

## **WILL THE CENTRAL BANKING BE THE CENTER OF BANKING?**

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### **Abstract**

*Could “Central Banking System” be able to harvest what Central Banks have cultivated after 2008. Would they be successful of managing the value of their money and the price stability by supplying more money and by expanding the monetary base. Central Banking has been defined as the most important discovery of the humanity together with wheel and fire. But, unwillingly in order to create inflation and indirectly to support fiscal policies of the governments for the recovery of the World economy, they are still expanding their balance sheets and depreciating their bank notes. Could it still be told that their independences exist? Are monetary policies still decided by their governance structure? After the Gold Standard and Smithsonian, inflation targeting, interest rates policies, seignior age, their supervisory functions, Basel Regulations were discussed in many environments. The development of digital money, alternative financing methods, The Fourth Industrial Revolution, non-bank financial institutions, new understandings in financial services and finally, most importantly changing forms of trade and business models will definitely change Central Banking. This paper puts new assertions, hypotheses for the future of Central Banking (and Central Banks) and discuss further possibilities for banking which is basically lending and depositing of any valuable thing.*

*Keywords: Financial services, Central Banking, Innovation, Alternative finance, Money*

### **INTRODUCTION**

During the period of time from barter economy to the invention of paper money, after the discovery of papyrus, humanity had always the same principles in trade. Demand and supply (and the optimal allocation of resources for prosperity which is called economics). This relation with supply and demand has the same dynamics in funds and money dimensions. This simple

principle is valid for financial services and banking as well, fund raisers and supplying in one side, fund seekers on the other side. Over time, financial services have started to pass into a different phase with development of banking and Central Banking. On the other hand, there has been a significant leap in financial services with development of mobile technologies and commercialization of internet. This tendency which has been accelerated after 1990s and in 2000s, has brought different business models to our lives such as e-commerce with new chip based processors and circuit systems. It's obvious that the improvements in the "Fourth Industrial Revolution" with mechatronic, robotic and Artificial Intelligence based technologies, will bear away financial services to a totally different stage. (Binner, 2004) Finally, with the commercialization of space technologies, undoubtedly financial services and finance' traditional understandings will pass to another dimension, started with 2008 Lehman Brothers' case and accelerated especially after 2015.

After the collapse of Lehman Brothers in United States, monetary policies of Central Banks with zero and even minus level interest strategies, which have also caused the Liquidity Trap of Keynes (Baydur and Süslü, 2011), are occupying the top of financial agendas. Despite these interest rates strategies, there are not any significant signal in inflation rates and GDP growth and this situation could only be explained with "Neutrality of Money Theory" (Polleit 2009).

Problems of individual consumers and SMEs for reaching to bank credits and issues in access to finance together with high-cost financial services are still a debating point in G-20 countries. Subjects such as risk venture capital, angel investors, protecting financial consumers, financial inclusion are the top priorities of G-20's countries and the most important topic of governments financial agendas for economic recovery and sustainability.

Nevertheless, increased transaction costs of big companies because of working with financial intermediaries, difficulties of finding new financial instruments that respond to investment and working capital needs, aggressive target and performance oriented banks lack of action for customer oriented banking are getting bigger every single day. Banking system which has to develop its banking fundamentals and baseline regarding Basel regulations and decisions, faces problems with capital requirements and its return on equity. Reserve ratio, Basel III requirements are some of the reasons that cost of capital increase and due to these pressures, investing in capital markets by banks are more popular than working with real sector companies. Thus, the gap between banking and real sector is getting bigger each and every day. Access to finance is another supporting issue of this situation with unbanked and underbanked individuals.

Issuance of money in the digital world and in binary/circuit systems has started to develop new payment systems. The active role of non-bank financial institutions, alternative financing methods and digital money are triggering different expectations on the banking and Central Banking developments. Finally, Central Banking system which funds indirectly the treasuries' budget deficits, triggered with a new liquidity crisis, may open a new page in the future with financially collapsed Central Banks. These impacts and the expectations enforce to have a new visionary perspective for Central Banks and Banking.

Finally, considering the Federal Central Banking System (FED) in US or the European Central Bank that has been established by European Monetary Union (EMU), it could be possible to reproduce such examples in other regions. Merger, demerger and takeover of Central Banks could be a higher possibility to foresee. Disruptive changes in financial world will have an important impact on Central Banking and their results will affect all money and capital markets.

