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Potential impact of financial innovation on financial services and monetary policy

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Abstract

The recent wave of financial innovation, particularly innovation related to the application of information and communication technologies, poses a serious challenge to the financial industry's business model in both its banking and non-banking components. It has already revolutionised financial services and, most likely, will continue to do so in the future. If not responded to adequately and timely by regulators, it may create new risks to financial stability, as occurred before the global financial crisis of 2007–2009. However, financial innovation will not seriously affect the process of monetary policymaking and is unlikely to undermine the ability of central banks to perform their price stability mission.

Executive Summary

- Financial innovation can be defined as creating new financial instruments, technologies, institutions, and markets. It includes institutional (e.g. new types of financial firms), product (e.g. new types of derivatives or securitized assets, among others), and process (e.g. online banking, phone banking, or other forms of information and communication technology applications) innovations. Financial innovation has its roots in technical and technological changes, regulatory changes, market condition changes, and economic policy changes. The role of regulatory changes is ambiguous—financial innovation can be encouraged by both deregulation and tighter regulation (i.e. to circumvent the regulation).
- The pace of financial innovation has accelerated and the degree of its sophistication has increased over the last half century due to rapid economic growth, globalisation, financial liberalisation and deregulation (or in response to new regulation), the development of new legal tools, and, most importantly, technological progress, especially in information and communication technologies. Financial innovation offers new opportunities for economic and social development, but at the same time generates new challenges and risks, especially concerning financial stability.
- Financial innovation, especially the application of information and communication technologies, has already revolutionised the financial industry and will continue to do so in the future. It will bring new products and processes and far-reaching organisational and institutional changes. However, licensed banks and non-banking financial institutions will continue to play a leading role in the provision of financial services, most likely in partnership with information and communication technology and data management companies. The application of information and communication technologies does not eliminate the problem of information asymmetry in financial services, which, in turn, requires the licensing of financial institutions and regulatory supervision.
- In contrast to generating far-reaching changes in the financial industry, financial innovation has had a very limited impact on monetary policymaking. Despite the visions of some futurologists, financial innovation based on information and communication technology applications has not reduced the demand for central bank reserve money,

including cash. On the contrary, the collapse of financial intermediation in the aftermath of the global financial crisis increased the demand for reserve money quite substantially.

- Due to its impact on the monetary policy transmission mechanism (via financial markets), financial innovation requires adjustments in the various technical aspects of central bank operations, such as modifying the procedures of open-market operations and other instruments and updating forecasting models, the definitions of broader monetary aggregates, and communication strategies, among others. Nevertheless, a core central bank mission – maintaining price stability – seems to remain intact.

1. Introduction

Financial innovation has a long history – likely as long as money and finance have served the economic activity of human kind. However, the speed and degree of sophistication of financial innovation has increased over the last half century due to rapid worldwide economic growth, globalisation, financial liberalisation and deregulation (or in response to government regulation), the development of new legal tools and, most importantly, technological progress, especially in the area of information and communication technologies (ICT). As any other kind of innovation, ICT offers new opportunities for economic and social development, but at the same time generates new challenges and risks. The latter concerns financial stability, which, if seriously undermined (as happened in the major advanced economies in 2007-2009), may have far-reaching negative consequences for financial intermediation itself, economic growth, and monetary policy.

This paper[1] presents a brief review of the recent financial innovation trends and what they mean for the financial industry, financial markets, and micro- and macro-prudential regulation and supervision (Section 2), and tries to assess their potential impact on monetary policymaking (Section 3). The final section presents conclusions.

Our working hypothesis is that while recent financial innovations (particularly those related to the application of ICT) pose a serious challenge to the financial industry's business model (in both its banking and non-banking components) and, if not responded to timely and adequately by regulators, may create new risks to financial stability, they will not necessarily revolutionise the process of monetary policymaking and are unlikely to undermine the ability of central banks to perform their price stability mission.

