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Securities Post-trading Infrastructure – Past, Present and Future

SUMMARY: The two fundamental institutions of the securities post-trading landscape are the central counterparty (CCP) and the central securities depository (CSD). While the institution of CCP was developed to mitigate the risk of the counterparties participating in (securities) trading, the development of CSD was driven by the need to increase market efficiency through securitization and capital flows. Both institutions were developed by market needs, but later on, following the 2008 financial crisis, the importance of these institutions has increased significantly since they have a fundamental role in ensuring safe and sound financial markets and cross-border capital flows. All around the world, strict regulatory regimes are formulated regarding CCPs and CSDs. As a consequence of the 2008 crisis, trade repositories (TR) are established in order to store OTC derivative transaction data. In the future, due to technological development, the post-trading landscape may change. One direction may be to introduce real spot markets (without settlement cycle) and the other one may be to implement distributed ledger technology to replace the current post-trading framework.

KEYWORDS: central securities depository (CSD), central counterparty (CCP), trade repository (TR), risk management

JEL CODES: E44, G14, G18, G21, N20

The financial and capital markets are considered to be the artery of the economy, which plays a crucial role, and indirectly determines and promotes the social welfare. Therefore, these markets are needed to be served by a complex post-trading system that is called payment and securities clearing and settlement system. This article focuses on the institutions of securities clearing and settlement system.

There is usually less emphasis on the securities clearing and settlement systems during the economic studies or in the economic news.

The lack of proper education is clearly a disadvantage. Since any disfunctional operation of the central counterparties (hereinafter referred as CCPs) and central securities depositories (hereinafter referred as CSDs) may influence negatively the economic actors directly or indirectly through spill-over effects, the absence of news about the CCPs and CSDs can be evaluated as a sign of sound operation of these institutions.

Because of the potential negative effect that may occur via the disfunctional operation of CSDs and CCPs, the securities clearing and settlement systems are considered as systematically important financial infrastructures in every developed country. Therefore, the

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operation of these two institutions are safeguarded jointly by the institution responsible for monetary policy and the institution responsible of prudential supervision.

The objective of this paper is to introduce the fundamentals of post-trading infrastructure (including economic rationale) using a historical approach starting from the past through present to the foreseeable development trends of the future.

The study first presents the historical roots of securities, which is followed by the evolution of securities trading. The economic rationale of the CCPs and CSDs is presented within the framework of the development of post-trading infrastructure. The recent events effecting the post-trading landscape and the effects will be described afterwards. Before moving on to the brief overview of the Hungarian post-trading infrastructure, the development paths are outlined.

FROM PROMISES TO SECURITIES

Economists, like *Weber* (2008), take the view that the derivatives¹ as we understand them today are as old as the formation of organized society. To be more exact, ever since people were able to make reliable promises to each other, derivative transactions have existed.

The old proverb says that a promise made should be a promise kept – to ensure this, it is a good idea to put the promise in written form. According to our current level of knowledge, the emergence of the science of writing² can be linked to the ancient Mesopotamia more than three thousand years BC. Accordingly, the first currently known written derivative transaction is also from this era. *Van de Mieroop* (2005) successfully reconstructed an ancient clay tablet during his researches, which says that Akshak-semi promised to deliver 30 trees to Damquanum at a specific time in

the future. This clay tablet was made in the 19th century BC. An interesting fact is that it contains the names of 6 witnesses, which indicates that sometimes keeping promises was challenging despite the rigorousness of Hammurabi laws. In any event, putting the promises in written form (clay and wood tablets) can be regarded from our point of view as the first steps of humanity toward securitization.

It should be noted that the futures trading played an important role in the ancient economies³ regarding either the production of agricultural products or the long-distance trading. Besides, derivative transactions were used in the slave trading as well. In his study, *Swan* (2000) points out that in connection with slave trading, not only simple future transactions were made, but a certain insurance element was already part of the contract. Accordingly, if the slave trader did not succeed in acquiring slaves at an acceptable (lower) price compared to the preliminarily bargained price, the slave trader had to pay back an amount slightly higher than the preliminarily bargained price to the party having the purchase intention.

At the end of his study, *Weber* (2008) concludes that the advantages and opportunities provided by derivatives contributed to both the improvements of the efficiency of the antique agricultural market, and the development of long-distance trade.

