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The Need for Trust and Ethics in the Digital Age – Sunshine and Shadows in the FinTech World*

János Müller – Ádám Kerényi

In the wake of the international financial crisis, digital financial and FinTech services have emerged as part of the fourth industrial revolution. These services, which are generally supported and welcomed by consumers, have now reached a stage where they are able to disrupt traditional financial structures. In the past, the role of FinTech startups was considered marginal and risk-free both by banks, which were busy restoring trust and optimising their operations, and by regulators and supervisors. However, as they have spread at a revolutionary pace, FinTech now entails several types of risk to financial stability and represents a serious threat. In order to address potential problems relating to financial stability, the need has emerged to regulate FinTech at the national and international levels, including the management of the body of data accumulated and used by FinTech companies. A situation has evolved in which three requirements should be met internationally and nationally: support for digital FinTech processes; a level playing field for incumbent banks and FinTech/BigTech companies; and the regulation of FinTech-type services at the international and national levels. Except for the first, these requirements have not been met to date, and expectations and codes of ethics and trust have gained prominence as workarounds. For that reason, the focus of our analysis is the importance of the requirements for trust and ethics in the banking sector, and the extent to which these requirements are enforced in the FinTech world. We present why it is becoming necessary to introduce codes of conduct, ethical standards and the exercise of due care in behaviour in order to build trust.

Journal of Economic Literature (JEL) codes: D74, G21, O33, N74

Keywords: trust, ethics, banks, FinTech, artificial intelligence, Regulatory Sandbox

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* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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1. Introduction

For centuries, the banking sector has been an industry which operates on the basis of trust. As such, it has a wealth of experience in what it takes to build and maintain the trust of customers and the market, and the speed at which that trust can be lost. In light of the lessons learned from economic crises, rebuilding and recovering trust and security is a slow and difficult process. Obviously, all of this is influenced by the external conditions of banking operations: the institutional background, regulation and supervision, as well as the economic policy environment, i.e. the degree of consistency between monetary and fiscal policy. With the rise of a problem, a recession, a crisis or a bank failure, regulators respond immediately, identifying the 'wrongdoers and sinners', i.e. the banks, in order to reduce the losses at the sector level, and then to help the recovery and rebuild trust (*Kerényi – Molnár 2017* and *Kerényi – Müller 2019*).

As an industry based on trust, the banking sector is governed by the fundamental operating principle of ensuring bank secrecy and the strict management of customer data, which is also regulated by law. Incumbent banks are also expected to apply ethical standards and requirements, and to ensure that these are enforced. At times when the economy works as it should, trust, confidence, ethics and a good business reputation represent value, and are means of achieving profitability. The question is how these expectations and professional requirements change and evolve in the course of a development process that is considered revolutionary, when the digital world has reached financial services and is forcing incumbent banks to transform their business models and when new operators and competitors are entering the market, as a result of which regulatory and supervisory arrangements are or should be changing as well. In that context, we examine the inevitable movements in the above factors at incumbent banks and FinTech/BigTech companies, and how trust is changing in the relationship between a bank and its customer. Is a level playing field provided for incumbent banks and the new digital service providers entering the market? Similar questions may also arise on the regulatory side. Every single activity of banks, including digital services, are regulated and may be controlled.

"How can we build trust in the digital age?" asked Roland Busch, a Member of the Managing Board of Siemens AG. *"Digital technologies are changing our lives and economies. Artificial intelligence, big data analytics, blockchain and cloud technologies are improving our world in countless ways. But they bring new vulnerabilities. Digitalization and globalization are shifting paradigms and bringing new opportunities"* (*Busch 2018:1*).

Can cross-border digital financial services be identified for regulatory purposes? Which jurisdiction will provide the background for trust: the country in which the FinTech company is registered, or the country in which the service is used? How can

consumers build their trust in connection with the services of FinTech companies? Will digital competition lead to the transformation of incumbent banks' codes of ethics? Does it make sense to talk about FinTech trust and ethics? In this paper, we track these developments and provide an overview of the current status quo. In our inquiry, it is necessary that the relationship of the banking sector to trust and ethical conduct should first be addressed, followed by an analysis of that relationship in the FinTech world.

2. Trust, confidence and ethics in the world of incumbent banks

Life in modern societies involves a number of activities[1] and services that depend greatly on trust and confidentiality. Without preserving secrets, the banking sector could not function; trust is based on an awareness that confidentiality exists. Over the centuries, stemming from the nature of its core operations, key requirements have emerged for the functioning of the banking sector: trust, security, confidence and ethical conduct towards customers.

All these features together underpin a bank's good business reputation. Trust in a bank's integrity and reliability can be developed if its decision-making and operations are governed by laws and detailed regulations, as well as by ethical and moral standards. Trust, strengthened by ethical conduct and a good business reputation are important preconditions for banks' successful operations, and their presence therefore represents value.

Trust is essentially a human predicament, developing on empirical grounds, during longer periods of smooth cooperation, or based on the experience of finding a solution to relatively difficult problems. One of its key preconditions is the maintenance of secrecy about matters of finance and wealth. The development of trust is also subject to some external conditions that apply independently of the financial institutions concerned, such as the legal environment, the laws governing financial institutions at large, the regulatory and supervisory arrangements in place, and also the level of financial awareness in a given country. Conditions referred to as internal include a bank's governance system, decision-making, risk management regulations, and procedures. Compliance with external and internal regulation is complemented by an element of building trust that is of critical relevance to our subject, i.e. the ethical conduct and integrity of bank employees.

[1] Consider, for instance, physicians, lawyers, or the spiritual participants of churches. In all of these cases, people share sensitive assets, concerns and sentiments with the parties they consult. Is there any treasure that is more precious than health? Can trust be greater than that of someone hoping to be healed by their physician? A believer expects sympathy and consolation from a pastor. Likewise, banks promise to safeguard families' industrious savings and reserves, and grant loans for the realisation of their plans. These are fields where confidentiality not only exists, but is expected and essential.

Trust can be earned through work and thus only develops as a result of a longer process. The trust earned will provide for the hoped-for presumption of confidence. The value of these will be demonstrated when trust in a bank, or the banking sector as a whole, collapses as a result of some wrongdoing, error, or a negative external circumstance such as a recession or a crisis. Although trust takes a long time to build, it can collapse in a minute. The loss of confidence may take dramatic turns when it causes panic, with customers hyped into massive bank runs. As confirmed by numerous examples in banking history, the collapse of trust is toxic and contagious, and spreads extremely fast.[2] Some of the building blocks of trust and confidence include past performance, excellent referrals, stability, profitability, a reliable and verifiable ownership structure, predictability, the quality of services and customer relations, and the longest possible continuous customer relations.

In order for the expected trust to develop, the relationship concerned must stand the test of distrust. The beginning of a relationship is fraught with distrust and suspicion by both parties. For example, both *ex officio* and in order to protect its existing depositors, a bank processing a credit application will be distrustful, i.e. it will collect a range of data from and about its prospective customer in an effort to conduct a risk analysis. In turn, customers will seek to ensure that their money or wealth is being committed to the care of a reliable institution.

The development of trust is thus the result of a process as part of which distrust, suspicion and confidence are balanced out. In addition to other important factors, the success of banks' business requires that balance be maintained for the longest possible time. In a bank functioning properly, legal compliance in the broad sense and ethical requirements coexist and work by mutually reinforcing each other. The order of priorities is also important, with precedence given to strict legal and internal regulations encompassing all processes in banking operations, integrated with the set of ethical standards. At the same time, the legal framework and regulations cannot cover all details of banking operations at all times. They are accompanied by the requirement for the application of ethical and moral standards in banks, and the need for professional integrity. There is a vast body of literature on bank ethics; for our purposes, it suffices to mention the generally accepted principles of ethical standards for banks. The literature sets out some eternal and mandatory requirements for incumbent banks' ethical conduct. These include, for instance, transparency, honesty, fairness, responsibility, predictability and respect for customers (*Villa 2015:83*).

[2] This is one of the reasons why the European Central Bank regularly reviews banks that carry systemic risk.

Ethics[3] and morals, as understood in the general sense, primarily concern core values and standards. Underlying both are intrinsic human values that are instrumental in guiding the individual in matters of good and bad, right and wrong, and equity and inequity. Hence the general understanding that ethics is a term capturing our moral standards that exist, whether explicitly or implicitly, even subconsciously, as a constant backdrop to our situational judgments, actions and decisions.[4] The development of an individual's intrinsic values and ethical standards is influenced by cultural and religious traditions, the family environment and upbringing, the social environment established by laws and regulations, and not least by the set of requirements applied in the profession or workplace in question. For our purposes, the profession and activities concern the provision of banking services, and the flawless operation of the financial intermediary system.

The above implies that such standards[5] can and do change as society and civilization evolve, while they also have pillars that have remained constant for millennia, which means that ethical standards have evolved into a sophisticated set of requirements over decades and centuries. The first of these is the requirement to comply with all valid rules in effect. To offer services and products that comply with the applicable provisions, including accurate and transparent information given to customers. This requirement is confirmed by the old adage that ethics begins where the law ends. Banking secrecy, data protection and confidentiality are prominent features of every bank's code of ethics. Another golden rule of bank ethics is the need to strive for the greatest possible degree of objectivity, by avoiding any form of influence or bias. The time factor also occupies a prominent role. This consideration may be stated briefly as the fact that in banking everything is urgent but nothing can be compelling. In today's fast-paced world, where business decisions and information can be transmitted electronically and digitally in a matter of minutes, the factor of accelerating time may lead to inaccuracies in risk assessment and errors in decision-making.

Looking back on the history of banks which lived through a series of economic cycles and crises, we can see that the questions of trust and ethics tend to take on increased prominence following periods of severe recession or crisis. In other words, there is a strong correlation between the trust in and the ethical requirements for banks on the one hand, and economic cycles on the other. These questions will

[3] Of Greek origin, the word 'ethics' is derived from 'éthos', meaning custom, tradition, form of behaviour. A frequent synonym of 'ethics' is 'morals', derived from Latin 'mores'. This means the right course of action, and irreproachable conduct. In everyday usage, the word 'morals' occurs more frequently.

[4] This is relevant because later on we will look for the ways in which these behavioural standards are manifested in the FinTech world.

[5] Consider the Bible, in the Old Testament where the law consisted in the Ten Commandments, including the eternal rule, "Thou shalt not steal". Over the course of time, the substance of that legal provision has undergone considerable changes. Today, its scope is no longer limited to an individual unlawfully taking an object; stealth includes tax fraud, while inappropriate bank contracts are also frequently seen by customers as stealth.

become prominent and the focus of analysis when an economy and its banking sector are already past the worst of the crisis, and the process of resolution and recovery has been successful. That is when the restoration and reinforcement of trust is again on the banking agenda, accompanied by demands for ethical standards to that end. The changes in the ethical standards for banks in the aftermath of individual economic cycles is well illustrated by Koslowski's judgment of the situation: *"the crisis in the financial markets unexpectedly turned a spotlight on the ethical aspects of financial markets and financial institutions as a topic of considerable interest to the wider public. […] The financial crisis is not only a crisis of the economic system, but also a crisis of ethics for financial intermediaries, whose conduct threatened to turn the industry into a field of unmitigated self-enrichment"* (*Koslowski 2011:3*).

After the eruption of the 2008 global financial crisis, we witnessed the development of a whole regulatory arsenal and an institutional architecture to strengthen the safe operations of the banking sector across the European Union. Suffice it to mention the broadened and strengthened powers of the European Central Bank (ECB), or the operations of the European Supervisory Authorities (ESA), the European Banking Authority (EBA), the European Insurance and Occupational Pensions Authority (EIOPA), the European Securities and Markets Authority (ESMA), the European Single Supervisory Mechanism, the European Funds and Mechanisms for Bank Resolution and Recovery, and the European Systemic Risk Board (ESRB). This was accompanied by ongoing efforts to build the Monetary Union, the Banking Union and the Capital Markets Union. Rules and measures were also adopted within national powers to guarantee the security of banking operations. The Hungarian practice was also aligned with these processes and objectives. Between 2009–2015, almost a hundred laws and regulations were adopted with relevance to the banking sector (consisting of 29 acts, 21 government decrees, and a large number of decrees by ministers and the Governor of the Magyar Nemzeti Bank [MNB]), while the applicable EU directives also had to be transposed into Hungarian law.

This (over-)regulation which is a typical feature of post-crisis periods was necessary to restore the stability of the banking sector, while also strengthening trust in the banking sector, both in Europe at large and in Hungary. For instance, compliance with capital requirements, and the situation of banks carrying systemic risk were monitored on a continuous basis. The banks resolved with government assistance were not allowed to undertake credit operations involving excessive risk. Wholesale funding and competition among banks resumed. One might be led to believe that all of this was sufficient for the recovery of trust. This was not the case. Almost as if following a set course, ethical and moral issues were raised. To cite another example from Hungary, as early as the beginning of 2010 the Code of Conduct for the banking sector was released with the primary aim of addressing specific areas

in terms of conduct and ethics that legislation was not yet prepared to regulate at the time. The Code was amended in 2015, because in the meantime several of its provisions had been incorporated into the legal framework. The Code requires banks to enforce the following fundamental principles on a voluntary basis: transparency, regulatory compliance, and information symmetry.

"The lenders signing the Code […] have an exclusive interest in supporting the development of their retail customers and thereby that of the Hungarian economy as a whole by means of fair competition and proper business conduct. They share the conviction that the present act of self-regulation, designed to complement the provisions of the Hungarian laws and regulations currently in effect by taking into consideration moral standards and not to replace those provisions, will further strengthen the competition for satisfied consumers in the market, and the quality and effectiveness of lending services in the retail segment" (*Hungarian Banking Association 2015:1*).

The above citations include most keywords related to the subject matter of our analysis: fair conduct, regulatory compliance, self-regulation, moral standards, clarity, and fair market competition. That said, the three principles enshrined in the Code need to be highlighted: transparency, compliance and symmetry. With this also in mind, the banks signing the Code undertook a commitment pursuant to Act XLVII of 2008 on the Prohibition of Unfair Commercial Practices against Consumers, which is peculiar and unique because on those grounds the Code represented a legally binding obligation for the signatory banks. The fact that a code of conduct and ethics is legally binding is clearly attributable to the effect of the crisis. Simultaneously, commercial banks revised their own codes of ethics and internal standards of conduct accordingly. As part of that process, the Hungarian Banking Association also updated its Code of Ethics and the operating procedures of its Ethics Committee.

Measures to enhance trust included the strengthening of the deposit insurance scheme and an increase in the insurance limit. In that regard, Hungary followed the applicable and legally binding directive of the European Union, increasing the deposit insurance limit in accordance with the EU objective that – as part of developing the Banking Union – implementation of the European Deposit Insurance Scheme should occur along with the Single Supervisory Mechanism and the Single Resolution Mechanism.

By the mid-2010s, the operations of the banking sector were back to normal, which could not have been accomplished without sacrifices. State intervention was successful in every country, bringing about over-regulation and major changes in banks' business models, organisation, and arrangements for governance, management and risk management. At the same time, ethical and conduct standards were applied on a large scale. It was in that new 'peacetime' that prominence

was given to the restatement of ethical standards for banks, and to the process of rebuilding trust in banks. Nevertheless, two questions remain valid. The first is whether the banking sector can again be driven into a situation, similar to that seen before 2008, which Chuck Prince, CEO of a Citibank distressed due to the crisis, explained and described by saying, "as long as the music is playing, you've got to get up and dance." The second concerns how the requirements for ethics and trust are likely to evolve and change in the FinTech world.