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1 This is a revised and updated version of the briefing paper prepared in response to the request of the European Parliament's Committee on Economic and Monetary Affairs ahead of the European Parliament's Monetary Dialogue with the President of the European Central Bank on 29 May 2017 – see http://www.europarl.europa.eu/committees/en/econ/monetary-dialogue.html. The opinions expressed in this paper are the sole responsibility of the author and do not necessarily represent the official position of the European Parliament, CASE or other institutions, which the author is associated with. The author would like to thank Kristen Hartwell for her editorial support.

2. Financial Innovation

In this section, we look at the definition of financial innovation as well as its classification and origins (Subsection 2.1), present a brief history of the phenomenon (Subsection 2.2), with special attention given to its recent wave (Subsection 2.3), and attempt to analyse what it means for the financial industry, financial markets, and financial stability (Subsection 2.4).

2.1. Definition of financial innovation and origins of innovation

According to the Financial Times Lexicon, financial innovation can be broadly defined as creating new financial instruments, technologies, institutions, and markets. This includes institutional (e.g. new types of financial firms), product (e.g. new types of derivatives or securitized assets, among others) and process (e.g. online banking, phone banking, and other forms of ICT applications) innovations.[2] Mishra and Pradhan (2008) offer a similar definition and classification of financial innovation.

The above definition and characteristics clearly demonstrate that financial innovation can have not only a technological background (like the increasing application of ICT in the last 30 years), but also legal and organisational ones. Often, it is a combination of all three components.

Among the factors that stimulate financial innovation, it is important to mention – in addition to technical and technological changes – regulatory changes, changes in market conditions (e.g. changes in the demand for financial services and in actual and potential competition), and changes in economic policy. The latter may lead, among others, to changes in the inflation rate and exchange rate regime, or may create market demand for new types of products (Meltzer, 1978; Mishra and Pradhan, 2008).

Regulatory changes are a factor requiring special analytical attention. Financial innovation can be encouraged by both deregulation (because certain products, processes,

2 http://lexicon.ft.com/Term?term=financial-innovation

and institutional forms were not previously allowed) and tighter regulation (to circumvent regulation). Meltzer (1978) mentioned several regulatory characteristics of the US economy of the 1970s that induced financial innovation. They included the prohibition of the payment of interest on demand deposits, maximum or ceiling rates of interest on time and savings deposits, differences in reserve requirements for types of deposits and types of institutions, zero interest rates on the required reserves of banks, and restrictions on lending and borrowing.

One may present other examples of how restrictive regulations, capital account controls, and macroeconomic instability, among others, have led to the creation of new financial instruments aimed to either circumvent these issues or protect financial institutions and their clients against the side effects of government policies. A substantial portion of derivative instruments has always served this purpose. Worse, however, is that there is often some sort of race between financial institutions and regulatory authorities where the former attempt to circumvent existing regulations and the latter attempt to create new regulations aimed at closing existing loopholes. The race is such that the regulatory authorities are in a rather disadvantaged position (see Friedman, 2000).

The above means that at least part of financial innovation does not necessarily serve increasing productivity in the financial industry and in the whole economy or decreasing the costs of financial services but rather helps to circumvent existing regulatory restrictions (in a legal way). This does not serve well the stability and transparency of the regulatory environment and the general respect for law, and often increases the costs and financial risks of financial institutions and their clients. Therefore, these negative side effects of excessive, too-restrictive and, sometimes, non-transparent regulations must be seriously taken into consideration by legislators and regulatory authorities.

2.2. Brief history of financial innovation

As mentioned earlier, the history of financial innovation can be traced back to the very beginning of the use of money as a medium of exchange – a few thousand years ago – and certainly to the time when merchant banks first emerged in medieval Italy (see Bernholz and Vaubel, 2014; Tufano, 2003). However, its pace accelerated in the post-WWII period, and in particular, since the 1970s. Financial innovation was driven by rapid economic growth, a growing reliance on financial intermediation, the improving well-being of the population, trade and capital account liberalisation, changes in international monetary regimes (moving from the Bretton Woods system of fixed but adjustable exchange

rates to floating rates), financial deregulation in most countries, globalisation, and technical innovation, especially in the ICT sector.

