018).

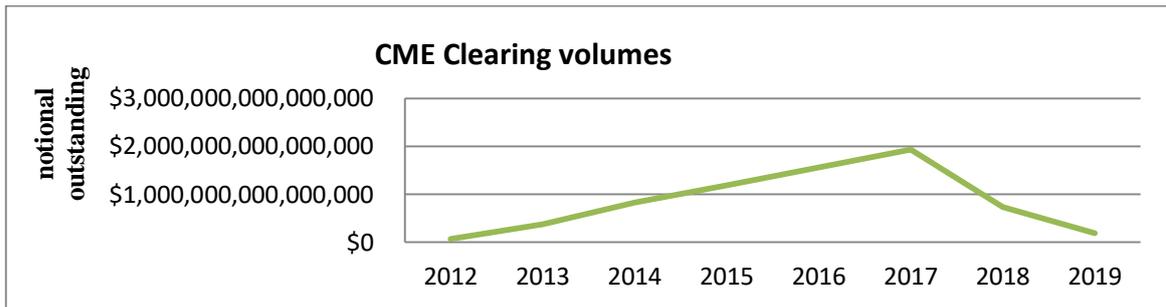
A group of 110 client members, forming a highly liquid pool consistent of 23 currencies, is unquestionably the number one source for the establishing of stable and rising incomes. In that light, LCH has an additional source of revenues derived from compression services. By compressing client's portfolio, it scales down the number of trades along with the notional outstanding, which in turns frees up a given amount of capital. It's a capital that otherwise would've been locked on clients' balance sheets. Compression services provided serious capital savings for the clients, resulting in EUR 39.5 billion. The notional amount compressed keeps going up by 27% to a total of \$773 trillion by 4Q18, compared to \$609 trillion YoY (LCH, 2012, p.4).

When it comes to LCH CDS Clear services, they are guided under LCH SA seated in Paris, France. Their position of hefty EUR 339 billion is fully secured by company's collateral that has not been utilized to the present day (LCH SA, 2018). Ultimately, in case of a clearing member default case-scenario, LCH holds a pool, worth of EUR 3.9 billion, to cover up for their CD (LCH SA Financial Statement, 2018, p.5). Moreover, the company holds a margin worth of EUR 4.439 million for CDS, exhibiting a growth of 34% of an additional value created, compared to EUR 3.328 million from 2017.

#### 2.3.4 CME Clearing volumes of cleared trades

As evident from the data from 2012, when the new legislation was introduced, the situation is somewhat different when it comes to the Chicago established clearing house. If we compare the trends of volume cleared as well as the denomination structure of IRS by currency with other European CCPs, CME Group differs on both aspects. Accordingly, at the end of September the notional outstanding volume and the total open interest for IRS cleared derivatives were noted to \$62 billion and \$441 billion respectively. When it comes to European CCPs trends of movements and the strictly imposed clearing obligation, the data was expected to show an upward movement. Unfortunately, this was not the case due to IRS's highly fluctuating oscillation. The notional volume cleared of IRS and their open interest for September 2018 have certainly progressed as expected, with \$3.716 trillion and \$8.492 trillion. Yet, as from 2017 onwards, IRS notional cleared is on a free fall (CME Group Volume Reports, August 2019).

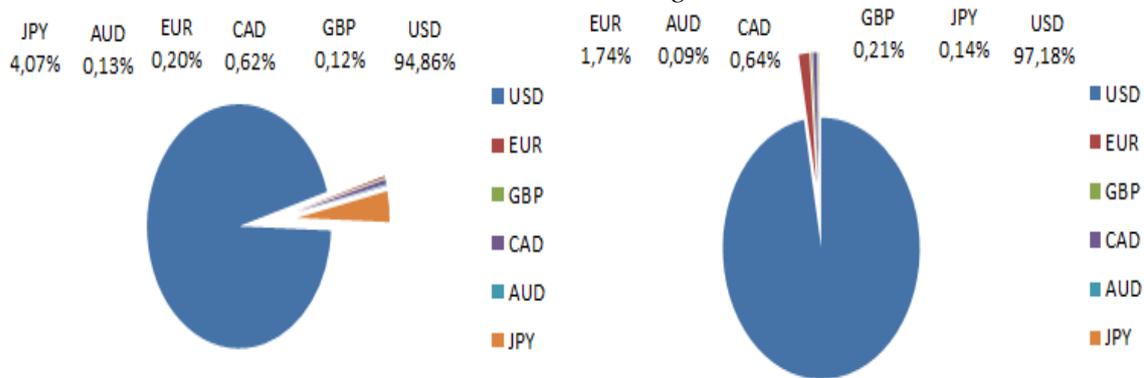
Figure 19: CME clearing volumes



Source: CME Group (2019).

When it comes to IRS denomination in currencies, in contrast to the European CCPs that mostly clear euro-denominated IRS, CME has a somewhat different denominated structure. This CCP clears mostly USD denominated IRS with a share of 56%, followed by 18.3% of GBP denominated IRS contracts. IRS contracts denominated in EUR are positioned last with 17.3%. Apart from the leading USD denomination of IRS contracts, the currency structure appears slightly changed for both intervals, end of September 2018 and for the 1Q 2019. Namely, as expected from the imposed obligation, clearing levels in EUR denominated IRS have risen. Nevertheless, the increased demand for JPY at the beginning of 2019 made these two currencies change places. Closing 1Q 2019 cumulatively, the percentage of USD was just around 94%, followed by JPY denominated IRS contracts with a share of 4.07%, then EUR denominated IRS with 1.74% and GBP with 0.12% respectively.

Figure 20: CME Group-Total Notional Outstanding by Currency as of 29 March 2019 left and 2018 on the right



Source: CME Group (2019).

Taking a look at the notional outstanding of \$16 billion CDS cleared and the open interest of \$44 billion as of September 2012, two trends become apparent. The derivative market saw a rise in the cleared and trade volumes with IRS, whereas trading in CDS has significantly dropped. With a specific regard to trading with CDS, all market participants make efforts to cope with the imposed standards of clearing and trading. This is a case with CCP's innovations, establishment and regulative enforcement towards promoting a safer market for trading and taking strict measures in terms of risk and default management in particular. Regarding all the imposed measures, it is only expected to see a rise in the cleared levels of CDS by CME Group as well. However, as of September 2017, the Board of CME decided to withdraw from providing CDS clearing services and focus instead on

further expanding capital efficiency for IRS traded OTC as well as for FX (CME Group, 2017). As evident, there is no data currently available on CDS cleared volumes and this is due to the suspension of CDS clearing services. Namely, as of September 2017 the Board of CME announced to exit the business of OTC Credit Clearing, by returning a full amount of \$650 million to its clearing members. Upon further reference to the Annular Reports from 2017 and the years previous to abolishing credit clearing services from the total cleared volumes and corresponding open interest, CDS shall be exempt.

#### **2.4. Margin requirements and collateral management**

At the Pittsburgh Summit back in 2009, G20 leaders agreed for all standardized OTC derivative contracts to be traded on regulated exchange traded platforms. This in turn imposed an obligation, for these transactions to be centrally cleared through a CCP and reported to a corresponding TR. On the other hand, the remaining non-centrally cleared derivative contracts are subject to higher capital requirements, thus, serving as collateral against credit risk of the other counterparty of the transaction (G20,2009, pp.13.3). The International Monetary Fund seconded this decision, finding that given types of underlying of unstandardized derivative contracts are not liquid enough to be cleared (International Monetary Fund,2010). The lack of commitment for non-standardized OTC contracts to be centrally cleared is due to CCP's requirement to deposit collateral in a form of initial margin. However, this is not a common practice of OTC dealers. It is guided by the principals for systematic risk reduction and enhancement of the significance of CCPs to do so, according to the G20 amendment, the Pittsburgh provision. At the Summit held in Mexico in 2012, the leaders highly encouraged extending the obligation of margining to non-centrally cleared derivatives contracts as well (G20, 2012, pp.39).

