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## Counterparty risk management framework: theoretical approach in COVID-19 environment

Deimante Teresiene<sup>1</sup>, Beatrice Gudaviciute<sup>2</sup>

<sup>1</sup><sup>2</sup>Vilnius University, Faculty of Economics and Business administration  
[deimante.teresiene@evaf.vu.lt](mailto:deimante.teresiene@evaf.vu.lt)<sup>1</sup>

**Abstract.** Counterparty risk is the most significant part of the credit risk. Credit risk can be explained by two different types of risk: issuer risk and counterparty risk. The importance of counterparty risk increased in the COVID-19 pandemic as lots of counterparties have met difficult economic conditions. This article presents the main issues related to the counterparty risk. Firstly, we try to identify the main concept of counterparty risk by analyzing different scientific views. We present various aspects of counterparty risk and we try to point how a counterparty risk should be understood in the context of credit risk. Then we make a short analysis of changes in credit quality and finally, we offer a framework for counterparty risk management. According to the latest data, we see a high probability of counterparty risk increase, especially in the energy and finance sectors. So because of that counterparty risk management framework is very important for every institution. Despite sometimes it can require higher costs for counterparty risk monitoring, every organization taking into account financial abilities must choose the right way for counterparty risk management.

**Keywords.** counterparty risk, credit risk, framework, risk management

### 1. Introduction

The importance of counterparty risk increased as the use of derivatives has grown. Systems and methodologies to monitor and mitigate counterparty risk have become more sophisticated so because of that it is essential to analyze counterparty risk more accurately and to create a good framework for counterparty risk management. Starting with the failure of Lehman Brothers in September 2008 and defaults or near defaults by Icelandic banks, AIG and many others have served notice that counterparty risk is quite complex and dynamic and that it should be managed more carefully than it was before. Counterparty risk has stalked in the banking system so now counterparty risk should be as important as market and liquidity risk. At any moment it is possible that another trading partner might fail, leaving financial institutions exposed to big sums. This point is especially important in the COVID-19 pandemic environment as there is an increasing possibility of growing counterparty risk.

To correctly and purposefully analyze the credit risk of a counterparty, firstly, it would be appropriate to define credit risk, because according to the authors, counterparty risk is a subtype of credit risk (Basel committee on banking supervision, 2000; Brown and Moles, 2011; Spuchlakova et al., 2015). Many authors define credit risk differently when it comes to the potential risk that a single counterparty might incur if the counterparty defaults. For instance, Ragunathan et al. (2000), Eichberger et al. (2012), Spuchl'áková & Juraj (2014), Spuchl'áková

et al. (2015) argue that credit risk is simply a risk of default. Other authors, such as the Basel Committee on banking supervision, (2000), Sinha (2005), Driga et al. (2010) identify credit risk as to the likelihood that the counterparty will not be able to settle by the contract. On the other hand, authors such as Giesecke (2002), Hagiú (2011), Spuchl'áková et al. (2015) associate credit risk with the risk of loss. Giesecke (2002) associates the risk of loss with unexpected changes in the credit or credit rating of an issuer or counterparty, while Hagiú (2011) describes credit risk as to the risk of losses arising in the event of a bankruptcy of a counterparty. Finally, Spuchl'áková et al. (2015) associate the occurrence of the risk of losses with non-fulfillment of the terms of the contract with the counterparty. After analyzing and comparing the definitions of credit risk provided by the authors, it can be stated that the main predominant element is the inability or unwillingness of the counterparty to fulfill its obligations, which best defines the concept of credit risk (Gregory, 2010).

Bindseil et al. (2007) describes credit risk as the risk of losses because of credit events which could be as a default or a change in credit quality. According to the Bank of International Settlement, credit risk can be divided into issuer risk and counterparty risk. In the counterparty risk trading partners, but not borrowers, are the source of risk. So we can see that in both cases of explanation we see two different sources of credit risk: borrower (issuer) and counterparty. The other aspect which should be stressed that credit risk is not only related to default but more related to the fulfillment of financial obligations on time and the reasons for that can be not only default. Credit risk not only encompasses default risk but also changes in the quality of the credit.