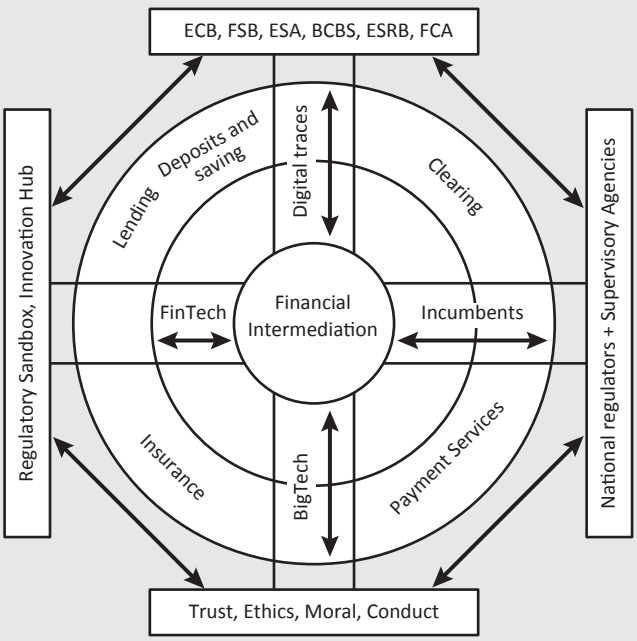
3. Trust, confidence and ethics in the world of digital finance? Harmony and disharmony

As indicated earlier, general trust in the banking sector had been largely restored by the mid-2010s. Also from the perspective of banking history, during that period a number of new features, changes and challenges emerged in the financial intermediary system. Banks adapted to the international and national regulations and supervisory standards, which had been tightened in response to the crisis and covered the smallest details of their operations. Where they were needed, resolution exercises were completed, allowing banks to meet the new capital requirements. Previously prevented by the crisis, developments were now launched in computing and other fields. Boosted by economic growth, corporate and retail lending grew at an accelerating rate. The favourable situation that emerged saw the revival and increasing intensity of competition among banks. It soon became clear that the operating environment of banks had changed significantly compared to the pre-crisis period. By analogy, the new situation may be described as that of an orchestra which, despite the instruments and most of its members being the same, is compelled to play new music due to changes in concert settings and audience requirements.

In this economic peacetime, the banking sector and the financial intermediary system at large could not avoid digital transformation, considered to be a part of the fourth industrial revolution, which, in some of its elements, was already emerging at the turn of the millennium, but only had a tremendous impact after the financial crisis. These 'revolutionary' changes are setting new requirements for financial services and service providers in terms of trust, confidence and ethics. Regarding the focal theme of our analysis, to use another analogy, we have reached a roundabout, which has the financial intermediary system at its centre, with several roads leading into and out of it. We would like to use this image (see *Figure 1*) to reinforce and support a number of our conclusions. Foremost, the fact that even the financial intermediary system is at the heart of both digital financial services and the world of the service providers that provide those services. In other words, it is the opportunities inherent in the financial intermediary system operated by incumbent banks that FinTech and BigTech companies are exploiting. The second round of the roundabout illustrates the fact that, apart from

financial services, FinTech companies today are also taking deposits and lending on an increasing scale. The outer framework of the roundabout shows that the entire process is enclosed by the need for international and national regulation and supervision. This is represented by the international and national regulatory and supervisory authorities shown in the figure, and the regulatory sandboxes[6] and innovation hubs created and used by them. However, at present, such efforts predominantly rely on the emerging standards of trust, ethics, morals and conduct, on which *Figure 1* is based.

Figure 1
Roundabout of the services of FinTechs and incumbent banks



At the junction characterised by this roundabout, new participants have appeared and entered from several directions. Ushered in by the emergence of the digital world, they initially gave way to the incumbents of the financial market. FinTech start-ups took advantage of the lower speed at which incumbent banks were able to launch online digital services in the period of recovery following the crisis. Initially, providers exploding onto the market had the tendency of relying

[6] In a Hungarian context, the MNB uses the Hungarian equivalent of 'Innovative Financial Test Environment' (source: https://www.mnb.hu/innovation-hub/regulatory-sandbox and *Fáykiss et al. 2018*).

on digital and innovative developments to set up profitable businesses with low capital needs and a quick return on investment, exploiting the niche created by the demand for fast and cheap payment services. Digital development was also seen as a matter of global competitiveness by Member States of the European Union, with FinTech start-ups enjoying overall support for their development and market entry on multiple levels. By contrast, incumbent banks were required to comply with the tight regulations applicable to them in order to launch services of this type, while FinTech companies were considered by regulators to be outsiders to the banking sector. This was partly due to the absence of a generally accepted definition of FinTech in technical literature that would be suitable for regulatory purposes. To date, the working definition adopted by the Financial Stability Board (FSB) of the Basel Committee on Banking Supervision (BCBS) is still in general use, according to which FinTech is "technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions and the provision of financial services". The BCBS considers that the above broad definition can be used pragmatically notwithstanding the changeability that characterises the current development of FinTech.

Obviously, the general support granted in the early stage and the flexible and broad definition had serious consequences, because the latter fails to clearly identify the contents and scope of FinTech services, while making it difficult to establish the legal framework and the confines of supervisory controls, and the provision of a level playing field for incumbent banks and FinTech companies.

In that initial setting, neither regulators nor customers were particularly concerned with the question of trust. No major doubts were raised over trust, only banks protested occasionally against the uneven playing field. What created or led to this situation in which trust was not called into question?

In the beginning, it was sufficient for FinTech companies to reach smaller, 'niche' customer segments to be successful, while the BigTech companies emerging later offered credit and other options to complement their non-financial services. In this changed environment, the ways to build trust were fundamentally influenced by the accelerating and significant transformation in the nature of customer relations. The unique character of the relations of incumbent banks with their corporate and retail customers stems from the emphasis on stability and a long-term perspective, *making banks' approach to their customers relationship-oriented* (authors' italics), as opposed to FinTech providers' *deal-oriented focus on individual transactions*. In the latter case, whether it is mobile payments, electronic banking, or online purchases linked to credit, the common feature is that access is made to a service in a fast, convenient, efficient and cheap way. At the same time, access to a digital service only takes a short time, with variations in the place and means of occasional

access and no stable relationship, and most importantly, without any human or institutional relations. The above distinction in quality was made by the European Banking Federation (EBF), representing the banking community of thirty-one countries, in connection with the level playing field that will be required for banks in the future for the sustainable finance of the economy (*EBF 2018:3*). In that regard, the emergence of BigTech providers is two-faceted because their repeated or more stable customer relationships are commercial in nature, and such providers build on that to provide occasional financial services.

The digital age is a major challenge both for incumbent banks and for customers. As far as banks are concerned, in order to build or renew their relationship of trust with customers, they have had to prove that they have addressed the negative effects of the recent global financial crisis, that their operations are stable, sustainable and profitable, and that they provide competitive and reliable services to their customers. They have also had to prove that in the foreseeable future they would provide all of the services that FinTech companies had to offer. They must (should) make customers realise that they benefit from a stable banking relationship.

We have already suggested that the balance of trust and mistrust could give rise to a situation on which stakeholders can build. "*If the lifeblood of the digital economy is data, its heart is digital trust – the level of confidence in people, processes, and technology to build a secure digital world. Companies, regulators and consumers need fresh mechanisms to build confidence as they address emerging challenges in business, risk management, and compliance*" (*Fleming 2018:1*). We have come to an important issue, the problem of a surplus and deficit in trust as regards the relations of incumbent banks and FinTech providers. Experience shows that while the younger generation prefers FinTech solutions, has advanced digital and internet skills and believes in fast and cheap payment solutions, their financial awareness is not always on par with their ability. Given this disproportionate situation and this customer segment, a major change is taking place in the way incumbent banks create balance, and gain and build trust.

4. Building the digital financial architecture – Where do we stand?

One common feature of revolutionary changes is that they are extremely fast and often disrupt the established traditional order. Central banks, regulators and supervisors are working to keep abreast of the rapid changes in digital development. While their approach to FinTech is essentially supportive (as shown e.g. by Regulatory Sandboxes and FinTech hubs), the first warning signs are starting to appear. Authorities and studies have increasingly been proposing that services of this kind should be regulated, ethical requirements should be set, and consumer confidence and security should be enhanced.

Events indicating that unregulated or loosely regulated trends in FinTech could involve risks intensified starting from 2016–2017, underlining the need for both regulation and international cooperation. Despite the increased prominence of the need for equality in services and regulation, and for a level playing field, no significant progress has been made in that regard.

In 2016, the Financial Stability Board, the highest-level international regulatory body, began to address the regulatory and supervisory aspects of the FinTech phenomenon in greater depth, and in 2017 it already raised possible issues with financial stability when it reported that potential risks included institution-specific micro-financial risks, which may evolve into systemic macro-financial and prudential risks, partly due to the high degree to which data are interconnected. Driven by those conclusions, the FSB is now closely monitoring the stability implications of FinTech trends.

An FSB report from early 2019 already points out that FinTech services can and do have an impact on market structure and financial stability. In its analysis, the Board examined three types of FinTech presence in the market (*FSB 2019*):

1. They may partner with (or be taken over by) financial institutions, allowing the institutions to improve their service level or efficiency.

2. They may provide a service which is complementary to those provided by existing financial institutions. This could improve the attractiveness of the existing service, e.g. payments 'front-ends' that utilise existing networks and maintain (or increase) existing transaction flows. While these services may complement those offered by a financial institution, they may have some detrimental effects on the financial institution, by replacing or weakening the institution's traditional customer relationship.

3. They may compete directly with existing financial institutions, reducing margins in the affected segments and reducing the financial institution's capacity to cross-subsidise products.

Based on an in-depth analysis of these three aspects, the FSB concludes that the risks identified may become more acute for three reasons: (a) the raft of new technologies introduced in the past few years, and the impetus provided by open banking could also quickly change the dynamics of competition; (b) changes in business models may occur more quickly than in the past as BigTech companies actively and successfully push into traditional financial services; and (c) the technology focus of both new providers and incumbents – particularly where they are closely integrated into firms' operations – may entail a new dimension of operational risks.

The FSB draws regulators' attention to new types of risk and the potential detriment to financial stability. "*The potential macro-financial risks from these developments relate to the effects of competition and disruption of business models on profitability, and therefore the ability to accumulate capital through retained earnings. This largely arises where FinTech firms actively compete with the incumbents or where their actions increase the mobility of customers. This could ultimately lead to an inappropriate loosening of lending standards by banks, and more risk-taking by other financial institutions*" (*FSB 2019:16*). The FSB considers that "*BigTech firms may provide various free services because of their ability to use the data for other business lines. Customers provide personal data in exchange for using these services, instead of paying fees"* (*FSB 2019:19*).

Of course, reducing or eliminating potential risks may directly influence the trust in financial service providers, whether that trust is being built or undermined. In this context, in addition to the need for regulation, the FSB places strong emphasis on the need to determine from the outset the conditions for licensing the activities of FinTech providers.

On the subject of regulation and licensing, we refer to the European Central Bank's publication of its Guide to assessments of FinTech licence applications, and its Guide to assessments of FinTech credit institution licence applications (*ECB 2018*). According to the Guide, the general criteria assessed in the licensing process include, but are not limited to, the following four areas: (a) governance (suitability of the members of the management body and suitability of shareholders); (b) internal organisation (risk management, compliance and audit frameworks); (c) programme of operations; and (d) capital, liquidity and solvency.

As we have seen, both the FSB and the ECB place emphasis on the licensing and regulation of digital financial services and on related international cooperation, while being compelled to keep regulation itself, i.e. the solutions to the problems, within the sphere of national competence.

While warning signs are multiplying, understanding the delay in comprehensive regulation requires an overview of the essential tools and background of digital financial services, i.e. the use of big data, reliance on customers' digital traces, artificial intelligence (AI) to assist data utilisation, the methods of machine data analysis (big data and API[7]), and robotics. Indeed, it is from this side that the darkest shadows are cast on FinTech, which is why the need for trust and ethics is also strongest here. Researchers at the University of Hong Kong described this as follows: *"FinTech today is often seen as a uniquely recent marriage of financial services and information technology"* (*Arner et al. 2015:3*).

[7] Application Programming Interface

Apart from the rapid development of digital technology, the difficulty of regulation lies in this complex formula. This is because while regulators strive to regulate the financial services that are offered and provided, the tools of these services (such as big data and AI) are difficult to identify and regulate. As a prominent example, FinTech companies use large amounts of data to provide their services. Some of that data is provided by willing and knowing customers, while in other cases customers understand little about what they are consenting to, or the source of their data. A large part of the latter is referred to as digital trace data. Describing the nature of such data, a Swedish researcher refers to the international controversy over who owns and holds the data collected and used digitally (*Bogusz 2019:1*). With incumbent banks, the answer to that question was clear: the data could only have two owners, the customer and the bank. Such data were strictly protected by bank secrecy. Without that, no trust or business relationship could have existed between a bank and its customer. "*The long-term sustainability of business models based on digital trace data requires that firms consider both privacy concerns and quality concerns when building their services. Given the potentially invasive nature of data collection, and the implications of possible backlash, FinTech firms need to be careful when designing [...] their services. There must be clear rules for present and future FinTech companies about the protection of personal data and the ways in which they can be processed, and it is inevitable that the moral and ethical aspects of this issue be taken into account"* (*Bogusz 2019*). This principal requirement is also supported by FinTech providers' extensive use of Artificial Intelligence in areas such as rating credit applications, direct lending, portfolio optimisation, risk analysis of insurance assets, or the investigation of suspected fraud and regulatory compliance.

The massive volumes of data, which are occasionally obtained by invasive means, support the rapid spread of FinTech in a variety of forms. Facebook has recently applied for licences to take up banking operations, while Robinhood, one of the world's first free securities trading companies, has also applied for a banking license of its own. The question arises why such companies are going down that avenue in business. The answer is simple: they have accumulated vast amounts of data, and by granting access to the data of bank clients, the PSD2[8] has opened the door to payment services wide in front of them, virtually setting off an avalanche.

Thanks to Facebook, this entire strand of digital development has recently taken new and unexpected turns. Following a series of criticisms concerning the ways Facebook was using and processing data, in spring 2019 Mark Zuckerberg, founder and CEO of the community site, published an open letter in The Washington Post, asking governments to impose legal regulations and controls on the Internet. A few months later, Facebook agreed to pay a USD 5 billion fine at the end of an investigation into the Cambridge Analytica scandal. In the course of the proceedings,

[8] Revised Payment Services, Directive (EU) 2015/2366

the results of which included a loss of confidence, Mark Zuckerberg also appeared at a U.S. Senate hearing to announce and promise a number of measures concerning ethics and trust enhancement. "*Now, Facebook might not intend to be dangerous – but they certainly don't respect the power of the technologies they are playing with. Like a toddler who has gotten his hands on a book of matches, Facebook has burned down the house over and over, and called every arson a learning experience. Facebook has two competing missions – make the world more open and connected, and make a lot of money. And as Facebook attempts to serve both of those missions, they wreak havoc on the rest of us*" (*Brown 2019:1*).

Another turning point was the announcement of Facebook's own cryptocurrency Libra, which raised concerns in both the U.S. Fed and the ECB. This series of Facebook events is worth mentioning because it highlights the delicate nature of data that is acquired and stored digitally and used in versatile ways, provokes a regulatory response (in retrospect, without any significant results), and shows that the massive amount of data at hand even creates a theoretical possibility for issuing a cryptocurrency that could hardly be controlled in monetary terms.

Returning to the above argument initiated by PSD2, it should be recalled that the Directive enables FinTech companies to initiate online transfers on behalf of users, and forward the related instructions to banks, or provide other services such as lending. FinTechs can thus carry out in-depth analyses of an individual's spending behaviour. The new options include Account Information System Providers (AISP) and Payment Initiation Service Providers (PISP).

Apparently, the dual role of regulators is further strengthened. Regulatory support is growing, but new entrants represent such a wide range of financial services that statutory regulation can only try to catch up. Due to the concerns expressed by both the FSB and the ECB in very clear terms, additional requirements have recently become increasingly important, given the inadequate or non-existent effects of statutory regulation. These include, for example, developing, applying, and requiring the duty of care, and conduct and ethical standards to build trust. We are providing an overview of these developments as indications of a paradigm shift.

A precursor to the need for regulation is the Global Financial Innovation Network (GFIN) initiative, which has created a cross-border regulatory sandbox to test innovative financial products and services. GFIN Chair Andrew Bailey, Chief Executive of the UK's Financial Conduct Authority (FCA), announced the organisation's plans to unite regulatory bodies from 29 countries, and that applications for testing have already been received from some 50 FinTech companies. In this situation, the FCA has sought to build a bridge of international use between the need for regulation and the promotion of fair FinTech conduct: "*I support successful open financial markets, with free trade that points away from tying markets to locations, and*

markets that are global not narrowly regional. But, the big but, all of this needs to be done on a basis that is fair and sustainable, and fair to all groups in society reflecting the different capacities and vulnerabilities that exist in any society including our own. The public interest demands that we combine success with fairness and sustainability" (*Bailey 2019:1*).