In this hypothetical study, more than focusing on past implementations and discussions of Central Banking, prudential business models of Central Banks will be reviewed in a futuristic and innovative perspective and their basic fundamentals are challenged. The aim of this study is to discuss these assertions and suggestions with future expectations and creativity more than today's available data and understandings. After the literature review, the new approaches are theoretically discussed and suggestions are summarized. Finally in the last section, findings and results will help for further discussions and researches.

## LITERATURE ANALYSIS

Financial services are operating since the invention of money until today under different applications and titles. But the phase of banking and Central Banking systems had started with the invention of paper money in 1600s BC during the development of international trade with Silk Road and other discoveries. Financial services short history had started in Italy with banco depositing and lending transactions, in England with Llodys insurance market and in US with capital markets started with railway bonds issuance during the medieval age and after. Finally, with Central Banks of Amsterdam and Sweeden at the same century, Central Banking had been started. With the development of different financial business and financing models and the regulations of lawmakers, today's financial systems have appeared. There are five fundamental elements of a financial system: Treasury, Central Bank, financial institutions, individual or companies with fund surplus or fund deficits. Central Banks are located differently among these because of their missions, banking and money market operations and balance sheet sizes. Therefore, they have different characteristics with treasuries or finance ministries.

Central Bank description could be made in different ways. But considering their first priority, it can be described as: “A financial institution which has the solely right to print the (paper) money named as bank note. As being the “Land of Last Resort” supplies the liquidity needs of the markets with the wide controlling mechanism and with the responsibility to manage the value of its money and the price stability.” More than managing the liquidity in the markets, Central Banks are responsible with the guidance and the implementations of monetary policies.

Designating the policy interest rates, determination and implementation of reserve ratio requirements, rediscount transactions, funding markets with open market transactions against public debt instruments and intervention to foreign exchange markets are the main tasks of Central Banks and they act (theoretically) freely for all of these when it is needed. They create a significant effect in economy and on other counterparts e.g. markets, investors, banking systems, etc. Apart from these, they operate and manage different responsibilities under special rules and functions.

Regulating and managing the banking system (It may differ in various countries. For example, this role has been given to “Banking Regulatory and Supervisory Agency” - BDDK in Turkey instead Central Bank), producing banknotes and coins, being an intermediate of IMF transactions as being Treasury’s agency, executing the banking actions of treasuries are some of these responsibilities and functions. Apart from these, they are lending money to banks as being the “Land of Last Resort”, are holding state reserves, are reporting main economic indicators while looking for profit as being a joint stock company and they are giving dividends to their shareholders. These are the most important tasks of Central Banks.

One of the fundamental difference between Central Banks and traditional commercial banks is that Central Banks have the specific rights to issue money called “emission”. But with the development of e-money schemes and digital payment systems, their situation gets into a different shape and different identities started to play the same role. There are many academic studies for e-money but there are not still any suggestion and any common description for its place in Central Banks’ balance sheets. There are limited works of its relations with money definition or velocity of money. The first study about this subject in Turkey was revealed by Dirican in his master thesis (Dirican, 2000). Central Banking are facing disruptive changes and impacts with latest technological developments but they are not limited only with e-money. But most of the papers stating the relation of technology and Central Banking are in general old-dated as seen in the literature review. (Goodhart, 2000)

The first Central Bank in the world was the Swedish Riksbank, founded in 1668. There are also claims which pretend that the Amsterdam’s (Netherlands) Central Bank was the first one. “Riksbank” had known as, giving banknotes instead of coins to the related parties who had

rediscounted their receivables and bills. In history, government (in reality Central Bank) money had issued at the first beginning for war & army financing, government budget deficits. Together with the development of paper bank notes had accelerated the establishment of Central Banks. Bank of England has been established in 1694 and “Central Bank of the Republic of Turkey” (CBRT) was established in 1930. (Eşsiz & Öztürk, 2012:71)

Independency of Central Banks are at the helm of topics discussed about Central Banks. Definition of their independency could be summarized as doing their banking transactions and as processing their monetary policies mainly for price stability without getting any effect or any impose from the government or the politic arena. (Alkinoğlu, 2000) In different words, “Independency of Central Banks” can be described as the ability of monetary policy makers of independently taking decisions and its implementations for such aims, as freely managing its organizational bodies and as having their own corporate governance model even though they receive pressures and sanctions. Central Banks’ independency can be classified under four groups:

**Purpose:** Being in a situation of political independency while taking and operating monetary policies and targets.

**Institutional:** Designating the tenure, assignments, works and termination of office times of Central Bank governors and managers with political independence, being transparent in these processes and procedures.