The credit risk in various financial institutions has different importance. For example, credit risk in commercial banks is the main source of financial risk while central banks have less exposure to credit risk. Different financial institutions have different sources of credit risk. In the case of central bank credit risk comes from two sources: monetary policy operations and foreign reserves management. Despite the role of credit risk in central banks is not as big as in commercial banks but the trend is increasing. Central banks take more credit risk to generate higher returns for foreign reserves. Credit risk can be a good hedge for currency risk and vice versa.

As counterparty risk can be explained as a type of credit risk it should be explained in more detail to show the main aspects. In practice in evaluating counterparty risk to conditions should be satisfied: 1) the investment should be profitable and 2) the counterparty must fulfill its obligation to the investor. Counterparty risk typically arises under the following scenarios:

1. OTC derivatives trading. Derivative contracts have two sides and every side may be exposed to counterparty risk. OTC derivative trades are bilateral contracts between two private parties so in this case counterparty risk is created at any time.

2. Brokerage relationships. After the subprime crisis client losses from failed brokerages became very serious problems and risks at the same time.

The main goal of this research is to identify and describe the concept of counterparty risk and to create a framework for counterparty risk management.

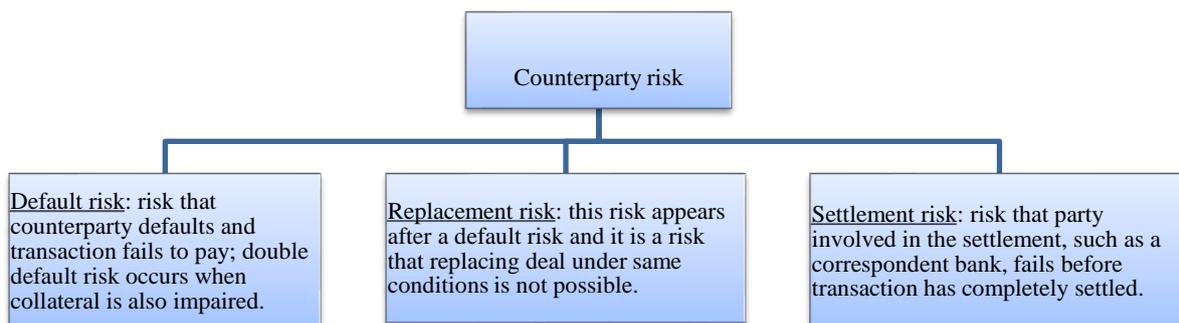
To reach our goal we used scientific literature analysis and synthesis. For current situation identification, we used screening methods and S&P Capital IQ data. Finally, we created a framework with suggestions for counterparty risk management.

## **2. Literature review**

In the further analysis of counterparty risk (CCR), it is necessary to examine the definitions provided by the authors of this risk and present its differences to credit risk. Belmont (2012) defines CCR as the risk of incurring losses due to the inability of a counterparty to properly

meet its obligations in the future following the terms of the contract. Ballotta et al. (2016) describes in more detail this risk and indicate that counterparty risk poses a threat to both counterparties. Other authors, such as the Basel Committee on Banking Supervision (2017), argue that counterparty risk arises when the counterparty's obligations are not met by the end of the contract. The above definition is supplemented by authors such as Gregory (2010) and Kroon & van Leliveld (2018), which indicate that risk may also arise since a party to a transaction, or rather a derivative contract, will not pay current or future payments. Finally, according to the author Sayah (2017), CCR arises when the counterparty fails to meet its obligations, or its credit quality is understated. To sum up, as in the definition of credit risk, it is visible that the predominant element in the concept is the default (Pykhtin & Zhu, 2007). However, CCR differs from credit risk in two respects: firstly, counterparty credit risk is a two-way risk associated with the rights and obligations of both counterparties, and secondly, variable position, which depends on the counterparty and market conduct (Gregory, 2010; Pykhtin & Zhu, 2007; Sayah, 2017).

