

2. Alternatives to mitigate counterparty risk management

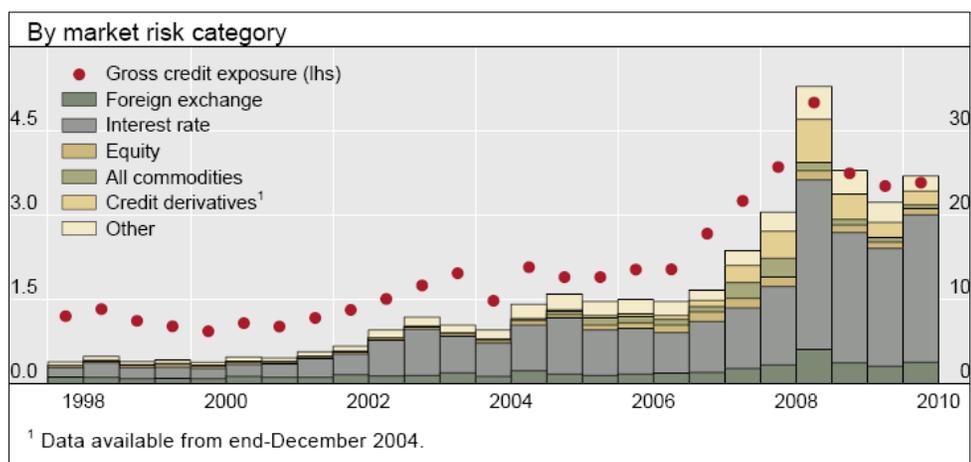
Past events have highlighted the deficiencies of the OTC derivative markets and the effects that a high level of counterparty credit risk concentration and misuse of derivatives have on the overall structure of the financial system. As a consequence, it has aroused the need of stronger practices of risk management in OTC derivative markets to mitigate effectively the exposure to the counterparty credit risk and avoid consequently the spread of systemic risk. The financial regulators and policy makers are currently working in creating and implementing a regulatory framework that encourages a wider use of risk mitigation practices. While it is true the effects of such reforms and new policies that attempt to move OTC derivative markets into more efficient and robust structures are still unknown, the risk management approaches have already started a polemic discussion in the financial community about the consequences of implementing, in a greater level, netting, collateral and the use of Central Counterparties (CCPs) as the alternatives to protect the OTC markets from counterparty risk. Theme of discussion for the following chapter is precisely the evaluation of the implications after implementing those three practices from two different perspectives. The general perspective will discuss the benefits and disadvantages for the entire structure of the OTC market while the specific perspective will analyze the positive and negative implications that affect market participants directly.

2.1 Bilateral and Multilateral Netting

2.1.1 Bilateral netting

Bilateral netting agreements are an important method to mitigate counterparty credit risk arising from OTC derivatives transactions (FSB, 2010, p. 36). It is considered an alternative to reduce counterparty credit risk because gross credit exposures values reported between 2009 and 2010 got to their normal levels they had before the financial crisis of 2008 as a consequence of a wider use of netting practices in the OTC markets²⁷ (BIS, 2010, p. 3). The behavior of gross credit exposure is shown in the Figure 4.

Figure 4. Gross credit exposure of OTC derivative markets – In USD trillion-



Source: BIS, 2010, p. 3

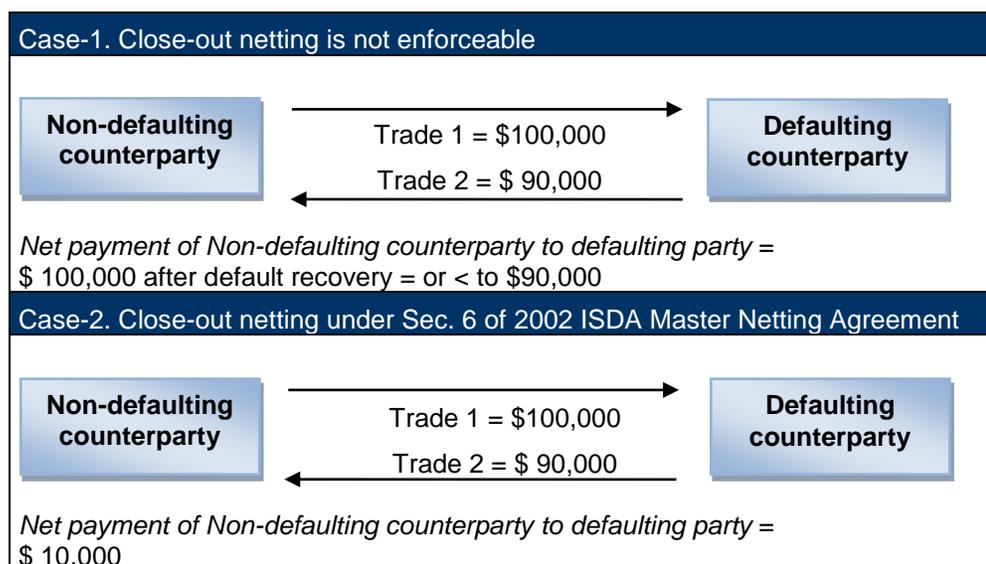
Parties achieve enforceable bilateral netting by documenting all transactions under master netting agreements such as the ISDA Master Agreements (FSB, 2010, p. 36). These documents serve as contracts that enable the aggregation of all exposures between two counterparties in a single agreement (ISDA, 2010e, p. 2). According to the International Monetary Fund (IMF, 2010, p. 4) most of the OTC derivatives contracts are covered by bilateral Master Agreements.

²⁷ Another visible effect caused by the increment of netting practices is the decline of the notional amounts outstanding between 2008 and 2009 drove mainly by trade compression after the stress experienced in the financial crisis (BIS, 2010, p. 2). This has, however, a secondary importance due to notional amounts outstanding are not indicators for risk exposure.

There are two forms of netting with major importance: *payment netting*²⁸ that combines offsetting cash flow obligations between counterparties into a single net payable or receivable and *close-out netting* that refers to a process involving termination of obligations under a contract when a defaulting event has occurred in which individual transaction exposures are netted and consolidated into a single “lump sum” obligation (ISDA, 2010e, p. 2; FSB; 2010, p. 36). If a party defaults, the presence of bilateral master agreements allows the non-defaulting counterparty to use the sum of the replacement values of a contract with negative values, *derivatives payables*, to offset those with positive values, *derivatives receivables* (IMF, 2010, p. 4). Figure 5 provides with an example that contrasts the payment obligations of counterparties in the presence and absence of enforceable close-out netting in OTC transactions. Based on the example, in the Case-2, where there is a master agreement in place, the non-defaulting counterparty can use the derivatives payables to offset receivables and make a net payment of \$10,000 thousand dollar instead of \$100,000 thousand dollar. If there is not Master Agreement in place, the \$100,000 might not be completely reimbursed after the counterparty default. This is how the mechanisms of close-out netting works to reduce the counterparty credit risk exposure in OTC trading.

²⁸ Paying netting is essentially the same as set-off (ISDA, 2010e, p. 2)

Figure 5. Payment obligations with and without netting

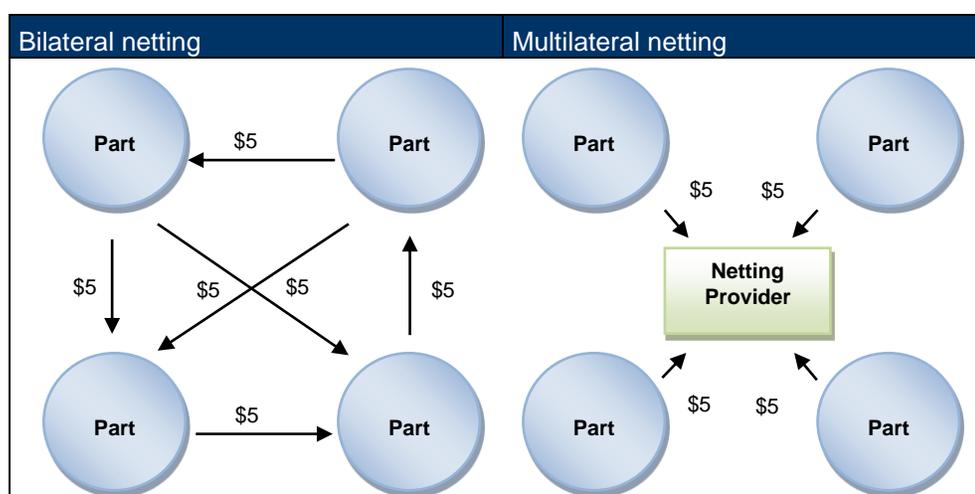


Source: ISDA, 2010e, p. 3

2.1.2 Multilateral netting

Even though bilateral netting has a significant impact in pure OTC markets by reducing the overall credit exposure, it is limited to two counterparties (Gregory, 2010, p. 53). The House of Lords of the European Union Committee (2010, p. 19) defines multilateral netting as the process of calculating when counterparty credit exposures cancel each other out. Figure 6 shows how multilateral netting reduces exposure for counterparties in comparison to bilateral netting.