SECURITIES TRADING

There is no uniformly agreed date to which securities trading could be linked. However, in his study *Malmendier* (2008) concludes that in order to maintain the internal market of the antique Roman Empire, securities trading was indispensable, so it, or any form of it, must have existed in the Roman Empire, and even earlier. It should be noted that in the era of the Roman Empire, beside the previ-

ously mentioned 'derivative securities', a kind of predecessor of the corporations (public limited companies) existed that were called *societas publicanorum* in Latin. This is underlined by one of the speeches of *Cicero* in which he is talking about high priced shares.

The first organized securities trading facility (stock exchange, as it is called nowadays) was established in 1531, in Antwerp (Poitras, 2009). This naturally does not mean that people had not traded with securities or products before, as it was common practice already in the era of the Roman Empire. The date of the establishment of the first stock exchange was merely a milestone. This was the date when an institution was created to promote trade. However, it should be noted that 'securities'⁴ trading was only an ancillary activity of the stock market at the time, its primary function was to mediate the trading in different currencies. Frankfurt, that is becoming now the financial center of the European Union, has its stock exchange since 1585 (DBG, 2018).

For a long time, securities trading was built on a scheme as simple as that of any other products: the issuer or seller of the security sold the security to the buyer directly or through an intermediary, for which they received the current price. It is important to note that until the end of the 20th century securities were paper-based documents and registers which existed in a physical form, so at the time of the sale and purchase the security itself was traded.

THE DEVELOPMENT OF POST-TRADING INFRASTRUCTURE

The central securities depository

Maybe the best way to introduce the development of the central securities depository, one of the key institutions of post-trading infra-

structure, through the example of the United States. From the emergence of the stock exchanges in the Middle Ages, the same trading structure characterized the trade of securities as any other product. There were sellers and buyers, and there were some wholesaler who were pursuing these activities not only in their own name. These wholesalers can be regarded as the predecessors of brokerage companies (investment firms). As far as the issuers of the securities are concerned, in the beginning they were in direct contact with the owners of the securities when the security was traded, at the time of the dividend and interest payment, and if the company changed its name, or merged with another. As time passed, however, the volume of the issued and traded securities became so large that it was increasingly difficult to monitor the processes, and the administration of the securities required significant amount of human resources. This constituted a kind of barrier to the expansion of the trading and the securitization process. Since the securitization is accompanied by several economic advantages and overall increases the welfare of the society, thus the administration costs (bottleneck) serving as a barrier for the development had to be eliminated somehow. The institution of the central securities depository emerged as a result of the aforementioned long process in the 1960's in the United States (Morris and Goldstein, 2010). The CSD as a new institution type has released the resource constraints existing in the securities trading and gave way to the further expansion of securitization.

A study by *Milne* (2016) highlights, however, that there was a central securities register already in the 1870's in London and Vienna, so at the time of the trade of a security or the implementation of a corporate action, it was sufficient for the owner or the issuer to turn to the central institution carrying out the securities registration. In this case we are not talking

about the securities issued on a paper basis, but a central accounting system, which was obviously still a paper based register.

The development of the institution of the central securities depository saved social costs, as the administration costs of issuers and holders of the securities reduced significantly. Parallel to the increasing securitization the responsibility of the CSDs and the social and economic importance has also developed.

Central counterparty

According to *Moser* (1998), the development of the institution of the CCP was triggered by the objective to⁵ prevent the default of the parties participating in a derivative transactions. However, an important difference in comparison with the today's CCPs is that at the time of establishment of this institution type there was no guarantee taking system behind the transactions that ensured the settlement. The settlement was fostered by netting of the transactions – in other words, default protection was treated as a liquidity issue. When netting the transactions it is not necessary for the parties participating in the transaction to possess the whole quantity of securities (formerly: products) and the purchase price necessary for covering their positions. In the mid 1800's, the 'Buffalo Association' in the United States successfully applied netting as a preventive method of defaults (*Silber*, 1986).

Kroszner explained at the 2007 conference of the ECB on the topic of post-trading infrastructure that the emergence of the institution of CCPs, similarly to the emergence of the CSDs, was the result of a relatively slow development process. According to the archive of the 'Chicago Board of Trade' the first demand to monitor problematik the stock exchange members emerged in the early 1870's. The introduction of initial margin and variation

margin as a risk mitigation tool by the stock exchange took place in the same period.