In that context, the principle of the duty of care is introduced, the application of which requires FinTech companies to assess their operations by asking whether those operations were 'right' rather than by asking whether they 'complied with the rules'. The authority would set out clearly the expectations and/or claims consumers may have in their relations with FinTech companies, and would develop a consistent and comprehensive concept of care to help restore consumer confidence. In this sense, the duty of care is essentially a form of conduct that is instrumental in developing the novel codes of conduct for banks and FinTechs. In short, the initiative reflects the realisation that services of this type need to be regulated, but does not go beyond the formulation of standards of care that build trust. As we have seen, there is an acute need for international cooperation in the field of regulation. A good example of how to initiate and build this has been provided by Austria, whose Minister of Finance has announced the development of a regulatory sandbox in close cooperation with the FCA, which represents a further step towards a single international approach. "*The FinTech Advisory Council, created last year, will help create the relevant rules to govern the young financial market around digitised financial services. The management of the Regulatory Sandbox will ensure the necessary supervisory oversight while at the same time encouraging innovation and growth"* (*Loeger 2019:1*).

In a similar vein, the Magyar Nemzeti Bank has a close professional relationship with the FCA, and has also joined the GFIN network. *"This network seeks to facilitate international cooperation between authorities and innovative market operators, and to provide joint support for the global roll-out of FinTech solutions. The international network provides a framework for countries for the formalised and effective exchange of information and experience on FinTech innovations, as well as on RegTech developments, the innovative solutions specifically used to meet regulatory requirements"* (*MNB 2019:1*).

One of the voices in the 'choir' is that of European Supervisory Authorities (ESAs), which are important means of harmonised EU regulation. *"Financial Technology (FinTech) is transforming financial services. It facilitates access to financial services and makes them more convenient. It increases operational efficiency and can lower costs for consumers. It may also lower barriers for new market players and increase competition. For these benefits to happen, it is important to ensure the integrity and resilience of IT systems, data protection, and fair and transparent*

markets. [...] This will require them to enhance a common EU supervisory culture as regards technological innovation among competent authorities. In particular, the ESAs has been tasked with coordinating national technological innovation instruments and tools – such as innovation hubs or 'sandboxes' – set up by national supervisors. Furthermore, the ESAs will promote technology literacy with all national supervisors alongside information sharing on cyber threats, incidents and attacks" (*ESA 2019:1–2*).

Here we have another important guidance, which, however, in practical terms, does not achieve more than setting the requirement for competent authorities to enhance a common EU supervisory culture as regards technological innovation in financial markets.

5. The grounds and architecture of trust in the FinTech world: the relationship between regulation and ethics

Above we have given an overview of the role of trust and ethics in our 'modern age', as they emerged over time for incumbent banks and FinTech providers. The international and the Hungarian banking system are both undergoing a period when digital development is spawning new challenges for all participants in the financial and banking system. For a decade now since the last financial crisis, economic conditions have allowed the undisturbed development of financing for sustainable economic growth, and the banking market has experienced a revival of healthy competition. It was in this almost idyllic setting that we saw the emergence of the difficult, or perhaps novel, questions formulated at the outset of this paper. We examined the operating environment and regulation of the financial intermediary system, as well as the related issues of trust and ethics primarily in the context of EU and domestic relations, from the perspective of a Member State of the European Union. The post-2008 period saw the development of a whole regulatory arsenal and an institutional architecture to strengthen the secure operations of the banking sector across the European Union. Significant progress was made in building the Economic and Monetary Union, the Banking Union and the Capital Markets Union. The emerging regulatory system was more nuanced, more consistent and supported greater security in the functioning of the banking system.

At that time, however, participants driving development in digital finance entered the market: the first of these were FinTech companies, followed shortly by BigTech, and even third-party providers (TPP). As a result of their steadily growing market presence, central banks, supervisors, regulators, and incumbent banks themselves were facing decisions.

International and national regulators were giving increasingly firm indications that FinTech developments carried risks to financial markets, and involved effects that were disruptive for the financial intermediary system. They called for comprehensive international and national regulation that would create a level playing field between incumbent banks and FinTech/BigTech companies, while also reducing risks. They found themselves faced with the need to establish prudential rules as well as rules concerning systemic risk and consumer and data protection in a complex situation where even a precise definition was lacking for the subject matter of regulation. All of this occurred in an environment where the majority of digital financial services were provided across borders, which required decisions as to what would be regulated by who and where. Against this backdrop, the European Central Bank has taken the position that for the time being FinTech services should be managed and regulated within the scope of national competence. In order for regulators to get up to speed with the trends, workarounds need to be found to temporarily substitute for regulation.

As a first step, the need to support the market entry of FinTech companies gained acceptance, leading to the set-up of incubators and regulatory sandboxes. These were expected to produce two effects: first, to introduce start-ups to the requirements for regulated operations with which they had to comply, and second, to provide insights into and an understanding of their services, based on which rules could be developed.

In the period without statutory rules, the next stage was marked by the formulation of ethical and conduct standards and duties for care, the need to enforce these, and the hope that the foundations of building trust could also be laid. This is a field where incumbent banks had and continue to have traditions and experience. While the process was accelerated by the rapid development and market penetration of digital financial services, from the outset the fundamental question in this regard was: if ethics, whose ethics? This question could not have been raised with regard to the codes of ethics of incumbent banks, since the requirements for ethics and fair conduct applied to the services of the given financial institution, the employees producing and providing them, and even to management. As we have seen, such codes helped to enhance trust, demonstrating banks' compliance with the rules as well as their ethical business conduct.

The world of FinTech is governed by a different formula and structure for ethics. The first essential difference lies in the aspect of time, because, as we have seen, in the case of incumbent banks it was in the aftermath of individual shocks that ethical standards gained prominence in order to restore trust. Most users have positive perceptions of FinTech-type financial services, and say that such services are fast and cheap. Those users have no suspicions and are not sensitive to risk.

However, complaints and critical comments are increasingly targeted at phishing, i.e. the collection and use of personal data, in particular digital trace data, in ways that are not known to data owners. As a result, we are faced with a situation where the standards of ethics, conduct, behaviour and care would primarily be supposed to substitute for delayed statutory rules. The rules for FinTech ethics emerge in an undisturbed economic and financial environment. Another feature distinguishing them from incumbent ethics is that such rules do not or not only apply to the end result of the service provided, such as payment services. As mentioned earlier, both the FSB and the ECB consider it important to impose statutory licensing requirements on the launch of FinTech operations, which is right, but makes it readily apparent that such licences will be limited in their ability to address the massive volume of data and the use of artificial intelligence underlying those operations.

Accordingly, due to the existing but insufficient regulation, efforts are being made to introduce application standards, akin to ethical norms and guidelines in character, in order to 'regulate' the toolkit of FinTech/BigTech financial services, i.e. the use of artificial intelligence, big data and digital traces.

There are many examples of the pursuit of statutory regulation in various countries. One is the United States. In consideration of the potential risks and invoking the position taken by the Board of Governors of the Federal Reserve System, Democrats passed a bill in the U.S. Senate's Financial Services Committee under which BigTech companies using large platforms would be forbidden from creating, maintaining and operating a digital device or program that is widely used as a means of exchange, unit of account, store of value, or in other similar functions.

Recognising and highlighting the risks to the financial intermediary system and to financial markets, a process has started for the development of a framework on ethics and care. As an integral part of that process, the standards to be introduced were extended to the tools used by FinTech companies. In April 2019, the European Commission published a document entitled 'Ethics Guidelines for Trustworthy Artificial Intelligence' (*European Commission 2019a*). According to the Guidelines, *"AI systems need to be human-centric, resting on a commitment to their use in the service of humanity and the common good, with the goal of improving human welfare and freedom. While offering great opportunities, AI systems also give rise to certain risks that must be handled appropriately and proportionately. We now have an important window of opportunity to shape their development. We want to ensure that we can trust the sociotechnical environments in which they are embedded. We also want producers of AI systems to get a competitive advantage by embedding Trustworthy AI in their products and services. This entails seeking to maximise the benefits of AI systems while at the same time preventing and minimising their*

risks. In a context of rapid technological change, we believe it is essential that trust remains the bedrock of societies, communities, economies and sustainable development. We therefore identify Trustworthy AI as our foundational ambition, since human beings and communities will only be able to have confidence in the technology's development and its applications when a clear and comprehensive framework for achieving its trustworthiness is in place" (*European Commission 2019a:1–2*).

The Commission's document sets out the requirements for ethical artificial intelligence: "*Achieving Trustworthy AI requires not only compliance with the law, which is but one of its three components. Laws are not always up to speed with technological developments, can at times be out of step with ethical norms or may simply not be well suited to addressing certain issues. For AI systems to be trustworthy, they should hence also be ethical, ensuring alignment with ethical norms. It is only with trust that our society can fully benefit from technologies. Ethical AI is a win-win proposition that can become a competitive advantage for Europe: being a leader of human-centric AI that people can trust*" (*European Commission 2019a:3*).

In defining the essential requirements for trustworthy, ethical, human-centric AI, the Commission proposes a multi-step approach. Under that approach, trustworthy AI must respect all laws and regulations. The assessment lists used for this purpose are designed to help identify and control the application of key requirements such as human agency and oversight; safety; privacy and data governance; transparency; environmental and societal well-being; and accountability. Trustworthy AI systems cannot function unless there is international consensus on human-centric AI. The European Commission would welcome the global enforcement of the approach to AI ethics on the grounds that technologies, data and algorithms do not stop at borders. To this end, the Commission will strengthen its cooperation with partners of a similar mindset, such as Canada and Japan. This objective of the European Commission represents a milestone, and a breakthrough in a sense.

Apart from competent authorities, scientific research has also been addressing ethical premises. In 2017, the Oxford Internet Institute set up a unit called the Digital Ethics Lab ('DELab') to tackle the ethical challenges posed by digital innovation as they permeate technology, science, law, business, and not least society as a whole. "*The DELab aims to identify the benefits and enhance the positive opportunities of digital innovation as a force for good and avoid or mitigate its risks and shortcomings*," said Luciano Floridi, the OII's Professor of Philosophy and Ethics of Information. Supported by a donation of approximately USD 190 million from the U.S.-based Blackstone fund, Oxford's new Institute for Ethics in AI was founded in 2019 as a research centre specifically dedicated to the study of ethical

aspects in artificial intelligence. Upon its foundation, emphasis was given to the importance of research into AI ethics on the grounds that the governments of the world were not prepared to address the effects of artificial intelligence, which calls for an understanding of identified standards of ethics and conduct in efforts to regulate those effects.

As the activity of smart and intelligent machines based on AI is an important element in the implementation of FinTech services, many researchers have addressed the ethical requirements, including the lack of the necessary regulatory framework. The following are highlights from the assertions of two noted researchers: "*Artificial intelligence (AI) relies on big data and machine learning for myriad applications. The availability of large amounts of data is essential to the development of AI. But the recent scandal over the use of personal and social data by Facebook and Cambridge Analytica has brought ethical considerations to the fore. And it's just the beginning. […] How do we bring more awareness about such responsibility, in the absence of a global standard on AI? The ethical standards for assessing AI and its associated technologies are still in their infancy. […] Given the stakes and the thirst for data that AI involves, it will likely require companies to ask very tough questions as to every detail of what they do to get ahead. The way industry and society addresses these issues will be crucial to the adoption of AI in the digital world. However, for AI to deliver on its promise, it will require predictability and trust. These two are interrelated. Predictable treatment of the complex issues that AI throws up, such as accountability and permitted uses of data, will encourage investment in and use of AI. Similarly, progress with AI requires consumers to trust the technology, its impact on them, and how it uses their data. Predictable and transparent treatment facilitates this trust*" (*Guillén – Reddy 2018:1–2*).

There have recently been many allegations that businesses have not used AI ethically. Presumably, this criticism was not unfounded because Amazon, Google, Facebook, IBM and Microsoft have formed a non-profit partnership to establish best practices in artificial intelligence technologies and promote public understanding. This example is highlighted here because the five global users have come to the conclusion that in the absence of regulation, they were supposed to develop a proprietary data processing platform that was self-regulatory in character, and enhanced trust.

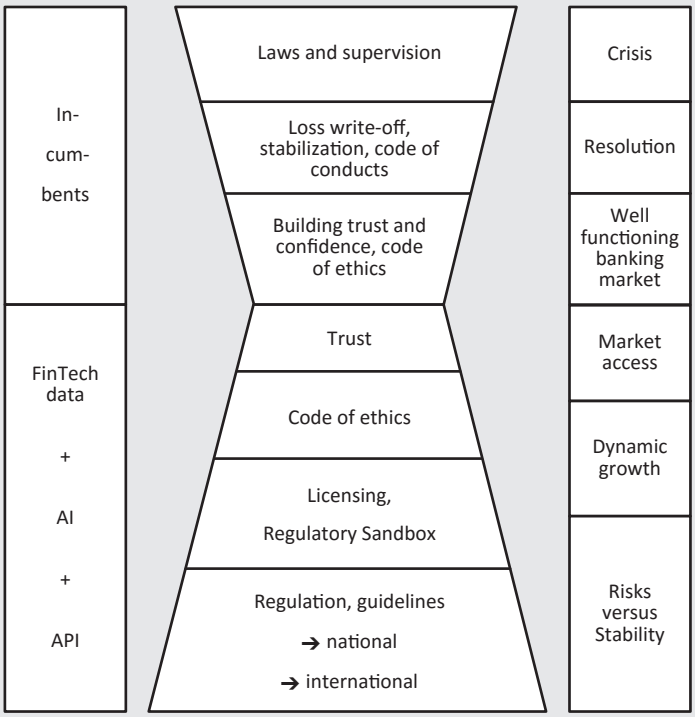
The above overview affords a comparison between the developments in the standards of trust and ethics for incumbent banks and FinTech type financial service providers. What emerges from that comparison is an evolutionary process that can be figuratively represented by an hourglass. We see a complete reversal in the order and weights of regulation and of ethical, moral and behavioural requirements for incumbents and FinTech/BigTech companies. In the case of incumbent banks

in general, and with a compulsory character in the wake of the most recent international financial crisis, regulations as well as loss and risk mitigation measures were introduced on a massive scale. Once we are past most of the recovery from the destruction caused by the crisis, it becomes timely and necessary to build trust, and foremost, to regain customer confidence. One common element in those efforts is to rethink and declare ethical and conduct standards. These codes of ethics are not substitutes for regulation, but are built on and reinforce it (a unique exception is the Hungarian Code of Ethics of 2015, referred to previously, which was legally binding at the time). The process is described by the upper part of the hourglass representation.

The consequences of FinTech's market penetration are illustrated by the lower part of the hourglass. When digital financial service providers first started to emerge, users of their services were satisfied, responding positively to speed, online administration and lower costs. Providers were trusted by customers, which is perhaps more aptly described as the absence of a deficit in trust.

For the reasons explained above (extremely rapid penetration, developments detrimental to the regular operation of the financial intermediary system, anomalies in the acquisition and use of data, absent and delayed regulation), certain risks in digital financial services became evident, and efforts to contain those risks were made by means of codes of ethics, conduct, care and self-regulation. Over time, the requirement for regulation becomes increasingly strong. This stage of development is represented by the lower part of the hourglass (*Figure 2*).

Figure 2
Hourglass: bank and FinTech ethics over time



Naturally, FinTech's current ethical requirements include the buzzwords of the codes of ethics for incumbents, such as fair business conduct, transparency, the duty of care and regulatory compliance. However, there are two differences. On the one hand, in the case of incumbent banks, ethical standards focus on the realised and 'sold' banking product (such as lending) and the related business conduct, and the internal parts of the codes provide guidance on the ethical conduct of bank employees. By contrast, FinTech ethics in respect of services enhance the careful realisation of transaction-based activities. However, in the realisation of the service the focus shifts from the human aspect to artificial intelligence and robotics. Responding to problems with the ways in which data were used and processed, the requirement emerged for specific standards of AI ethics in respect of the artificial intelligence applied. The peculiarity and novelty in such ethics is the prohibition of harm to humans, the requirement of being human-centric, and the prohibition of robotics turning against humans. For example, responsibility for decision-making is examined within that framework. In particular, how can the responsibility for decisions be shared when using AI, and who will be liable for risk in the event

of errors causing damage? From another perspective, where complex machine learning systems are used to make important decisions, the drivers behind the series of actions concerned can only be explored if the principle of transparency is applied. In connection with data protection and internet security, the great power of AI that is rooted in access to big data is also under scrutiny from an ethical point of view. What happens if an AI system is trained on a data set and then applied to learn a new data set? According to the ethics guidelines, responsible AI provides for the moral principles and values to prevent any breach of basic human ethics.