The period from the 1970s to the mid-1990s was dominated by innovation based on institutional changes and new legal instruments resulting from financial liberalisation and deregulation, both domestic and international. Eliminating capital controls, opening domestic financial markets to foreign entities, privatising state-owned banks and non-bank financial institutions, softening various regulatory restrictions (e.g. on deposit and lending rates), and enhancing cross-border competition, among others, facilitated the formation of the single global financial market and transnational financial corporations. On the other hand, it also increased opportunities for cross-border regulatory and tax arbitrage, which drove several financial innovations (see Subsection 2.1). Disinflation in advanced economies in the 1980s (followed by a similar trend in emerging market economies in the 1990s) radically changed the macroeconomic environment in which financial intermediaries operated (Mishkin, 1990).

Technical innovation, although important (e.g. introducing ATMs or debit payment cards or increasing the use of computers for the internal operations of financial institutions, such as data gathering or accounting), seemed not to play a leading role at this stage.

However, this has changed radically since approximately the mid-1990s, with the increasing role of the internet, personal computers, intercontinental data transmission, mobile telephony, and new forms of digital services. These new ICT applications helped to sharply reduce transaction costs, increase transaction speed and transparency, and further diminish the importance of borders between various jurisdictions. As result, financial markets became truly global and even more competitive.

Surely, the role of legal and organisational innovation did not disappear. Let us mention the mortgage-backed securities, collateralised debt obligations, and credit default swaps of the 2000s. The expansion of specialised bonds, such as green or development bonds, also belongs in this category (Mendoza, 2015). However, many new financial products and institutions, such as crowdfunding or peer-to-peer lending platforms (see Subsection 2.3), have been possible precisely due to new technological opportunities.

The application of ICT has also revolutionised the business model of the financial industry (see Subsection 2.4), improved client access to various forms of financial services (via the internet, personal computers, and mobile telephones), and allowed for the creation of new products and new institutions that can offer financial services (e.g. digital platforms, information technology companies, and operators of mobile telephony).

2.3. Examples of ICT applications in the financial sector

It is outside the scope of this paper to present and analyse all or even most of the ICT applications in the financial sector. Accordingly, we will concentrate on selected examples which may have a revolutionary impact on the way in which financial services are provided and on the business model of banks and non-bank financial institutions (see FT, 2015).

The online provision of financial services with the use of personal computers, tablets, or mobile telephony devices has already become the dominant business model in the financial industry. The further spread of e-services and e-payments, including cross-border e-services and e-payments, will be facilitated, among others, by increasing the processing power of ICT devices and data transmission channels, improved cybersecurity (including the broader application of blockchain technology[3]), the broader use of digital valets, and the development of various kinds of e-payment gadgets.

The development of digital platforms can allow not only the broader distribution of financial services provided by traditional financial institutions, but also the popularisation of peer-to-peer lending and equity financing (crowdfunding) beyond the boundaries of traditional financial institutions. This may broaden access to financial services for the population and businesses as well as make them less expensive. On the other hand, it may generate new risks to financial stability (see Subsection 2.4).

The rapid expansion of business-related crowdfunding, originally developed to collect donations for non-commercial purposes (Wilson and Testoni, 2014a; Wilson and Testoni, 2014b), is a good example of a new funding opportunity for small- and medium-sized enterprises, which do not have easy access to bank credit and capital markets. In 2015, the crowdfunding industry was expected to collect over US$30 billion, that is, more than venture capital funds (Barnett, 2015). However, prospects for its further expansion (as in the case of some other new institutions and products) depend, to a large degree, on financial regulation (Wilson and Testoni, 2014b). We will come back to this question in the next subsection.