Instrumented by G20 efforts to bring stability and transparency to OTC derivative markets, the EU made its move with EMIR. More specifically, with the amendment version introduced under EMIR Refit and Draft RTS on margin requirements and intergroup exemptions. EMIR's Margins Rules help implement the Risk Management Procedures to preserve the resilience of financial markets. The Margin Rules impose an obligation to any market participant, trading non-cleared OTC derivatives to exchange a prescribed amount of collateral, regarding the corresponding OTC derivative contacts. Counterparties to a non-centrally cleared OTC derivative contracts, need to exchange two types of collateral in a form of Variation margin and Initial Margin. (European Commission, 2016, art.3)

- Variation margin serves a persistent safeguard to the transaction counterparties when it comes to current changes in the market value of the given OTC derivative contract. Meaning, it covers for current exposure. Variation margin is a single payment from one counterparty to the other. As such, it is largely calculated based on a marked-to-marked portfolio. (European Commission, 2016, art.10)
- Initial margin protects the counterparties against potential losses. They are covering future exposures ranging from the in-between time of the last Variation Margin exchange to the liquidation of positions on the default of the counterparty. Initial margins typically result in exchanged payments by both counterparties.

Most importantly, whether a given counterparty is a subject to margin requirement obligation or not, is dependent on two criteria:

1. **Counterparty classification-** refers to the implementation timing of when a margin requirement will be applicable for the entities under the scope of the Regulation. More importantly, it serves to determine whether a counterparty is subject to Initial Margin, as some derivative classes are exempted due to their lack of liquidity. For example, physically settled FX forwards and FX swaps are subject to Variation Margin only, meaning, these transactions are exempted from the Initial Margin. The same goes for Currency Exchanges and Covered Bond Swaps which are a subject to Variation Margin only. Counterparties classification is conducted based on aggregated average notional on a group level, including all OTC derivatives contracts cleared along with the FX forwards.
2. **Volumes of the derivative contract's transaction-** defining thresholds is an important in determining counterparties systematic relevance, in terms of OTC derivative contracts. In other words, the size of undertaken transactions trading with derivative OTC contracts distinguishes between FC and NFC imposing systematic risk to the financial system. Understandably, the larger the market participant is, the bigger the damage it can transmit to the other counterparty of the transaction. Transaction value and volume define the margining requirements demanded from the counterparties.

Thresholds based on Initial Margin:

- **Gross national threshold-** article 28(1) of the Commission Delegated Regulation No2016/2251 defines exclusion for Initial Margin collection. The exclusion is valid if the firm's gross notional amount falls under EUR 8 billion, on a group basis. Implying that some firms with smaller portfolios on a group basis will remain outside Initial margin requirement, however Variation margin is applicable in all cases without exception. Initially, all larger entities with portfolios on a group basis of above EUR 3 trillion fall under the scope of Initial Margin requirements as of February 2017. However, the latest amendments of the Commission Delegated Regulation intended to grasp a larger segment of the market, hence further expanding the Initial Margin requirement to a lower threshold of EUR 8 billion gross notional amount (European Commission, 2016, pp.14).
- **Initial Margin threshold-** is considered as a limit on the scope of RTS Draft and article 28(1) accordingly. Namely, when an Initial Margin is provided, article 29(1) of the Commission Delegated Regulation specifies a limit of EUR 50 million. The threshold drops to EUR 10 million for intergroup transactions. Noting that if a counterparty is required to provide an Initial Margin up to EUR 50 million, than none is needed under the requirements.

To closely define the collateral management, a parallel observation presents the difference in the process and requirements of OTC derivative contracts cleared through a CCP and counterparties outside the clearing obligation (Commission Delegated Regulation, 2016, art.19). As with the clearing and margining requirements, FC and NFC+ exceeding the clearing thresholds fall under the scope of collateral requirement. Counterparties outside the collateral requirement are NFCs under the clearing threshold and NFCs established outside the EU, not exceeding the clearing threshold (ESMA, 2019).

Simply put, collateral is a form of an asset securing the loan. Practically it's a form of insurance that the borrower gives to the lender, to guarantee its ability to perform the contract. Collateral management is especially relevant in the field of credit risk and market risk management as a risk mitigating-technique. As stated earlier, EMIR provisions a legal

obligation for some classes of derivatives to be cleared through a CCP. However not all derivative contracts meet the conditions to be centrally cleared. The given entities are required to install efficient systems to mitigate potential systematic risks arising in this regard. Article 11(3) under EMIR, especially highlights the instalment of solid procedures and arrangements. The article in reference emphasizes the importance of collateral management because a well-established system enables collateral to be timely and accurately exchanged between counterparties. Therefore, it keeps track of operational risk as well as counterparty credit risk arising from the related transaction. Essentially, risk assessment, monitoring of contracts execution and collateral reassessment are all part of collateral management.

Speaking of transactions cleared through a CCP for instance, it is not a straightforward process, but it is, however, quite simplified. Regarding the above stated EMIR requirements, CCPs have the role of providing a high level of protection to its clearing members by guaranteeing a solidly established risk management framework. A framework in demand of EMIR requirements to promptly monitor, detect and address credit, operational and liquidity risk arising from its clearing members transactions. Implementing appropriate procedures and mechanisms is necessary to handle a clearing member's default while avoiding any negative effects on the other counterparty of the transaction.

The level of protection is highly dependent on the level of segregation of client accounts, and it is an additional responsibility that CCP takes. It is thus mandatory that CCP segregate their assets from their clearing member's assets. Furthermore, the European Commission briefly specifies segregation requirements for non-cleared OTC derivatives referring to article 2 of the Commission Delegated Regulation. In this context, the article in reference specifies the eligibility of collateral deposited under initial and variation margin as well general requirements on calculating the margins. Namely, as the value of outstanding contracts needs to be marked to market daily, this by default introduces an obligation to appropriately collateralize or cover for the transaction's risk. However, if the outstanding contract value isn't appropriately collateralized, the Regulator requires two preventive measures to be undertaken. Principally, under article 11(4) under EMIR, FC needs to have a fair amount of capital to manage risk properly. Second and perhaps more important, is to ensure appropriate segregation of cash collateral. The collateral must be deposited to a third authorized counterparty. This preserves the separation of the counterparty accounts assets (European Commission, 2016, art.19).

Eligibility of asset classes to be collected as collateral, are further specified under article 4 of the Commission Delegated Regulation. The given article divides collateral as cash collateral in a form of money, gold, and non-cash collateral in a form of debt securities. In terms of liquidity, cash collateral is certainly more desirable. The collateralized assets are not only preferred but demanded to be liquid and legally settled. In other words, collateral transfer should not face any potential operational or regulatory constraints or third party claims. Point 24 of the Commission Delegated Regulation, further stipulates the counterparties' operational capacity to efficiently liquidate the collected assets from the defaulted counterparty and use the cash proceedings.

Once again, segregation refers to maintaining separate records and accounts so that in the initial margin, or the variation margin, payments are separately recorded for both counterparties. However, in order to avoid any inconveniences arising from difficulties in segregating cash collateral, point 29 of the Commission Delegated Regulation imposes an obligation for financial counterparties to limit their cash collection in initial margin and

thus diversify its initial margin collection in cash and non-cash collateral. In addition to this, article 29 of the Commission Delegated Regulation sets a threshold based on initial margin requirement amounting to EUR 50 million. The threshold applies to counterparties that are not a part of any group or linked to two different groups of entities. Accordingly, a threshold of EUR 10 million is applicable on transactions where both counterparties are part of the same group. Special attention is brought to the intergroup criteria. These entities are subject to some exceptions in terms of margining requirements. The provision lets counterparties bilaterally agree whether they will set a threshold for the exchange of initial margin collateral. Whether the threshold is enforceable or not, is highly dependent on the significance of exposure that one of the counterparties has on the transaction in question.

In conclusion, every step in evaluation is technically demanding. From an operational point of view, it is inevitable for a third neutral party to be involved in the transaction in order to provide a proper separation of collateral deposited from the transaction counterparties. It is a common practice among some European jurisdictions, as well as a European Commission recommendation, that cash collateral collected under initial margin should be held by central banks or other authorized credit institutions. Understandably a third-party institution is not related to any of the counterparties of the transaction in question (European Commission, 2016, pp. 36).