Regarding FinTech and other digital-based financial services, the European Commission reiterated the need to reduce potential risks and strengthen the network of trust that supports such services. The European Commission has published its guidelines on the use of artificial intelligence, asserting that "*…the ethical dimension of AI is not a luxury feature or an add-on: it needs to be an integral part of AI development"* (*European Commission 2019b:1*). In defining the essential requirements for trustworthy, ethical, human-centric AI, the Commission takes a multi-step approach.

6. Sunshine and shadows, sunshine or shadows? Summary

Since the emergence of digital financial services as part of the fourth industrial revolution, and the rapid increase in their market share and user numbers, the consequences of their activities have been analysed by all stakeholders, including the FinTech companies themselves. Innovative services were greeted with cheers because they were fast and cheap, and users had not the slightest distrust rooted in potential risk. The launch of such services enjoyed support from both economic policy makers and supervisors, who argued that rapid digital development was essential for keeping up with international competition. Initially, incumbent banks did not consider FinTech start-ups to be a serious challenge, resting assured that needs be, they would either implement similar developments or merge the best start-ups. FinTech companies were also delighted by the ability to create fast-growing and profitable businesses by carrying out developments of intellectual value with low capital needs and without excessive regulatory restrictions. Arguably, this was the bright golden age of FinTech development.

Rapid and diversified development, and the entry of new types of actors gave rise to and foreshadowed problems that needed to be identified, and for which solutions had to be found. In 2019, the FSB went as far as to state that FinTech developments could disrupt the financial structure and pose a threat to financial stability, while the European Central Bank has stressed the need for a level playing field, and for equality in services and regulation.

The analysis of these initial conditions and rapid developments showed that the supervision and regulation of a given financial service and service provider was no longer sufficient and should be extended to the tools of underlying the service, such as artificial intelligence. As comprehensive and harmonised regulation has yet to be developed, requirements for ethics and self-regulation have been introduced as substitutes.

To draw lessons and conclusions, we abstracted the requirement for trust, confidence and ethics as a traditional value underlying the successful operation of incumbent banks. We then reviewed the regulatory situation and needs as far as developments in digital finance were concerned.

We described the process under review in stages. Following the international financial crisis, incumbent banks had to restore their operations and consolidate their trust and ethics capital. Offering digital financial services, FinTech start-ups emerged as challengers. They were met with consumer trust, while their market weight was considered marginal and risk-free by banks and regulators. In the second half of the last decade, FinTech spread at a revolutionary pace, giving rise to three types of threat. Incumbent banks indicated that regulation did not provide for a level playing field and that PSD2 amendments would expose them to major losses in data and markets unless they implemented digital developments at significant cost. International regulators issued warnings indicating rapid changes in market structure, financial stability issues and competitive constraints that posed micro- and macro-financial risks. To address potential problems relating to financial stability, the need to regulate FinTech emerged at the national and international levels. A survey of the means required revealed that it was not enough to regulate FinTech providers and products alone. Potential risks are carried by the amount of data used, artificial intelligence, and the algorithms processing big data.

As comprehensive regulation was not achieved, workarounds such as licensing guidelines were introduced. In the absence of regulation, the need to build trust is evident, which is why the emergence of codes of conduct, ethical standards, duty of care and international regulatory sandboxes was a real breakthrough.

In the mid-2010s, the banking sector overcame the worst damage caused by the financial crisis and sustainable financing for the economy recovered. The need to bring banking over-regulation due to the crisis to a normal level was put on the agenda, and rebuilding trust in the banking system became a central concern. An important building block in the process was the rethinking of banks' ethical standards and codes of conduct.

During this undisturbed and peaceful period of development, the fourth industrial revolution accelerated, with all its essential elements entering the global economy, from artificial intelligence to robotics. For a long time, incumbent banks looked at new FinTech players without substantive criticism or opposition, and were confident that the new entrants would not be able to take over their core banking services and would remain marginal, or that cooperation or merger agreements would be made with the owners of successful innovations. In the first phase of the process, incumbents mainly protested against the unequal terms, i.e. the fact that regulatory conditions created an operating environment that favoured FinTech companies, and that the playing field was not level. Concerns over risk or issues of trust were not raised either by regulators or by users of digital financial services. Summarising the characteristics of this development phase, the segment of FinTech start-ups can be said to have expanded in brilliant sunlight, driven by regulatory support and market demand.

Of course, the brighter the sunlight, the more pronounced the shadows are. The appearance of several factors within a short period of time indicated that risks are present or anticipated, and that darkness would grow wider and deeper. The approach was adopted that it was better to support FinTech start-ups and get to know them better, and to follow up on developments through regulation. There were various means of support, ranging from regulatory sandboxes to innovation hubs, until PSD2 amendments allowed FinTech companies to access some of banks' customer data.

At this point we reached a milestone. Digital financial services carved out a significant portion of the market and profits of incumbent banks. At the same time, BigTech companies entered the market, offering not only payment services, but also credit, deposit and insurance products, with fast execution and extremely low cost. Giant companies like Facebook applied for and obtained a bank license. According to an official announcement by TechCrunch, Facebook Payments International LTD (FBPIL) was licensed as an electronic money institution as of 24 October 2016 by the Central Bank of Ireland (CBI), enabling to carry out electronic money transfers, payment services and credit transfers.

These digital financial service providers make use of all available elements of digital technology, including big data, artificial intelligence, API data analytics, robotics and the use of digital traces.

When incumbent banks realised that they were out of step, they undertook significant digital developments from 2017, accelerating their digital convergence and requesting authorities to provide a level playing field.

The next development stage was related to the use of tools and data for digital financial services. There was increasing professional criticism about access to and the use of big data and digital traces. A significant part of that data was collected by algorithms and programmed applications without the knowledge of the owner, but the use of the data subsequently caused problems even if they were recorded with the customer's consent. BigTech companies provide some of their services in exchange for data.

The shadows on FinTech services being darker, it is time for regulators and supervisors to take action. The potential risks were first pointed out by the FSB, noting that the market penetration of FinTech/BigTech companies was changing the structure of the money market and that financial stability risks might arise, and that BigTech services which were fast and were low-priced or free would force incumbent banks to compete, giving rise to operational risks. Due to the potential risks identified, there was consensus among national and international regulators that providers of financial services and FinTech companies should be subject to licensing requirements. In this respect, the European Central Bank issued a licensing guide, but licensing and supervision remained a national competence, while there is a need for harmonised international regulation.

As it is clear that such a comprehensive set of rules can only be expected in the distant future, a set of requirements appeared on the horizon, supported by international agreement and cooperation. This involves the demand for trust and ethics, new behaviours and new standards for the duty of care in the world of FinTech and the digital devices that support it.

In the case of incumbent banks, experience has shown that in the aftermath of individual crises and shocks ethical standards gain prominence, when trust is being restored after regulatory measures for crisis recovery. Initially, as far as FinTech was concerned, the need to build trust was not particularly pronounced, and regulation was loose and accommodating. For example, the primary purpose of regulatory sandboxes was to help FinTech start-ups enter the market. In such an environment, the approved start-ups are temporarily exempted from certain regulations in respect of a limited number of customers for a limited period (e.g. 6 to 12 months). Subsequently, the innovator will be required to comply with all applicable regulations in force.

Rapid development showed that it was not sufficient if the regulation, and the requirement of fair and ethical conduct was applied only directly to FinTech providers and of digital financial services, but the scope of regulation and requirement should inevitably be extended to the tools essential to the business of such providers, including artificial intelligence and the processing of big data. In that

situation, the application of ethical standards and codes became a matter of primary importance. When regulators finally addressed the requirements of FinTech ethics, the traditional sequence of actions was changed and this was made possible by the fact that the digital financial services described above penetrated the market during a period of sustained, undisturbed economic development. The ethical and conduct standards currently in place and the lack of comprehensive international regulation will be tested when an economic slowdown or recession occurs. That is when the development and tightening of the rules for FinTech is expected to accelerate and become inevitable, and that is when a level playing field with incumbents may be enforced. Based on our experience of digital developments in recent years, we can say that they are capable of mobilising tremendous forces and may have a huge influence on the development and structure of the financial markets.

In this paper, we discussed one of the key drivers of the fourth industrial revolution. The key drivers of the third industrial revolution were machines and the mechanics underlying them. It gives a moral lesson to revisit the statement of the basic law of mechanics at the time: "*Mechanics is the science of the effects of forces. The effect of forces is manifested in provoking and preventing the movements of bodies, and in causing or preventing changes to ongoing movements*" (*Ritter 1879*: *1*.). Although the 19th-century laws of mechanics did not have a code of ethics, their values can be translated into the language of FinTech and AI.

A final thought: the development of ethical standards in the world of FinTech and BigTech should not be underestimated. Our paper seeks to support the argument for the importance of their role, on the grounds that such standards pave the way for control and accountability, that they provide a conceptual basis for the necessary supervisory and regulatory tasks, and that in a later stage of the process, a harmonious relationship can be established between the ethical values of incumbent banks and those of FinTech providers.

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Who Does Not Have a Bank Account in Hungary Today?*

Dániel Horn – Hubert János Kiss

Based on a representative sample, the study examines how regional variables and variables related to settlement type as well as demographic (gender, age), social (qualifications, income) and labour market characteristics (unemployment, public sector) and individual preferences (risk-taking and patience) are correlated with the fact that the respondent has a bank account or bank card or not. The authors find that having a bank account or bank card is not influenced by whether someone works in the public sector or not or by the individual's gender, while the effect of the preferences depends on the financial service. The impact of the other variables (age, education, income, unemployment) is in line with expectations and is significant separately as well as if they are taken into account simultaneously. The analysis shows that regional impacts and ones related to settlement type are also significant.

Journal of Economic Literature (JEL) codes: D14, G2, G4

Keywords: bank account, bank card, risk-taking, financial inclusion, socio-demographic characteristics, patience

1. Introduction

It is an accepted fact that financial services facilitate economic development at the macroeconomic level (*Jayaratne – Strahan 1996; Levine 2005; Beck et al. 2007*). For example, the spread of electronic payment methods may support economic growth, *inter alia*, through social cost savings (*Bergman et al. 2007; Gresvik – Haare 2009*).[1] At the individual level, the use of financial services is often conducive to

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[1] According to the calculations of *Turján et al.* (*2011*), a more modern payment system, for example one that uses less cash would entail social cost savings amounting to 0.4 per cent of GDP in Hungary.

increasing savings (*Dupas – Robinson 2013; Brune et al. 2016*), helps the start-up of enterprises (*Pitt – Khandker 1998; Augsburg et al. 2015; Banerjee et al. 2015a; Tarozzi et al. 2015*) as well as with the management of risks and emergencies (poor harvest, job loss, health problems) (*Karlan et al. 2014; Cai 2016; Cole et al. 2017*).[2] Those who do not have a bank account or bank card may not enjoy these benefits.

Based on the above, beyond the individual or household levels, it is understandable why promoting the use of basic financial services, i.e. financial inclusion, is an important public policy objective. In 2017, in Baden-Baden the G20 countries (and thus the countries of the European Union as well) committed themselves to promoting financial inclusion globally, and the World Bank announced the Universal Financial Access 2020 initiative. There are individual initiatives as well in a number of countries. In Hungary, for example, financial inclusion was also given a key role as one of the seven main objectives in the government's *Strategy for Financial Education*.[3]

Concerning financial inclusion, the Global Findex database of the World Bank is an excellent starting point as in this topic it contains an immense amount of data for most of the countries. This database was created with the help of questionnaire surveys, during which 1,000 people were asked about financial matters in most of the countries (more people in larger countries). At the global level, financial inclusion has been assessed three times to date, with the last survey occurring in 2017. The report prepared on the basis of the database (*Demirguc-Kunt et al. 2018*) reveals that the reasons for financial exclusion may be the following: a) the financial institution is too far away; b) the service is too expensive; c) lack of necessary documents; d) lack of trust in credit institutions; e) bank services are not used for religious reasons; f) no money to put in the bank; g) someone else in the family has an account; and h) no need for financial services.

This survey reveals that in 2017, 75 per cent of the population in Hungary had a bank account. There is a difference of 6 percentage points between men and women, and a difference of 12 percentage points between the richest 60 per cent and the poorest 40 per cent in terms of having bank accounts. The data also show that the probability of having a bank account grows with age, education and active presence in the labour market.[4] In developed countries, the ratio of bank account ownership (euro area: 95 per cent, USA: 93 per cent) is higher than in Hungary.

[2] *Demirguc-Kunt et al.* (*2017*) and *Karlan – Morduch* (*2010*) provide great insight into the literature. It is important to note that access to financial services does not always clearly improve the situation of households or firms. Many studies have not found any positive impact (e.g. *Kaboski – Townsend 2012*, *Dupas et al. 2018*), or consider the impacts to be only moderate (*Banerjee et al. 2015b*).

[3] The OECD National Strategies for Financial Education: OECD/INFE Policy Handbook contains further useful information about national strategies regarding financial culture (*OECD 2015*).

[4] On the website of the World Bank, individual-level data are also available, which provide information not only about the use of financial services but also about gender, age, education, income quintile and the labour market situation.

Although the figure for Hungary is better than the global average (63 per cent), the situation is more favourable in many of the neighbouring countries compared to Hungary (Czech Republic: 81 per cent, Croatia: 86 per cent, Poland: 87 per cent, Slovakia: 84 per cent and Slovenia: 98 per cent). As financial inclusion is higher in these countries, whose history and level of development are similar to those of Hungary, it indicates that there may be room for progress.

In addition to the World Bank survey, at various points this study shows common features with the work of *Ilyés – Varga* (*2015*), who also examined payment habits in Hungary with the help of a representative survey and also touched upon the question of what socio-demographic characteristics are the most typical of households which do not have bank accounts or bank cards. According to their data, 76 per cent of people have bank accounts and 72 per cent have bank cards. They find high bank account and bank card coverage (of around 90 per cent) up to the age of 50, while financial inclusion is lower in the older age-groups. In these older age-groups, bank card ownership is lower than bank account possession. Education also has a significant effect: average coverage is higher among those with a higher educational level. While less than half of those with 8 years or less of elementary education have a bank account or bank card, and the ratio of vocational school graduates who possess a bank account or bank card (72 per cent and 67 per cent, respectively) is also lower than the national average, in the case of those who have a secondary school leaving certificate these figures already exceed the national average (88 per cent and 86 per cent, respectively). The highest coverage is observed among degree holders (96 per cent and 95 per cent, respectively). The correlation between income and ownership of a bank account or bank card is positive, although the impact is smaller than expected, as even in the lowest income groups coverage falls only slightly short of the national average. In terms of settlement type, coverage is the lowest among those who live in villages. Higher values are observed in the case of town-dwellers, while the coverage values are the highest among those who live in county seats or Budapest. In terms of labour market status, coverage is highest among active employees, while the figures for pensioners and unemployed are below the national average. As there may be a correlation between these effects, the authors used logistic regression analysis to find which characteristic(s) have the greatest impact. They found that all of the aforementioned variables are important for understanding the ownership of bank accounts and bank cards, and their impact is significant even if the other variables are taken into account. Respondents who did not have a bank account or bank card were asked about the reasons. The most frequent answer (90 per cent) was that they did not consider these financial services necessary, while others mentioned the high costs (25 per cent and 19 per cent of the respondents in relation to bank accounts and bank cards, respectively). Few people indicated lack of confidence in credit institutions (10–11 per cent) or perceived security risks (3–4 per cent).

This study is based on the data of the TÁRKI Omnibus survey conducted in early 2017. Compared to the World Bank database, the study by *Ilyés – Varga* (*2015*) is richer, and the database used in this study contains even more variables. We have information on the respondents' risk and time preferences and even about whether they work in the private sector or the public sector. As is presented, according to our expectations these variables may also affect bank account and bank card ownership. The main question of the study is who does not use basic financial services in Hungary at present, which we measure with the ownership of retail bank accounts and bank or credit cards.