**Financial:** Ability of having financial assets and capital force and operating with its own budget and financial figures. Determining the budget by the bank administrative means without any control from outside. Another criterion is the composition of their capital.

**Instrument:** Ability of controlling money policy instruments with the decisions taken freely and the situation of “Monetary Policy Council” working without any influence.

Actually, Central Banks should coordinate in general with the governments for supporting the macro economic and the strategic goals but while acting for realising and for supporting these goals they have independently to decide policies, to choose instruments, to operate in markets freely, to implement regulations for the banking system’s safety and to supervise banks equidistant.

Central Banks are the final credit authorities and being as the “Land of Last Resort” is one of the most unique characteristic of them. There are some discussions in literature which claim that “Dealer System” after 2008 has caused the appearance of shadow banking and the usage of derivatives such as interest, F/X, credit swap transactions by corporates for replacing traditional funding and financing methods and these are the modern version of Bagehot

theories. (Mehrling and others,2013) Friedman had also put some arguments in his futuristic article in 1999 that are similarly discussed and suggested within this paper.

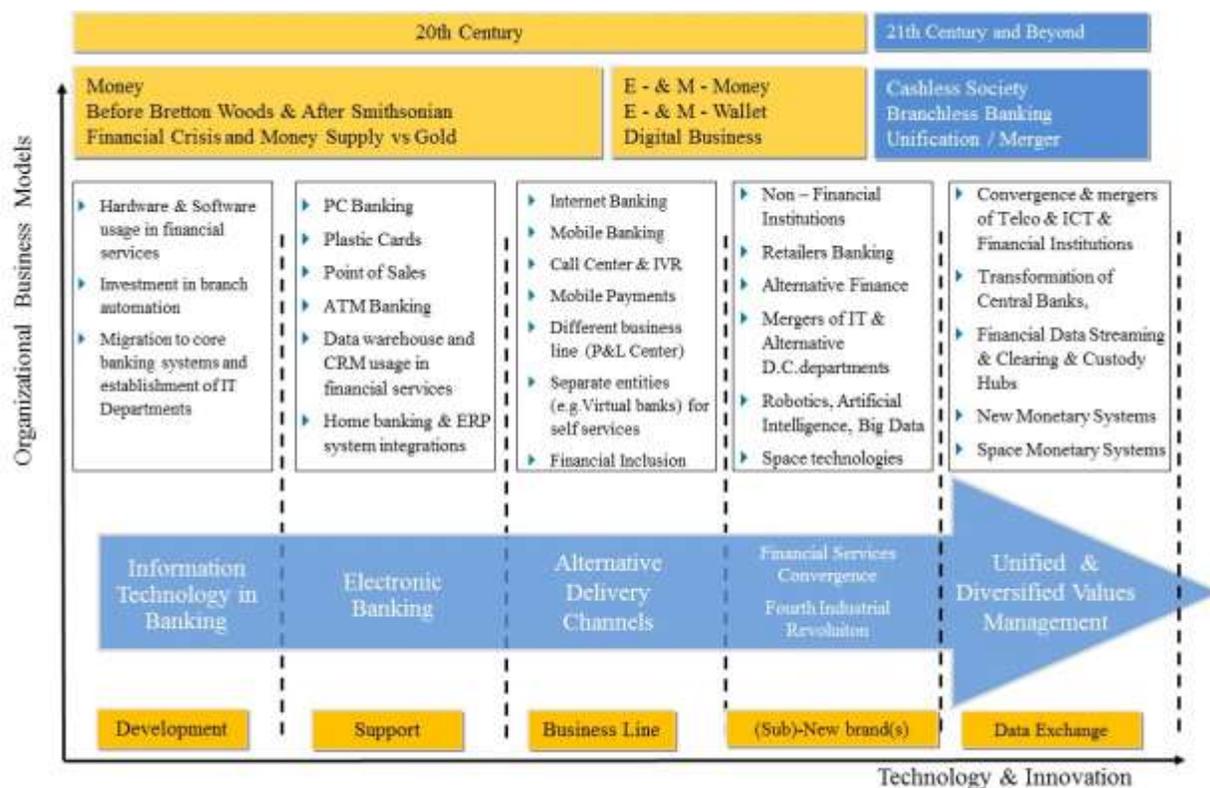
Friedman claimed that monopolistic Central Banks will limit the possibilities of reaching to credits by individuals and by companies via reserve ratio increases and decreases. Likewise, in the situation of issuing (e-)money by the commercial banks will restrict commercial banks funding and financing abilities due to the reason that they should also have their own buffer reserves in their balance sheets. The same situation is valid when banks would have directly proportional required reserves with the (e-)money in electronic chips, on smart cards and in mobile devices. Other subjects that Friedman discussed are that banks would lose their role of loan originator to non-bank (financial) institutions and new clearing systems would be established by banks other than the Central Bank's clearing systems, e.g. Interbank Card (Clearing) Center in Turkey. Finally, he cited about the ability of working cross border for a Central Bank. (Friedman, 1999)