#### 2.4.1 Exemptions

As noted earlier, under EMIR's RTS some market participants benefit from the clearing obligation exemptions. Market participants in question are mostly small financial counterparties or FC and NFC that do not exceed the specifically calculated amounts individually set for all OTC derivative contracts. The noted clearing thresholds are calculated in gross notional value, dividing the derivative asset classes in two groups; clearing threshold amounting to a gross notional value of EUR 1 billion for credit and equity derivatives, and a clearing threshold of EUR 3 billion gross notional value for IRD, FX and Commodity derivative contracts. (Fieldfisher LLP, 2017, p. 5)

According to the very basics of clearing obligation, the clearing requirement is enforceable only if both sides of OTC derivative contracts fall under the scope of clearing. Any exemption from the clearing obligation is very narrowly defined in the RTS so that it wouldn't reduce the effectiveness of the obligation. Thus, in order for a counterparty to be granted an exclusive right to be exempt from clearing obligation, it must meet the specifically defined criteria. It is important to note that when ESMA grants an exemption, it especially takes into account the effect that the exempted counterparty has on other market participants. Additionally, EMIR Refit grants temporarily exemption from clearing obligation to Pensions Funds, in an extended version to June 2021. However, the exemption is granted with a long-term goal to eventually integrate Pension Funds within the scope of clearing and reporting obligation. The grounds on the given exemption are discussed below.

##### 2.4.1.1 Pension funds

Pension funds are socially important as they principally serve to maintain a living standard in the retirement. While some people are able to accumulate wealth in different forms during their lifetime, thus supplementing their pension scheme income, majority is highly dependent on their pension as a basic income. Consequently, this makes Pension Funds highly dependent on cash in order to duly fulfil its obligation towards its members. Namely, if pension funds would be required to clear its outstanding OTC derivative

contract transactions, a large proportion of its cash holding assets would be aimed to settle its margining requirements towards CCPs. Diversifying their portfolio holdings and thus converting non-cash assets to cash is a risky undertake. It undermines the efficiency of pension funds since that is not their main purpose. As a result, this would directly impact pension funds solvency and the ability to settle its individually contracted pension scheme claims towards its members.

For the stipulated reasons above, managing collateral is technically challenging for pension funds, because cash is the main and most widely accepted form of collateral. Pension Funds will remain excluded from clearing obligation until further notice. Technically, until a practical technical solution is found for non-cash collateral to be accepted under a variation margin (ESMA, 2017b). It is important to mention that the given exemption is only valid for Pension Scheme entities established in the EU, whereas entities established and residing in third countries are not entitled to the given exemption (ESMA, 2020,p.32,Q13.c). However, Pension scheme arrangements are subject to reporting and bilaterally collateralizing requirements (European Commission, 2016, pp.28). In contrast to the provisioned obligation to report, ESMA's Q&A from January 2020 clearly states that pension funds are not obliged to calculate its outstanding gross notional positions or to notify ESMA in that manner. However, even though pension schemes enjoy an exemption from clearing, EMIR Refit does authorize ESMA to periodically assess whether they exceeded the clearing thresholds (Sykes & Karsten, 2019).

Lastly, Collateral requirements refer to the collection of initial margin and instalment of appropriate risk mitigation procedures in particular. However, when the collected collateral under initial margin exceeds EUR 1 billion, the collecting counterparty is bound to comply in a certain way. This way, Article 8.2 from the Commission Delegated Regulation No2016/2251 limits concentration risk.

#### *2.4.1.2 Intergroup transactions*

Like the above-stated FC and NFC counterparties that stand alone and do not exceed the corresponding clearing thresholds, abide by the same rules. Namely, FC and NFC, other than representing themselves, can be a part of the same group, entering transactions among one another, hence forming an Intragroup transaction. Legislation wise, before a given group of entities applies for an exception as part of an Intergroup transaction, it must meet a strictly defined set of rules. Yet it is noteworthy that despite the given exemption from clearing obligation, intragroup transactions are still required to exchange collateral and implement risk mitigation procedures accordingly. Article 3 from the Commission Delegated Regulation defines a set of criteria that must be simultaneously met:

1. Counterparties taking a part of the same OTC derivative contract transaction;
2. Counterparties that are a part of the same consolidation basis, meaning that the total set of accounts contributes to the group's overall financial results.
3. Counterparties under the same risk management procedures and control, where risk evaluation is executed centrally. Centralized risk assessment is very convenient, because it provides easier identification of risks to the overall level of the group.
4. because it provides easier identification of risks to the overall level of the group.

Notably, to be eligible for an exemption as a part of Intragroup transaction, the underlining group needs to establish a well-constructed subordinated monitoring system that is

centrally commanded. This implies a monitoring system with insight and control over all transactions of the group's underlying entities. The complexity of OTC derivative contract transaction depends on the types of counterparties involved and the contract's underlying asset. For that reason, complex transactions are required to implement solid and highly functional risk management system, an imperative for systematic risk prevention. Moreover, the intragroup counterparties need to be able to timely settle its obligations. In that manner, the intragroup counterparties need to refrain from installing or entering in any type of business practices that can negatively impact its liquidity. Point 39 of the Commission Delegated Regulation implies no administrative or regulatory impediments either.

Legislation wise, depending on the area of establishment of entities belonging to intragroup transactions, a different set of rules is applicable. Intragroup transactions are divided in two categories: both counterparties are established in a single member state of the European Union or all counterparties are established within different member states of the EU. Alternatively, there is still a likelihood that one of them belongs to a third country. It is important to note that, in order for the exception to be applicable, at least one of the counterparties must be an FC. Nevertheless, it appears to be quite a facilitated procedure when it comes to NFCs authorization as a part of intragroup transactions. As found, such entities represent a very small to insignificant fraction of the total OTC derivative contracts traded. Additionally, NFC's involvement in these types of transactions is primarily driven by their need to hedge outstanding positions. Consequently, point 16 of EMIR Refit acknowledges NFC with the exclusive right of exemption from the reporting obligation.

### **3. EMIR AND COMPANIES**

By introducing the very basics of risk and types of risk that the business sector is facing, this chapter will present key arguments in favour of derivatives, as they do not impose a risk per se. This will eventually lead to a conclusion that, out of all risks present, derivative trades have failed due to the imposed operational risk. In order to present derivatives in a more positive light, this chapter will present practical examples as to why some managers choose to trade or refuse to use derivatives. The practical examples refer to a pair of historically known collapses. Eventually, both scenarios show that operational risk or a "human error" may cause a severe damage. In conclusion, it is highly likely that even the presence of a stricter regulation would not have changed the outcome in some instances. Yet, imposing the 20th-century Regulation is found to be inevitable in cases where management fails to follow the most fundamental risk and safety procedures. It is crucial to impose a more strict law in order to firmly stick to the very basic operational standards and respect minimum risk management standards, including procedures to be followed in case of a market member defaulting on its obligation in terms of derivative transactions.

#### **3.1 Why derivatives can be lethal?**

As with all financial instruments that can possibly lead to fatal consequences, the same stands for derivatives as well. However, it is certainly not up to the financial instrument characteristics per se, but up to how those instruments are handled. Looking backward, numerous bankruptcies have erupted due to companies' indebtedness and due to the credit risk involved. Historically speaking, the same scenario followed bank credits, bonds and stocks, not any different than derivatives - so what is it that makes derivatives so interesting to the world? Overall, the excessive growth of OTC markets without any safeguards installed along with the cases of Metallgesellschaft and Barings Banks implies that derivative-related scandals occur due to:

1. **Managerial Incentives.** Speaking in terms of managerial incentives, it is important to differentiate between earning profits by trading derivatives and providing stable cash flows by hedging given position with derivatives. Managerial incentives are mostly driven by managerial portion of ownership of the company, if existent, and by management compensation (Adkins, Carter & Simpson, 2000, p.7). In terms of managerial ownership to the company, the research found that equity holdings, like stocks for example, do motivate managers to hedge, hence it increases the likelihood that managers will use derivatives to do so. Namely, to protect the company against volatile cash flow shocks, managers are motivated to hedge as it drops down stock prices. Additionally, speaking in terms of managerial compensation with option awards, the results of the study have found the contrary. Notably, if managers receive awards or stimulation in the form of option, they will probably not use derivatives to hedge against risk. The reasoning behind the given observation is because option prices raise proportionality with risk incensement. Exposing the firm to volatility would be preferable in the given scenario. Finally, if the company's establishment prefers the management to undertake given measures in a direction of risk hedging with derivatives, a combination of annual bonds and small fraction in options might be desirable. This way, the management does not acquire a share of the company's equity. However, it is still directly affected by company's performance throughout the year. For the above stipulated reasons, it is essential to highlight the importance of adequately arranged contracts with the management to avoid unwanted agency problems.
  