Figure 6. Overview of bilateral and multilateral netting



Source: Kiff, 2010

Nowadays, there is a widespread of modern techniques and appropriate technologies that facilitate multilateral netting to reduce gross exposure (Gregory, 2010, p. 53). An example of this is the TriReduce service offered by TriOptima, an important provider of post-trade infrastructure for the OTC derivatives markets²⁹. TriReduce is a multilateral early termination service for interest rate, credit and energy derivatives that run termination cycles on fixed schedules according the type of product that is going to be subjected to portfolio compression where 10 to 30 dealers participate simultaneously (CPSS, 2007, p. 62). After participants submit files with the products they want to put forward to termination, the system runs a series of algorithms to detect and eliminate the redundant positions based on a set of constraints that are a pre-specified by dealers (CPSS, 2007, p. 62; Gregory, 2010, p. 53). According to the TriReduce, 80% of a typical dealer' positions can be unwound having minimal impact on net exposure (CPSS, 2007, p. 62). Because of number increase and wide variety of products could be subjected to netting procedures, the benefits are potentially greater.

For portfolio compression services, there are in the market, netting providers that do not require specific infrastructure that substantially increase costs for dealers³⁰. Some of them offer web-based services that facilitate multilateral risk offsetting or corporations that deliver settlement services to the market and provide flexibility to their customers by adapting netting procedures to their particular needs and forms of trading.

2.1.3 Assessment I

Benefit for the general structure of OTC markets

The major benefit for market participants of netting bilaterally or multilaterally is (i) the elimination of redundant positions and unnecessary multiplication of risk exposure in derivative markets³¹ (Turner, 2009, p. 82). The losses, in case of

²⁹ See www.trioptima.com in order to find more details about services and technologic solutions.

³⁰ Good example for that is TriOptima (2010) that does not require the installation of any software in order to reduce redundant exposures through portfolio compression. The requirements are more oriented to portfolio reconciliation.

³¹ According to the financial review as a regulatory response to the banking crisis published in March of 2009 by Lord Turner, (p. 82) bilateral netting represents the "simplest way" to reduce unnecessary multiplication of gross exposures between counterparties.

counterparty default, are diminished and major derivative dealers avoid the spread of a domino effect that affects the financial stability of other companies.

Disadvantage for the general structure of OTC markets

The negative critique is related to the extent in which jurisdictions across the world allow bilateral or multilateral netting. While in the United States and the United Kingdom laws provide a strong case for the non-defaulting party to close-out and net swap derivatives when there is no signed master contracts in place; in Japan, Germany and Switzerland pre-specified strict conditions have to be met in order to achieve the benefits of netting in the event of a counterparty default (CPSS, 2007, p. 16). Consequently, even though gross credit exposure across derivatives markets shows a decrease (i) new legal risks arise³².

Benefits to market participants

As a consequence of elimination redundant contracts, (i) the counterparty credit risk diminishes which contributes to (ii) reduce operational costs through portfolio compression (Gregory, 2010, p. 53). In a hypothetical case where a bank deals with high volumes of a certain instrument per day, the entity would use netting to reduce costs of trading with a high volume of derivatives. Instead of sending an infinite number of trading messages, the amounts traded would be netted internally reducing the volume to a few number of messages processed once positions between counterparties are offset and netted amounts are known (Lefler, 2009, p. 5). Operational cost reduction is also possible during post-trade processing when contracts are terminated in early stages of the trade.

Disadvantages to market participants

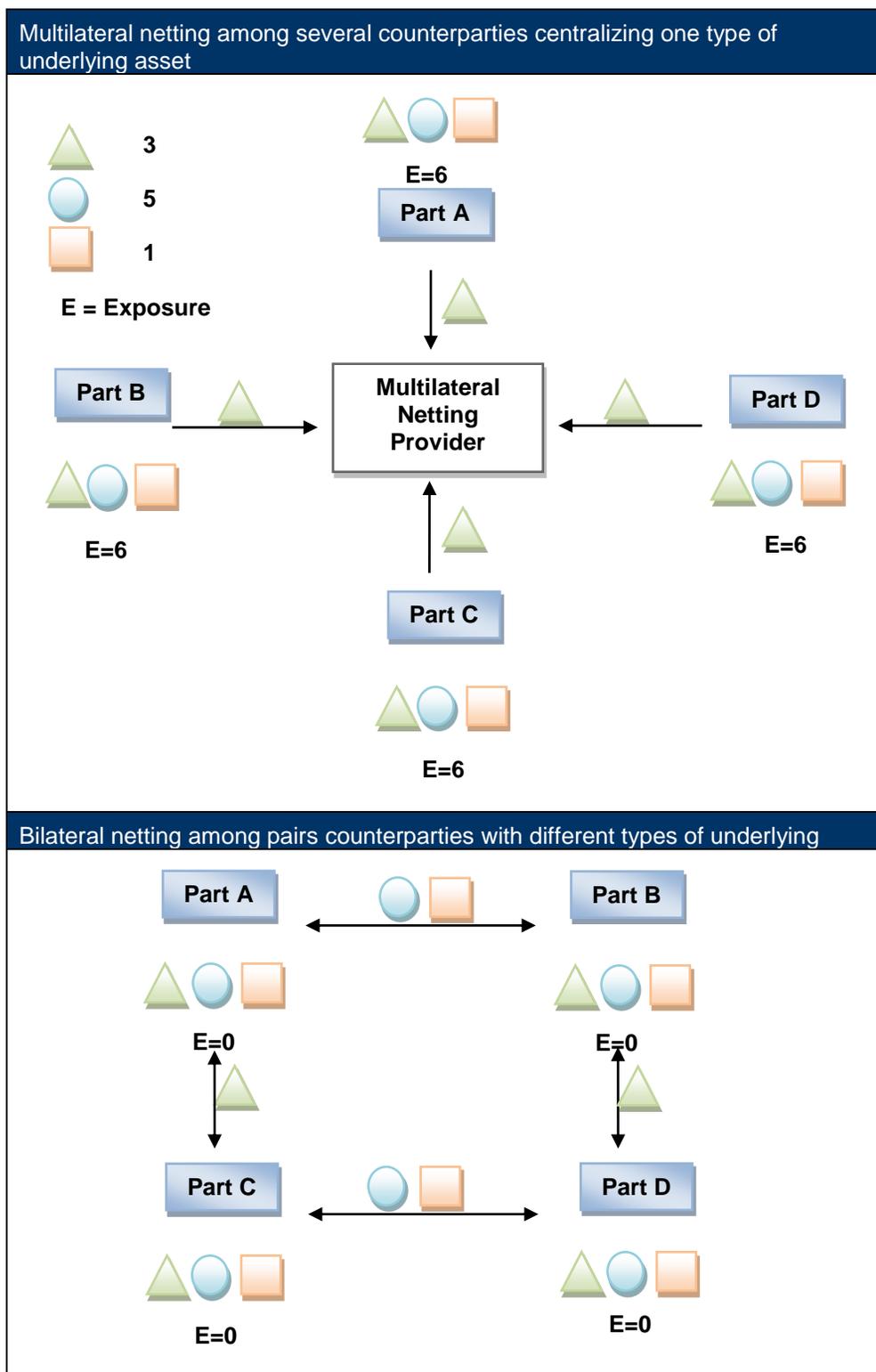
In contrast, there are points of view that fail to recognize counterparty risk reduction and cost advantages for corporations by using bilateral and multilateral netting. The first weakness of bilateral netting is that (i) it is limited to two counterparties and the benefits obtained from netting might not justify the operational costs of netting. In addition, bilateral netting might not be always advisable for all corporations (Lefler, 2009, p. 6). The argument for that is that

³² These risks are not explicit considered in the BIS measurement for OTC market.

accepting netted payments could move corporations further from their pricing model that would lead them to (ii) inefficient operations with inconsistent and unpredictable flows (Lefler, 2009, p. 6). This affirmation is found on the inconsistency of trading patterns that would destabilize predictable flows leading to inefficiency in day-to-day operations (Lefler, 2009, p. 6). Gregory (2009, p. 53) points out another disadvantage for multilateral netting. He identifies that in order to obtain the benefits of the portfolio compression, (iii) open and transparent information about dealers' positions must be provided by participants in the network to the netting provider which represents an inconvenience for those dealers with strict data confidentiality (Gregory, 2010, p. 53).