Finally, in 2008, ICT technologies allowed for the creation a digital quasi-currency, *bitcoin*, which is used internationally for certain e-transactions (Cohen-Setton, 2014).

3 See Church (2017) and Boucher et al. (2017) on technical aspects of the blockchain technology and its potential to revolutionise various areas of economic and social activity.

2.4. How ICT-related innovation will change the financial industry and financial services?

Financial innovation has the potential to revolutionise the financial industry more so than what has already happened—to a great extent. Today, banks and non-banking financial institutions operate in a very different way than they did 20 or 30 years ago. An increasing number of clients do not need to physically visit a bank office (or the office of another type of financial institution) to deposit money, receive a loan, make a payment or transfer, or buy insurance or other financial products. The speed of transactions has also increased rapidly. Some traditional financial instruments have either disappeared or their role has decreased dramatically. For example, in many countries, debit cards and e-transfers have replaced checks.

One can easily imagine that during the next decade or two, most financial services will be offered exclusively online, operational branches of financial institutions will largely disappear, and various forms of e-payments and e-transfers will expand further. This means significant changes and challenges for traditional business models as well as internal organisational structures and the employment of all financial market players.

Another question concerns the chances of the current types of financial institutions surviving the increasing competition of other market players. Potentially, non-financial companies, for example in the ICT or retail sector, can also offer financial services and successfully compete with traditional financial institutions based on their technological advantages. This is already occurring (e.g. digital platforms or new forms of payment services) and has the potential for rapid expansion. However, how far it advances will depend on the regulatory environment.

For example, technically, crowdfunding can compete with traditional corporate bonds and venture capital funds. Its rapid expansion in equity-based and lending-based segments has been based on regulatory exemptions in individual jurisdictions, which allowed firms seeking funds not to issue a prospectus (up to a certain maximum amount of funding and a maximum number of investors, see Hornuf and Schwienbacher, 2017). If the standard prospectus and other regulatory requirements are applied, the attractiveness of crowdfunding and other financial services based on peer-to-peer lending platforms may diminish.

Legislators and regulatory authorities face an uneasy dilemma. The promotion of certain new financial products and institutions based on ICT technologies would require easier and simpler regulation. On the other hand, these products and institutions, if they remain unregulated (or insufficiently regulated), may become victims of business failure, abuse, or fraud. If this occurs on a massive scale, it may lead to a systemic financial crisis.

The same dilemma applies to ICT companies, which may offer various e-payment services, but should not accept deposits unless they meet the regulatory requirements for deposit banks.

Overall, the application of ICT does not and cannot eliminate the problems of information asymmetry and adverse selection[4] inherently present in financial intermediation. Recent lessons from the 2007-2009 global financial crisis suggest the importance of regulatory requirements, although they should remain maximally simple, transparent, and guarantee a level playing field for all potential market participants. Furthermore, if possible, they should be coordinated internationally to avoid regulatory and cross-border arbitrage and artificial innovation (see Subsection 2.1). It would be extremely risky and unfair to allow non-financial newcomers to the financial market to be exempt from the standard regulatory requirements that must be followed by incumbents.

The above means that banks and non-bank financial institutions will not disappear from the market, although their business model may significantly change. ICT and other non-financial companies will become the technological or information partners of licensed banks[5] and non-bank financial institutions (offering them specific services) rather than autonomous financial market players on their own. Consequently, digital platforms, which offer lending and crowdfunding services or new forms of e-payments, will predominantly serve the business operations of licensed banks and non-bank financial institutions – the practice that one already observes now. Autonomous peer-to-peer lending or crowdfunding platforms will have a secondary importance operating on the margins of the financial system in respect to small-scale financial transactions and non-commercial activities.

Regulatory authorities, both those dealing with micro- and macro-prudential supervision, must closely follow all types of financial innovations (even those having a purely technological character) and understand their potential impact on the financial system, financial stability, and consumer protection. If necessary, they must be able to take preventive actions on time.