2. **Lack of regulative norms to control over those incentives.** Recalling on earlier findings of Norvald Instefjord, credit derivatives riskiness for the banks was confirmed by the Bank of England. It argued that: "For most banks – and perhaps for the system as a whole – the largest source of risk in recent years has not been leverage or market volatility but credit "(Bank of England, 2003, p.25). Accordingly, The Bank of England finds that credit derivatives inflict the banking sector's stability. Also, CDS, as a financial innovation, potentially increases bank`s risk. However, this finding is subject to credit market elasticity and credit prices, depending on where the banks are operating (Instefjord, 2003, p.12). Notably, banks exposed to very elastic credit markets are more sensitive in comparison to banks operating in non-elastic credit markets. It can be said that derivative market for all assets and underlying follows that same logic and that the system is ruled by the belief that more trading offsets more risk by transferring it to the outside parties. The real question is, how much risk remains within the bank or the firm? Recalling on the oil industry, futures contracts gained in popularity when it comes to trading this commodity. Hedging risk in oil commodities also disperses risk within the industry because there is always someone willing to take the other side of the contract. The same logic is followed by the credit market industry's engagement with oil derivatives for the purpose of hedging risk.

Contrarily, another study argues that derivatives increase banks' efficiency overall (Rivas, Ozuna & Policasteo, 2006, p.25). It is a very interesting research and it proves a fair point that even countries from emerging economies can benefit from derivatives usage. The research was conducted at a time of hands-off governmental approach when it comes to any regulation of the markets. At the given time, the markets of Mexico, Brazil and Chile respectively, were in the phase of liberalization in order to attract more foreign capital and initiate market competition. Banks faced difficulty with attracting cash inflows and were therefore forced to lend at higher rates, which in turn resulted in their involvement in riskier projects. Hence, the research found that banks who used derivatives to hedge risks

were twice to tenfold the size of banks who did not use derivatives. Also, the research found that loans and liquidity positively complimented bank's efficiency. Notably, the usage of derivatives for all three countries demonstrated that on average derivatives increase bank efficiency and thereby decrease bankruptcy chances. The same goes for the size of loans as a diversified portfolio. The size of loans portfolio, which is a proxy for asset diversification, plays an important role in determining risk. McAllister & McManus find that on average banks with small loan portfolios are required to maintain much higher capital levels than banks with large portfolios, which reduces the banks' ability to perform efficiently (in Rivas, Ozuna & Policestao, 2011, p.50)

Nevertheless, all 182 banks in the research have demonstrated a lower equity ratio. Although they had a beautifully diversified portfolio, it still does not mean that they are highly leveraged. This, in turn makes the borrowing costs larger (Rivas, Ozuna & Policestao, p.52).

Moreover, the case of the Chilean derivatives market, as it demonstrated best results among Latin American markets, it presents a fair example that Emerging Economy Markets (hereafter: EMS) can indeed benefit from derivatives usage. Looking back, the ultimate drivers of the domestic FX derivatives market were the investments in foreign markets of the Chilean Private Pension Fund "Administradoras de Fondos de Pensiones" in Spanish (hereafter AFP). Namely, ever since the pension system was structurally reformed, the introduced reform became obligatory for the new labour entering the markets from 1981 onwards. Aside from the influx coming in from the privatized pension system, the government accelerated the growth of AFPs by gradually liberalizing the types of asset classes where AFP can invest their funds. Aside from the initial investments in Chilean Fixed Income instruments, following 1985 and 1990's, it was possible to diversely invest as in the Domestic Stock Market as in foreign asset instruments. In the coming years, AFP's assets grew massively. A decade later, in 1995, they stood for a share of 40% of GDP and a share of 60% respectively of 2010's GDP. AFP managed to create a remarkably favourable net foreign investment position, mainly consisted of hedged exchange rate position with FX derivative instruments, 90% of which were forwards and slightly less, about 7.2%, FX swaps. Their portfolio additionally consisted of hedged positions in commodities and lastly. investments in IRD instruments.

AFP's positive experience of hedging their foreign assets positions only encouraged the Chilean government to do so as well and so maintain the liquidity of foreign assets. Namely, the collapse of Lehman Brothers in 2008 and the financial crisis that came in the years after, created a significant pressure on FX markets as cross border funding was decreasing dramatically. According to F. Avalos and R. Moreno, derivatives market does reduce financial stress and in the given case, it has mostly to do with AFP's hedging. Despite the financial crisis, AFP did not close a single existing position. On the contrary, it kept hedging its foreign asset positions with a considerably larger share than what they were legally required to hedge.

Two groups of researchers have opposite views when it comes to CDS provoking the 2008 financial crisis. Namely, Rivas, Ozuna and Policasteo find that institutional oversight and regulatory constraints negatively affect efficiency. In contrast, Instefjord finds that credit derivatives positively increase banks risk. Eventually, the case of remarkable liquidity and the Chilean FX derivative market will prevail. Meaning, that even with stringent governmental regulation, followed by a very well-thought and consistent strategy of matching short and long, positions can have a rather positive outcome overall.

### 3.1.1 Comparative study of derivative debacles

This section is a short introduction to the famous derivative debacle cases related to Metallgesellschaft and Barings Banks in 1995, in order to determine the types of risks present in each of the cases. The risks are categorized as a non-systematic or systematic risk depending on whether governmental incentives can do something about in the future to prevent it from happening again. Both given cases were related to a European firm's subsidiary in a foreign country. One subsidiary founded in America and the other in Asia, both of which initially aimed to hedge its open positions, but instead turned into pure speculative deals. The unsuccessful strategy accompanied with the lack of internal supervisory control, ultimately led to catastrophic losses. So what kind of deal was it?

- MGRM Marketing & Hedging Program

Metallgesellschaft, a German operated company, launched a very innovative mechanism to sell petroleum products through its Oil Subsidiary in the U.S. The programme known as MGRM, was a combination of both a marketing and a hedging program with a perfectly built strategy to guarantee its customer long term prices. MGRM protected its customers against price volatility by simultaneously going short on long-term forwards contracts and then hedging their forwards positions by taking a long position on short term futures contracts. Since the maturity of the two given types of arrangements differentiate among each other, and additionally long term Futures are illiquid, MGRM involved in a so-called stack and roll strategy. This strategy involved hedging its long-term short forward contracts with a bundle of near term long term future contracts with the same expiration. Prior to the expiry date, MGRM offsets this position by entering in a new bundle of contracts. In order to pull this strategy off, MGRM relied on backwardation. On these terms, as long as oil prices were going up and forward price is lower than the spot price, they would have earned on their future prices. However, the market went to an almost persistent contango where the oil prices hit a downfall, which in turn triggered margin calls. Allegedly, the accumulated cash flows needed to be deposited as collateral that sent the company to the ground. An accumulated debt of \$1.5 billion made the management board shut down the U.S. Subsidiary. Essentially, sufficient facts are presented at the case summary, which serve to identify the four groups of risks that undermined MGRM's hedging strategy:

1. Basis risk- Futures Long position for less than one year is due to the adverse correlation between their underlying short position, of 5-10 years and the asset for hedging that position. The financial hardship started when the market shifted from very expected backwardation to contango. Meaning the forward prices were bigger and not smaller than the spot prices on the market. This resulted in two types of implications for the subsidiary. Primarily, when margin calls were received, that did not affect the forward contracts at a given extend as it impacted future contracts, according to the German law provisions at the time. Namely, Forward contracts are settled at expiration regardless of its loss or win situation. On the other hand, Futures contracts are marked-to-market daily. So, as the above-named bundle of Stack and Roll contracts was unfolding in a continuous loss since spot price kept lowering, MGRM had to deposit collateral on the loss on its positions. This is the risk that comes with Stack and Roll strategy. The cost is unknown. In the given scenario, the future price is like an x unknown of the equation between each of the points as the bundle of contracts unrolls. Therefore, the future prices might go higher and higher, which would be preferred, but instead the prices hit the opposite direction.