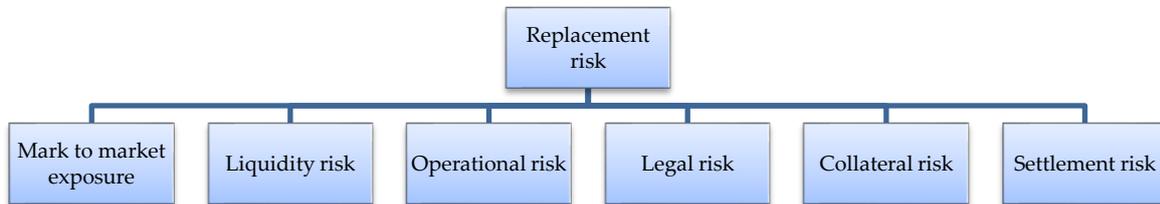
As mentioned earlier, counterparty credit risk is a type of credit risk. However, counterparty risk itself is divided into 3 subtypes: default risk, substitution risk, and settlement risk. The first risk is associated with default by the counterparty and, as a consequence, unsuccessful money transfer, but this risk can also be two-way, for instance, when a financial transaction involving the return of collateral does not occur (Beier et al., 2010; Belmont, 2012). According to the author (Belmont, 2012), the aforementioned default risk is the most significant form of CCR. After a default, there may be a risk that it will not be possible to exchange a transaction for another under the same conditions, and then the counterparty is exposed to the risk of substitution (Pykhtin & Zhu, 2007; Beier et al., 2010; Belmont, 2012). And the last subtype is settlement risk, which is associated with the collapse of the counterparty and which arises if the counterparty has not fully settled before the collapse (Basel committee on banking supervision, 2000; Beier et al., 2010; Belmont, 2012). Counterparty risk can be divided into three main parts (Figure 1).



**Figure 1.** Counterparty risk. Beier et al. (2010)

Usually all over the counter transactions face settlement risk. Such arrangements as securities lending, repurchase agreements, and reverse repurchase agreements have settlement and replacement risks. Derivatives have the most part of counterparty risk. The combination of three forms of risks depends on the complexity of derivatives. In 2013 National Association of Pension Funds described counterparty risk in the context of derivatives. According to the mentioned association derivatives carry counterparty credit risk which arises when one of the

parties defaults, resulting in a replacement risk for the non-defaulting party. So replacement risk can be described in the context of six different risks (Figure 2).



**Figure 2.** Replacement risk. National Association of Pension Funds (2013).

In practice, we can find some variations of counterparty risk. Double default risk is the risk that counterparty that sold default protection on a third party will default at the same time as the third party. Double default risk can be explained as counterparty risk and correlation risk. This risk became especially important after the case of American International Group (AIG). The other variation of counterparty risk is custodial risk. This risk refers to the risk

One way to mitigate counterparty risk is to use credit derivatives. A credit derivative is a transaction that allows one counterparty to transfer the risk of default of a third party to another counterparty in exchange for periodic payments for the transferred risk (Ranci re, 2002; Bomfi, 2005; Dawood et al., 2007; Douglas et. al., 2007; Kiff & Morrow, 2009; Chaplin, 2010). One of the characteristics of a credit derivative is that the initial relationship with the lender and the third party whose risk is being sold does not change. This means that the transfer of risk in a credit derivative transaction to the counterparty does not transfer the ownership of the original transaction between the creditor and the debtor (Douglas et al., 2007). Moreover, credit derivatives such as swaps, options, and forwards can be mentioned (Kiff & Morrow, 2009). Examining credit derivatives from a theoretical point of view, it has been observed that credit default swaps (CDS) are considered one of the most popular credit derivatives (Bomfi, 2005; Gregory, 2010; Marchioro, 2011; Vasudev, 2014). It is also important to note that CDS performed a significant role during the 2007-2008 financial crisis: the growth of the CDS market has affected the stability of financial markets and contributed to the effects of the financial crisis for financial markets (Terzi & Ulu ay, 2011). Like credit derivatives CDS is a two-way transaction between two counterparties, between a seller of risk and a buyer of protection (Bomfu, 2005; Brigo and Morini, 2005; European Central Bank, 2009; Chaplin, 2010; Marchioro, 2011; Terzi and Ulu ay, 2011). It may be mentioned that the simplest form of vanilla credit default swap is single-name CDS. A single-name credit default swap is a swap in which the seller of risk pays certain periodic premiums over a specified contractual period to another counterparty, that is, the seller of protection (Bomfi, 2005; Chaplin, 2010; Terzi and Ulu ay, 2011).