Ho, came up with three different effects of financial innovation: Transparency of banks' balance sheets will decrease with derivative transactions, credit risks will increase, systematic risk will go up with new toxic financial products. (Ho, 2006) Hoda, in his detailed literature review discussed the effects of financial innovation and found a strong correlation between Central Bank's related topics e.g. interest rates, mortgage backed securities and financial innovation. (Hoda, 2013) Berk discussed briefly in his article written in 2002 that Central Banks will not lose their control on interest rates and their force on its determination despite financial innovations. (Berk, 2002) There is almost no study in literature about the possibility of Central Bank collapses. It can only be seen in the studies of Howden and Buiter that except Tajikistan and Zimbabwe Central Banks there were no Central Bank broke since the establishment of Bank for International Settlement (BIS) in 1930. (Howden, 2009; Buiter 2008)All the papers found in the literature about Central Banking future and its relations with innovation argue the possible changes in basic fundamentals of Central Banking, i.e. interest rates, inflation, money creation and monetary base, the cost of funding, the risk of government bonds in their balance sheets, quantitative easing, zero minus level interest rates implications. (Lautenschläger, 2014; Tromp, 2013; Berk, 2002; BIS, 1996& 2003)

The biggest power of Central Banks is the ability of printing and issuing money. That is why it seems impossible for them to collapse or to go to bankruptcy as long as they can pay their debts with the money they issue and they can borrow from the markets with their own liquidity bonds. But it could be possible to face their failure or sharp decline in their forces to act for urgent market needs. With a new global financial crisis, this situation could be happened when holders require the equivalents of their banknotes just like (demand) deposit withdrawals

in commercial banks during a “Big Run”. If the possibility of maturity and liquidity risks could happen simultaneously, Central Banks could risk to pay (inter)bank’s deposits and overnight duties. Finally, if their assets and its values decline simultaneously and if they also face huge amount of F/X losses, it might be the case of using and of losing their whole capital which is not covered by Basel Capital Adequacy Ratio. (Howden, 2009) In that case, the role of BIS would also be tested. Electronic and digital improvements and heavy technology usage in financial services made a huge impact on the future of banking and other financial institutions. Table 1. shows the past and the future possibilities of banking and Central Banking. At that point, in order to read properly and to argue on the Table 1 and in the findings, the definition of futurism should be remembered: *“An artistic movement begun in Italy in 1909, which strongly rejected traditional forms and embraced the energy and dynamism of modern technology. Launched by Filippo Marinetti, it had effectively ended by 1918 but was widely influential, particularly in Russia on figures such as Malevich and Mayakovsky.”* (<http://www.oxforddictionaries.com/definition/english/futurism>).

Table. 1 Past, Present, Future of Banking



Source: Dirican, C. (2013). Convergence of Financial Services and Telecom. IPQC Banking Technology Summit, 2013, Conference Presentation, [www.ecoleistanbul.com](http://www.ecoleistanbul.com)

## METHODS AND DISCUSSION

Lehman Brothers' bankruptcy caused the global financial crisis in 2008. Operating costs, hedging of risks, sustainable cash flow and income generation became the biggest issues of today's companies besides the governments' GDP growth and budget problems. The last financial turmoil and the political developments questioned the reliability of the financial institutions and trust became the most important topic for banking industry. All financial institutions are still working on and are renewing their strategies to gain more customers and to make them loyal. (Jayamaha, 2002) Central Banks are still been seen as trustworthy but they are out of ammunition (Lynn, 2016).