In brief, a comparison of bilateral against multilateral netting is necessary to establish under which circumstances bilateral netting results more effective to mitigate counterparty risk and maximizes the particular benefits for market participants. Lefler (2009, p. 6) affirms bilateral netting is advisable for those derivatives dealers that trade high volumes of products in a small network of counterparties. From another perspective, Duffie and Zhu (2010, p. 2) show with a model that multilateral netting between clearing participants across a single type of underlying assets brings greater benefits to derivative traders in comparison to those obtained through bilateral relations between pairs counterparties with netting among several categories of products only if, the opportunities of multilateral netting between several counterparties in one class are greater than the loss in bilateral netting opportunities across derivatives of different classes. In other words, bilateral netting is advisable when, given a wide variety of products; the opportunities of netting are greater than in a multilateral relation if there is just one class of underlying available for netting. This situation is shown in Figure 7.

Figure 7. Advantages of bilateral netting against multilateral netting (1/2)



Source: Based on Duffie and Zhu, 2010, p. 1-34

Table 2. Assessment of Bilateral and Multilateral netting in OTC markets

	Benefits	Disadvantages
General perspective	<p>Benefits to the financial structure of derivative markets</p> <ul style="list-style-type: none"> i) Reduce unnecessary multiplication of gross exposures by eliminating redundant contracts in derivative markets. 	<p>Disadvantages against the financial structure of derivative markets</p> <ul style="list-style-type: none"> i) Arise legal risk due to questionable enforceability in several jurisdictions.
Specific perspective	<p>Benefits to market participants</p> <ul style="list-style-type: none"> i) Reduce counterparty credit risk exposure. ii) Reduce operational costs through portfolio compression. Cost reduction in trading (less number of messages per trade) and post-trading processes (when contracts are terminated in early stages). 	<p>Disadvantages to market participants</p> <ul style="list-style-type: none"> i) Bilateral netting is limited to two counterparties. ii) Inconsistent and unpredictable flows with bilateral and multilateral netting that harm day-to-day operational efficiency. iii) Multilateral netting requires open and transparent information about positions from participants in the network which represents an inconvenient for those dealers with strict data confidentiality.

2.2 Collateralization

2.2.1 Role of Collateral

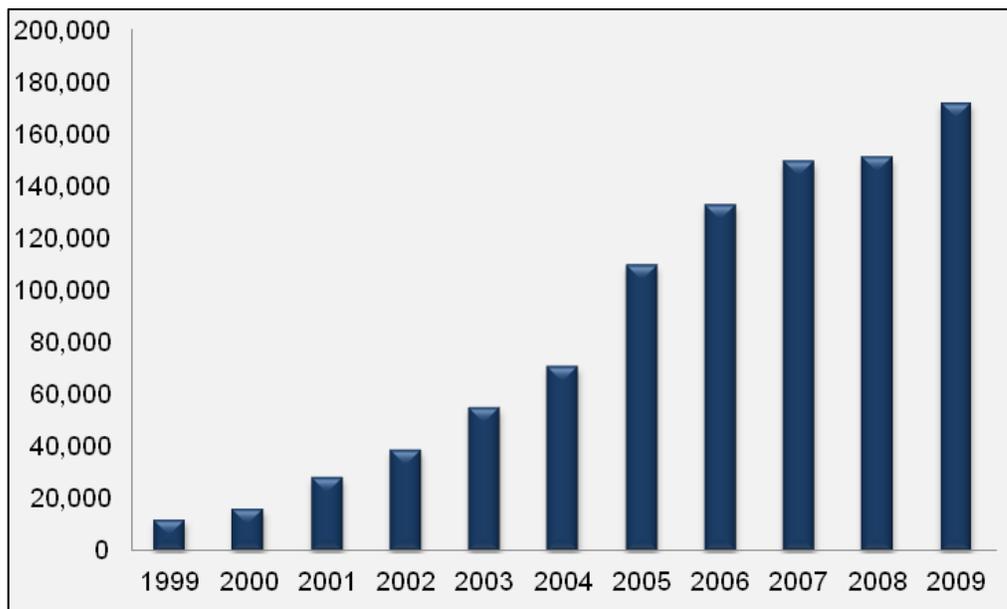
Collateralization is one of the most used methods to reduce counterparty credit risk in the OTC derivatives markets (FSB, 2010, p. 36). Market participants have increased their reliance on collateral over the time as it is shown in Figure 8. They have also modified their preference of the types of collateral used to cover counterparty credit risk. According to the Committee on Payment and Settlement Systems (CPSS) (2007, p. 21), at the end of the last century, government bonds were the predominant class of collateral preferred by OTC dealers. Recent data published by the ISDA Margin Survey 2010 (p. 6) showed that cash collateral has become more popular between derivative traders leaving behind the use of government bonds³³. The same survey (2010b, p. 6) reported that more than 70% of all derivatives with diversified underlying types are using collateral to reduce their exposure which proves its popularity among financial corporations and other OTC derivatives users³⁴.

The House of Lords of the European Union Committee (2010, p. 14) defines collateral as assets pledged by a party to secure a loan or other form of credit. Their functionality relies upon their capacity to compensate losses suffered by the non-defaulting counterparty and hence, provide protection to parties in the event of a failure (ISDA, 2010c, p. 5).

³³ See in Annex-B Table 7. *Value of collateral received and delivered in ISDA Margin Survey* .

³⁴ The Bank for International Settlements (1998, p. 22) identifies two types of collateral agreements: *one way* and *bilateral agreements*. *One way* agreements are those that require only one party to post collateral and *bilateral agreements* are those where both parties agree to post collateral.

Figure 8. Growth of collateral agreements - In USD billion-



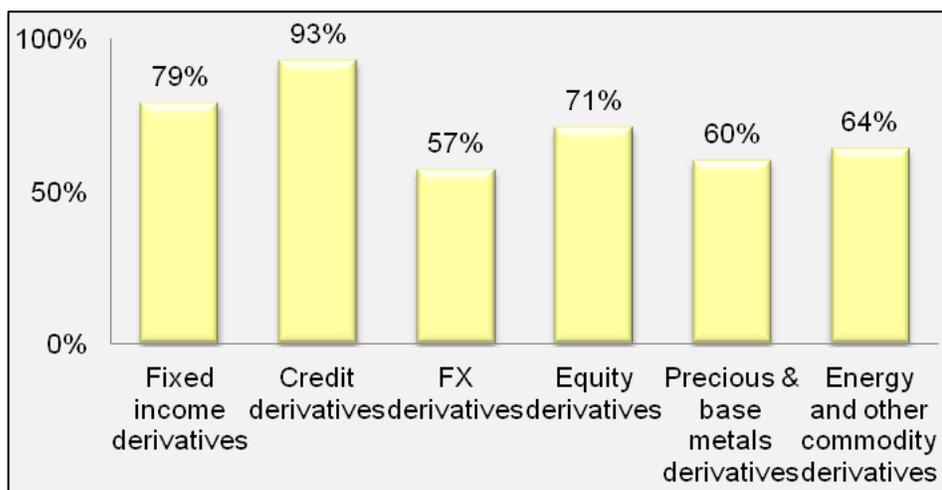
Source: ISDA, 2010b, p. 9

Important is to mention that all derivative transactions can be subjected to collateralization³⁵; however, there are in reality different levels of collateralization among OTC derivative markets. Good explanations of such disparities among underlying assets are based on the different market conventions and risk profiles across OTC market segments (ISDA, 2010b, p. 10). Figure 9 shows the different degree of collateralization according type of underlying asset.