The predecessor institution of the CCPs was called clearing house. The first one was established in 1883 in the United States. *Kroszner* (2007) underlined the argument of *Silber* (1986), according to which clearing houses initially strived to promote the settlement of the transactions primarily by netting them. At that time guarantee taking activity was now executed by the clearing houses. Regarding Europe, the first clearing houses appeared at the end of the 19th century.

The first clearing house, which can already be called a CCP, was founded in 1925 in Chicago under the name 'Board of Trade Clearing Corporation'. It was the first clearing house, which carried out a guarantee taking activity, that is, in case of a potential default, the party innocent in the default was compensated. The regime employed technically shared the risks between members of stock exchange. In practice, each company pursuing a stock exchange activity had to be a shareholder in the clearing house. If the loss was so great that it would have consumed not only the margins but also the capital of the company, the stock exchange members had to buy newly issued shares to cover the loss. The risk taking regime introduced above fostered the continuous development of risk management processes (*Kroszner*, 2007). It should be noted that the academics like *Dionne* (2013) date the beginning of organized risk management activity to the 1950's. In this sense, the CCPs were far more advanced in the matter of risk management.

THE ECONOMIC ADVANTAGE OF THE CENTRAL SECURITIES DEPOSITORY AND THE CENTRAL COUNTERPARTY

The advantage of the CSDs is that the transaction costs of the issuers of the securities and

the securities traders significantly decrease (for example, there is no need to be in direct contact between the current owner of the issued security and the issuer of the security). As a result of technological development, in parallel with the dematerialization of the securities, the transaction cost decreased further following the 1990's (economics of scale). The decrease in the transaction costs of securities issue and trading strengthened the process of securitization. According to *László* (2017) securitization provides the following advantages for the economic actors.

- ▶ Through issuance of securities, companies can obtain cheap financing, or they can raise the capital for their company that may improve the capital structure of the company resulting credibility from the viewpoint of the investors.

- ▶ From the viewpoint of banks, securities contribute to the improvement of capital adequacy, reduce the credit risk, improve the balance sheet, increasing lending capacity, and contribute to higher profitability.

- ▶ Via securitization investors are able to diversify their investments in order to achieve proper level of risk. In this term, securitization provides security for investors.

- ▶ As for the government, securitization allows a flexible, cheap and measurable economic development (for example: project-based funding; increase of the competitiveness of SMEs etc.).

The list above demonstrates that the existence of CSDs and the sound and safe operation thereof have a positive effect on all the sectors of economic life as for the social efficiency and effectiveness.

Regarding the economic (public) utility of the CCPs, several factors have to be considered simultaneously. First of all, as a result of the netting the securities transactions, the market participants need to have less liquidity to implement the transactions or a more

intensive trading activity can be carried out with the same amount of resources. Secondly, CCP reduces the risk of default (partner of credit risk) since it novates⁶ the transactions. The CCP activity, in this terms, results a risk concentration of the market participants because it takes over the partner risk from the market participants. In practice, this type of risk concentration reduces the overall risk of the CCP cleared market, as the CCP gathers all the market information. As a quasi fully informed player, CCP can make decisions relating to risk management which will mitigate the overall risk of the market. With other words, this high level of information is more likely to result in decisions which are favorable from the aspect of social optimum. The aforementioned risk concentration is called guarantee taking activity. In other words, the CCP guarantees the settlement of the securities transactions cleared, even by using its own assets. If the indirect advantage of the CCPs is examined, we can practically turn back to the predecessors listed in case of the CSDs in connection with securitization.

FACTORS DRIVING THE DEVELOPMENT OF CSDs AND CCPs UNTIL 2008

The positive effect on economic efficiency and effectiveness of CSDs and CCPs is unquestionable in the light of the above. Still, until the early 1990's their situation was not particularly prominent among the institutions of the financial system. As a result of the continuous expansion of the international trade after World War II, the demand for the secure settlement of international transactions was given more and more prominence. This affected primarily the international payments, but the international-level securities transactions were naturally affected as well. At the end of the 1980's, after recognizing the defi-

ciencies hidden in the payment systems, the groups consisting of the experts of the G–10 countries⁷ started to study the possibilities to reduce the risks of international payments. As a result, the Angell report was published by the Bank for International Settlements (BIS) in 1989. The report primarily deals with the liquidity and credit risk arising from international transactions. They recognized that netting can be advantageous, so a Committee was established to explore the possibilities provided by the interbank transactions operating on the net basis. If we look back, the predecessor institutions of the CCPs are applied netting successfully already in the second half of the 1800's, as a risk-mitigating method.