In this study, the future of Central Banks is going to be discussed more than its past. Therefore, limited number of notions and descriptions together with well-known discussions in the literature are cited in the paper, it is mainly focused on the future expectations. Most important issues such as issuing money, seigniorage, inflation, interest rates and Treasury relations are shortly summarized for better understanding the discussions and the suggestions made in this paper. Central Banks, which are under enforcement power of governments, covered many times the public debts and budget deficits. Therefore, issuing money, without being directly proportional with their active assets, is one of the reason of inflation and interest rates. For this reason, seigniorage income via money emission was discussed frequently in the literature as a major point of difference between commercial banks and Central Banks. (Buiter, 2007) As being agent of the treasuries, the function of being financial intermediary is another differentiation point. But Central Banks shouldn't get out of the intermediary goal by increasing "advances to treasuries" in their balance sheets. Undersecretaries of Treasury own in general the mint managed by Central Banks where bank notes are printing but this shouldn't be understood and be used falsely. The discussions and the suggestions made for the future of Central Banking system are:

As a first argument, the claim that the economy may work well even without Central Banks can be discussed. (Congdon, 2009;183) There are many alternative financing methods that have begun especially after 2008 Lehman Brothers crisis since credit crunch was a big issue. (M&G Investments, 2013) Angel investments, risk venture capitals are the new capital injection models for start-ups which don't have the chance to be opened to public listings. Crowdfunding and fundraising are two other new methods. In these methods, collection of funds, like donations in general for a project or for an idea, is accepted as a new capital raising model. Direct lending and P2P (Peer to peer) lending/payments are also new ways of investments. In these methods, fund suppliers and fund seekers connect without any (financial) intermediaries. Non tangible assets and property sales and lease back are also new methods.

In this method, company sells non tangible assets e.g. factory building and lease back from the side they sold. Private placements are also preferable. In this new model, reconnection of fund suppliers and fund seekers is realised by banks but the banks are not opening a credit line, they are acting like a real estate agent among them and earn commissions by this intermediary position. Hence, it can be said that over the counter credit markets are properly growing in the previous years. In this direction, these fund suppliers and fund seekers will meet without banks or financial intermediaries. These new money markets which will not be under the Central Bank's regulation or supervisory, can be argued as a significant example. "Russian Central Bank" (Ostroukh, 2014) which opened direct credit limit for Russian companies who suffered from U.N. (International) embargo and "Central Bank of Republic of Turkey" which made direct foreign currency transactions with public and government companies for managing foreign exchange volatility in the market and its effects on "Current Account Deficit" are also two other examples for financial services without intermediaries. Mobility of bank account numbers and its transportation like mobile phone numbers have been discussed in Australia, France and Netherlands and it stands as a new opportunity for financial consumers' protection and a new working area for banking which is seeking for efficiency. It could be also a new clearing system income opportunity for Central Banks (BEUC, 2012; cbanque.com, 2012; Moorhouse Consulting, 2015) And, suppose that all cards, mobile phones and bank account IBAN numbers are merged.

As a second argument; With the development of e-money, mobile payment and mobile money transfer systems, the importance and market share of the non-bank (financial) institutions are rising. For example, in Turkey, after the new "Law On Payment and Security Settlement Systems, Payment Services and Electronic Money Institutions" passed in 2013, payment systems came into a new phase. It's now possible in Turkey to issue e-money, to collect bill payments in "Bill Payment Centres", to transfer money apart from bank branches, by receiving necessary approvals and licences from BRSA.

Even though e-money has no big value and strong effects on seniorage for today and for financial markets and for money substitutes, it could be pretended that digital currencies such as Bitcoin are seen in the markets as an alternative to Gold Standard and to Bretton Woods' ounce price implementation. Bitcoin's parity or transformation value to a currency's level which had almost similar levels with ounce price of gold in 2015, could be taken as first signals for such impacts. Policy makers should consider such improvements seriously as it means that investors are looking after new values instead of gold. After the technical default and the financial crisis in Southern Cyprus, international investors wanted to carry out their money abroad in form of bitcoins since international money transfers and deposit withdrawal sanctions

were accepted by its government and this situation could be given as a strong example for this discussion. In the future, Central Banks' integration or merger with these e-money licenced companies, acquisition of non-bank financial institutions, merger of Telecom companies with commercial banks and transforming into a clearing and a custody center or even a new Central Bank shouldn't be seen as a utopia and should be considered seriously. (Yaltirak, 2014:18) If European Central Banks can constitute an umbrella Central Bank, then those scenarios could also be the case.