The collateral that is going to be exchange is specified in the Master Agreements between counterparties. The *Credit Support Amounts* will act as the amount of collateral that will help to cover risk exposure (ISDA, 2010c, p. 11). For the calculation of the CSAs, the exposure plays a crucial role; whenever overall exposure changes, the collateral requirements between counterparties show the variations. Thus, collateral will generally attempt to reflect different levels of risk exposure (ISDA, 2010c, p. 11).

³⁵ Except from those derivative transactions that take place in a countries where collateral is not allowed for a certain type of business.

Figure 9. Percentage of trades subject to collateral agreements by asset



Source: ISDA, 2010b, p. 10

The margin requirements calculation³⁶ is driven by different elements that together adjust collateral to the appropriate levels. Those elements are (i) *independent amounts*³⁷, (ii) mark to market quotations of the pre-established trades covered by the agreement³⁸; and (iii) valuation of collateral in place (ISDA, 2010c, p. 1; ISDA, 2010a, p. 7). It should be noted that not all assets can be posted as collateral. In theory, the parties negotiate privately the quality of collateral that satisfy eligible criteria based on volatility, liquidity, credit quality, custody and settlement efficiency, pricing ease, price transparency or any other considerations (ISDA, 2010c, p. 46). Nevertheless, in the practice, dealers negotiate terms and levels of collateral that adapt better to risk acceptance of counterparties (FBS, 2010, p. 36; BIS, 1998, p. 23).

³⁶ See Table 2-C. *Margin requirements calculation under ISDA Credit Support Documentation*.

³⁷ ISDA in its publication *Market review of OTC derivatives bilateral collateralization practices* (2010c, p. 12) defines *independent amounts* as the amount that is applicable with the purpose of increasing the amount of collateral to provide a “cushion” against changes in exposures that might take place between collateral valuations or the period between valuation and registration. According to the BIS (1998, p. 23) independent amounts are required even if the counterparty has no current exposure. In practice, parties recourse to this way of protection very seldom.

³⁸ The terms “initial” and “variation” margin do not belong technically to the OTC market but they are commonly used to refer to independent amounts and marked-to-market quotations respectively (ISDA, 2010c, p. 11).

2.2.2 Assessment II

Benefit for the general structure of OTC markets

The first substantial benefit of collateral is (i) the improvement of liquidity in times of financial stress. Collateral in place is a cushion of financial resources that would enable to close-out positions without incurring in greater losses for the non-defaulting counterparties in case of the default of a major derivative dealer.

Disadvantage for the general structure of OTC markets

The first general point of criticism that question the effectiveness of collateral in reducing counterparty risk from a general perspective have their fundamentals on (i) tax and legal restrictions that prevent its use in some jurisdictions. There are certain types of regulated funds that are not allowed to post collateral due to the limits of risk concentration; there are also some jurisdictions where collateral is absolutely prohibited (ISDA, 2010c, p. 34). The US and the UK are countries with a step ahead in collateral regulation than other parts of the world. In those jurisdictions with low collateral regulation, even if collateral is posted, it might offer (ii) limited protection when a party defaults due to its low enforceability level (Schinasi, Craig, Drees and Kramer, 2000, p. 53). While it is true counterparty credit risk in OTC derivative markets decrease with the use of collateral, legal risks arise from the uncertainty of being able to close-out positions by using posted assets.

Benefits to market participants

From a narrower perspective when evaluating the concrete advantages of collateralization for derivative markets the first outcome is (i) the mitigation of counterparty risk that it is reflected through the reduction of capital requirements which frees up capital to engage in other more profitable transactions that would not be possible without collateral in place (ISDA, 2010c, p. 5; BIS, 1998, p. 23). The second observable benefit is (ii) the flexibility provided by bilateral negotiations and adaptability of collateral to different levels of creditworthiness. Market dealers freely negotiate the need of an independent amount, the frequency of margin calls, minimal amounts to be traded when exposures changes and the amount of exposure will be left uncovered, between other important aspects. The lack of strict

frameworks is what gives to collateral the attractiveness and popularity among other methods to mitigate counterparty risk exposure.

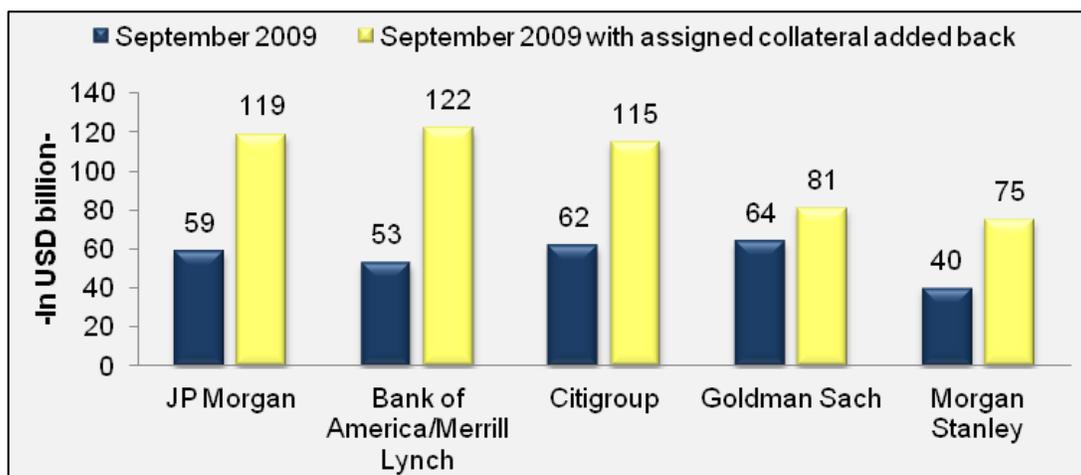
Disadvantages to market participants

In contrast, some issues are address regarding the use of collateral, calling into a question the preference of this practice against other forms of credit risk mitigation. Even though collateral can decrease the overall counterparty risk exposure, (i) their benefits constraint when there is a lack of segregation of collateral payments from other companies' assets or when those posted assets are volatile and illiquid collateral³⁹ (House of Lords, 2010, p. 38). Segregation of collateral however might result unattractive for some sectors of market participants such as investment banks that use capital that results from saving funding costs to make more profitable investments (House of Lords, 2010, p. 38). Figure 10 shows the difference in magnitude between two columns that represent the derivatives payables from major dealers with and without *assigned collateral*. Assigned collateral is defined by Singh (2010b, p. 114) as the collateral that is re-used for other reinvestments purposes by the institution to which it is posted⁴⁰.

³⁹ With the default of Lehman Brothers, who was an important counterparty to many OTC derivative dealers, different parties provided margins that were considered sufficient to cover Lehman's obligations in the occurrence of a credit event (House of Lords, 2010, p. 38). However, after its bankruptcy the presence of collateral had no greater benefits for those counterparties whose collateral payments were not clearly separated from other Lehman's assets (House of Lords, 2010, p. 38). Additional to the lack of segregation of collateral, the fact that the collateral posted by Lehman Brothers consisted in illiquid securities, whose value was hard to address, made it difficult to resolve claims after its default (House of Lords, 2010, p.38).

⁴⁰ The re-use of collateral is also known as rehypothecation (Singh, 2010b, p. 114).

Figure 10. Derivative payables after netting



Source: Singh, 2010b, p. 114

From this graph it can be deduced that the main reasons for dealers to reject any collateral segregation and regulation are (ii) the lost of rentable businesses and investments they would not be able to take if collateral is clearly separated from other companies' assets.

Another negative aspect of collateralization practices from market participants' point of view is (iii) the operational complexity involved in these negotiations with respect to legal considerations, monitoring of exposures, constant margin calls and extensive documentation which is seen sometimes as burdensome capital and time investment in form of operational and technology costs, custody fees, hiring of financial experts, investor advisors, etc. (ISDA, 2010c, p. 33).

The fourth critique is made with respect to the negative effects for non-financial firms that arise from a greater use of collateralization. Some non-financial firms do not trade frequently high volumes of derivatives and cannot compensate all the costs derived from the collateral management. Corporations that use derivatives to hedge risks from the operation of their businesses might find a disadvantage in the operational and procedural burdens that are not compatible to their business models (ISDA, 2010b, p. 2). That is, in the extent non-financial firms use OTC derivatives to hedge their risks and cash flows from their operations, (iv) the use of collateral that implies constant margin outlays and inherent management costs

would damage their business (House of Lords, 2010, p. 34). Therefore, collateral is a negative incentive for hedgers to use OTC derivatives and might force some of them to move into more standardized derivatives products that might not perfectly cover their risk exposures⁴¹.