As a consequence of the Angell report, the Lamfalussy report was published in 1990, according to which netting contributes to the performance of (international) interbank transactions, and increases the efficiency of the payment systems by mitigating the risks in the system and reducing the transactions costs.

For the further increase of the stability and efficiency of the payment system, in 1990, the same year when the Lamfalussy report was published, the Committee on Payment and Settlement Systems – CPSS⁸ was established. Recognizing the importance of the securities clearing and settlement systems, the Committee started to elaborate recommendations for both the CSDs and the CCPs. The first document was published in 2001,⁹ which made 19 recommendations for the securities settlement systems (CSDs), and it was followed by another document in November 2004 that provided 15 recommendations for the securities clearing systems¹⁰ (CCPs). The above mentioned recommendations had two objectives. On the one hand, the recommendations contributed to the spreading of the best practices of the sector, and on the other hand, via the spread of the best practices, a kind of uniformization

occurred. This uniformization served as a basis of interconnectivity of the securities clearing and settlement systems that were operating according to different rules previously.

THE EFFECT OF THE 2008 CRISIS ON POST-TRADE INFRASTRUCTURE

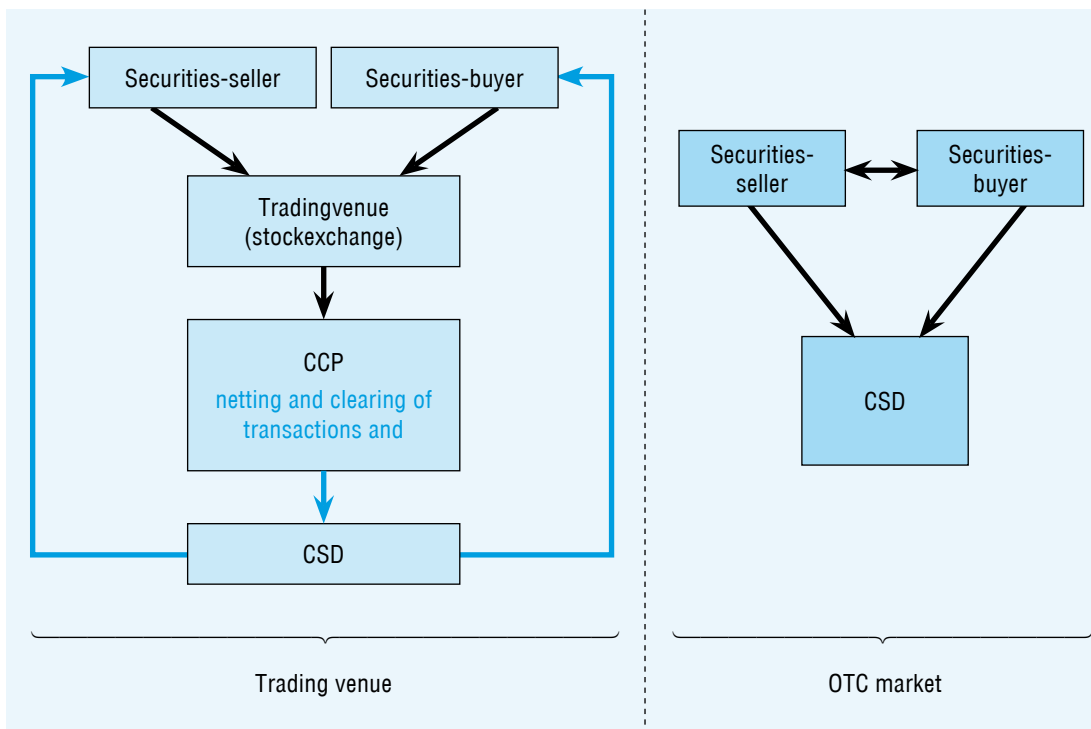
Securities may be traded in essentially two ways. On the one hand, at a trading venue, such as stock exchange, or on an OTC basis. *Figure 1* shows the difference between the two ways.