As a third argument, expectations of Central Banks' "Land of Last Resort" function to be changed can be discussed. It may happen in different ways. As it is described in the second argument, existence of these non-bank institutions which issue (e-)money, could cover the funding needs of other non-bank financial institutions or even commercial banks. Real industry firms which have the allowance to work directly with commercial banks in money markets and finally directly borrowing or lending money from/to Central Banks would be possible in the near future. Open market committees should also consider real industry firms' assets as collateral. Real industry firms that had lending facilities from FED were are examples of this situation. (Haltom & Lacker, 2014). If Central Bank broke could be happened, then this argument would have directly been the case.

As a fourth argument, Treasury's technical default devalues their issued bonds in the balance sheet of Central Banks which hold them (e.g. Greek banks' and Treasury default in 2015). could cause capital problems. For the same reason, serious counterparties' risks of open market transactions with commercial banks could also cause collateral problems (Gatarek & Jablecki, 2014) and global foreign exchange market volatility and collapses of foreign currencies due to trade and currency wars could accelerate the case of a Central Bank failure. As it's mentioned in this study before, there are two limited examples for a Central Bank's default which can be ignored due their importance. Therefore, the strongest argument of this paper states that in the next global financial crisis, the World will be witnessing (hopefully our theory is wrong) a Central Bank broke. Swiss Central Bank's serious amounts of Swiss Franc currency sells could be shown as a good example for this situation that even Central Banks have a limit in their power. (Revill, 2015) Their authorisation and their ability of issuing and printing money should not be considered as a saviour if this situation occurs. None would accept a dead star money by reminding the real purchasing power of US Dollar against gold since Bretton Woods. (Petroff, 2016)

The last argument is about the subject which could happen in the medium or in the long term. Central Banks cannot stand insusceptible against companies which are struggling with sharp declines of ROE and for that reason are putting efficiency and productivity in the first rank.

Financial institutions, especially investment banks will look after staff costs' efficiency and will try to avoid asymmetric information risk by utilization of big data and will be using artificial intelligence more for faster decision making. In this direction, their intense and their higher technology usage will take part and response in the agenda of Central Banks and will push them to respond these technological changes. Istanbul Stock Exchange's cooperation with NASDAQ for accelerating the transactions speed with NASDAQ's IT infrastructure and systems could be given as an example for this situation. If banks transact heavily with artificial intelligence, Central Banks should respond with the same bazookas.

In consideration of previous information in this study, futuristic hypothesis on "The Future of Central Banks" can be also listed in the findings. Preparing legal fundamentals and regulations for these suggestions and assumptions, their entry into force, their preparation with related parties are the essentials and critical requirements that must be taken care of. There is a necessity of doing more study and examination on these topics to make it work in practice. During the transition period and time, with developing technologies and with new trends, possible changes could trigger to make revisions for the arguments that took place in this article. But obviously, the time has come to discuss the future of Central Banks. Central Banks' lack of supporting economic growth and their independencies questioned under governments direct or indirect interventions, their indirect funding operations of treasuries with open market transactions should be discussed in details including monetary base expansion or even money issuing. (Cobham, 2012) Finally, in case of consideration of some or most arguments to be implemented in Turkey, there will be a need of detailed discussions and examination with the cooperation of BRSA and CBRT in the first rank.

## RESULTS

In consideration of these previously information, all possible suggestions, discussions, findings, theories and arguments for the future of Central Banks and Banking are listed below:

- Ability of doing direct business of real sector companies with Central Banks, e.g. overnight repurchase agreements and of being direct member of check and card clearing systems;

Real sector companies' ability to do open market transactions like commercial banks with Central Banks against their own company bonds and against securities portfolios they hold and usage of these as collaterals (Telegraph, 2012)

- Ability of intercompany funding and dealings between real sector companies in Central Banks' money markets by having the necessary changes in regulations of competition act, hidden capital transfer and lending money measures