A fifth consideration against the extensive use of collateral is related to liquidity risk, market risk and operational risk. (v) The more widely collateralization is used the more important liquidity risk becomes (BIS, 1998, p. 4-5). This type of risk arises with the frequency between margin calls that force counterparties to post collateral at short notice (BIS, 1998, p. 4-5). Market and operational risks arises from disputes between market dealers that are an inherent part of collateral negotiations (CPSS, 2007, p. 23). The disputes before and after margin calls increase significantly in number and frequency when price volatility raises which (vi) leave exposed positions in moments where there are supposed to be covered against risk given the high volatility of the market (CPSS, 2007, p. 23). Delays in adjusting collateral through variation margin as consequence of process deficiencies represent also a source of operational risk.

Finally, the last point of criticism focuses on the fact that, outside collateralization, (vii) there might be other effective risk mitigation practices that reduce counterparty credit risk and adapt better to a thin volume of derivatives traded or would not required the use of working capital. Important is to notice that until now, there is no official rule that obligates derivative dealers to collateralize their transactions if, this was not part of the previous agreement (ISDA, 2010c, p. 7). Meanwhile, financial regulators of major jurisdictions are working on new reforms that encourage the widespread of collateralizing risk and oblige OTC derivative trades that are not cleared to post collateral to reduce counterparty credit risk. The US and Europe authorities are putting pressure in accelerating the transition from an environment where posting collateral is optional to the scenario where collateralization would become an obligation (Price, 2011).

⁴¹ Private non-financial companies have already expressed their concerns regarding this issue in the paper *Corporate concerns about OTC regulation* (EACT, 2009, p. 1). Some of the firms might even consider collateralization as a practice that forces companies to divert working capital from the original purpose of the business (House of Lords, 2010, p. 31).

Table 3. Assessment of Collateralization in OTC derivative markets

	Benefits	Disadvantages
General perspective.	<p>Benefits to the financial structure of derivative markets</p> <ul style="list-style-type: none"> i) Increases liquidity that facilitates to the non-defaulting counterparties the close-out of positions in times of financial crisis. 	<p>Disadvantages against the financial structure of derivative markets</p> <ul style="list-style-type: none"> i) External tax and legal restrictions in some jurisdictions prevent posting collateral. ii) Different degrees of legally enforceability.
	<p>Benefits to market participants</p> <ul style="list-style-type: none"> i) Mitigate counterparty risk that bring as consequence a reduction on capital requirements which enables companies to invest in other more profitable businesses. ii) Provide flexibility in bilateral negotiations and adaptability to different levels of creditworthiness. Freely negotiation of collateral terms in CSAs. 	<p>Disadvantages to market participants</p> <ul style="list-style-type: none"> i) Benefits of collateral constraint if there is a lack of segregation of collateral payments or if volatile and illiquid assets are used as collateral. ii) Segregation of capital constraints the ability of investments banks to re-use collateral in more profitable business. iii) Entail operational complexity and inherent costs that are associated to legal considerations, monitoring of exposures, constant margin calls, etc. iv) Discourage the use of derivatives to hedge against risk since non-financial firms might face margin requirements that do not match with the cash flows from their businesses. It forces commercial users to divert working capital from productive uses and place it into collateral. v) Raise liquidity risks by increasing the frequency between margin calls which force counterparties to post collateral at short notice. vi) Represent a source of operational and market risk. Disputes about margin calls leave uncovered positions when price volatility arises. Delays in variation margin, as consequence of process deficiencies, increase operational risk. vii) Other risk mitigation methods might result more cost-effective.
Specific perspective		

2.3 Central Counterparties

2.3.1 Role of Central Counterparties

CCPs are considered structures that facilitate clearing and settlement in trading processes in derivative markets and reduce counterparty credit risk by centralizing derivatives clearing into a single entity that would become the counterparty for all trades⁴² (Cherry and Craig, 2010, p. 1; Tumpel-Gugerell, et al., 2007, p. 4). Even though financial markets have long been using CCPs for exchange-traded derivative markets, there is a consistent interest from financial authorities in expanding their use and moving OTC markets to the oversight and control of CCPs (Tumpel-Gugerell, et al., 2007, p. 4). This part of the study focuses on the role of CCPs because of their risk-mitigating features that makes them an attractive alternative for market participants to contra rest the risk exposure after entering into derivative transactions. However, the effects of a wider use of CCPs are still under the watchful eye of the financial world due to the high degree of uncertainty that the transition of unregulated OTC structures into more robust and regulated frameworks carries. Therefore, in order to provide an overview and evaluate the implications to market participants of using CCPs as an alternative to reduce counterparty risk, the following section is presented.

In general, the key aspect of the role of CCPs in OTC markets is simple. A CCP, which is generally a clearing house, stands between the two original counterparties, acting as the seller to the original buyer, and as buyer to the original seller (Duffie, Li and Lubke, 2010, p. 5). The typical forms of mitigation practices in OTC markets were separately handled in Section 2.1 and 2.2, and now are gathered together in one entity that, as central counterparty, will assume the credit risk exposure of all market participants that are registered as CCP members. In centrally cleared derivative markets, trading remains being bilateral, but once counterparties agree on the contractual terms, trades are *novated* to the CCP and

⁴² *Clearing* takes place between the execution of a trade that occurs when two counterparties agree to fulfil specific obligations along the contract's life and the settlement of the contract which takes place when legal obligations are fulfilled (IMF, 2010, p. 5).

the direct relationship between counterparties disappears⁴³ (Cecchetti, Gyntelberg, Hollanders, 2009, p. 45). Once the CCP becomes counterparty in all trades, it makes use of multilateral netting techniques to reduce credit exposure of all clearing members and the probability of a counterparty default. (Casanova, - , p. 42). In order to face the gain of risk exposure after contracts are novated, the CCP obtain through different ways financial resources that could be used in case of a counterparty default. It collects various safeguards from members in form of *initial*, *variation* and *guarantee funds* from clearing members to reduce the impact of potential knock-on effects of the failure of a major counterparty⁴⁴ (IMF, 2010, p. 3-7). In contrast to pure OTC derivatives where posting collateral is not an obligatory practice, CCPs require from all members to post margins which facilitates the recognition of those parties with previous under-collateralized positions and force them to cover the exposure with higher margin requirements (Singh, 2010a, p. 6). Beyond providing initial and variation margins, members of a CCP also have to contribute to the financial resources by posting capital to a pooled guarantee fund that acts as an additional layer of defense after the initial margin that would also contribute to cover losses caused by the failure of a member (Duffie, Li and Lubke, 2010, p. 7).

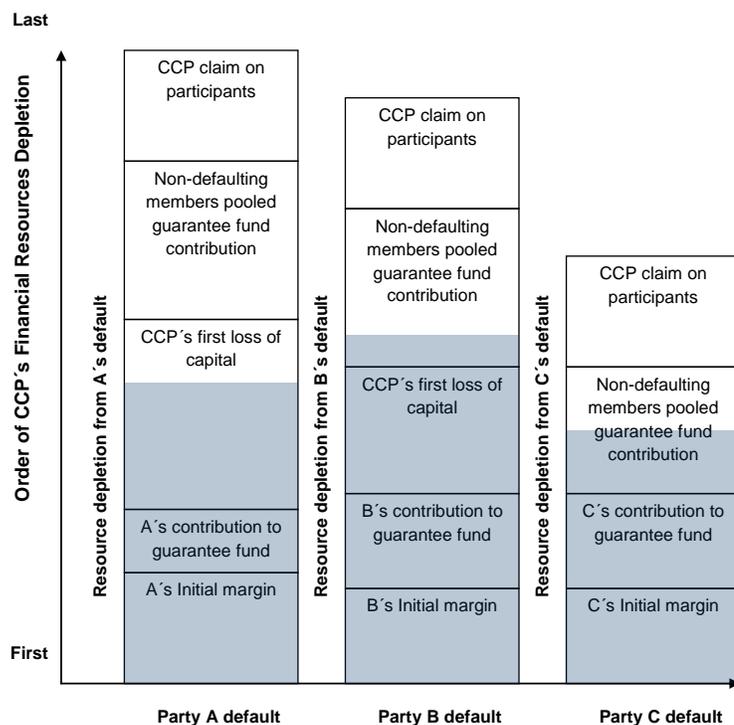
Figure 11 shows the depletion of guarantee fund when more than one party default and the way in which financial resources provided by counterparties will bear the losses of multiple defaults. As it is shown in the figure, the initial margin is the first part of the financial resources of a CCP that absorbs the losses. For each type of derivate class, this amount should reflect an appropriate estimation of volatility of market values and the number of days that the CCP will need to unwind the positions left opened after the counterparty default (Duffie, Li and Lubke, 2010, p. 8-9). Having an appropriate initial margin in place, prevent CCPs from incurring in greater losses caused by fire-sales if the need to close positions arises and the

⁴³ The Committee on Payment and Settlement Systems (CPSS, 2007, p. 33) defined *novation* as the replacement of a contract between two initial counterparties with a new contract between the remaining party and a third party. See in Annex-A Figure 17. Novation that provides more details about how the process works for counterparties.