Thus, the analysis of the scientific literature showed that the assessment of the credit risk of the counterparty became relevant after the financial crisis of 2007-2008. Given the recurrence of financial crises, the assessment of CCR becomes even more meaningful, therefore the exploratory part of the paper will assess counterparty risk with the help of the most popular credit derivative, the credit default swap (CDS). CDS is used as a counterparty risk assessment tool because it has also had a significant impact on the financial crisis and because this credit derivative is closely linked to CCR.

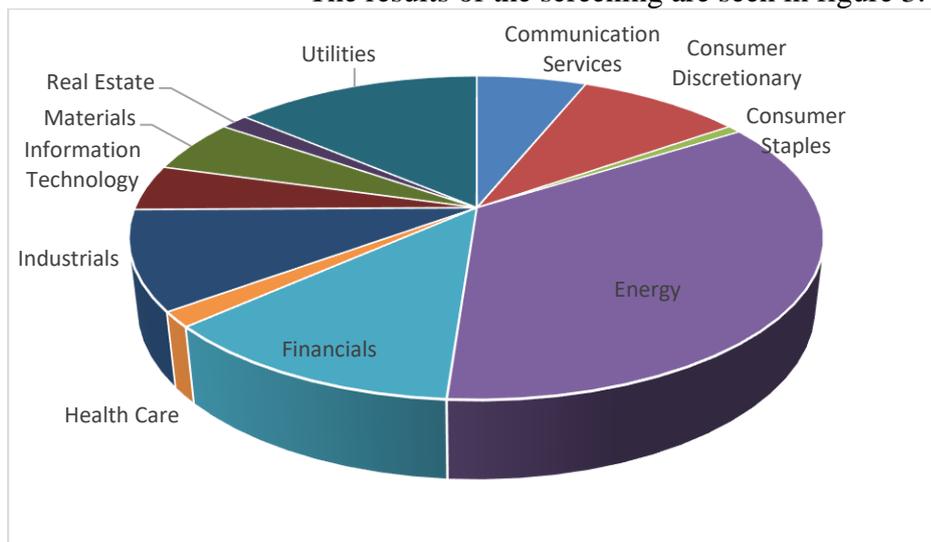
### 3. Theoretical framework for counterparty risk management

Counterparty risk management is very important in every institution. To have an efficient risk management process every institution must have a clear framework for counterparty risk management. This especially important in the period of COVID-19 pandemic as there is quite a high probability of higher counterparty risk and in a broad sense counterparty risk increased in every sector.

Using S&P Capital IQ data we made a research to identify those sectors which were affected the most and got negative rating actions. For the research, we had the following screening criteria which was used for global issuers:

- 1) S&P RatingsDirect® Industry: Corporates (Primary) OR Industrials (Primary) OR Aerospace & Defense (Primary) OR Homebuilding (Primary) OR Media & Entertainment (Primary) OR Metals & Mining (Primary) OR Containers & Packaging (Primary) OR Retailing (Primary) OR Telecom Services (Primary) OR Transportation (Primary) OR Automobiles & Components (Primary) OR Energy (Primary) OR Paper & Forest Products (Primary) OR Hotels & Gaming (Primary) OR Building Materials (Primary) OR Capital Goods (Primary) OR Chemicals (Primary) OR Consumer Products (Primary) OR Commercial & Professional Services (Primary) OR Health Care (Primary) OR Information Technology (Primary) OR Property & Real Estate (Primary) OR Utilities (Primary) OR Project Finance (Primary) OR Financial Institutions (Primary) OR Insurance (Primary) OR Sovereigns (Primary) OR Business and Consumer Services (Primary)
- 2) S&P Entity Credit Rating Action [Year to Date]: Downgrade OR CreditWatch OR Outlook (Issuer Credit Rating - Foreign Currency LT) (Rating)
- 3) S&P Entity Credit Rating - Issuer Credit Rating - Foreign Currency LT [Latest] (CreditWatch): equals Watch Neg  
Or) S&P Entity Credit Rating - Issuer Credit Rating - Foreign Currency LT [Latest] (Outlook): equals Negative  
Or) S&P Entity Credit Rating Action [Year to Date]: Downgrade (Issuer Credit Rating - Foreign Currency LT) (Rating)

The results of the screening are seen in figure 3.