4 A large body of economic literature on asymmetric information and adverse selection goes back to the seminal papers of Akerlof (1970) and Stiglitz and Weiss (1981). A practical analysis of asymmetric information in the financial sector is provided, among others, by Bebchuk (2003).

5 See Arnold (2017) on cooperation between large European banks and IBM in applying blockchain technology to build trade finance platforms.

3. Potential Impact of Financial Innovation on Monetary Policymaking

In this section, we will analyse whether and to which degree financial innovation can influence the process of monetary policymaking. We will start from a brief reference to the earlier debates on this topic (Subsection 3.1). Then we will discuss the question of currency substitution (Subsection 3.2), demand for reserve money, including cash (Subsection 3.3), and the various technical aspects of monetary policy, such as the definition and measurement of monetary aggregates and the transmission mechanism (Subsection 3.4).

3.1. References to earlier debates

The impact of financial innovation on monetary policymaking and the role of central banks has been discussed extensively in economic literature dating back to at least the 1970s, when the innovation process intensified and central banks assumed a more active policy role after the collapse of the Bretton Woods system. The papers of Meltzer (1978), Akhtar (1983), Bernanke and Blinder (1988), and Arize (1990) represent just a few examples of such analyses.

Another round of debate followed at the turn of the century, partly inspired by the July 2000 conference "The Future of Monetary Policy", sponsored by the International Monetary Fund (IMF), the World Bank, and the journal "International Finance" (see the papers of Friedman (2000), Goodhart (2000), and Woodford (2000), among others). In the same vein, the OECD (2002) published proceedings from its own conference.

The major conclusion of the above-mentioned papers was that financial innovation, although important for the financial industry itself, would not bring revolutionary changes to monetary policymaking and the role of central banks in conducting macro-stabilisation policies. Certainly, it will not eliminate the demand for cash and other reserve money and will not diminish the possibility of central banks influencing spending in the economy (although, it may change some technicalities of monetary policymaking). In the subsequent

subsections of this paper, we will discuss further and empirically verify detailed findings of this debate.

In the context of the global financial crisis of 2007–2009, the discussion on the potential impact of financial innovation returned; however, this time it concentrated on its threats to financial stability (if wrongly designed and regulated). Thus, it addressed only indirectly the question of how financial innovation affected the conditions of monetary policymaking via challenges to financial stability (see, for example, Mishra and Pradhan, 2008).

3.2. Can private e-currencies crowd out existing currencies?

Analysing the potential impact of financial innovation on monetary policy, the first question to answer is whether the emergence of private international e-currencies such as Bitcoin, Ethereum or Ripple can challenge the existing government-backed currencies issued by central banks. Enthusiasts of private money and free banking[6] are excited about this prospect and hope to see it materialise (see, for example, Lietaer and Dunne, 2013; Milling, 2012).

However, the answer seems most likely "no", despite the relative market success of Bitcoin. After almost a decade since its creation, and notwithstanding its acceptance by several digital platforms and strong market value, its role remains marginal. In May 2017, its total "supply" (determined automatically by market demand for this medium of transaction) did not exceed the amount of $30 billion. Total supply of all other "crypto-currencies" also did not exceed $30 billion (Economist, 2017; Batsaikhan, 2017). Their major role is a store of value (financial asset) rather than medium of exchange or unit of account. Rapid increase in their market value (by more than 50% between January and May 2017) signals a new financial bubble rather than their more frequent use for transaction purposes or flight from traditional currencies.

The strong market position of traditional currencies is determined not only by government regulation, which may require conducting certain types of transactions (e.g. paying taxes and wages and salaries, among others) in official currencies, but also by the dominant preferences of market players.

Private sector choices are determined not only by the perceived stability and strength of individual currencies, but also by the size and reputation of these economies as well as the reputation of the central banks and governments standing behind them. Another important factor relates to network externalities – that is, to the dominant currency choic-

6 Hayek (1990) provided contemporary arguments in favour of private money and free banking.

es of other market participants (to decrease transaction costs) and to the availability of various kinds of financial instruments in a given currency.