⁴⁴ Initial and variation margin have similar functions than the independent amounts and marked-to-market quotations in the collateralization process. In this section the terms initial and variation margin or margin requirements will be used to differentiate them from collateral calls.

variation margin does not reflect the changes in exposure from the default immediately⁴⁵ (Duffie, Li and Lubke, 2010, p. 8-9).

Figure 11. Depletion of CCPs fin. resources in a scenario with multiple defaults



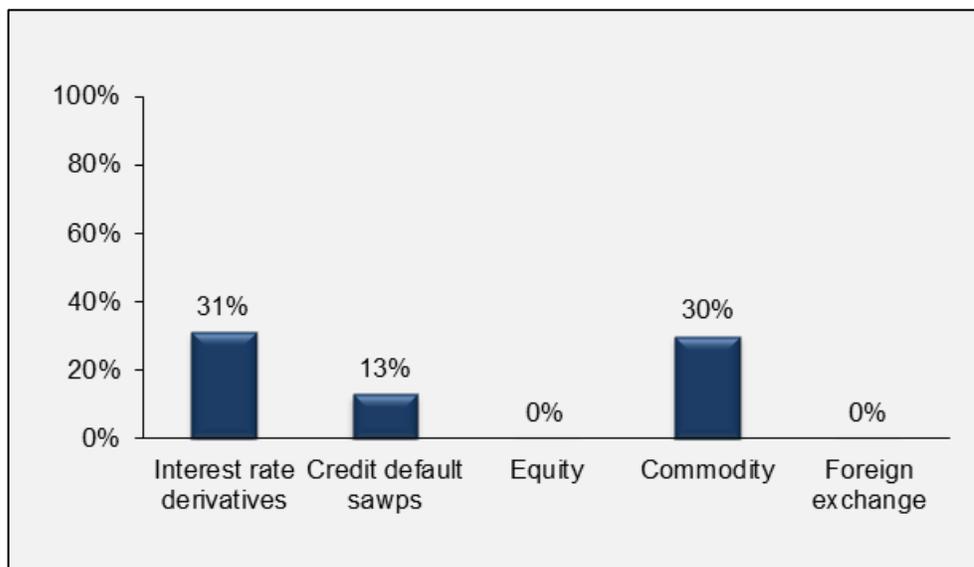
Source: Duffie, Li and Lubke, 2010, p. 24

Nowadays, the portion of OTC derivatives cleared through CCPs is unequal across the different categories of underlying assets as the Figure 12 shows. While some categories of OTC derivatives have less degree of centralization of trading in CCPs such as foreign exchange contracts, some categories are a step ahead in the clearing transformation towards the centralization of trading. One of the origins of such the disparities lies in the fact that CCPs provide clearing and settlement

⁴⁵ Duffie, Li and Lubke (2010, p. 8) consider that initial margin could be estimated by multiplying the daily volatility of the market value of the positions by two days of the delay plus the number of days required to unwind the position, and multiplied further by a safety factor. Two days are added as a delay to the calculation because the adjustment of variation margin is taken from values of the day before but the updates will be received the day after (Duffie, Li and Lubke, 2010, p. 8). Due to the delay, the importance of an accurate initial margin in place increases.

services only to standard and liquid instruments, excluding those products with complex pricing models or exotic features⁴⁶.

Figure 12. Estimated percentage of major OTC derivatives on CCPs⁴⁷



Source: FSB, 2010, p. 24

In order for a derivative transaction to be cleared through a CCP and for market participants to reduce counterparty credit risk by margin requirements, derivative contracts need to be standard (IMF, 2010, p. 6). As a result of that, the UK and US financial authorities have placed relevance on the topic using the argument that greater standardization of contracts needs to be implemented to address shortcomings in OTC markets (FSA, 2009, p. 3). The importance of the standardization issue worldwide has been mainly driven by the belief that once OTC derivative contracts are standardized they can be cleared and settled through CCPs. On September, 2009 as outcome of the third head of state meeting of Leaders in Pittsburgh, the G-20 made an important statement on this matter (FSB, 2010, p. iii). The financial leaders left clear that all standardized OTC derivative

⁴⁶ SwapClear, global clearing service provider does not clear complex products such as interest rate options in part because of the complexity of its valuation (CPSS, 2007, p. 27). See www.lchclearnet.com/swaps for more detailed information about SwapClear services.

⁴⁷ According to the FSB (2010, p. 24) the table is just an estimation of central clearing in the different OTC derivative markets as of September 2010 and should not be interpreted as an indication of the level of standardization or clearability of the assets in question.

contracts should be traded on exchanges or electronic trading platforms and cleared through CCPs by end-2012 at the latest (FSB, 2010, p. iii). More than one year has passed since the G-20 set its commitments and the polemic still continues regarding the consequences that an enforceable clearing of OTC trades would mean for the entire financial system.

2.3.2 Assessment III

Benefits for the general structure of OTC markets

In first place, centralizing derivative trades in a CCP (i) reduce uncertainty by increasing transparency for financial regulators and market participants that lead to a clearer overview of systemic risk concentration in major derivative traders (FSB, 2010, p. 9-10). The role of the CCPs is the mitigation of systemic risk through the decrease of the interconnectedness degree among financial institutions; that is, a CCP concentrates risk and use general and common pooled resources of the members to avoid knock-on effects and multiple defaults (Scott, - , p. 687). Moreover, due to the fact that CCPs' clearing houses are owned by the private sector, their number and location are subjected to market forces; this creates (ii) an incentive to constantly improve the quality of their services with the idea of gaining market share against other clearing houses (House of Lords, 2010, p. 39).

The third benefit is (iii) the reduction of legal risk that could arise from derivative contracts. In most jurisdictions, CCP clearing houses are subjected to insolvency regimes that offer protection to market participants by providing explicit procedures for the application of the default rules and, in some cases, by offering support along the process (CPSS, 2007, p. 27). CCPs could additionally (iv) decrease the raise of moral hazard issues between parties after becoming members of the CCP by adding an unlimited call of resources (Singh, 2010a, p. 9). The moral hazard issues arise if parties have an incentive to enter into high credit risk positions with the idea that losses would be shared among all members. With the agreement of an unlimited call, if margins and guarantee funds are insufficient to cover losses, the CCP would claim additional financial resources from its members (Singh, 2010a, p. 9).

Disadvantages for the general structure of OTC markets

The first concern is made around the risk concentration in a CCP that could lead to an increase of systemic risk instead of mitigating it. Scott (-, p. 687-688) recognizes that even though interconnectedness between institutions with high systemic risk is considerably reduced by a CCP, (i) the own systemic importance of the CCP might be amplified after centralizing the risk from all its members. Previous events left clear that there is currently and will not be a single entity in the public or private sector capable of bailing out a failure of a CCP, once major derivative market participants have decided to move their positions into a small number of CCPs. Thus, the enforceable clearing of OTC derivatives through CCPs is justified in this sense if, the reduction of systemic risk by mutualizing losses of counterparties is greater than the potential systemic risk obtained from the centralization of trading (Scott, - , p. 688).

As it was addressed in the first part of the assessment, clearing houses move in a competitive field. Leaving the number of clearing houses merely to market forces can have negative consequences if, as part of the market competition and with the purpose of increasing market share, (ii) CCPs focus in offering low margin requirements to decrease costs of customers instead of focusing in ensuring that margins reflect accurately the risk exposure of their members (House of Lords, 2010, p. 39).