The next section presents the data and hypotheses, while in the third section we discuss our findings with the help of descriptive statistics followed by regression analysis. Finally, we draw the conclusions.

2. Data and hypotheses

In 2017 Q1, the Omnibus survey of TÁRKI took a 1,000-person sample of individuals aged 18+, which was representative in terms of gender, age, education and settlement type. The sample provides a thorough survey of the respondents' demographic (age, gender), economic and social (educational level, income, labour market status, residence) situations. Below is a brief presentation of the most important variables.

The Omnibus survey measures the educational level on a nine-grade scale, from less than 8 years of elementary to university. These nine categories are used in the descriptive part, but in the regression analysis we transformed this variable into one that measures the years spent at school.[5]

As far as income is concerned, the survey asks about the income of both the individual and the household. Respondents could give net income and estimated income at both levels. In the latter case, they had to choose their income level from the given ranges (HUF 20,000 or below, HUF 21,000–40,000, HUF 41,000–70,000, HUF 71,000–100,000, HUF 101,000–150,000, HUF 151,000–200,000, HUF 201,000–300,000, HUF 301,000–500,000). Both at the individual and household levels far more people indicated net income than estimated income. We formed the two types of income for all respondents using imputation with the help of control variables concerning mainly consumer durables and real property. Fewer people (456) gave responses regarding household-level income than individual-level income (722). However, individual and household incomes strongly correlate; the correlation coefficient is 69 per cent and 66 per cent for net and estimated incomes,

[5] We assigned 6 years to the category of less than 8 years of elementary school, and the shortest period of time needed for graduation to the other categories.

respectively, and the correlation is significant ($p<0.0001$ in both cases). Individual-level net income and its imputed values were used in the descriptive statistics and in the regression.

Two dimensions are examined in the case of the labour market status. Firstly, whether the respondent works when the question is asked, and secondly, we also have information whether the person works in the public sector. The use of this variable in the analysis was justified by the assumption that those working in the public and private sectors receive their salary by transfer to a bank account to different degrees.[6] More exactly, our expectation was that most of those working in the public sector receive their salary to a bank account, contrary to the private sector, where this practice is less widespread. And the outcome may be that employment in the public sector in itself explains the higher degree of having a bank account, irrespective of other variables.

We examined two aspects of the dwelling place as well. Firstly, which region the respondent lives in, and secondly, the settlement type. The latter contains four categories: Budapest, county seat, town, or village.

In addition, we have data on the respondents' risk and time preferences, which were surveyed by TÁRKI at the authors' request. Risk preferences were assessed with the help of a hypothetical question. The respondent had to decide, if he received HUF 10,000, what percentage of that he would spend on a gamble where there is a 50 per cent chance to win the double of the amount staked and equal probability to lose it. *Sutter et al.* (*2013*) also used this test, which basically corresponds to the investment game of *Gneezy and Potters* (*1997*), which is often used to measure risk attitudes (see, for example, *Charness – Gneezy 2012, Crosetto – Filippin 2016*). The amount staked on the gamble can be considered the natural measure of risk-taking, as the higher percentage the respondent would spend on gambling, the higher risk he is ready to take. Based on *Falk et al.* (*2018*), we assessed the time preference with the help of five interdependent choices between immediate and delayed financial rewards. For example, the respondent had to decide whether he would like to receive HUF 10,000 today or HUF 15,500 in a month. Depending on the answer, we changed the latter amount in order to be able to roughly assess by five questions what amount available in a month would be equivalent for the respondent to today's HUF 10,000. The quotient of the two amounts (HUF 10,000/HUF in a month) gives the respondent's discount factor, i.e. how he evaluates the future compared to the present. In recent literature, this preference has started to be referred to as patience. The higher this quotient, the more patient the individual is. The examination of preferences is justified by the fact that on the basis of microeconomics, in addition to constraints and opportunities,

[6] *Demirguc-Kunt et al.* (*2018*) also call attention to the fact (see *Section 3*) that if those working in the public sector receive their salary to a bank account, it may significantly affect the differences in bank account ownership seen across countries.

individuals' decisions are determined by their preferences. In line with this, the examination of the role of preferences has become increasingly important in recent years. As mentioned in the introduction, the use of financial instruments and financial inclusion may significantly facilitate the management of risks and emergencies, and thus we might expect that risk attitude may have a correlation with the use of basic financial services. Many recent studies examine the relationship between patience and accumulation decisions, and especially financial decisions within the latter. *Sutter et al.* (*2013*) observe, for example, that more impatient young people save less in Austria. *Bradford et al.* (*2017*) identify a positive correlation between patience and savings on a representative US sample. *Falk et al.* (*2018*) find that this correlation exists at the global level as well.[7] On the basis of the findings presented we thought that patience may also be correlated with financial inclusion. More specifically, we expect that more patient individuals (who discount the future to a lesser extent) save more, and thus we expect that they are more willing to use financial services than their less patient compatriots.[8] It is important to note that preferences may affect the other variables as well, for example, more patient individuals may have higher qualifications.[9] In the regression analysis, however, we can take into account these indirect effects by including the above variables, and thus we can examine whether preferences have an impact on the use of basic financial services beyond these indirect effects as well.

In the survey, there were two questions concerning basic financial instruments: 'Do you have a retail bank account?' and 'Do you have a bank card or credit card?'.[10] In the Hungarian questions the pronoun 'you' is used explicitly both in the singular and plural sense, so that the unit of observation is not clear; the individual level and the household level are not clearly separated. It is not even an objective to precisely separate them, as in terms of financial inclusion it is not the point whether the individual has a bank account or bank card or not, but the point is that there should be an individual like that in his/her environment in a narrow sense.[11]

As a first step, we examine whether we can confirm the findings of the World Bank analysis or the study by *Ilyés – Varga* (*2015*) using our data, i.e. whether we can find any difference in the use of basic financial instruments on the basis of gender, age, education, income, labour market status or settlement type. We expect that in terms of these variables our findings will also be similar to those of the World Bank survey and the study by *Ilyés – Varga* (*2015*). Neither the World Bank, nor *Ilyés – Varga* (*2015*) examine the effect of whether someone works in the public

[7] It should be mentioned that certain studies (e.g. *Chabris et al. 2008*) do not find any correlation between patience and financial decisions.
[8] Using these same data, *Horn – Kiss* (*2019*) find that patience has a significant impact on savings decisions, even if a number of factors (such as demographic characteristics, educational level, income) are taken into consideration.
[9] See, for example, *Golsteyn et al.* (*2014*) or *Horn – Kiss* (*2019*).
[10] For the sake of simplicity, the term bank account is used instead of current account as well as bank card in lieu of bank card or credit card in this study.
[11] *Ilyés – Varga* (*2015, Part 4.1*) do the same.

sector, and none of the studies deals with the effect of preferences. Therefore, our study contributes to the existing literature, and shows whether these variables are important in the understanding of who has a bank account or bank card.

In addition to the above, we also examine if regional disparities affect whether the respondent uses basic financial services. It may happen, for example, that in a richer region even poorer people have a bank account, while in poorer regions they do not. Based on the above considerations we expect that we will find regional disparities, and in richer regions the use of basic financial services will be higher, *ceteris paribus*.

3. Results

3.1. Descriptive statistics

According to the survey, 82.9 per cent of the respondents have a bank account and 83.2 per cent have bank cards. 83.1 per cent of women and 82.7 per cent of men have a bank account, while the figures for bank cards are 83.6 per cent and 82.7 per cent, respectively.[12]

Table 1 shows the characteristics of individuals who do not have a bank account or bank card (column 'No') and those who have one (column 'Yes'), and whether the difference seen in these characteristics is statistically significant or not.

Table 1
Differences between individuals who have and who do not have basic financial instruments

	Bank account				Bank card			
	No	Yes	Difference	Significance	No	Yes	Difference	Significance
Women (%)	56%	57%	–1%	0.87	55%	57%	–2%	0.70
Age	58.33	47.99	10.34	0.00	60.68	47.60	13.07	0.00
Education (year)	10.11	12.24	–2.13	0.00	10.26	12.20	–1.94	0.00
Income (HUF thousand)	101.4	136.3	–34.9	0.00	99.6	136.3	–36.7	0.00
Works (%)	23%	71%	–48%	0.00	22%	71%	–49%	0.00
Public sector (%)	33%	27%	6%	0.17	35%	27%	8%	0.05
Patience	0.79	0.81	–0.02	0.20	0.77	0.81	–0.04	0.00
Risk (%)	30%	40%	–10%	0.00	30%	40%	–10%	0.00

[12] These figures are higher than the ones mentioned by *Ilyés – Varga* (*2015*) (75.7 per cent have a bank account, and 71.7 per cent hold a bank card), but those data are from 2014. It is to be noted that 22 and 24 of the respondents did not want to or could not answer the questions concerning bank account and bank card ownership, respectively.

Clearly, as opposed to the World Bank survey, we do not see any gender difference. The ratio of women among those who do not use basic financial services is slightly higher compared to the ones who use them, although the difference is not significant.

Looking at the age, we can see that the individuals who have a bank account / bank card are typically younger than those who do not have a bank account / bank card, and the difference is significant. As regards age, two effects play a role. Firstly, as respondents grow older, their income grows, and there is an increased probability that they will use the basic financial services. Accordingly, as opposed to what is shown in *Table 1*, one would expect that the individuals that have a bank account / bank card are typically older. Secondly, it may be the case that many of the elder, mainly country people grew up without using these services, and did not use them later either. It seems that the second effect dominates, and the older age-group uses the basic financial services to a lesser degree than young people. This is corroborated by *Figure 1*, which shows that among those who are older than the generation that is around the age of 55 the use of bank account and bank card declines strongly with age. Looking at the use of bank accounts it is also seen that in the case of young people the probability of use grows with age. These findings are very similar to those of *Ilyés – Varga* (*2015*). We can also see, as they do, that bank account coverage is typically higher than bank card coverage in the case of the older age-groups.

Figure 1
Ratio of bank account / bank card ownership depending on age

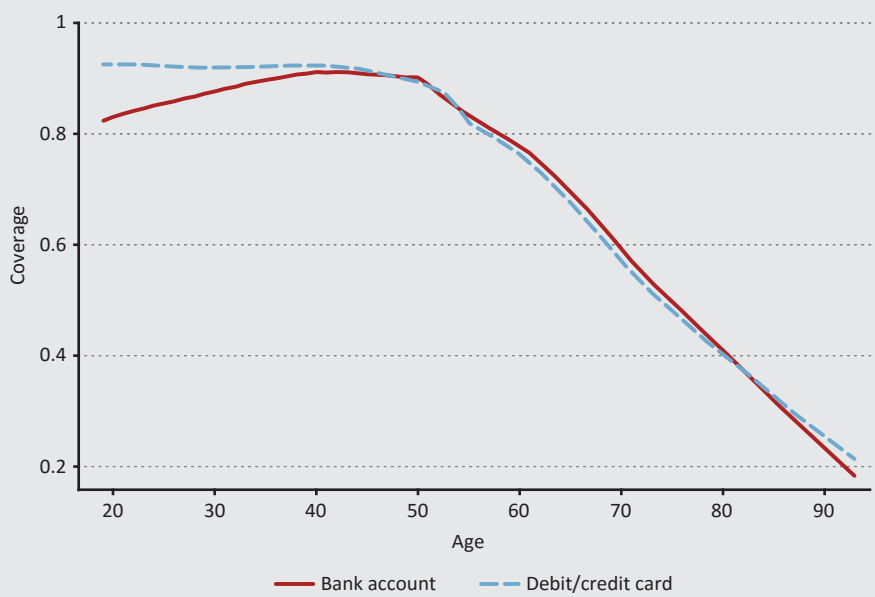
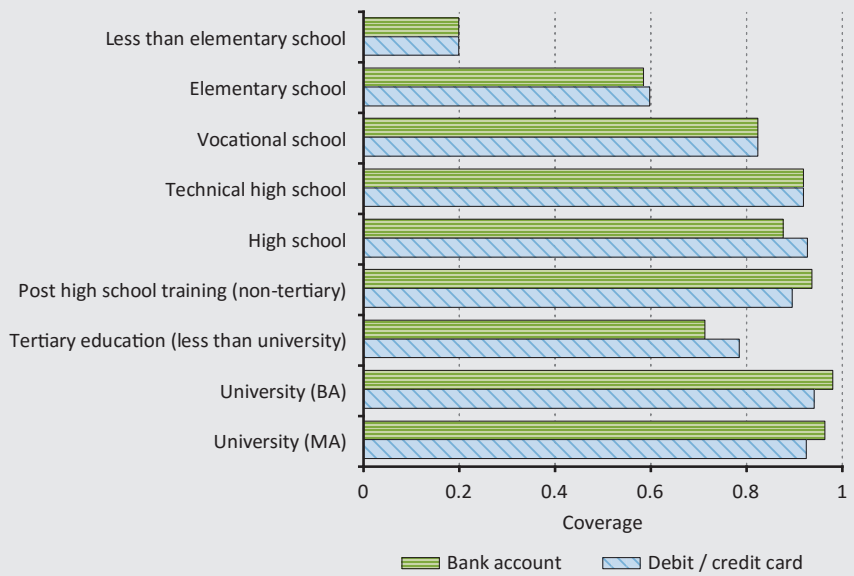


Figure 2 depicts how the ratio of bank account and bank card ownership changes with educational level. Similarly to the study by *Ilyés – Varga* (*2015*), we see the expected correlations: the ratio of bank account and bank card ownership increases with the educational level, although the growth rate is lower and lower. While among the people who did not finish more than 8 years of elementary school (this group of respondents is constituted by the first two lines in *Figure 2*) the ratio of bank account ownership is 56.29 per cent, and that of bank card ownership is 57.49 per cent, in the case of vocational school graduates these figures rise to 82.45 per cent for both financial instruments. For those with a secondary school leaving certificate (in *Figure 2* this group of respondents corresponds to the combination of lines four and five), bank account ownership is 90.16 per cent, while bank card ownership is at 92.36 per cent. As these are already high numbers, higher education (the last two lines in *Figure 2*) can contribute only to a modest improvement in the figures (97.73 per cent have a bank account, and 93.89 per cent have a bank card).[13]

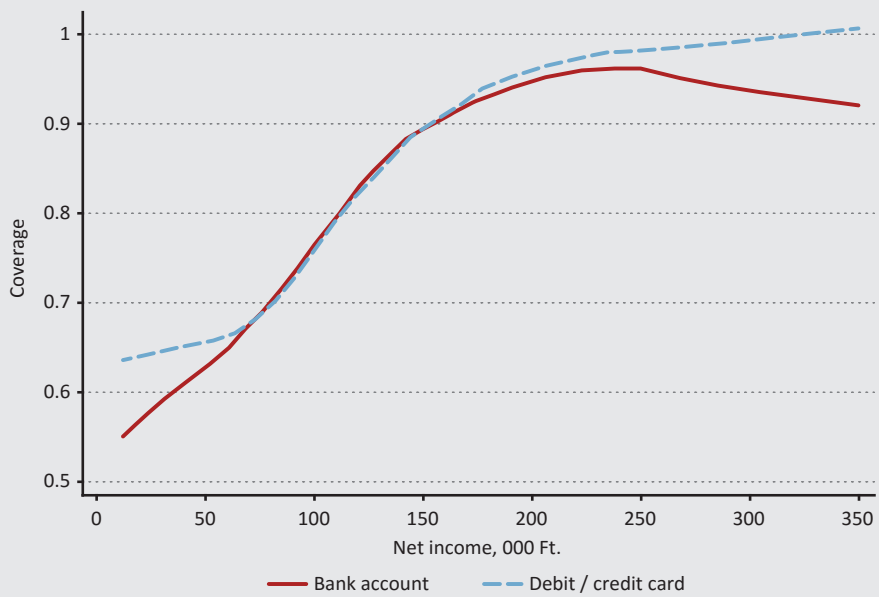
Figure 2
Ratio of bank account / bank card ownership depending on education



[13] The category 'Tertiary education (less than university)' contains 15 observations. The low number of observations may explain the slight deviation of the results from the trend.

Education significantly determines income as well. Therefore, it is no surprise that according to *Table 1* the income of individuals with a bank account / bank card is significantly higher, i.e. by HUF 35,000. Concerning bank accounts, *Figure 3* complements this conclusion with the fact that bank account ownership grows together with income up to around HUF 200,000, but above that income no change is observed, or in the case of high incomes even a slight decline is seen in the data. In the case of bank cards, their ownership ratio rises continuously with income, although the growth rate declines steadily, as complete coverage is approached.