This is the key reason behind the continuing dominant role of the US dollar as the international reserve and transaction currency, despite its periodic fluctuations against other currencies and the not always superior macroeconomic performance of the US economy (Dabrowski, 2010). The euro is the second most important global currency, with the same justification of its role as in the case of the US dollar. The key advantage of the US dollar over the euro and other currencies, which play or pretend to play an international role (e.g. Japanese yen, British pound, Swiss franc, or Chinese renminbi), is the presence of much larger, deeper, and sophisticated global markets for financial instruments denominated in US currency.

Financial globalisation and financial innovation facilitate an increasing competition between individual currencies, perhaps in the Hayekian spirit, and the resulting currency substitution. However, at least as for now, the major official currencies, such as the US dollar and euro, are the main winners of this competition. Historically, there has always been demand for these currencies (predominantly in the form of cash) in countries suffering from the instability of their national currencies, high inflation, political turmoil, or war. In the contemporary world, there is also an increasing demand for them in all small open economies that is motivated by international transaction needs and other network externalities. This significantly narrows the policy space of individual central banks and places an additional responsibility on the major central banks, such as the US Federal Reserve Board, the European Central Bank, or the Bank of Japan (Dabrowski, 2013).

3.3. Demand for reserve money and cash

Demand for central bank liabilities[7] was the central issue in the turn-of-the-century debate mentioned in Subsection 3.2.

First, the rapid expansion of digital banking, money, transactions, and payments seemed to lead to the elimination– or at least the sharp decrease – of the demand for cash. This tendency could be further strengthened by government regulations which require transactions (above a certain limit) be conducted in a non-cash form in order to fight tax evasion and money laundering and by proposals to eliminate high-denomination banknotes (see, for example, Rogoff, 2016).

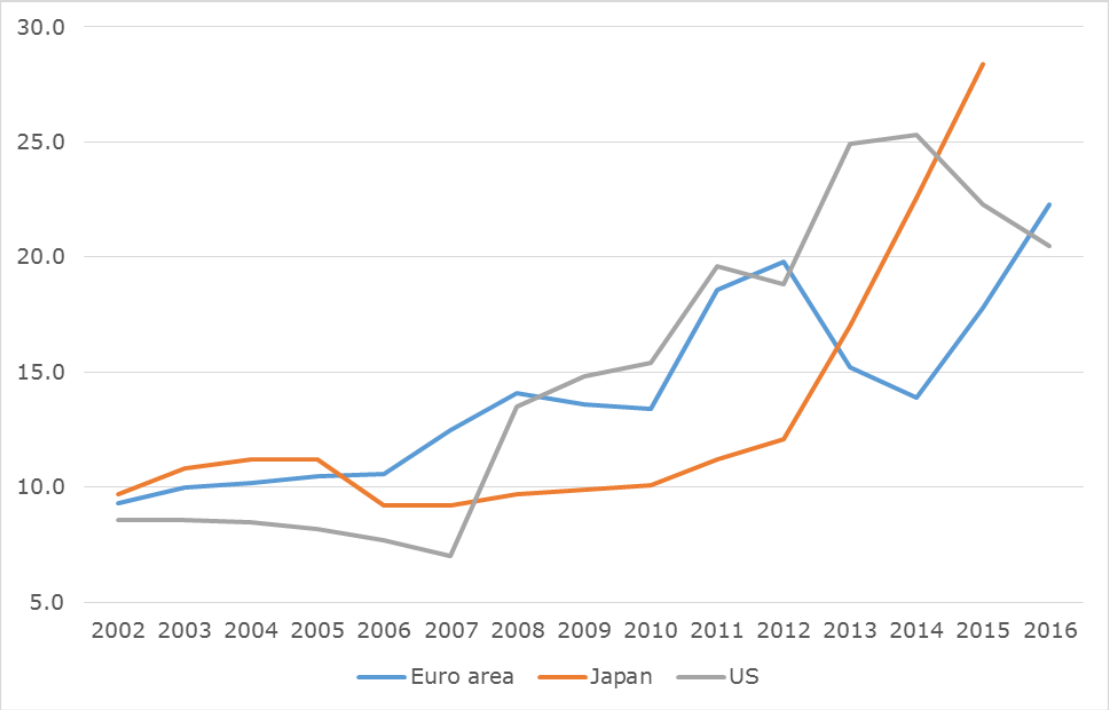
Interestingly, one of the major arguments in the turn-of-the-century debate was that cash would still be in demand because of its anonymity, an important characteristic for