It can be easily recognized that in case of stock exchange trading, the settlement of the transaction in the CSD is ensured by the CCP through its guarantee taking scheme. In addition, the transactions are always registered at the trading venue as well. Contrary, the risk of OTC transactions is significantly higher, since in this case the settlement of the transactions is not guaranteed. In order to mitigate this risk, the CSDs using the so called DVP¹¹ transaction type, i.e. the transaction is not settled until both the security leg and the cash lag is available. At the same time, many transactions are settled by FoP (Free of Payment) way in the CSDs, especially the OTC derivative transactions. The uncertainty of OTC trading is further increased by that in most cases the CSDs were not provided the information of the incomplete or defaulted transactions. Besides CSDs had no information if a transaction generated further transactions at a future date. Therefore, in practice, there was no operator who kept authentic records related to the OTC transactions. When different academics and decision makers mentioned that they could not even estimate the size of the OTC market in connection with the 2008 crisis, then they referred to this phenomenon presented above.

It was realized by the regulators examin-

Figure 1

THE SCHEMATIC PRESENTATION OF TRADING VENUE AND OTC TRADING



Source: own edited

ing the events of 2008 financial crisis that the securities transactions cleared by the CCPs are settled with minimal losses and all the open positions were closed in a short period of time.¹² In this term CCPs has provided security for counterparties participating in the transactions.

In contrast, the volume of open OTC derivative positions could be only estimated regarding the 2008 crisis.

As a result of analysing the 2008 financial crisis, at the G20 meeting held in Pittsburg in 2009, a declaration was accepted which aimed to increase the stability of the financial system. The declaration essentially meant three main objectives in respect of the financial infrastructures (including CSDs and CCPs). On the one hand, the regulators tried to strengthen the positions of the CCPs and stipulated

clearing obligation related to all standardizable OTC derivative transactions. This inevitably increased the risk of the CCPs. Therefore by incorporating the industry best practices in laws,¹³ the regulators strengthened the sound operations of the CCPs.¹⁴ Last but not least, a new financial infrastructure was established, the so-called Trade Repository (hereinafter referred as TR). The primary task of this new institution is to store the data of all OTC derivative transactions.

Naturally, in the European Union, the CSDs could not be left out of the wave of regulations.¹⁵ The objective of CSD regulation is to decrease the transaction costs of cross-border securities transactions in the long term, as well as to strengthen the protection of the interests of the investors through uniform rules even in short term. In other words, the

objective is to facilitate the free movement of capital within Europe.

Currently, the fine-tuning of the regulations applicable to CCPs is on the agenda, while the regulation applicable to CSDs became complete only in 2018. Authorisation according to the new rules has already occurred in respect of the European CCPs between 2013 and 2015, while the authorisation process of the European CSDs is expected to be concluded between 2018 and 2020.

POSSIBLE PATHS OF DEVELOPMENT

The development paths of the post-trade infrastructure are determined by technology. In the frameworks of the present article, basically two possible future directions are outlined. One direction analyzes the potential in the present system, while the other examines the formation of the system based on distributed database (distributed ledger).

Immediate securities transactions

The possible direction of development within the frameworks of the present securities clearing and settlement system may be the promptness of the securities transactions, i.e. the shortening of the clearing cycle.

In respect of securities transactions, the risk – among others – lies in that there is a time-gap between the trade and the settlement of the transactions. This is a heritage from the times before the dematerialization of securities, since at the time of paper based securities it took a few days until the seller delivered the securities to the buyer. If the securities were held at the CSD for custody, then the parties had to wait until the securities were re-placed from the shelf of seller to the shelf of the buyer (it can be that the name of the owner was over-

written on the securities as well). As a matter of fact, this type of partner risk (time-gap) and resource need (administration) contributed to that CCP and CSD activity developed.

According to the regulations currently in effect, only those securities may be traded at the trading venue which exist in dematerialized form. This means that no time is needed for the securities to change owners physically, therefore, the transaction cost thereof is reduced. Therefore, if the securities could be moved simultaneously with the time of the purchase, and if the purchase was accompanied by an immediate settlement system as well – so that not only the securities-leg but also the cash-leg of the transaction could be settled immediately – then securities could be traded in real-time.

This promptness would simplify securities trading, and at the same time it would stir up significantly the currently established securities clearing and settlement systems and the solutions used in trading. On the one hand, certain types of transaction which had come into existence built on and in order to make use of the time-gap of the settlement cycle would disappear or transform. For instance, currently it is possible to bet on that the price of a security will drop, and therefore during the same day to sell some of it and then, later, when the price thereof is already lower to buy and earn on the difference between the selling and buying price. In case of promptness, this would not be possible in this way, considering that you could not sell something that you do not possess. On the other hand, the activity of the CCPs would be limited to derivative transactions.