Figure 3
Ratio of bank account / bank card ownership depending on income



Similarly to the World Bank analysis and the study by *Ilyés – Varga* (*2015*), the data in *Table 1* show that the use of basic financial services is correlated with the labour market situation: among bank account and bank card owners the ratio of those who have a job is significantly higher.[14] At first sight it may seem strange and contradictory to our hypothesis formulated on the basis of the World Bank analysis that among those who do not use the basic financial services the ratio of

[14] One underlying reason may also be that many of the poorer families are indebted, and for them it is not worth to have a registered job, as one third of their income would immediately be deducted for repayment. See, for example: https://www.portfolio.hu/finanszirozas/hitel/bedolt-hitelek-van-remeny-a-szegenyeknek-itt-a-megoldas.305659.html

those who work in the public sector is higher, and this difference is significant in the case of bank cards. Apparently, public sector employees are very heterogeneous in the sense that those who do intellectual work as state employees (who, without exception, probably receive their salaries to a bank account) as well as physical workers and public workers employed by local governments (for whom cash payment may be the usual method) are treated alike.

Based on *Table 1*, in terms of preferences, patience is not correlated with bank account ownership, but individuals who have a bank card seem to be significantly more patient than those who do not hold a bank card, although the numerical difference is not substantial. As for risk-taking, regarding both bank accounts and bank cards, those who use these basic financial services are significantly more willing to take risks. These findings are reflected by *Figure 4* as well.

Figure 5 illustrates the regional disparities. It is clear that there are such regional disparities. Recourse to basic financial services is the lowest in Southern Transdanubia (the ratio of bank account and bank card ownership is 77.08 per cent and 73.68 per cent, respectively), while Western Transdanubia and the Southern Great Plain are the leaders with bank account ownership of more than 90 per cent and bank card ownership reaching 87 per cent. The differences are significant at the national level, but only at a 5 per cent significance level in the case of bank cards.

Figure 6 shows that settlement type is also correlated with the use of basic financial services. Proceeding from county seat to village, the ratio of both bank account (from 88.13 per cent to 79.59 per cent) and bank card ownership (from 90.63 per cent to 78.91 per cent) declines. The explanation may be similar to the one described in the World Bank report and the study by *Ilyés – Varga* (*2015*), i.e. these services are not available in smaller settlements. But it is also possible that in these settlements the educational level and the income of the population is lower, and based on the above we have seen that this may also be behind the lower use of financial services. Interestingly, and contrary to the study by *Ilyés – Varga* (*2015*), according to our data the ratio of bank account ownership is the lowest in Budapest, and Budapest does not reach the level of towns in bank card ownership either. As in the case of regions, settlement types also significantly explain the dispersion of bank account and bank card ownership, but only at a significance level of 5 per cent in the case of bank cards.

Figure 4
Ratio of bank account / bank card ownership depending on patience and risk-taking

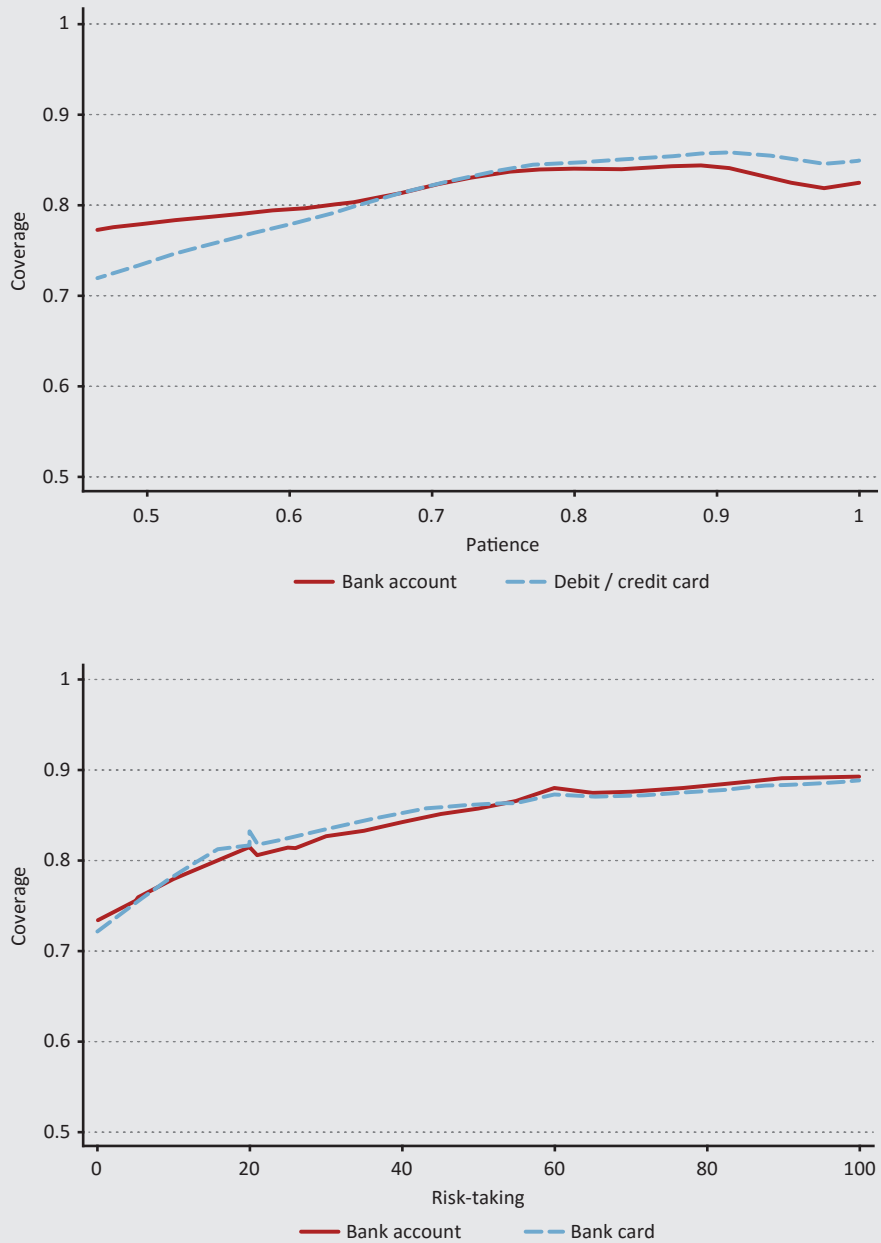


Figure 5
Regional disparities in using basic financial services

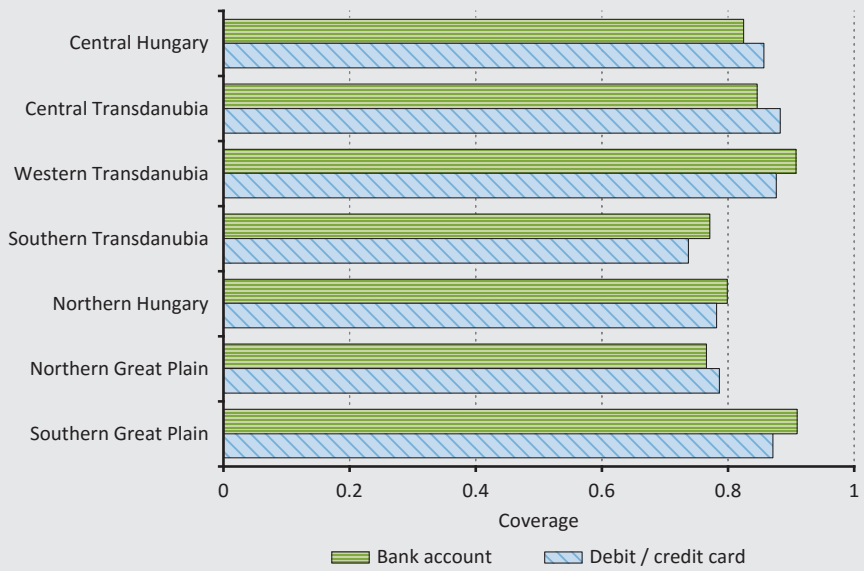
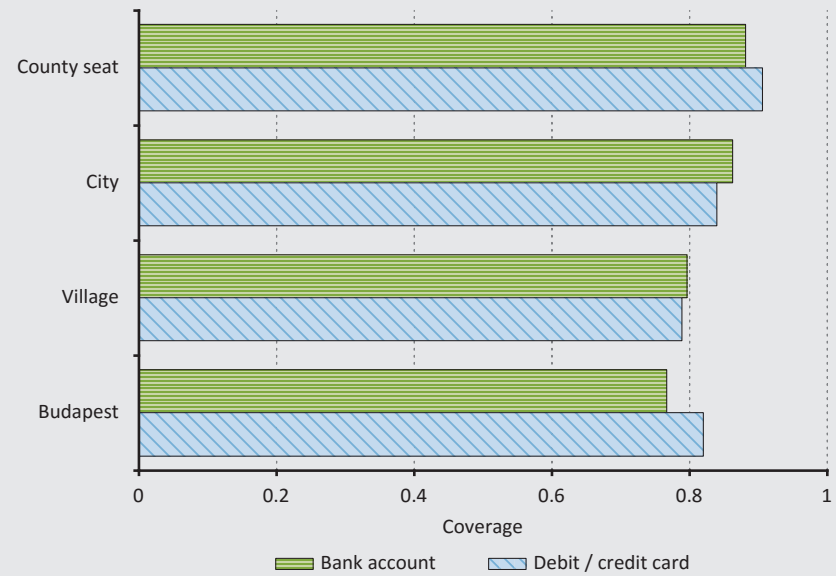


Figure 6
Ratio of bank account / bank card ownership in various settlement types



3.2. Regression analysis

In this section, with the help of regressions we attempt to better understand who does not have a bank account / bank card in Hungary. The advantage of this analysis is that we can take into account the various impacts simultaneously, and thus it is possible to verify whether a variable proves to be significant in the descriptive statistics only because it correlates with another variable.

Using the ordinary least squares (OLS) method we would like to understand what influences whether a respondent has a bank account or bank card or not. The dependent variable is a binary variable, whose value is 1 if the respondent has the given financial product; otherwise it is 0.[15]

The explanatory variables in *Table 2* are identical to the ones seen before. Of the demographic variables, the value of the *woman* dummy is 1 if the respondent is a woman; otherwise it is 0. In the case of the age, the quadratic term was also taken into account, as the inverted U in *Figure 1* indicates the presence of non-linear effects. We examine the effects of education (educational level is measured here with the years spent at school) and income, as well as whether the fact that the respondent works affects the ownership of the financial product under review. We also examined whether it has an impact if the respondent works in the public sector. We also took into account the effects of patience and risk preferences. Finally, we also examined the effects of regional and settlement type dummies.

We transformed the coefficient of the explanatory variables in order to be able to interpret them on a percentage basis. This was done because if the value of an explanatory variable increased by one unit, the coefficient shows how many percentage points greater the chance would be that the respondent has the given financial product, while the values of the other variables remain unchanged.

[15] In the case of a binary independent variable the application of other, non-linear specification is also possible. In the event that logit or probit regressions are used in lieu of linear ones, with the specification below, we come to qualitative results that are very similar to the ones described.

Table 2
Regression analysis

	(1)	(2)
	Dependent variable: Does the respondent have a	
Variables	bank account?	bank card?
Woman, dummy	1.706	2.106
	(2.571)	(2.567)
Age	1.699***	1.237***
	(0.515)	(0.466)
Age square	–0.0199***	–0.0173***
	(0.00550)	(0.00510)
Education (year)	3.370***	1.995***
	(0.611)	(0.686)
Income (HUF thousand)	0.0522*	0.0877***
	(0.0275)	(0.0273)
Works, dummy	14.52***	11.69***
	(3.861)	(3.697)
Public sector, dummy	–2.112	–1.668
	(2.798)	(2.931)
Patience	4.437	19.89**
	(8.621)	(9.924)
Risk-taking	0.0176	–0.0304
	(0.0366)	(0.0393)
Central Transdanubia, dummy	–2.952	–4.303
	(4.596)	(4.581)
Western Transdanubia, dummy	0.118	–7.283
	(5.040)	(5.419)
Southern Transdanubia, dummy	–10.43*	–15.35**
	(5.568)	(6.206)
Northern Hungary, dummy	–5.685	–9.217*
	(4.788)	(4.909)
Northern Great Plain, dummy	–9.557*	–11.82**
	(4.894)	(5.230)
Southern Great Plain, dummy	–0.250	–5.431
	(4.634)	(4.890)
County seat, dummy	19.33***	17.46***
	(5.850)	(5.842)
Town, dummy	19.12***	13.73***
	(4.954)	(4.788)
Village, dummy	16.85***	11.60**
	(5.314)	(5.119)
Constant	–19.89	5.107
	(15.44)	(13.98)
Number of observations	862	862
R-square	0.258	0.249

*Note: Robust standard errors in brackets. *** p<0.01; ** p<0.05; * p<0.1.*

It is visible in *Table 2* that similarly to what was seen in the descriptive statistics, gender and working in the public sector do not affect the use of the financial products under review. Looking at the preferences, in terms of patience we can see the same thing as in the case of the descriptive statistics, i.e. it does not have an impact in the case of bank accounts, but more patient people are more likely to possess a bank card.[16] The effect of risk-taking disappears in the regression analysis, i.e. the other variables absorb the effect of risk-taking. Interestingly, but at the same time similarly to the study by *Ilyés – Varga* (*2015*), although there may be interrelationships between the other individual variables (e.g. higher level of education usually entails higher income), their effect still remains significant, i.e. they are important determinants of bank account and bank card ownership by themselves, not only as a result of their correlation with other variables. More specifically, it is seen from the regression that the probability of ownership of the financial products under review rises with age, but the growth rate declines steadily. Moreover, the use of basic financial products by older people also declines, as shown by the negative sign of the square of age. Plus one year spent at school increases the probability of bank account and bank card ownership by 3.4 and 2 percentage points, respectively, *ceteris paribus*. This is a very significant effect, like in the study by *Ilyés – Varga* (*2015*). Income also has a significant positive effect; income HUF 100,000 higher increases the use of bank account and bank card by 5.2 and 8.8 percentage points, respectively, i.e. the effect on bank card ownership is stronger here. It has a very strong effect if someone works: it increases the use of the financial products under review by more than 10 percentage points, if all the other variables are unchanged. Regional variables show that compared to Central Hungary, basic financial services are used to a lesser extent in Southern Transdanubia and in the Northern Great Plain. Settlement type dummies, in turn, show that the financial products under review are used to a greater degree in other settlement types compared to Budapest.

The number of observations in the regression is less than one thousand because if any of the above variables is missing in the case of a given respondent, the latter was not taken into account in the regression analysis. The above regressions are able to explain one quarter of the variance in the ownership of the financial products under review.

4. Conclusions

The objective of this study was to characterise those individuals who do not use basic financial services. They may be the main target groups of the programmes that facilitate financial inclusion. We cannot see any gender differences, i.e. based

[16] It is not clear why the effect of patience is different in the case of these two basic financial instruments. Further research is necessary to find out whether it is only the peculiarity of our sample or there is another underlying explanation.

on our sample, women do not use bank accounts or bank cards to a lesser extent than men. Whether someone works in the public or private sector also does not help to understand who does not use the basic financial products. Bank account and bank card ownership rises with age in the beginning, but then declines. Education, income and employment all significantly increase the use of basic financial services. These effects by themselves are not surprising; common sense would also suggest these findings. However, the regression analysis also revealed that the aforementioned effects exist not only separately, but also in the presence of the other effects. Looking at the preferences, the effects are more complex. Examining them separately, risk-taking seems to be important; people who are more risk-tolerant are more inclined to use the basic financial products, but this effect disappears in the regression analysis, i.e. the other explanatory variables absorb the effect of risk-taking. Patience seems to be significant in connection with bank card ownership; more patient people are more inclined to hold a bank card, but it does not have an effect on bank account ownership. One of the lessons from the study is that the new variables (working in the public sector, patience and risk-taking) included in addition to the ones used before do not provide any significant help in understanding who does not use these basic financial services.