7 In monetary policy analyses, referred to as reserve money, monetary base, high-powered money, or central bank money.

illegal transactions and other "bad" behaviour (Goodhart, 2000). Another argument was related to the use of cash outside a given monetary jurisdiction by residents of other countries (as a means of currency substitution).

The demand of commercial banks for non-cash reserve money – that is, mandatory and voluntary money balances held by these commercial banks in central banks – depends on many factors. Among them, monetary policy instruments, such as mandatory reserve requirements, reverse repo, or auctioning of certificates of deposits, play an important role. Other factors may include some macro- and micro-prudential tools such as the liquidity coverage ratio, the organisation of the payment system, and the liquidity preferences of commercial banks.

Figure 1: Reserve money in the Euro area, Japan, and the US, 2002–2016
(in percentage of broad money)



Source: IMF International Financial Statistics

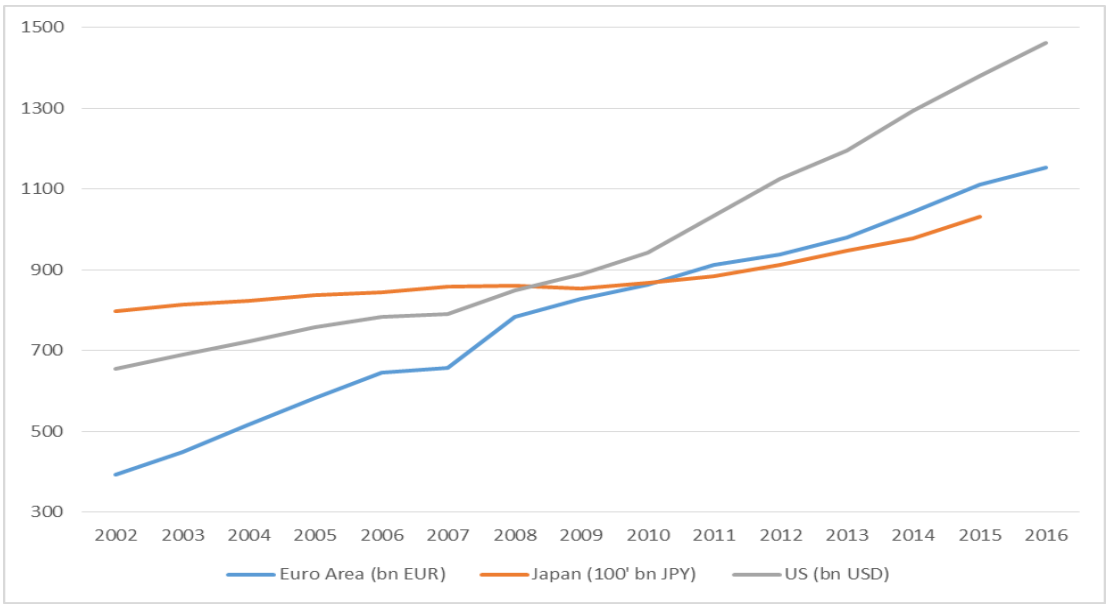
Empirically, Figure 1 demonstrates that the role of reserve money in major currency areas has not diminished since the beginning of the new century. On the contrary, as result of the

global financial crisis, its share in broad money increased substantially (the reverse side of the collapsing money multiplier). This has reflected both stricter liquidity regulations and, more importantly, commercial banks' own liquidity preferences. Commercial banks were ready to retain substantial balances of money in central banks—in some instances at negative interest rates—rather than risk lending to unviable borrowers or on an interbank market.