The question regarding promptness is that under what conditions will it be worth decreasing the currently 2-day settlement cycle to immediate clearing, and if it is even necessary to do so. Most of the risks related to the 2-day settlement cycle are known, there-

fore one should concentrate on answering the question as to which risks would disappear from the system and which new risks would appear that should be managed somehow. Such prompt system would essentially be similar to the DVP transactions used by CSDs, with the difference that it could be settled faster than a DVP transaction.¹⁶

Considering the regulatory environment, promptness could be managed by moderate modifications of the current financial market infrastructure framework.

The distributed ledger (DLT)

The appearance of BitCoin, or more precisely the technology (DLT) – on which the crypto money is based – questions the fundamentals of the current securities clearing and settlement system. On the one hand, because it ensures the promptness of the transactions, on the other hand, because no financial or regulatory institution is required in order to guarantee the reliability. For the current securities clearing and settlement system this would

mean that the centralized securities register is no longer necessary, and neither the central clearing and validation of the transactions. In terms of economics, securities trade would come close to being costless.

In its 2017 publication, BIS outlined the four models how DLT technology may be realized. The model features can be seen in *Figure 2*. The first model (on the left side) is essentially the presentation of the current model with the DLT technology, while the last one (on the right side) is the other extremity, when the financial infrastructure of today's terms is not necessary at all, i.e. neither the CSDs, nor the CCPs. There are mixed solutions between these two, according to whether the roles are determined or not, and who may validate the transactions.

Although now the introduction and diffusion of the new technology seems far away, at the same time, the collection of *Jun* (2018) highlights that the DLT-based securities clearing and settlement system could affect the industry significantly in the near future. For example, in Australia, replacing the entire securities clearing and settlement system with

Figure 2

DESCRIPTION OF THE DLT MODELS

Description of arrangement	One entity maintains and updates the ledger (for example, a typical FMI)	Only approved entities can use the service, entities can be assigned distinct restricted roles	Only approved entities can use the service, entities can play any role	Any entity can use the service and play any role
Operation of the arrangement	Single entity	Multiple entities		
Access to the arrangement	Restricted			Unrestricted
Technical roles of nodes	Differentiated		Not differentiated	
Validation and consensus	Within a single entity	Within a single entity or across multiple entities		Across multiple entities

Forrás: BIS (2017)

the DLT technology by 2018 has been set as an objective. China is even further ahead, considering that they had launched their securities depository system based on the new technology in 2016 and are operating successfully. In December 2017, the French government amended its regulation so that the securities clearing and settlement system based on the DLT technology may be operated regarding non-listed securities. In the United States, pursuing the securities trading and securities depository activities based on the new technology had been legally possible since July 2017.

Taking into consideration that the securities clearing and settlement system is made up of institutions which are systemically important in terms of the entire economy, and have significant role in fostering social welfare, it is highly likely that the diffusion of the technology will happen when the reliability of the DLT based systems are unquestionable.

THE EVOLUTION OF THE HUNGARIAN SECURITIES CLEARING AND SETTLEMENT SYSTEM

After the establishment (re-establishment) of the two-tier banking system in 1987, two trading venues were created in 1990, the Budapest Stock Exchange (Budapesti Értéktőzsde, BÉT) and the Budapest Commodity Exchange (Budapesti Árutőzsde, BÁT). At the beginning, the two exchanges kept records of the securities (and commodity transactions) (securities depository activity) and also carried out the clearing thereof themselves. KELER was established in 1993,¹⁷ which took over the clearing and central securities depository function from the Budapest Stock Exchange, and as of 1994, KELER took over the clearing of commodity futures¹⁸ from the Budapest Commodity Exchange as well. In addition, the DVP

type OTC market clearing was introduced during this year as well (KELER, 2010).

The Hungarian securities clearing and settlement system at that time was run by one institution up until 2008, namely, by KELER Central Clearing House and Securities Depository. Following the recommendation of European Central Bank, the central securities depository and the clearing house functions had been separated as of 1st January 2009. KELER CCP was established that was responsible for the clearing of the securities transactions. The guarantee taking activity was added to the clearing function as of that date, meaning that the first CCP was established in Hungary.