We can see that in addition to individual characteristics, regional effects are also significant; compared to Central Hungary, there are three regions where bank card ownership is significantly lower, even after taking into account all the other variables. Differences according to settlement type are also significant; basic financial services are used to a lesser extent in smaller settlements, in many cases probably because they are locally not available.

In connection with the findings, the constraints of the analysis are also worth mentioning. The data are based on the respondents' answers, which may not completely reflect reality. The underlying reason may be that the respondents do not know the exact answer, but instead of admitting it, they say something to the question, or their answers are simply wrong. This data quality problem is unavoidable in the case of surveys like this; it is not possible to systematically check whether the answers are true. Our findings indicate such possible problems originating from measurement errors in two cases. Firstly, taking into account the low number of prepaid bank cards it is strange that in many cases we see that bank card ownership (sometimes significantly) exceeds bank account ownership. Secondly, the fact that bank card coverage is the lowest in Budapest also indicates potential problems related to data quality.[17] Considering all these constraints, we hope that our study will help to provide a more precise picture of the factors that hinder financial inclusion, making the latter easier to achieve.

[17] We thank one of our anonymous reviewers for calling our attention to this problem.

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Laffer Curves for Hungary*

Péter Gábriel – Lóránt Kaszab

The study uses a general equilibrium model calibrated for the Hungarian economy to estimate the Laffer curve of the labour tax rate. According to the results, the tax rate maximising budget revenues in the medium term is 55 per cent, while based on the model version taking into account the accumulation of human capital and capturing the longer-term effects of a tax cut, it is 40 per cent. The simulations showed that the self-financing rate of the reduction of the labour tax rate from its pre-crisis level to the level in 2011 is roughly 80 per cent over the medium term and that it is fully self-financing in the longer run. In the case of additional tax cuts, the self-financing rate diminishes somewhat in line with the lower tax rate at the outset, but remains high.

Journal of Economic Literature (JEL) codes: E0, E13, E2, E3, E62, H0, H2, H3, H6

Keywords: Laffer curve, fiscal policy, labour tax rate, tax cut, human capital, self-financing

1. Introduction

The quality of fiscal policy decisions is improved if the consequences of the decisions can be quantified with appropriate accuracy. In tax policy, decision-making can be strongly supported by the information obtained from the Laffer curve,[1] which shows how budget revenues change when tax rate is adjusted. This adjustment affects economic growth and thus also budget revenues via various channels, and, consequently, it is difficult to comprehensively quantify the impact that a shift in the tax rate has on budget revenues. With the availability of new databases in more and more countries, one can re-estimate the effect of changes in the tax rates on budget revenues. This helps explore the channels through which the impact of tax measures may emerge. Besides better data, Laffer curve estimates have also

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[1] The Laffer curve was first mentioned by *Wanninski* (*1978*).

became more popular again, as they can help solve economic policy debates of professional and public interest.

After the outbreak of the financial crisis and the global economic downturn, it was important to decide how much fiscal stimulus should be used to trigger economic growth. When interest rates reach their zero lower bound in an economic downturn, fiscal policy is quite effective in stimulating the economy, which, in itself, could be used as an argument for more active fiscal intervention. However, during the crisis, the sustainability of financing government debt also came into focus. The sustainability of the economic stimulus implemented via tax cuts depends strongly on the longer-term effects generated by the tax cuts in the economy. For example, if labour supply expands considerably due to the cut of the labour tax rate – in other words, the initial labour tax rate is close to the peak of the Laffer curve – the tax cut may be highly self-financing, which means that no government debt sustainability issues arise in the long run after the cut.

This study uses a general equilibrium model calibrated for Hungary to estimate Laffer curves of the labour tax rate. The Hungarian tax structure changed significantly in the past decade. Within tax revenues, the proportion of revenues from taxes on labour dropped, while the share of revenues from consumption taxes rose. The Laffer curve calibrated for the Hungarian economy helps quantify the impact of the recent and potential future tax policy measures. Our study quantifies the consequences of the reduction of the labour tax rate in 2007–2011 and another potential tax cut. It demonstrates that past tax cuts were self-financing, and that the extra revenues arising from higher economic growth and the reduction of the shadow economy also substantially dampen the direct fiscal effect of the tax cut.

2. Summary of literature

Empirical estimation of the Laffer curve and the revenue-maximising tax rate is extremely complex. First, the tax rates vary from country to country in a limited range, which usually does not include the revenue-maximising rate. Second, the impact of the labour tax rate can depend on several factors, such as the level of other tax rates and country-specific factors, which are challenging to control for. Third, some of the impact on total revenues may not necessarily be reflected directly in revenues from the labour tax rate, but rather indirectly, through the consumption and capital tax revenues which are difficult to estimate.

In view of the above-mentioned challenges, most empirical studies focus on the impact of changing the labour tax rate on the labour tax base and employment. The elasticity of the tax base and employment for the tax rate is usually estimated by using the heterogeneous effect of changing tax rules on taxpayers in a given country and time-period. *Feldstein* (*1995*) produced estimates for the US, *Kleven*

and Schultz (*2014*) did so for Denmark, and *Jongen and Stoel* (2019) did so for the Netherlands. The estimated elasticities mostly took values of around 0.2–0.3, in other words a 1 percentage point reduction of the tax rate expanded the tax base of the labour tax rate by 0.2–0.3 per cent. Other studies indicated that the effect on the tax base from adjusting the tax rate emerges not only due to the change in employment but also, to a high degree, due to the change in tax optimisation and tax evasion. When the tax rate is raised, the number of self-employed increases, more taxpayers take advantage of the tax allowances available in the tax regime and the proportion of undeclared income increases.

Saez et al. (*2012*) explain the assumptions under which the elasticities estimated by using the micro-databases provide adequate information for calculating the revenue-maximising tax rate. Among the necessary assumptions, there are a number of fairly restrictive ones: i) the labour tax rate only affects its own tax base, and ii) the estimated elasticity does not depend on the tax rate. Nevertheless, the use of estimated elasticities is quite widespread in determining the revenue-maximising tax rate. Based on these estimated elasticities, tax revenues typically peak at high tax rates of 70–80 per cent.

Using data from 34 countries between 1978 and 2014, *Akgun et al.* (*2017*) estimates the impact of changing the tax rate on tax revenues. Their approach of using data from several countries is helpful because it allows the Laffer curve to be estimated even with a more flexible functional form. In particular, they estimate that labour tax revenues peak at a tax rate of 50–70 per cent. Their paper also pointed out that increasing the progressivity of the labour tax rate significantly reduces the tax revenues. However, the estimates are uncertain, as the revenue-maximising rates change considerably under the different specifications.

On account of the difficulties involved in the empirical estimation of the Laffer curve, several studies use macroeconomic models to specify the curve. The advantage of this approach is that the impact of changing the tax rate can be quantified comprehensively and for a longer period. Furthermore, these models can also be used to simulate the impact of economic policy measures.

Schmitt-Grohe and Uribe (*1997*) employ a simple business cycle model, where the government balances its budget in all periods only by changing the labour tax rate. The two authors show that the Laffer curve can be derived in such a model. They also find that balanced-budget fiscal rules can be detrimental to an economy, because they overstimulate it during an upswing with lower taxes and higher government expenditure, while in a recession the situation is exacerbated by raising taxes and curbing spending.

Ireland (*1994*) and *Novalez and Ruiz* (*2002*) examine the impact of tax cuts on revenues in an endogenous growth model. According to their findings, tax cuts significantly influence growth due to the incentives to accumulate human capital, and therefore other measures to maintain a balanced budget are not necessary, even in the long run.

Floden and Lindé (*2001*) analysed the impact of government transfers on welfare in a model calibrated for Sweden and the US with heterogeneous agents, where individuals face idiosyncratic, uninsurable, individual-specific productivity shocks. Besides the welfare-maximising tax rates, the revenue-maximising rates are also quantified. According to their results, in the case of taxes on labour, the Laffer curve peaks at around 50 per cent. They also found that the shape of the Laffer curve depends mainly on the elasticity of the labour supply and the level of the consumption and capital tax rate, while all other parameters are of secondary importance.

Trabandt and Uhlig (*2011*) performed fiscal analyses for the Laffer curve fitted to 1995–2007 in the EU-14 and the US. They found that cutting the labour tax rate was more self-financing in the EU-14 than in the US, because the average effective tax rate was closer to the peak of the Laffer curve in the former. *Trabandt and Uhlig* (*2012*) extended the analysis until 2010, thereby facilitating the examination of the European sovereign debt crisis with a Laffer curve. Their results show that in 2010 the tax hikes aimed at fiscal consolidation had a very limited revenue-increasing effect in European economies.

Nutahara (*2015*) used the models described by *Trabandt and Uhlig* (*2011; 2012*) to estimate Laffer curves for the Japanese economy. According to his calculations, the tax rate maximising the revenues from labour taxes may be around 50–60 per cent. He also found that since in Japan the capital tax rate was high and the labour tax rate was relatively far off from the peak of the Laffer curve, a reduction in the capital tax and an increase in the labour tax rate, which offsets the budget revenue losses, could significantly boost welfare overall.

Féve et al. (*2018*) expanded the models of Trabandt and Uhlig to include liquidity-constrained households. Their results show that the shape of the Laffer curve hinges on whether the amount of debt or transfers changes after the tax rate is cut. Nonetheless, their results on the shape of the Laffer curve mainly deviate from the calculations of earlier studies with respect to the scenarios assuming negative government debt. In such a case, the Laffer curve becomes horizontally S-shaped.

This study basically used the model in *Trabandt and Uhlig* (*2011*) calibrated for Hungary to quantify the Laffer curve. The analysis of changing the labour tax rate was also performed using the model version with human capital accumulation.

Taking into account the findings of empirical studies, the original model was extended, explicitly incorporating the impact of changing the labour tax rate on tax evasion. We believe that this model version is able to capture all major mechanisms that can significantly influence the shape of the Laffer curve estimated for the Hungarian economy.

3. Hungarian tax reform

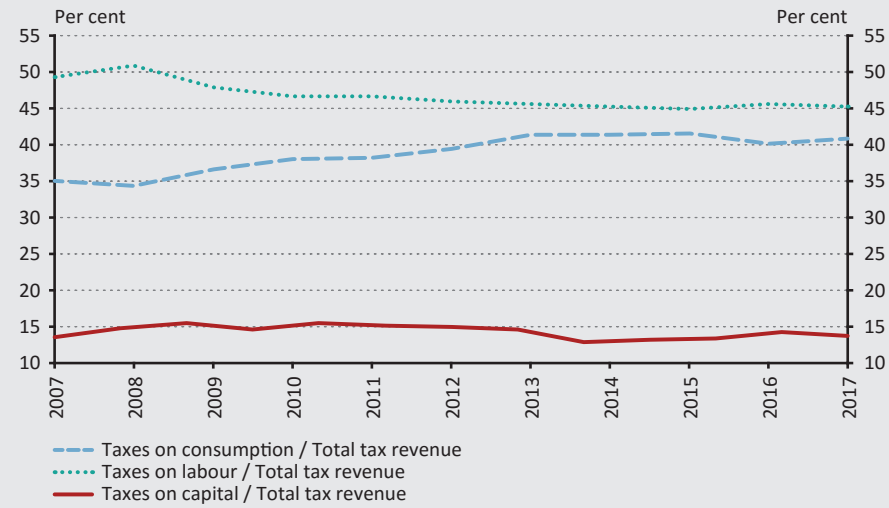
The shape of the Laffer curve is relevant for the Hungarian economic policy as well, as it can help quantify the impact of already implemented and announced future measures.

The Hungarian tax regime changed significantly in the past decade.[2] Until 2010, taxes on labour were characterised by extremely high rates and progressivity. The large tax wedge curbed labour supply and encouraged income underreporting. In 2011, the government introduced a flat-rate personal income tax, and the progressivity of taxes on labour was eliminated after the gradual phase-out of the tax credit, the super gross tax base and the pension contribution cap.[3] With a view to supporting economic growth, the corporate profit tax rate was also lowered from 2017, to 9 per cent for all small and large enterprises. To ensure a balanced budget, the value added tax was raised as labour and corporate taxes were reduced, and the government introduced special sectoral taxes in the services sectors. Consumption tax revenues were further increased by the government measures aimed at reducing the shadow economy. Due to changes of the tax structure the share of labour taxes within tax revenues decreased, while the proportion of consumption taxes increased (*Figure 1*).

In line with the previous government decisions, overhaul of the tax structure may continue in the future. After the wage agreement with the representatives of employers and employees in November 2016, the government announced that it would gradually cut the employers' social contribution tax from 27 per cent in 2016 to 11.5 per cent until 2022 if real wages continue to expand rapidly. The planned measures may bring about further significant changes in the tax structure.

[2] The major measures are listed in the Annex.
[3] The steps of the Hungarian tax reform are discussed in detail in *Baksay and Palotai* (*2017*) and *Matolcsy and Palotai* (*2018*).

Figure 1
Components of government tax revenues



Source: MNB (2018)

4. The model

The economic model used in our study is based on *Trabandt and Uhlig* (*2011*). The original model was extended to incorporate the interaction between tax rates and tax evasion. Following *Trabandt and Uhlig* (*2011*) we use two model versions. In the first, the labour input of the production function is defined as the number of hours worked by employees, in other words the quality of human capital is assumed to be homogeneous and constant in time. In the second version, human capital can be accumulated, and therefore the labour input of production also includes the quality of employees. Three agents are included in the model: households, companies and the state.

Households

The household maximises the following utility function (U) over an infinite time horizon:

$$E_0 \sum_{t=0}^{\infty} \beta^t \left[U(c_t, n_t) \right],$$

where c_t and n_t denote consumption and the number of hours worked. Consumption and leisure time (total time less the number of hours worked) increase the utility of the household.

β denotes the discount factor, which is typically between zero and one and captures the impatience of the household: it prefers consumption in the present to consumption in the future, and therefore future consumption is taken into account with a lower weight (it is discounted). E_0 denotes rational expectations, which are formed by the consumer looking ahead from the initial, period zero. The sum symbol (Σ) captures the fact the household sums its utility in the present and the future (discounted to the present).

Based on *Trabandt and Uhlig* (*2011*), the following utility function with constant Frisch elasticity is employed:

$$U(c_t,n_t)=\begin{cases}\dfrac{1}{1-\eta}\left\{c_t^{1-\eta}\left[1-\kappa(1-\eta)n_t^{1+1/\varphi}\right]^{\eta}-1\right\}, & \text{when } \eta\neq 1,\\ \log(c_t)-\kappa n_t^{1+1/\varphi}, & \text{when } \eta=1.\end{cases}$$

In the previous equation, $\eta > 0$ denotes risk aversion (and its inverse is the intertemporal elasticity of substitution), κ is a parameter used to set the n_t proportion of the number of hours worked (25 per cent) in the steady state within the whole time frame, which is normalised to one. $1 - n_t$ denotes leisure time, while φ means the Frisch elasticity of labour supply. Household preferences satisfy the requirements of the balanced growth path (see, for example, *King and Rebelo 1999*). The second row of the above equation shows that consumption is logarithmic when $\eta = 1$.

In the baseline model, the actual income from work (declared plus concealed) is derived by multiplying real wages and the number of hours worked ($w_t n_t$).

The baseline model can be supplemented with so-called second-generation human capital accumulation based on *Trabandt and Uhlig* (*2011*). Households can accumulate human capital by learning. They spend a fraction of total time endowment on work ($q_t n_t$) and learning ($(1 - q_t)n_t$), and the rest on leisure time. Taking into account human capital accumulation, earned income can be stated as follows:

$$L_t=w_t h_{t-1} q_t n_t$$

The restriction $h_{t-1}q_t = 1$ delivers our baseline medium-term model without human capital accumulation.