According to Figure 2, the amount of cash in circulation in three major monetary areas also increased systematically, at an accelerating pace since 2008. The similar trend is noted in most OECD countries (Gros, 2017) where cash-to-GDP ratio increased between 2003 and 2017. That is, there is no prospect of cash disappearance in the foreseeable future and its increased use cannot be explained only by a shadow economy, illegal activity, or the demand of foreign residents.

If monetary policy and central banks face serious challenges (and indeed, they do), they do not originate from a declining demand for central bank money in any of its forms (in particular, as a result of financial innovation and, specifically, the increasing application of ICT in the financial industry). Rather, this is a legacy of the global financial crisis of 2007–2009 and the resulting financial disintermediation (Dabrowski, 2015), which has yet to be overcome.

Figure 2: Cash in circulation in the Euro area, Japan, and the US, 2002–2016 (in national currencies)



Source: IMF International Financial Statistics

3.4. Technical aspects of monetary policymaking

Without a doubt, financial innovation has an impact on various technical aspects of monetary policymaking. Changes in financial products, the processing of financial transactions, financial institutions, and financial market structure may affect the monetary policy transmission mechanism and the effectiveness of individual monetary policy instruments. With the appearance of new financial products, the definitions of broader monetary aggregates (beyond M2) may require updating. The same may concern central bank forecasting models and their communication strategies with financial markets.

However, these should be routine procedures in the macroeconomic and financial environment, which is no longer stable as assumed in some traditional textbook models. Central banks and their monetary policy must be ready to react to the various shocks coming from, for example, the world economy, and generated by globalisation, regulatory changes in the financial sector (see Dabrowski, 2015), episodes of financial instability, political shocks, and financial innovation, among others. In light of the experiences of

the last two decades, financial innovation is just one of many factors that determine the monetary policymaking environment, and is not necessarily the most important one.

4. Conclusions

Our analysis has confirmed the serious impact of financial innovation – especially its most recent wave related to the tremendous application of ICT on the business model of the financial industry. Most likely, these changes will continue in the future. They will bring new products and processes as well as organisational and institutional changes. Whether banks and non-banking financial institutions will continue as the main providers of financial services will depend on the regulatory environment. However, given the serious risks associated with Schumpeterian "creative destruction" in this industry (especially in light of the recent experiences of the global financial crisis of 2007–2009), one can expect a less radical scenario: traditional financial institutions will continue their dominant role, albeit in close partnership with ICT and data management companies. The recent grass-root initiatives such as autonomous digital platforms offering peer-to-peer lending or crowd-funding services will play a rather marginal role (due to regulatory constraints). Even such a scenario involves serious challenges for regulatory authorities who must be able to timely detect and prevent potential risks to financial stability.

To the extent that central banks are engaged in macro- and micro-prudential regulation and supervision (and many of them are), this is also their agenda.

In contrast to revolutionary changes, which have already happened and may continue happening in the financial industry, monetary policy and the basic mission of central banks (maintaining price stability) has not been seriously affected by financial innovation. Demand for cash and central bank reserve money has not disappeared. On the contrary, it increased significantly in the aftermath of the global financial crisis. Even if the wounds to financial intermediation caused by this crisis finally heal, demand for reserve money will remain, most likely, at a higher level than before the crisis (due to more restrictive financial regulation, among other reasons). Central banks will continue playing their statutory missions, even if certain technical aspects of their activity (e.g. monetary policy transmission channels, forecasting models, ways of conducting open-market operations, and the definitions of broader monetary aggregates, among others) must be modified as a result of financial innovation.

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