- Real sector companies' lending money to commercial banks differently from deposit, bank's liquidity bond and investment fund lending forms. For realizing it, enabling companies' to open nostro and vostro accounts like correspondent banking transactions in UFRS and companies' accounting systems should be allowed
- In the analytic balance sheets of Central Banks and in their other reporting systems, e-money descriptions, definition of new accounts, accounting requirements, new procedures and processes should be developed.
- Possibility of privatization of Central Banks when they need to get more capital, allowing them to get more shareholders for new capital injections and determination of the processes for public listings i.e. initial public offerings should be ready
- Identification of responsible (government) bodies that will handle collapsed Central Banks, whom / which institution will take over and designating liabilities of shareholders in this situation should be clearly decided and be defined
- The capital raise or decrease and merger& acquisition of Central Banks as well as selling its shares or an important per cent of their assets should be defined and necessary procedures, work processes should be in place if Central Banks would have dramatic financial problems. The disaster recovery scenarios should be revised including their collapse. The case of Iraq, Syria, Egypt Central Banks should also be considered
- Definition of how the Bank for International Settlement will take action in the situation of Central Banks broke as well as other Central Banks (regarding credit crunch of European commercial banks during 2008) and discussions of such situations should be made in Basel, BIS, G-20 and IMF.
- Definition of Central Banks' demerger (considering Federal Reserve System) or establishing local Central Banks, merger with other Central Banks, acquisition of other Central Banks and opening representative offices and foreign branches abroad should be defined clearly. This would be the case in the future with human colonies in other planets
- Evaluating of becoming and of acting as other countries' Central Bank and clarifying the organizational and operational business models for such works. Preparation of processes and procedures for lending money and for banking transactions abroad as being another country's Central Bank. This is the case of monetary union in general
- In the situation of accepting that monetary policies (especially after 2008) don't help economic recovery, growth and increase of prosperity which are the basics of economics, closure of Central Banks and cancellation of Central Banking system and transferring them to treasuries (back to the basics considering that most of the

developed Central Banks are not independent since they are funding treasuries indirectly) and transforming them to work in parallel with public needs and wealth expectations should be considered (FED holdings of direct and indirect (mortgage backed securities) bonds in its balance sheet are equal %24 of US GDP, %98 of total assets and %22 of outstandings government debts.)

- Considering developments in the payment methods such as cards, mobile, cheque, enabling related companies to be a direct member of clearing systems and designing the membership procedures should be available
- Designing the process and the policies of using foreign country's Central Banks' clearing and payment systems (e.g. Single European Payment Area, SEPA) regarding the reasons (such as monetary union and economics of scale)
- Merger of e-money companies with Central Banks and determination of take-over, acquisition processes should be decided
- Because of cost, imitation, holding, spreading and security reasons, 3D/4D printers should be considered for issuing money when / where it is needed. Therefore, it should be also discussed the possibility of printing / issuing the money individually which means individuals and companies could also print their own money which can be named as "Personalization and/or retailing of money"
- Pioneering the "Bank for International Settlements" for designing these processes and for leading common sense ideas and for establishing new working groups for such arguments and developments. How BIS will interact with Central Banks' like and e-money companies should also be discussed under these working groups
- In the case of electronic money issuing companies and a second Central Bank existence in country, money reports, its consolidation and tracking systems in money definitions such as M1, M2 should be considered and be defined as well as their consolidation criterion
- In parallel with the velocity and the usage of e-money in the financial system and in trade, calculation of inflation and its relation with inflation should be analysed
- Telecom operators' transformation to a financial clearing system or exchange centres with mobile money and mobile money transfers and their integration to Central Bank's EFT systems should be considered
- Their merger or acquisition with commercial and Central Banks or with e-money companies should be discussed (regarding that in the Major Industry Identifier (MII) codes system, number "8" is fully assigned to Telecom companies in the World)