Still, some critics argue that MGRM should have stayed persistent in its strategy, as the market recovered in the next year. During 1994, the prices rose again and all the past funding of margin calls was unwritten as a sunk cost. However, there are cases when the market went to a persistent contango in the commodity industry and it has not recovered ever since (Edwards & Canter, 1995, p.12). For example, for the year 1965-1975 the market was in backwardation for soy and copper and then shifted to a persistent contango. Secondly, the fact that backs up the closedown of the program and takes off the blame of derivatives is that the short-term futures are considered more volatile than long-term forwards (Edwards & Canter, 1995, p.13). Finally, even though it was some sort of a hedge, its profits off set none of the losses in the forward market. If this was taken into account, it would've massively shrunk down the size of the allegedly prescribed loss of \$1.3 billion to a net worth of unrealized contracts amounting to \$170 million. After all, the company has come up with a theoretically decent strategy to hedge against risk. However, the lack of management's comprehension of the Programme and therefore, their ability to fund the program is what finished it.

2. Liquidity risk - Accounting standards certainly played a role here. Once again, losses in the futures contracts were not offset by the gains in the forwards contracts, which are realized at expiration. Instead it called in for continuously receiving of margin calls and thereby writing off any credit to gains accredited to the short position in long-term forwards. And so, as oil prices kept scaling down, continuous losses on MGRM future trades, which were marked to market, triggered large margin calls. As a result of the given circumstances and to safeguard the interest of the exchange floor, NYMEX expressed its concern about MGRM's liquidity by raising their margin requirements. Consequently, some of MGRM's OTC counterparties terminated its contracts, whereas others demanded collateral. A later change in the management, directing towards terminating all long-term contracts and liquidating the hedge, lead towards even harsher rules imposed by NYMEX. Primarily, the exchange requested larger premium payments to roll each stack of short-term contracts at expiration (Schwartz & Smith, 1997 p.12). Secondly, the exchange took down the hedging exception for MGRM, which by that point of time, allowed them to take larger positions in FX Futures, hence limiting MGRM's focus on futures positions (Schwartz & Smith, p.7). Finally, MG's financial difficulties were not attributable solely to the use of derivatives. Namely, in addition to the continuous outflows of MGRM hedging programme, as Mello and Parsons found, the parent firm had already accumulated debt amounting to DM 5.65 billion between 1988 and 1993.

3. Operational risk - Concluding on the given remarks hereafter, it is not derivatives that ultimately brought the company into a collapse. Internal management failure is what undermined almost all MGRM Marketing and Hedging Programmes. However, it is unimaginable for a company to lose a DM 1.3 billion, whether MGRM's strategy was to hedge or speculate. After all, he adds that if the parent company was doing the right thing, they wouldn't amass a debt of that size (Nasar, 1994, p. 15). From one side, the main fault lies with the internal supervisory board of the company, which allegedly had little knowledge of the hedging program and understanding of derivatives trading. Secondly, Deutsche Bank, who financed the hedging program in question, has very much underestimated the cost of financing as it was alarmed by margin calls coming in. That, without a doubt seconds the fact that in both instances, from both Company and Banks perspective, they had little awareness of the risk that they were facing. The European Bank, however, found these claims outrageous, as it is unimaginable that neither DB Management nor MG's supervisor was not better informed of the riskiness of the undertaken trades, senior executive EB (Nasar, 1994, p. 19). The undertaken actions by

CFTM against MGRM Hedging Program are in favour of the above stipulated arguments. Namely, CFTM's chargers, aside from questioning the legal grounds of MGRM's, also raised charges against internal control for the undertaken measures and arranged agreements with its clients. Even though MGRM's management didn't respond to the given allegation in any way, a DM 2.5 million settlement with CFTM serves as a confession. They have also accepted to act in line with the pointed recommendation of further strengthening internal control.

4. Legal risk- by definition, legal risk is the risk of loss because a contract is found not to be legally enforceable. Like any other contract, derivatives are types of contracts themselves, hence, they require a properly established legal infrastructure for the bare purpose of enforcement of contract provisions and conflict matter resolution. This, however, wasn't the case with the oil hedging program trading with futures.

In this regard, as traded on a regulated market, future contracts are regulated legal contracts themselves. Thus, they did not impose a major risk to the stability of the financial markets at the time. However, the very sudden change of the management and the MGRM program's cut down resulted in a famous dispute that had to be resolved. Namely, W. Arthur Benson, former chief executive of the MGRM oil hedging program, pressed charges against MG the parent company for being dismissed unfairly as well as for falsely declaring the oil deals arranged by MGRM as speculative. The matter was resolved later in May 1996, as the New York arbitrators ruled out the allegation, finding that Mr. Benson did indeed impose significant damage to the parent company.

- Barings Futures Subsidiary

An inadequate system of internal and external control and very little supervisory insight by the company's management enabled a single person to cause a corporate collapse of a once known and conservatively managed Barings bank. The Barings case is the best case-scenario example of attributing risky derivatives. The fatal consequences are a result of pure speculative trading combined with non-existent supervisory control available in any instance. There was no internal supervision or audit control implied by the exchanges, whereas the regulation did not place limits on trading exposure externally. Shortly, Barings Bank London headquarters appointed Nick Lesson as a Head of Back office and Settlement at its Indonesian office. He got licensed to perform trading at the Singapore International Monetary Exchange short time after (hereafter: SIMEX). Generally, settlement and trading are two separate divisions within a company, as the settlement department needs to do a pre-check-up of individual trades enclosed by the traders. This certainly was not the case here and eventually only served as a beginning of a downward spiral. Lesson acquired its permission to exploit arbitrage opportunities on the Nikkei 225 index futures between the Singapore and Osaka stock exchange floors. When entitled to trade on companies' account, the once known arbitrage trading shifted to speculative trading on the rise of Nikkei 225 index futures and 10-year JGB rising. Despite the repetitive fall in Nikkei 225 index future, Lesson would persistently keep increasing its position and thus magnifying the banks future losses. Again, as with the case of MGRM, facts sufficient to sort out the types of risk that challenged Barings durability are presented here.

1. Market risk- I would not necessarily attribute the market risk to undermining Lessons speculative trades. Earthquakes, for example, do transfer risk on capital markets but they are not technically market risks but an uncontrollable outside force. Kobe's earthquake was a "vis-major" and as such , it affected the overall market.

2. Operational risk- in terms of operational risk, both instances of failure are due to the lack of internal and external control. Namely, a number one reason for poor performance is incompatibility among two functions within the company. This, however, was not the case with BFS. Leeson, as a man in charge of both trading and settlement department, was in a unique position to cover up for major losses by providing factious accounts and spectacular profit reports to the Barings headquarters in London. The supposedly good business performance was in turn rewarded in continuous funding granted by the London office. Concluding on Banks of England's remarks on this matter it seems that: "Barings erroneously concluded that BFS's activities were low risk" (UK Government, 1995, p. 255). Furthermore, aside from the additional funding approved, the BFS office was additionally financially stimulated by trading without exposure limit, as Leeson was granted an exception by SIMEX. This in terms, displays a failure of an external control as well.

Namely, granting exceptions is a common practice for some notable members, however and by the rules, Clearing Houses have an obligation to monitor any member of the exchange who has been granted with an exception. At least that is the case in the United States. As apparent, Leeson took advantage of the competitiveness among OSE and SIMEX. The lack of communication and cooperation among the two exchanges enabled Leeson to take large positions on speculative trades on Nikkei 225 index at the SIMEX exchange, without even offsetting a single position on the Osaka exchange. This again was not evident until it was too late.