**Figure 3.** Sectors which were affected the most and got negative rating actions 2021 year to date (2021 February 5)

Looking at figure 3 we see that the highest counterparty risk is in the energy sector and finance sector. Especially in the COVID-19 pandemic environment, it is very important to start managing that risk on time.



**Figure 4.** Counterparty risk management framework. Moody's analytics (2016).

*Step 1 Potential counterparty evaluation.* Moody's analytics recommends at this step firstly, to analyze private/public financial data. We agree with that but we would like also to add the analysis of all possible public information to evaluate headline risk. Headline risk can be very dangerous and can have a very negative effect on counterparty credit risk. Especially, when the counterparty is a financial institution we must value reputational aspects as well. According to Moody's analytics recommendations, it is very important to have standardized data, centralized location, and to maximize automation of the financial ratios calculation process. When there are a lot of counterparties in the organization, then the automation process is very important as every institution seeks to minimize costs. But on the other hand credit experts' qualitative insights are very helpful for counterparty risk management. It is not only essential to analyze financial ratios but it is also very important to check the main structure of shareholders and try to identify their relations with other companies.

*Step 2 Peer group analysis.* Firstly, the analyst must make a research about the sector in which the counterparty acts. Especially it is very important in the COVID-19 pandemic environment because some sectors are affected much more comparing with others. We also offer to identify the government support for the sector to value the real effect. After making a deep sector analysis it is essential to determine a peer group to compare a counterparty with similar companies in the sector.

*Step 3 Credit score.* After the first two steps, it is important to determine a credit score. For this purpose, the company can use a standardized credit scoring system or use internal credit models. Using internal credit models the companies must not forget to follow the validation process. Tabakis and Vinci (2002) in their research analyzed the aspect of the internal credit rating system. Internal credit rating systems require monitoring and at the same time substantial expertise and are quite costly. The author Ramaswamy (2004) indicated that due to the availability of rating scores issued by the major rating agencies for most of central banks' counterparties, the development of an internal credit rating system is generally too costly comparing to its marginal benefits.

*Step 4 Credit limits.* For better counterparty risk management the company must set credit limits and terms. Usually, credit agencies at this step offer to establish a framework for translating credit scores into limits and terms. Setting credit exposure limits to counterparties usually a limit function is used:  $L(Q, S)$ , where  $Q$  is the measure of credit quality,  $S$  is a size measure, for example, capital. Above limits are non-decreasing in both input variables. The size measure typically aims at avoiding build-up disproportionate exposure to some counterparties, issuers, countries, or markets. Lots of financial institutions by determining counterparty credit quality

use external credit ratings. But lately, the reliance on credit rating agencies has decreased a lot. To decrease the role of credit rating agencies financial institutions can:

- Invest resources into understanding rating methodologies;
- Understand main factors driving the relevant industries;
- Monitor market measures of credit risk (bond or credit default swaps spreads)
- To set up an internal credit rating system which is based on public information about the company paying the most attention to financial data (balance sheet and profit/loss account information) and high-frequency news about the company.
- To rely on ratings by several rating agencies and to create an aggregated ratings index.

Gould et al. (2017) identified that counterparty credit limits have a small impact on trade and that in extreme circumstances can destabilize prices and have an impact on systemic risk.

*Step 5 Monitoring.* The last step is the process which must continue daily because credit risk events may appear at any time. Firstly, the analyst should try to identify early warning signals which can inform about the higher possibility of counterparty risk increase. This process cannot be ensured if the institution does not have a sufficient risk monitoring system. Finally, the analyst by monitoring the list of counterparties must make different scenarios to identify the shock of possible risks in different circumstances.

Figure 5 points that counterparty risk volatility can be quite high, especially in the periods of external shock. But from credit default swaps' (CDS) indices we can also see that the COVID-19 pandemic effect was quite short. iTraxx and CDX indices allow market participants to value not only sentiment on credit as an asset class but also help to have a view on changes of counterparty risk.