- Banks that have strong capital and financial health could unify to establish a financial holding for considering to launch their own organised money markets or to become a Central Bank. This situation should be decided as being competition of Central Banks
- The same logic could be valid for other “over the counter” markets. Interbank Money Market could face a competition risk with an Intercompany Money Market
- In a similar situation for SMEs which have credit crunch problem in general, SMEs could transform their credit unions to such money markets operators by the help of technology and cross border banking and capital transfer abilities (e.g. Google or Facebook international advertisements and local tax issues could be a case study for the same cross border transactions)
- How the Central Banks would react with the acceleration of alternative financing methods for such options, is another discussion point.
- Custody services of Central Banks could be developed for e-money, DNA, citizenship identity, patents, licences, blood group or elements and mines which similar examples can be seen in capital markets custody and clearing systems with bonds, stocks, etc.
- Integration of e-bartering and e-purchasing systems, of credit cards and SWIFT payment systems to Central Banks clearing systems, providing the variety and added value of services could decrease the dependency of Central Banks to seniorage income
- Definition of how to use the algorithms with artificial intelligence in Central Banks and in its markets and finding the effects of new technologies such as robotics, cloud technology, big data on the Central Banks’ monetary policies and their daily business as usual is inevitable. Central Banks should immediately revise their main strategies against the “Fourth Industrial Revolution” and the “Commercialization of Space Technologies”
- Under the title of space economy, in the near future human made space stations or colonies in other planets, would be seen. Determination of their monetary systems and how to include into the Central Banks’ balance sheets should also be analysed from today
- Discussions should be started for a new currency (system) to use in space such as IMF money SDR case. The conversion rates to world currencies could be fixed as it is the case of Euro and IMF’s SDR
- Theoretically, determining Bank of International Settlement’s roles and method of works with local Central Banks in different colonies in space could be another discussion point
- All the values that could be defined in binary numbering system could be used or be exchanged in the clearing systems of Central Banks. Binary number schemes and

values to be tracked in the analytical balance sheets under internal and external assets should be defined. Impact of artificial intelligence algorithms on these items and how external assets could cover space based assets in the future should be discussed

- Finally, discussion of the necessity and the existence for a Central Bank with the development of alternative financing methods such as peer to peer lending, crowdfunding, fundraising and exchanges of binary codes usage instead of money in the future should be made. Or, new financial business models more and other than inflation and interest rates, inflation targeting and independency for Central Banking system should be considered

## CONCLUSION

Digital advances and improvements in smart technologies have accelerated financial services disruptive changes. Due to the 2008 financial turmoil, Central Banks exponentially inflate their balance sheets by government assets instead of gold and other assets. The gaps in their balance sheets could probably be concluded by the first collapse of a Central Bank. On the other hand, digital money will affect their seignorage income since e-money definition and its place in their balance sheet are not clearly defined globally. “Basel Banking Committee” should focus Central Banks’ issues more than commercial banks capital adequacy problems and their systematic risks. Even though there are many organizations working for the global economic recovery and growth especially with G-20 summits, even though Central Banks support treasuries with intelligence sharing in coordination (Simmons, 2005), as a first and fundamental rule of economics science, the countries who would like to increase the level of wealth and the prosperity, have to find their own way in the global competition. It can be pretended that there are many possibilities for the future of Central Banks but most probably they will split up by two. First, a disruptive financial crisis like Lehman Brother could collapse Central Banks due to they are out of bullets. In that case, their liquidation, rescue situations, confiscations, take-overs and the institutions which they will be transferred to will be highly discussed. There will be topics such as capital increase and raise, new shareholders receipt, to be initially offered to the public or to transfer to Treasury, merger with commercial banks that could appear. Second case is that Central Banks’ seriously organizational and operational transformation with the impacts of latest technological developments. At this possibility, first of all e-money institutions could be acquired by Central Banks or merge among themselves in order to respond to Central Banks’ competition or Central Banks establish their own affiliates like mint companies. Second sub-heading would be that artificial intelligence, neural networks, big data usage with the aim to reach to the level of the market dynamics together with 3D / 4D printer technologies for issuing / printing money.

Similarly, in case of technological development of robotic technologies converging with the "Internet of Things", their aims to get rid of the cost of printing money and to reach "Cashless Society" ideal would be a separate title.

In the future, telecom operators and technology companies could merge for transforming into new data and storage centres or clearing and custody systems. If they also judge their position to transform to a Central Bank role, the scenario of cross-border merger of Central Banks to respond to these competitions would also be possible. It should be remembered that most of the dimension of science, sectoral and space economy are not existing with today's knowledge. That is why it is called social sciences because most of the arguments could only be tested while living and experiencing. Finally, in the context of "Space Economy" and "Space Age", money and monetary policies and its management models within the boundaries of our planet and abroad must be analysed in details in further articles and in academic researches. The aim of this study which has similar visionary characteristics with Friedman's article (1999) is creating a primary resource for different possibilities and future studies of Central Banks and will be followed by new researches.

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