Overall, reflecting on the International Financial Organizations Reports, they all display a lack of internal control and not following basic procedures as main elements that led to bankruptcy. By the time of the collapse, neither senior management nor internal audits had followed up to ensure the implementation of the management actions, as previously agreed in October 1994 internal audit reports on BFS: "...Failure of management to implement recommendations within a timeframe agreed with internal audit should be reported to the Audit Committee" (UK Government, p. 255).

3. Legal risk- In this instance, legal risk isn't concerning enforceability or the nature of derivative contracts that Leeson purchased, but the financial institutions' failure to cut down on legal risk. Nonetheless, the lack of regulative norms on the legal effect in case of an insolvency of a member of the exchange was a very much expected consequence of it. Namely, due to the falsely provided information, it was impossible to distinguish among individual accounts. Therefore, rules on segregation of accounts were impossible to implement. However, BFS clients eventually did get in touch with the banks to prove their transactions with BFS. However, even then, the practical appliance of the law was ambiguous because Japan did not have provisions on bankruptcy law. More precisely, they did not have laws on the segregation of accounts. However, as most of the trades were performed on SIMEX, Singapore did have the needed provisions but has never practiced it.

Due to the appointed legislative loopholes, FIA insisted on new rules established as practical provisions on bankruptcy Law. More precisely, new requirements that are internationally coherent with other nation's legislations in order to avoid conflicting provisions. Ultimately, to provide closer monitoring of clearing members and Clearing houses activity. Thus, under the Commissions Exchange Act on legal risk: "Each derivatives clearing organization shall have a well-founded, transparent, and enforceable legal framework for each aspect of the activities of the derivatives clearing organization"

(UK Government, 1995, p. 121). Especially those who have taken larger positions or been granted an exception by the exchange. Lastly, FIA insists on customer protection and follow the precedent established by the American law on detaching customer's assets from the ones of the company, due to banks or clearing houses insolvency.

### **3.2 The importance of Risk Management for companies**

Highlighting the importance of a sound risk management practice, the main objective of this paragraph is to determine the relationship between financial risk and risk management efficiency. However, there is a slight gap between what is theoretically defined as a good risk management practice and its corresponding empirical evidence.

From a theoretical point of view, a well-established risk management is inevitable, as it serves to identify, assess and control any potential threat for the organization or its earnings. Therefore, number one importance of risk management is to provide stability to the business operations. Once a systematic or unsystematic form of a risk is identified, it needs to be matched with a proper risk management model of assessment, a measuring tool, or a strategy to be able to mitigate risk. Examples of financial risk modelling are most often used econometric models. The given model provides a possibility to determine the amount of risk present within the business, project, or cash flow. Then the given model is used to identify which independent variables have the biggest impact, meaning which factors impose a threat to the business, project, or the given cash flow. Bearing in mind the above stated, it is expected to see the same outcome in practice. However, empirical study has found minimal or negligible results of the effectiveness of financial risk management for enterprises. Researches, however, don't have enough data samples to properly analyse the effectiveness, which then by default gives little power to the test.

Managing risk cannot be disregarded based solely on the given points. The fact that Risk Management is a relatively new term needs to be taken into consideration. Modern risk management, as we know it dates from the 1950's onwards. It is mainly during 1970's and 1980's that the concept of risk management was revolutionized from pure risk management to financial risk management that corporations can benefit from. Again, as the concept of risk management gradually evolved in stages, from pure risk management in 1950's, to a more broad concept in 1980's, it was mainly known as financial risk management or portfolio management. In the given period of 1970's-1980's both financial and non-financial sectors gave certain consideration to credit risk and market risk assessment due to the overall market fluctuations in IR, XR as well as commodity and raw materials prices (Dionne, 2013, p.5).

Namely, it is in the 1980's that the market participants turned to derivatives as a new financial instrument to hedge against market risk exposure, compared to the traditional form of insurance. The given types of risks resulted in developing different financial hedging products to cover for credit, market, operational and liquidity risk (Dionne, 2013, p.11).

Introducing derivatives, as a form of financial insurance to the market, has certainly changed the approach to risk management implementation itself. Thus, rather than evaluating how well a particular financial decision provides market insurance coverage, the focus was then directed to measure the effect of a given decision on the firm's value or firm's portfolio.

A shift in comprehension of the importance of risk management implementation took place almost two decades later. The reasoning being that derivatives were most used as insurance against risks or market fluctuations, and internal risk managements were unnecessary as derivatives served this very purpose. The overall established and implemented risk management regulation did not prevent the 2007 crisis from happening (Dionne, 2013, p.6). Primarily referring to the Sarbanes-Oxley Regulation from 2002, enforced by the NYSE, as well as the following Basel I and Basel II, imposing harsher rules on capital requirements mostly for banks and other financial institutions. Contrarily, Dionne points out “self-protection” as a preventive measure against financial distress. Examples of good practice are the RiskMetrics and CreditMetrics models for internal risk management, developed by JP Morgan in 1994 and 1997. The established models, later, resulted in developing a VaR model, as a risk measuring tool. Namely, VaR found to be broadly implemented as a risk measuring tool even in analysing Barings’ losses in 1994, by re-evaluating the maximum loss a firm could have had.

Confronting Dionne’s elaborate critique on risk management enforcement, Stulz, on the other hand, states that ” A large loss is not evidence of a risk management failure because a significant loss can happen even if risk management is flawless” (Stulz, 2008, p.1). He thereby defines several factors that determine risk management failure. First thing leading towards risk management failure is mismeasuring known risks seized by the model. Second thing leading towards risk management failure is not paying attention to known risks to the organization’s management. Failing to take risks into account and thus not implementing them into the model, certainly leads to underestimating potential threats. In this context, guided by the “Garbage in, Garbage out” principle, it does restate the above-stipulated failure of the VaR model as appointed by Dionne. Hence, as the principle implies, when risk is underrated, the model itself cannot be held accountable for that.

Secondly and more importantly, once risk is accurately measured, it needs to be correctly communicated to the top management, so that they can decide which risks to consider. The case of Metallgesellschaft is a good example of a poorly communicated strategy that was undertaken. This in turn made the top management underestimate the undertaken market risk. Consequently, poorly accessed and communicated risk cannot be rightly monitored nor managed, according to Stulz. Finest example of a failure in monitoring risk is certainly the Barings case, considering the unauthorized trades in Futures and Options. The Higher Court of England held Barings Banks auditor accountable for neglecting their obligation in supervising Mr. Lessons activities.

Risk Management serve to call for responsibility from the management of the organization. However, since risk is managed internally, the three main sectors within the organization that call for accountability are: Financial reporting, Audit and Internal Control (Spira & Page, 2004). However, audits know that internal control mitigates risk and for that reason, a slightly different kind of risk management might be found more useful in successfully running an organization. Enterprise Risk management (hereafter: “ERM”) declines the likelihood of financial distress (Pagach. & Warr, 2010, p.13). ERM provides stability of the earnings, thus enables the company to reach its objectives more easily and efficiently. In that manner, the given research wished to pragmatically confirm the reasoning behind the broad adoption of ERP model.

Nonetheless, through the study conducted in 2010, the researchers did not determine a direct positive cost-benefit relationship between the ERM model and risk reduction in enterprise earnings. However, the lack of results does not diminish the significance of

ERM model. The ERM model's adoption likely takes a more extended period to see the positive effects. A positive and significant relationship is found between total risk management and company's performance (Mohammed & Knapkova p. 276). ERM framework has been further promoted two years later by McKinsey & Company in 2018, by pushing forward ERM framework as an essential to trace all kinds of risk present across the organization, which should be further addressed with an individual framework (Gius, Mieszala, Panayioutau & Popenzieker, 2018). McKinsey & Company point of view goes very much in line with futuristic views on risk management importance (Miller & Waller, 2003). This point of view goes forward from traditionally defined risk management of handling the downfalls of risks, to a more moderated view of taking advantage of operating in a dynamic environment. It is certainly an outdated view of risk management systems effectiveness only in terms of safeguarding the company from potential downfall. Definite advantages that the enterprise gains from improved performance should also be considered. Seeing risk as a possibility to exploit an opportunity is the purpose of establishment of ERM framework.