A third point of criticism is focused on the legal risk of OTC transactions between CCPs. Even though most jurisdictions have contributed to define and clarify insolvent procedures for clearing houses, (iii) the feasibility of achieving close-out promptly in the event of the default of a large market participant is still questionable (Tumpel-Gugerell, et al., 2007, p. 33). In stress market conditions there must be a high degree of coordination between the governments, financial authorities and clearing houses of the countries involved, for parties to be able to claim the right to close-out across countries and avoid greater losses.

Furthermore, the CCPs can reduce the counterparty credit risk exposure by the effects of multilateral netting. However, (iv) these benefits obtained after netting positions are attenuated if CCPs offer clearing services to a limited range of OTC products (CPSS, 2007, p. 26). At present clearing houses on the market clear only

a certain category of derivatives⁴⁸. If the number of CCPs increases to satisfy the new demand for clearing OTC derivatives encouraged by the mandatory rules, the multilateral netting benefits will not suffer any change if the CCPs continue clearing inside only one or a few categories of underlying assets (Duffie and Zhu, 2010, p. 18). That is, the effectiveness of multilateral netting in CCPs lie in the range of derivatives they clear rather than in the number of clearing houses on the market. The same arguments used at the end of the assessment of Section 2.1 can be applied for this assessment in the following way: in the extent multilateral netting of the CCP exceed the benefits obtained by bilateral netting, the transition of OTC would be justified, if this is not the case mandatory clearing would seriously damage the progress made so far by netting bilaterally (Duffie and Zhu, 2010, p. 1-25).

The fifth point of critique that it is used against the transition of OTC derivatives into CCPs focuses on the *standardization* as the key criteria to determine if a contract is eligible for clearing or not. The House of Lords of the European Union Committee (2010, p. 31-33) expressed two major concerns. The first one is the fact that even though a derivative contract is considered standard, it might lack of price transparency or it might not be liquid enough to be cleared (House of Lords, 2010, p. 31-33). The second point is made by fact that there are currently contracts with non-standard terms of transactions that are indeed cleared (House of Lords, 2010, p. 31). Taken as basis these two perspectives, it is inferred that determining the clearing eligibility of a contract based only in the degree of standardization is mistaken. (v) If CCPs define their clearing criteria of OTC trades considering only the degree of contract standardization without regarding other derivatives features such as liquidity, volatility and price transparency, the exposure of parties to greater losses would increase significantly (House of Lords, 2010, p. 31).

Mandatory clearing would also oversee the inability of CCPs to net internal positions effectively (Singh, 2010a, p. 8). If a CCP normally clears CDS and it is suddenly forced to clear interest rate swaps, even though they might have

⁴⁸ See in Annex-A.

standard structures the operational processes and considerations are different. Thus, if CCPs are compelled to undertake risk they are not able to handle they could face (vi) serious difficulties to close-out positions after default which would lead to greater losses for their members (FSA, 2009, p. 12).

The last critique to the centralization of OTC trading in a CCP is (vii) the potential increase of wrong way risk. The assets that are used to fulfill the margin and guarantee fund requirements might be source for wrong way risk in the extent the parties are correlated to the value of the assets they post⁴⁹ (Pengelly, 2010).

Benefits to market participants

The centralization of OTC trades in a CCP (i) allows in first place multilateral netting procedures that have the potential to reduce considerably counterparty credit risk exposure as shown in Section 2.1. The reduction of counterparty are reflected in a (ii) higher decrease of economic or regulatory capital beyond what it could have been achieved through bilateral netting or collateralization (CPSS, 2007, p. 25⁵⁰).

Additionally, if multilateral netting is performed by a CCP, (iii) it also increases the accuracy of margin requirements calculation through variation margins adjustments that reflect the change of exposure with new market conditions. Hence, a CCP will have a better picture of the overall risk exposure than isolate counterparties (House of Lords, 2010, p. 29-30).

As fourth benefit stands out the (iv) improvement and simplification of the management of counterparty risk by centralizing transaction processing and responsibilities of risk management in one entity (Cecchetti, Gyntelberg, Hollanders, 2009, p. 49). Once risk is novated to the CCP, market participants delegate in its majority the monitoring of risk to the CCP which helps them to reduce significantly operational costs⁵¹ and time invested on a thief risk management (Tumpel-Gugerell, et al., 2007, p. 6-7).

⁴⁹ For example, a Greek bank posting Greek bonds (Pengelly, 2010).

⁵⁰ See Footnotes from the page it was indicated.

⁵¹ The operational costs that would decrease are: back office services, trade capture, trade matching, reporting, collateral valuation, settlement costs etc. (Tumpel-Gugerell, et al., 2007, p. 6-7).

Additional to the cost and time reduction, a key advantage of a CCP is (v) the concentration of credit and market risk from all its members and the mutualization of losses in the event of a member default (Cecchetti, Gyntelberg, Hollanders, 2009, p. 50; IMF, 2010, p. 7). If a major counterparty defaults the impact is mitigated and absorbed by the CCPs' resources posted by the defaulting and non-defaulting counterparties for that purpose (IMF, 2010, p. 7). The benefits are maximized when there is a high degree of interoperability and multilateral cross-guarantee agreements between CCPs⁵² (Singh, 2010a, p. 8-9).

Disadvantages to market participants

Most of the critiques about centralizing OTC derivatives in CCPs to reduce counterparty credit risk come from the dealers' perspective. As it was pointed out, all members of a CCP have to post margins frequently and contribute to a pooled guarantee fund. Even though the calculation is closely related to the credit quality of each party and its positions, high rated companies, large banks and other type of large complex financial institutions do not collateralize all their risk exposures and, in the same way, do not offer collateral for all trades (Singh, 2010a, p. 6). In this sense, moving positions to a CCP would mean obligatory margin requirements and the transfer of the existing collateral into a CCP which is translated into a (i) larger upfront cost of posting margins and guarantee fund contributions and (ii) the inability to rehypothecate their existing collateral that consequently cause the reduction of profitable businesses and rentable investments (Singh, 2010a, p. 8).

As it was addressed in the assessment of collateral where the liquidity risk was reliant on the extend of collateral use and frequency of collateral calls, CCPs margin requirements, in this case, place a complex liquidity risk for the CCP members (CPSS, 2007, p. 26). The Committee on Payment and Settlement Systems (2007, p. 26) finds (iii) ambiguous the liquidity risks posed on the CCP. The argument is based on several factors that a clearing member needs to

⁵² If CCPs reach a high degree of interoperability, market participants are able to concentrate their portfolio in any CCP they choose and still be covered by the financial resources of several CCPs in case of a default (Singh, 2010a, p. 8-9). In the same way, if CCPs establish multilateral cross-guarantee agreements, the excess of margins posted by parties are shared to cover the close-out of positions from the defaulted counterparty (Singh, 2010a, p. 8-9).

consider when assessing its liquidity risk such as the share of centrally cleared contracts and the frequency of margin calls (CPSS, 2007, p. 26). The complexity arise when the member also have bilateral contracts that are not cleared through the CCP. In that case, liquidity risks from unexpected collateral calls from the non-clearing members have to be considered (CPSS, 2007, p. 26). In brief, the exposure to liquidity risk is greater for those parties that are still subjected to collateral calls in bilateral agreements and at the same time are members of a CCP.

Duffie, Li and Lubke (2010, p. 8) state that (iv) clearing thinly traded OTC derivatives is not cost effective. Pushing all kind of OTC derivative trades into CCPs through mandatory clearing would damage the liquidity of the CCPs by increasing their operational costs without proportional benefits. As a main consequence the CCP might not be able to offer lower capital requirements as before. If mandatory clearing reaches all standard contracts as it is the objective of financial regulators, corporations that use standard OTC contracts to hedge their cash flows and risks would result damaged. Margin requirements would (v) discourage the use of OTC derivatives to hedge and would add burdensome costs that could hit the economic growth of an entire industrial sector (Clark, 2010). The argument used by non-financial businesses for OTC derivatives against collateral is based primarily on the idea that derivatives for hedging purposes entail less risk than those used by speculators because the value is closely related to the value of the underlying asset (House of Lords, 2010, p. 35).