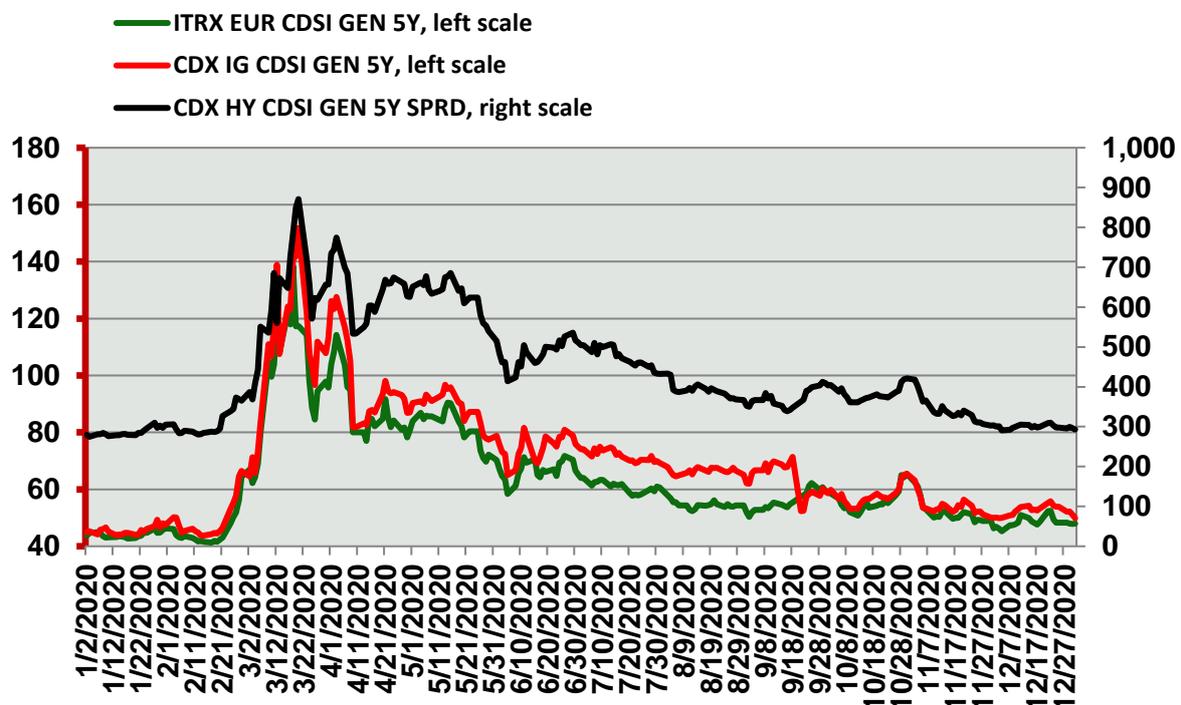


Figure 5. Credit default swaps' indices in Europe and US, Bloomberg data

Despite the COVID-19 pandemic effect on the CDS market is till now quite temporary, valuing the future tendencies we see that a counterparty credit risk can increase. The main reason for

such tendencies is that lots of entities for quite a long time were in lockdown and faced lots of cash flow difficulties.

### Conclusions

After analyzing different views in scientific works and issues mentioned in practical literature we can conclude that there are lots of understandings and definitions of credit risk. One part of the authors have quite a narrow view about credit risk while others describe this type of risk much broader. Despite different views in scientific literature, we think that counterparty risk is a part of credit risk and must be analyzed in that context.

There are lots of different ways for counterparty risk management. Counterparty risk can be mitigated by accurately measuring exposures, maintaining assessment of counterparty conditions, dealing with a diverse group of counterparties, and minimizing exposures to weaker counterparties. We think that counterparty risk can be significantly reduced by netting. Netting is very important as transaction parties very often trade multiple positions with each other. Netting even can be multilateral in those steps when is netting among multiple different counterparties. We think that a counterparty risk management framework is an essential aspect in every institution. COVID-19 pandemic rises a lot of risks that are related to lots of sectors. But some sectors are especially sensitive to credit risk and counterparty risk as well. Those sectors are energy and finance. Despite the banking sector looks quite strong because of supportive monetary policy but we must take into account the worsening economic situation and possible growth in defaults.

We recommend for institutions not only to concentrate only on potential counterparty evaluation but to put the biggest attention to the later steps, especially the monitoring process.

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