## CONCLUSION

Considering derivatives to be a relatively risky financial instrument, this thesis aimed to conclude the overall justifiability of the undertaken market reforms in order to improve the security of the market. This was done by referring to EMIR as European regulatory provisions on mandatory clearing and trade reporting of certain classes of derivatives traded OTC. Namely, this thesis notes that, like any legal contract, derivatives have their shortcomings and hence can be subject to misuse if, and only if, they are not adequately regulated. It can be argued that CDS is not an extremely risky instrument and thus is not the cause of the financial crisis of the last decade. On the contrary, what contributed towards the financial collapse was more of a legal issue. More precisely, the inadequate regulation of derivatives at the time was backed up with the enforcement of the CFMA of 2000. As a side effect, the market deregulation enabled plenty of speculative trading with CDS without any coverage in the underlying. Understandably, many large corporations were involved in this sort of deals and this certainly implies management failure in terms of trading with derivatives.

1. How consistent are the structural reforms of EMIR regulation and the impact of its implementation?

Before addressing the effectiveness and progress on the undertaken reforms, it is important to show that the overall regulation aiming to contribute towards enhancing the security of OTC trading is indeed yielding the targeted effect. Observing BIS results on a global scale, the data shows that the legislative interference on the financial market is overall effective. Speaking in terms of the CDS: IRD ratio, even though CDS trade at a decreased volume compared to before, they do gradually stabilize in traded volume. In addition, the legal safeguards only further raised the popularity of the IRS.

In terms of trading structure, derivative contracts representation, and currency denomination, the thesis shows that the European Derivative Market is shaped in the same manner as the Global OTC market. Notably, this claim is valid for both segments of the OTC and ETD market. Accordingly, on a global scale, IR and Currency derivatives are at the top of the trading structure, whereas equity and commodity derivatives are the least traded derivative classes. From 2008 onwards, the Global OTCD presents decreased activity across all derivative classes. However, as previously stated, the contrast is

especially emphasized between IRS and CDS. In addition, IRD is taken as a representative of the OTC market because its trades consist of almost 90% of the derivative market. Namely, IRD most appropriately displays the market's reaction to the new regulative changes, although the market needed time to cope with the altered provisions and different forms of trading and margining, IRD still managed to remain relatively stable and respond steadily until the first market reforms were enacted from theory into practice. Additionally, regardless of the continuous decline, CDS managed to position themselves extraordinarily well, taking a share of over 5% of the OTC market, closing H218. This is relatively good, considering that currency derivatives that follow along with the same trend-line movement of IRD, have a share of 6.78%. Considering the inverse relationship between IRD and CDS, a further inspection of a possible correlation among them is conducted. However, the correlation coefficient displays a weak linear relationship, practically insignificant. Upon further inspection of the IRD market, moderate to high concentration across currencies is evident, except for USD and EUR denominated FRA contracts. The growth of exchange-traded Futures and Options market on a YoY basis is mainly driven by short-term contracts. Short-term contracts are evenly traded for the American and European markets, whereas the Asian market is more involved in long-term positions.

The structure of the European derivatives market is similar for both market segments, OTC, and exchange traded. Again, the research results indicated a very likely concentration present in the European Market. These findings were proven correct as the European IRD market is majorly dominated by investment firms or credit entities, which in turn increases the barriers for entering this segment of the market. Accordingly, in terms of currency denomination, ETD Futures that take IRD as underlying are majorly denominated in 4G currencies, that is USD, followed by EUR and GBP. ESMA supported these findings in its Annual Statistical Report on the Derivatives Market 2018. Additionally, by further inspecting the currency denomination of IRD, the cleared trades of EUREX AG and LCH CCPs also show that IRDs are dominantly cleared in euro, followed by dollar-denominated IRD. It comes as no surprise that Europe-CME Group, an American Seated CCP, clears majorly dollar-denominated IRD.

## 2. What do the regulative changes mean for the market players and how compliant are they with it?

It is important to address the lack of insight in individual transactions and realize that this is a major flaw of the financial market. This was the first issue EMIR targeted to resolve in order to contribute towards the accountability of the market. The goal was to make it more open in the sense of transparency of information. Furthermore, to reduce the risk of a default occurring in OTC derivative transactions, EMIR introduced the clearing obligation. Overall, this goal was accomplished with the establishment of two institutions: TRs and CCPs.

To determine how well the market participants comply with the provisioned obligations, this research analysed the trade reporting volumes and cleared volumes of TRs and CCPs, respectively. Based on a quantitative and qualitative analysis over 1Q19, the results indicated an exquisite coherence between TRs and CCPs. Bearing in mind that cleared trades need to be reported, it makes sense that the size of the clients dictates the volume of trades reported. For example, Regis-TR, as the largest TR of the sample, has the two

largest clearing houses in Frankfurt for its clients. It registered 32 million of OTC trades reported and twice as many trades reported for exchange traded IRD. The same factual situation is ascertained with the CCPs, noting higher volumes of cleared trades for exchange traded IRD.

With further regard to the trade reporting obligation, the research consisted of a sample of four TRs trade reported, comparing IRD and CDs trades reported for both segments of the market. Across the 1Q19 IRD trades reported OTC, this share of the market emerges with significant volatility across three TRs from the sample. An exception is Regis-TR, which is only slightly impacted, almost unnoticeably. However, the variability of reported trades for Unavista TR, as the second-largest TR in IRD trades reported OTC, should not be underrated either. The main reason is the fact that the U.K. was expected to withdraw its membership from the European Union at the same time.

Considering the uncertainty of further Regulation of IRD traded OTC, it is highly likely that it has deterred market participants from trading OTC at all or have shifted their reporting to other TRs. Nevertheless, a positive externality of this is that the largest clearing house in the world, LCH, has just become Unavista's client. Consequently, it is very likely that Unavista TR will become the leader in trades reported in the near future.

Regis-TR, as a representative TR of this sample, seconds the findings of the European Derivative market that a larger share of IRD's are exchange traded. Namely, upon further inspection of the ETD side of trade reporting, a greater competition on this segment of the market becomes evident. In terms of ETD trades reporting, the rivalry remains between Regis-TR and DTCC TR. Also, the volume of CDs trades reported should not be neglected. Namely, comparing the size of IRD trading to either of the OTC or ETD side of the market, all other (derivative traded) volumes seem small. However, it should be taken into account that the regulations have positively encouraged re-trading with CDS, noting larger volumes of CDS trades reported for its OTC side. In contrast, a lower volume of CDS trades reported is registered for the exchange side of the market.

Furthermore, given this interconnectedness between TRs and CCPs, by examining EUREX AG cleared volumes for IRD traded OTC and as ETD, EUREX AG seconds TR's findings in two instances. First, EUREX AG also displays volatility for IRD cleared trades across 1Q19, yet the cleared trades manage to recover nicely closing 1Q19. Second, EUREX AG presents a higher level of cleared IRD derivatives ETD, with Fixed Income Futures practically driving the volume of cleared IRD with over 75%. Reviewing EUREX AG cleared volumes from 2014 onwards, it signals a positive feedback from the market. Namely, ever since the clearing requirement was enforced, EUREX AG cleared volumes mark a rising tendency of cleared trades, except for few declines due to compression cycles and the possible adaption of market participants to the new reforms of margining. Besides, LCH also endorses the increased IRD clearing volumes by supplementing a moderately enlarged group of clearing members, a rise in open interest, and a notional outstanding rising from 2012 onwards. Closing with 110 clearing members in 2018 and clearing revenues reaching quadrillions, remains a strong indicator of how well the market complies with clearing.

Moreover, LCHs CDS Clear Program additionally endorses CDS clearing by establishing very appealing results. Lastly, as an addition to the previously stated CCP's results, CME displayed an upward trend of IRD clearing volumes only till 2017 when notional volumes

of IRD hit a decline. Paradoxically, the very same year, CME announced to delist CDS and focus more on IRS and FX.

### 3. Do derivatives use per se increase the overall risk of FC?

This research question emphasizes the importance of installing appropriate Risk Mitigation Techniques for those transactions whose value does not exceed the regulatory threshold for clearing and trade reporting.