The sixth aspect that is considered as a disadvantage for market participants in the sense it affects in a negative way the interests of a certain market sector is the reduction of dealers' profits. As discussed in Section 1.4, the profits gained by market makers by quoting the bid and ask price is the spread. Moving OTC into CCPs (vi) might modify the spread if the use of electronic matching services reaches rapidly CCPs. If OTC trades are automated through trade matching solutions the spread of market makers will be reduced significantly. Thus, major dealers of Wall Street are still reluctant to follow the recent reforms proposed by financial authorities (Duffie, Li, Lubke, 2010, p. 10; Grant, 2010).

Table 4. Assessment of Central Counterparties in OTC derivative markets (1/2)

General Perspective	Benefits	Disadvantages
	<p>Benefits to the financial structure of derivative markets</p> <ul style="list-style-type: none"> i) Reduce uncertainty by increasing transparency of market activity that provide regulators and market participants with a clearer picture of systemic risk concentration. ii) Encourage improvement in quality of clearing houses services due to the competitive business market in which they interact. iii) Reduce legal risk because in most jurisdictions clearing houses are subjected to regimes with explicit procedures for the application of default rules. Some jurisdictions provide support during the process. iv) Reduce moral hazard if CCPs add an unlimited call in case margins and guarantee funds are not sufficient to cover losses. The unlimited call would obligate members to post more capital. 	<p>Disadvantages against the financial structure of derivative markets</p> <ul style="list-style-type: none"> i) Increase own CCPs systemic risk that can be translated into greater impact on stability of the financial system if a CCP collapses. ii) Give an incentive for clearing houses to low margin requirements that might not reflect real risk exposure in order to gain market share against competitors. iii) Questionable feasibility of CCPs achieving close-out promptly if there is no coordination and cooperation between CCPs across countries. iv) No benefits maximization obtained after netting due to the limited range of OTC products that CCPs clear. At present, CCPs clear only a certain category of derivatives. v) Greater counterparty risk exposure if standardization of derivatives is the only criteria considered to determine clearing eligibility. vi) Serious difficulties in closing-out positions after default if CCPs are compelled to undertake risks by mandatory clearing. vii) Increase wrong way risk if there is a high correlation between the parties and the assets they post to cover margin and guarantee fund requirements.

Table 4. Assessment of Central Counterparties in OTC derivative markets (2/2)

Specific perspective	<p>Benefits to market participants</p> <ul style="list-style-type: none"> i) Reduction of counterparty credit risk through multilateral netting as shown in Section 2.1. ii) Reduce economic or regulatory capital beyond what could have been achieved through netting and collateralization in bilateral relations. iii) Increase the accuracy of margin requirements through marked-to-market adjustments that reflect new market conditions. CCP will get a better picture of the overall exposure than isolate counterparties. iv) Improve and simplify counterparty risk management due to centralization of transaction processing and major responsibilities of risk management practices in a CCP. Reduce operational cost and time invested in their risk management for its members. v) Concentrate credit and market risk from all members. Mutualize losses in the event of default. Greater benefits when there is a high degree of interoperability and the existence of cross-guarantee agreements between CCPs. 	<p>Disadvantages to market participants</p> <ul style="list-style-type: none"> i) Costly transfer of collateral because of larger upfront cost of posting margins and guarantee fund contributions at CCPs. ii) Losses from the inability to rehypothecate the existing posted collateral because it has to be transfer to the CCP to ensure risk coverage. Profitable and rentable business might be missed. iii) More ambiguity of liquidity risks than in bilateral relations. Factors such as the share of centrally cleared contracts and frequency of margin calls established by the CCP need to be considered. Higher liquidity risk for members of a CCP that maintains partially bilateral contracts with the non-clearing members. iv) Lower cost effectiveness for those thinly traded OTC derivatives. Clearing thinly trade derivatives reduce the potential benefits obtained from centralizing risk management operations in one entity if the benefits of clearing that category are lower than the variable and fixed costs of clearing the contracts. v) Discourage the use of derivatives for hedging risk in non-financial companies similar to what it would happen in the placement of collateral (See Assessment 2.2). The negatives incentives rise from the upfront cost of margin calls. vi) Reduce the participation of market makers in the trading matching which affect the bid-ask spread by using trading matching services that automate the trading process.

2.4 Summary of Chapter II

Past events have enhanced the need of stronger practices of risk management in OTC derivative markets to mitigate effectively the exposure to the counterparty credit risk and avoid consequently the spread of systemic risk. There are three risk mitigation practices that have already started a polemic discussion in the financial community due to the potential consequences for the OTC markets. These alternatives to protect the OTC markets from counterparty risk discussed in Chapter 2 are: *netting*, *collateral* and *CCPs*. From one side, the *bilateral* and *multilateral netting* enable to the non-defaulting party the use of derivatives payables to offset derivatives receivables after a default event. On the other side, *collateral* use pledge assets to reduce the impact of losses after a counterparty default with the help of independent amounts and marked-to-market quotations. The third alternative is the *centralization of risk in a CCP*. The risk management practices implemented by a CCP would gather together the mechanisms of netting and collateral and attempt to maximize the potential benefits of centralizing risk management practices.

The logical structure is the same for the three assessments: a comparison of benefits and advantages from the general and narrow perspective in each case. For bilateral and multilateral practices the general benefit is the reduction of redundant contracts that unnecessarily generate multiplication of gross exposures. The general disadvantages are the different levels of enforceability according legal framework in jurisdictions. From the market participants point of view the benefits are in first place the reduction of counterparty risk, followed by a decrease in operational costs trough portfolio compression. The disadvantage of bilateral netting in comparison to multilateral netting is the fact that all benefits that can be reached are limited to the netting opportunities between two counterparties. In the same context, the disadvantage of multilateral netting is the obligatory opening of trading data which could inconvenient for those dealers with strict data confidentiality. Furthermore, bilateral and multilateral netting can damage day-to-day operations by creating inconsistent and unpredictable operational flows.

In the same way netting does, collateral facilitate close-out positions in times of financial stress at cost of an increment in legal risk due to different degrees of

enforceability, tax and legal restrictions across jurisdictions. From a narrower perspective by evaluating positive effects of collateralizing risk, the outcomes are the reduction of counterparty credit risk, lower capital requirements and the flexibility of posting any type of collateral as long as it meets the previous requirements agreed between counterparties. The disadvantages arise when the assets are not liquid enough to close-out positions and when the collateral is not segregated from the assets of the defaulting counterparty. In addition, operational complexity and inherent costs from collateral management can create a negative incentive that prevent market participant from its use. Other arguments used against collateralization practices are the counterproductive implications for non-financial corporations that use OTC derivatives for hedging purposes and the potential increase of other type of risks such as liquidity, market and operational risks. The last point of criticism is related to the possibility that there might be more effective ways to mitigate counterparty risk that do not precisely require capital placement.

Finally the last alternative corresponds to CCPs where positive criticisms are the increase of transparency of market activity that would deal regulative authorities to avoid high concentration of systemic risk in a few institutions; the constant improvement of clearing services; the reduction of legal risk with stronger regimes that regulate clearing houses procedures and the reduction of moral hazard issues could arise from the centralizing risk and mutualizing losses. Negative implications make emphasis on the high concentration of systemic risk hold by CCPs; low margins requirements as product of a high competitive market; the questionable feasibility of achieving close-out promptly if there is not enough cooperation and coordination between CCPs across countries; the poor maximization of benefits due to the limited range of derivatives a CCP clears; the possibility for CCPs of undertaking risks that cannot manage if their only criteria for clearing eligibility is standardization of the products; the potential difficulties of closing-out as a result of mandatory clearing and finally the potential increase of wrong way risk. From the point of view of market participants, the benefits of centralizing risk in CCPs are the reduction of counterparty credit risk due to the use of multilateral netting

practices among a major range of products, lower capital requirements, the improvement of accuracy of margin requirements calculation, the simplification of risk management that bring cost and time advantages and finally the mutualization of losses after a counterparty default. The disadvantages for market participants are oriented to higher costs of transferring the existent collateral to a CCP, the losses caused by the inability to rehypothecate, the increase and more complex liquidity risks with the margin calls, the reduction of cost effectiveness when clearing a thinly traded volume of contracts, the negative incentives for non-financial entities of hedging through OTC derivatives and finally the decrease of profits for derivative dealers if there is a high automation of processes.