Considering the institutions of the current Hungarian post-trading infrastructure, at the time when this article is being written, one CSD and one CCP is operating in Hungary. Although there were plans to establish a Trade Repository, however, it was not yet realized. This means that the OTC derivative transactions concluded by the Hungarian market participants are registered in a TR based at another EU country – the relevant regulations ensure access to these data for the Hungarian authorities. In addition, it shall be noted that similar to the European CSDs, the Hungarian CSD had also joined the Target 2 Securities (abbreviated as T2S) initiative.

SUMMARY

The development of the CSDs and CCPs was driven by the aim of sound and effective management of securities trading.

As the first step, the clearing house function of the CCP evolved, i.e. the netting of the transactions appeared, as the first line of defense against the defaults of the trading counterparties. The guarantee taking activity accompanied much later in time. Ultimately,

the two functions supplementing each other could and are currently able to contribute efficiently to the management of the partner risk of the counterparties participating in securities trade. As a consequence of the 2008 crisis, the significance of CCPs increased substantially, therefore their regulation was adjusted accordingly.

Fundamentally, the CSDs was not established for the management of market risks but for reducing the transaction costs of securities trading. Because of the technological development and primarily to the dematerialization of securities, the role of CSDs has increased significantly starting from the 1990s. This also fostered and fosters the process of securitization, which has many direct and indirect advantages for the economy such as the promotion of the free movement of capital.

The establishment of the Trade Repository as a post-trading infrastructure was driven not by the market demand but by the regulatory intention as a consequence of the 2008 financial crisis since it was difficult to assess the magnitude of the OTC derivative market open positions and through that the scale of the actual and potential future damage.

In the future, we definitively have to ex-

pect the transformation of the post-trading infrastructure. The reason behind the change is the technological development. According to the first version presented, the essence of the change could be the transformation of the concept of promptness and thereby the cease of the current T+2 clearing cycle characteristic to the prompt markets. According to the second version, the DLT technology could reform the foundations of the current post-trading institutional system.

In my opinion, the two development paths will happen simultaneously, namely in parallel with the slow steps made toward the direction of promptness by current post-trading institutions, the DLT technology based securities trading, clearing and settlement systems will emerge. The latter one may eventually take over the role of the current institutions completely.

Overall, the CSDs and the CCPs currently determine the efficiency of the financial and capital markets fundamentally. Doing so, the two institution types indirectly affect the performance of the whole economy. Therefore, considering their crucial role in ensuring the flow of capital, both the CSDs and the CCPs are considered to be systematically important financial infrastructures.

NOTES

¹ Derivative financial instruments

² Not including the hieroglyphics in ancient Egypt

³ The economy of the antique economy was based on the developed agriculture

⁴ Future trade

⁵ Default means that one party participating in the securities transaction does not comply with its com-

mitment, i.e. it does not supply the security or does not pay its price.

⁶ The original transaction is divided into two separate transactions: CCP becoming the buyer of every seller and seller of every buyer. Thus, the novation constitutes the basis of the guarantee taking activity of the CCP.

⁷ USA, the United Kingdom, Belgium, France, the Netherlands, Japan, Canada, Italy, Germany, Sweden

- ⁸ currently: CPMI – Committee on Payments and Market Infrastructures
- ⁹ RSSS – Recommendations for Securities Settlement Systems
- ¹⁰ RCCP – Recommendations for Central Counterparties
- ¹¹ Delivery Versus Payment
- ¹² In order to indicate the efficiency of a CCP, in connection with the most significant Hungarian broker scandal of recent times, the Hungarian CCP was able to close the open positions of the largest derivative market participant within 5 days, without any loss.
- ¹³ Regulation (EU) No 648/2012 contains the basic rules applicable to CCPs and Trade Repositories – the regulation mentioned is often referred as EMIR.
- ¹⁴ By that time, a single framework system had been developed by CPMI-IOSCO under the title Principles for Financial Market Infrastructures
- ¹⁵ Regulation (EU) No 909/2014 contains the common European rules applicable to the CSDs. This regulation is referred as CSDR.
- ¹⁶ In case of DVP transactions – since the two trading parties have to give instructions separately – there will definitely be a time-gap between the receipt of the two instructions at CSD level, therefore, in this regard the system will never be prompt, only for one of the counterparties (the counterparty who secondly submits the instruction).
- ¹⁷ KELER Central Clearing House and Securities Depository (old name)
- ¹⁸ commodity futures are considered as financial instruments

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