This thesis welcomes the imposed reforms of derivative markets by providing arguments in favour of Mr. James Chano's findings on derivatives. It argues that if traded and financed properly, derivatives are just like any other financial instrument. On that note, Chile's experience as a developing country opens a new perspective on the benefits of derivatives trading. Although regulatory interference of the state with the market is unwanted, the establishment of adequate legal infrastructure and strong supervisory control over this type of investments has proven to be highly successful. In the case of Chile, the government specified what risk levels are acceptable for pension funds and followed up with a stringed control over those investments.

Overall, it cannot be stated that risk is an inherent characteristic of derivatives. Bankruptcies have occurred before, even with much "safer" financial instruments like bonds and stocks. Principally, the finding of this paper indicates that in all given examples, companies have defaulted on its debt due to management failure to follow basic procedures. More precisely, practical examples provided from Metallgesellschaft and Barings case serve as a solid example of operational risk combined with no supervisory control of any kind. Neither internal nor regulatory. When it comes to operational risk, some studies find that managers' motivation to preserve the value of the company by hedging its outstanding position depends on how they are compensated for their work. Thus, the given research suggests a well-rounded compensation consisted of a combination of equity and options. However, this proposition is not always applicable. If we consider the Barings case, for example, the managerial incentives were purely driven by speculation. Closing on a positive note, this paper provides an example of a remarkably successful derivative trading in FX. The Chilean government aimed for a "hands-off" approach, however, it provided fundamental guidelines for this kind of investment. This emerging economy's expertise is not an exception to the rule. It does, however, serve as a good example that unhazardous trading is possible.

Concluding on the inevitability of the imposed regulatory changes, the excessive flexibility of the OTC derivative market indeed required an urgent and immediate need for restructuring. It took a while for the market participants to cope with the new requirements. Bottom line, it certainly has shown to be beneficial. The volumes traded, clearing and trade reporting volumes of CDS, are a firm example of regulative reforms positively recovering this segment of the market. The purpose of this research was to encourage further trading in derivatives by highlighting the advantages of these financial instruments while clarifying the circumstances and reasons for unsuccessful trading.

In conclusion, I will make two suggestions in terms of further normative changes in derivatives trading policy. Considering hedging socially beneficial, policy-makers should not exclude arbitrage and speculation, under certain terms. Mainly because speculators contribute towards market liquidity, ESMA should find appropriate mechanisms to integrate these two groups of market participants so they can further contribute towards the correct pricing of financial instruments. Secondly, as one of the limitations of this paper is

the sample size, due to data restrictions for the general public, this was the maximum amount of information that could be gathered for analysis. When it comes to transparency, the data made available should be all-encompassing and more comprehensive. Therefore, ESMA should make an effort to enhance the quality of the data, make it more detailed, organized and clearly divided. In terms of data division, a clear distinction between notional amounts of cleared and non-cleared trades reported to TRs should be made. In terms of data completeness, it is necessary to adjust for single sided as well as double-sided reporting of cleared trades.

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## **APPENDIX**

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## Appendix 1 Povzetek (Summary in Slovene Language)

Po vrsti nezaželenih dogodkov so se voditelji držav članic skupine G20 na konferenci v Pittsburghu leta 2009 zavezali, da bodo preoblikovali trge izvedenih finančnih instrumentov, in s tem zvišali transparentnost, preprečili zlorabo in zmanjšali sistemska tveganja. Če se osredotočimo le na Evropo, je Evropska unija podprla vizijo preoblikovanja infrastrukture trgovanja na finančnih trgih s sprejetjem Uredbe o evropski tržni infrastrukturi, ki je uradno znana kot **Uredba (EU) št. 648/2012 Evropskega Parlamenta in Sveta z dne 4. julija 2012 o izvedenih finančnih instrumentih OTC, centralnih nasprotnih strankah in repozitorijih sklenjenih poslov** (v nadaljevanju: EMIR). Cilj Uredbe je pogasiti tri žarišča, in sicer povečati transparentnost z ustanovitvijo javnega registra (v nadaljevanju JR), zmanjšati kreditno tveganje nasprotnih strank s standardizacijo OTC trga oz. obvezno opravljanje centralnega kliringa transakcij prek centralne nasprotne stranke. EMIR predpisuje tudi uporabo tehnik za zmanjšanje tveganja za izvedene finančne instrumente, ki niso centralno klirani, da bi tako zmanjšali operativno tveganje. Uveljavitev zgoraj omenjene zakonodaje nadzira Evropska agencija za trge vrednostnih papirjev (v nadaljevanju: ESMA).

S stališča merila odpornosti je EMIR ponovno uredil evropski trg izvedenih finančnih instrumentov, še posebej OTC trg. V povezavi s tem so glavni cilji tega magistrskega dela: (1) določiti učinkovitost in napredek izvedene reforme, (2) preveriti spoštovanje Uredbe s strani podjetij in (3) preveriti upravičenost sprejetih ukrepov. Upoštevajoč zastavljene cilje bom združila kvantitativno in kvalitativno analizo ter poskušala ugotoviti, ali obstaja skladnost med teorijo in prakso. Za implementacijo zakonodaje, tako v svetovnem merilu kot tudi na evropski ravni, je nujna uskladitev in primerjava premikov v razredih izvedenih finančnih instrumentov na OTC trgu. Pri ocenjevanju učinkovitosti in napredka izvedenih reform me bodo vodili poročila BIS in ustrezna statistika, ki je na voljo za izvedene finančne instrumente, ki so predmet trgovanja na OTC in ETD trgih.

Magistrsko delo je pokazalo konsistentnost med trgi; evropski trg izvedenih finančnih instrumentov je v strukturi trgovanja po številu pogodb izvedenih finančnih instrumentov in valutah primerljiv s svetovnim OTC trgom. S stališča učinkovitosti so udeleženci na trgu potrebovali nekaj časa, da so se spopadli z novimi zahtevami, a se je izkazalo, da je bilo to za njih koristno. Obseg trgovanja, kliring in poročani obseg trgovanja s CDS-i so trden primer regulativnih reform, ki pozitivno vplivajo na trg. Poleg tega je v magistrskem delu pregled poročil o obsegu trgovanju in obsegu kliranih TR-jev in CCP, da bi ugotovili, kako dobro udeleženci na trgu izpolnjujejo svoje obveznosti. Na podlagi kvantitativne in kvalitativne analize v obdobju 1Q19 so rezultati pokazali izjemno skladnost med TR in CCP. Enako stanje je bilo ugotovljeno v obeh institucijah, pri čemer je opaziti večji obseg odobrenih poslov na IRD. Trenutno je na podlagi tržnih gibanj mogoče ugotoviti, da se povečuje količina klirinških IRD; sledijo ji tudi rastoči CD. Do večjih nihanj je prišlo pri OTC IRD, ki jih je treba izpostaviti kot *najbolj očiščene izvedene instrumente*. Tako je tudi s stopnjami kliringa, ki so v skladu z raziskavo Evropske komisije pokazale zgornjo smer gibanja.

Cilj teh ugotovitev je spodbuditi nadaljnje trgovanje z izvedenimi finančnimi instrumenti s poudarkom na prednostih, ki jih ponujajo, ter razjasniti okoliščine in razloge za preteklo neuspešno trgovanje. Metallgesellschaft in Barings sta zelo dobra primerja, kaj se zgodi, ko vodstvo ne sledi zakonodaji. Ti dve zgodbi sta trdna primerja operativnega tveganja v kombinaciji s pomanjkanjem notranjega in regulativnega nadzora. Nekatere študije kažejo, da so spodbude vodstva k ohranjanju visokega vrednotenja podjetja zelo odvisne od oblike

nadomestila, ki ga vodstvo prejme. Pomanjkanje regulativnega nadzora nad spodbudami vodstva je glavni razlog, zakaj se hedging spremeni v čisto špekuliranje.

Konec koncev magistrsko delo pozdravlja reforme trgov izvedenih finančnih instrumentov z navajanjem primerov iz prakse in hkrati trdi, da so izvedeni finančni instrumenti enakovredni katerikoli drugim finančnim instrumentom, seveda pod pogojem, da se z njimi postopa v skladu s pravili.