Progressivity

The introduction of progressive taxation requires that households vary, which is captured in the steady state with the following assumptions. It is assumed that households differ in terms of human capital, and the distribution of households' human capital is normalised to one: $1=\int hH(dh)$, where the integral (∫) captures that human capital (h) is summed. Let $\bar{n}=\int h\bar{n}_h H(dh)$ denote the average labour supply weighted by households' human capital, which can be regarded as a sort of aggregate labour supply. Then the pre-tax earned income of a particular household h at time t is given by $w_t h n_{h,t}$. In the case of progressive taxation, the average and marginal tax rates differ. Based on *Heathcote et al.* (*2010*), it is assumed that the marginal tax rate responds to the changes in net income with constant elasticity. Elasticity is denoted by υ, and earned income taking into account human capital accumulation is weighted as follows:

$$L=w(\bar{n})^{1-\upsilon}(h\bar{n}_h)^{\upsilon}$$

Concealed income and reduction of the shadow economy

Concealed income is calculated using the following rule-of-thumb (with a given labour tax rate, which is denoted by τ_i^n):

$$\breve{E}(\tau_i^n)=\epsilon L+\epsilon(\tau_i^n-\tau_{ref}^n)L\phi$$

where $\breve{E}(\tau_i^n)$ is the concealed income for a given labour tax rate. L denotes the product of wages and the number of hours worked. τ_{ref}^n is the reference tax rate. ϵ shows the proportion of concealed income with the reference tax rate $(\tau_i^n=\tau_{ref}^n)$. The parameter ϕ helps calibrate the sensitivity of concealed income to the tax rate for given wage bill (L).

Accordingly, declared income is actual income less concealed income:

$$\dot{B}(\tau_i^n)=L-\breve{E}(\tau_i^n)$$

The collected tax revenues can be calculated by multiplying declared income and the tax rate:

$$T_i^n=\dot{B}(\tau_i^n)\tau_i^n$$

Accordingly, the effective labour tax rate implied by the model can be stated as follows:

$$\tau_{i,\,effective}^n=\frac{T_i^n}{\dot{B}_i}$$

After concealed earned income is taken into account, the household's budget constraint, physical capital and human capital accumulation equations can be stated as follows:

$$\left(1+\tau_t^c\right)c_t + x_t + b_t = \left(1-\tau_t^n\right)\dot{B}_t + \breve{E}_t + \left(1-\tau_t^k\right)\left(d_t-\delta\right)k_{t-1} + R_{t-1}^b b_{t-1} + s_t + m_t$$

$$k_t = \left(1-\delta\right)k_{t-1} + x_t$$

$$h_t = \left(Aq_t n_t + B\left(1-q_t\right)n_t\right)^{\nu} h_{t-1}^{1-\nu} + \left(1-\delta_h\right)h_{t-1}$$

In the previous equations, s_t, k_t, x_t, and b_t denote government transfers, physical capital, investment in physical capital and government bond holdings. The household holds the bonds issued by the government, receiving interest (R_{t-1}^b) on the bond holdings in the previous period (b_{t-1}). m_t denotes the trade balance (exports-imports), and d_t is the rental rate of capital. The labour, capital and consumption tax rates are denoted by τ^n, τ^k, τ^c. w_t denotes real wages. δ denotes the depreciation rate of physical capital. $d_t - \delta$ means that depreciation can be deducted from the capital's tax base. In the equation for human capital accumulation, A and B are constants that help calibrate labour efficiency gains and learning. δ_h measures the depreciation rate of human capital. The value of the parameter A is chosen so that q, which is the proportion of the time spent working within the time devoted to working and learning, is 0.8. B ensures that $h = 1$ in the steady state. $\left(1-\tau_t^n\right)\dot{B}_t$ shows net wages from the actually declared income, and $\breve{E}_t$ is concealed income.

At this point it should be noted that changes in either labour, capital or consumption taxes are equivalent to movement on the Laffer curve whereby the government's budget constraint is balanced by the change in transfers. Moreover, it is assumed that when calculating the aggregate resource constraint, which means the aggregation of the household's and the government's budget constraints, concealed income is considered as a sort of government transfer.

State

The government sets the labour, capital and consumption tax rates as well as the progressivity of the labour tax. In addition to taxes, it acquires funds by issuing government bonds. Additionally, the state transfers money to households which appears explicitly in households' budget constraint. Direct government consumption is assumed to be constant relative to GDP, and therefore adjustments to the tax rate mainly change the amount of transfers to households on the expenditure side.

The government's budget constraint can be written as follows

$$g_t + s_t + R^b_{t-1} b_{t-1} = b_t + T_t$$

The right-hand side of the government's budgetary constraint shows the revenues, derived from taxes (T_t) or bond issues (b_t). The left-hand side of the constraint shows the expenditure, which is non-productive government consumption (g_t) that does not increase the utility of the household, interest paid on the bonds in the previous period $R^b_{t-1} b_{t-1}$ and transfers to households (s_t).

The government's tax revenues T_t are summed as follows:

$$T_t = \tau^c_t c_t + \tau^n_{t,\,effective} \dot{B}_t + \tau^k_t \left(d_t - \delta\right) k_{t-1}$$

In other words, the government taxes consumption ($\tau^c_t c_t$), labour ($\tau^n_{t,\,effective} \dot{B}_t$) and capital ($\tau^k_t \left(d_t - \delta\right) k_{t-1}$).

Company

The company maximises its profits through the optimal choice of capital and labour:

$$\max_{k_{t-1},\, n_t} \pi_t = \max_{k_{t-1},\, n_t} \left\{ y_t - w_t n_t - d_t k_{t-1} \right\}$$

where y_t is a standard Cobb–Douglas technology: $y_t = \gamma^t k^{\theta}_{t-1} \left(h_{t-1} q_t n_t\right)^{1-\theta}$, where γ denotes technology's deterministic trend growth. In the production function, θ shows the share of physical capital within production, and 1 – θ is the proportion of labour extended with human capital in production.

In equilibrium, households maximise their utility, companies maximise their profits and the government sets tax rates so that revenues cover expenditures at all points in time. It follows from the latter that the state's debt is constant. In equilibrium, the variables grow at a constant rate on the balanced growth path.

5. Calibrating the model and the solution

The calibrated model parameters for Hungary is included in *Table 1*. The parameters η, φ are set for their standard values in the literature. Equilibrium conditions and the depreciation rate of capital δ is used to calibrate the proportion of capital within production (θ), which is around 38 per cent in the period under review. Based on *Trabandt and Uhlig* (*2011*), it is assumed that human capital depreciates at the same rate as physical capital: $\delta_h = \delta$. The amount of hours worked in steady state (25 per cent of total time, similar to *Trabandt and Uhlig* [*2011*]) are calibrated with the parameter κ. The model captures the steady state of the economy; therefore, it was calibrated mainly by taking into account the average values of the macroeconomic variables in 2007–2018. Capital relative to GDP (*k/y*) is determined by the model parameters and the capital tax rate. The ratio of private investment and GDP (*x/y*),

which is a function of the capital-to-GDP ratio, the depreciation of capital and the economic growth rate, is 25 per cent, that is close to the average of the window period (22 per cent) even though it is not calibrated. Government spending relative to GDP (*g/y*) was around 21 per cent in in the same period. The current account-to-GDP ratio (*m/y*) is 0.5 per cent on average in 2007–2018. The consumption-to-GDP ratio is derived endogenously from the aggregate resource constraint and was roughly 50 per cent in the period under review. The government debt-to-GDP ratio was approximately 75 per cent in the period under consideration.

Table 1
Calibrated parameter values

Parameter	Symbol	Value	Source
Depreciation of physical and human capital	$\delta = \delta_h$	0.07	*Trabandt and Uhlig* (*2011*)
Proportion of capital in production	θ	0.38	*Trabandt and Uhlig* (*2011*)
Weight of learning in human capital accumulation	ν	0.5	*Trabandt and Uhlig* (*2011*)
Inverse of intertemporal elasticity	η	2	*Trabandt and Uhlig* (*2011*)
Frisch elasticity	φ	2	*Trabandt and Uhlig* (*2011*)
Restriction	κ	3.46	$\overline{qn} = 0.25$ is satisfied
Discount factor	β	0.99	Implied by the long-term interest rate and the growth rate.
Sensitivity of concealed income to the change of the tax base	ϕ	0.05	*Clotfelter* (*1983*)
Working time/(time spent working and learning)	q	0.8	*Trabandt and Uhlig* (*2011*)
Proportion of concealed income within total earned income	ϵ	0.25	*Köllő* (*2010*)
Progressivity of the tax system	ε	0.08	Authors' estimate
Average reference tax rate	τ^n_{ref}	0.50	*Köllő (2010)*
Government spending/GDP	g/y	0.21	2007–2018 average
Government debt/GDP	b/y	0.75	2007–2018 average
Net imports/GDP	m/y	0.005	2007–2018 average

We contribute to the literature by extending the model with human capital accumulation such that it explicitly incorporates the effect of the tax rate on the concealment of income and the option of progressive taxation. Furthermore, we used the following assumptions to calibrate the effective tax rate in the model:

Reduction of the shadow economy

When calibrating the reduction of the shadow economy, it is assumed that 25 per cent of the tax base of the labour taxes is concealed at a tax rate of 50 per cent τ^{n}_{ref} (see *Köllő 2010*). When calibrating the effect that changing the tax rate has on declared income, we suppose that reducing labour tax by 4 percentage points decreases concealed income by 5 per cent (see, for example, *Clotfelter 1983*).

Progressivity

Prior to the flat-rate personal income tax, the progressivity of the labour tax is estimated in line with the representation of progressivity in the model, by regressing net incomes on the total wage costs, i.e. the database containing the 2007 contributions by contribution payers, similar to *Heathcote et al.* (*2009*)*:*

$$y^{net} = constant + (1 - \varepsilon) y^{total\ wage\ cost}$$

In the previous equation, ε shows the progressivity of the tax system and thus the degree of redistribution. When ε = 1, there is complete redistribution, while ε = 0 means a flat-rate system. In the calibrated model, 1 – υ is the counterpart of ε in the above regression. According to our estimates, ε is 0.08. The left-hand and right-hand side variables of the regression are logarithmic, and therefore 1 – ε can be interpreted as elasticity, so a 1 per cent change in the wage costs triggers a change of less than 1 per cent in net income.[4]

Effective tax rates

In the model, the calibration of effective tax rates is based on the actually observed tax rates. The estimated effective tax rates are the ratio of the budgetary tax revenues from the given tax type and the tax base. This allows the estimated tax rates to capture the effect of tax allowances as well. Labour tax revenues are taken from the report on the accounts of public finances. The tax base of the labour tax is the total wage cost determined by using the PIT tax base as calculated by the tax authority (NAV) and the prevailing employer's social contribution rates. The effective capital tax rate and consumption tax rate is calibrated using the calculations of the *European Commission* (*2019*). The tax base of capital tax constitutes the capital revenues as defined in the Commission's methodology, while the tax base of the consumption tax is households' final consumption. The estimated effective tax rates are shown in *Figure 2*.

[4] Estimated regression:
$y^{net} = \underset{(0.0004)}{0.496} + \underset{(0.00002)}{0.922} y^{total\ wage\ cost}$,
where the values below the estimated coefficients denote standard errors.

Figure 2
Effective tax rates in Hungary between 2007 and 2017

Source: Taxation Trends in the European Union by the European Commission, NAV and the report on the accounts of public finances

It is important to note that the tax base of the effective labour tax rate estimated here is the sum of the tax bases declared by taxpayers. Accordingly, tax evasion does not explicitly influence the estimation of the effective labour tax rate. It must be further noted that the effective tax rate is calculated from the actual budgetary revenues and, thus, several factors can contribute to the change in the effective tax rate from one year to the next, not only the changes in tax rules. However, when a longer period is analysed, the level of the effective tax rate is mostly determined by the tax rates and other tax rules (e.g. tax allowances).

Solution of the model and simulations

The aim of this study is to estimate the Laffer curve for Hungary. To that end, the steady states of the model are computed with a numerical method (Newton's method) for each value of the labour tax rate. The budgetary revenues realised with the various labour tax rates yield the Laffer curve.

The calibrated model is also used to simulate the effect of tax policy measures. Since the calibrated model reflects the features of an economy in equilibrium, apart from the assumptions on the tax rates and progressivity, the model parameters are kept constant during the simulations. Two periods are analysed in the model: i) the labour tax cuts in 2007–2011 and ii) a hypothetical 6 percentage point labour tax cut relative to the 2018 effective tax rate. The comparison of the static (fixing the

tax base) and dynamic effects (allowing for the tax base to change) of tax changes on tax revenues helps examine the tax cuts' self-financing rate.

During the simulations, the model version allowing human capital accumulation and one without accumulation are analysed as well. This is because the effect of the tax change through human capital accumulation takes hold only in the long run, and thus the results derived from the two versions of the model can be interpreted as the long and medium-term effects of the change, respectively.

6. Results

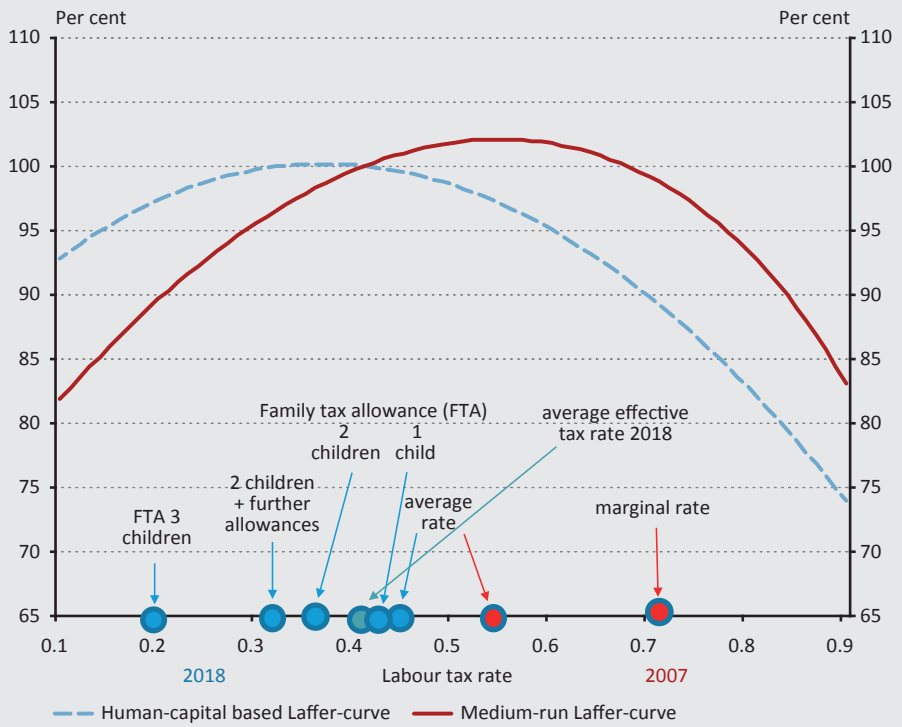
The described model is used to estimate the Laffer curve of the labour tax rate for the Hungarian economy with the version including human capital accumulation (long-term) and one without it (medium-term). *Figure 3* shows the estimated curves. The Laffer curve estimated on the basis of the 2018 tax structure peaks with a tax wedge (taxes and contributions relative to the total wage costs) of around 55 per cent based on the medium-term version and around 40 per cent based on the long-term version of the model. It is important to point out that prior to the economic turnaround in 2010, the maximum marginal tax rate was right to the peak of the Laffer curve, on the negative slope. After the 2010 tax reform, the marginal tax rate shifted to the left of the peak, to the positive slope, considerably improving the efficiency of the tax regime.

Simulations were performed with the model calibrated for the Hungarian economy to estimate the effect of a labour tax cut on budgetary revenues. The question to be answered was to what extent a tax cut performed from a given initial position can be self-financing. The self-financing rate is calculated from the static effect (denoted as direct effect in *Figures 4–7* below) and the dynamic effect of the tax cut: (static effect – dynamic effect)/static effect. We calculate the static effect of the tax cut keeping all tax bases fixed, while all three tax bases (labour, consumption, capital) may change when the dynamic effect is calculated (called labour, consumption and capital surplus in *Figures 4–7* below). Self-financing is measured for total budgetary tax revenues, where the drop in the labour tax revenues is partly offset by the expansion of the capital and consumption tax bases.

Figure 4 shows the effect of the change in the labour tax rate between 2007 and 2011, based on the model without human capital accumulation. Between 2007 and 2011, total tax revenues would have shrunk by 6 per cent[5] (direct effect), with an unchanged tax base. However, the lower taxes boost economic performance,

[5] The proportion of the labour tax revenues within total tax revenues amounted to 49 per cent in 2007. Simple calculation shows that in the case of a labour tax rate reduction from 51 to 45 per cent, tax revenues fall by $((51 - 45)/51) \cdot 100 \cdot 0.49 \approx 6$ per cent according to the static effect.

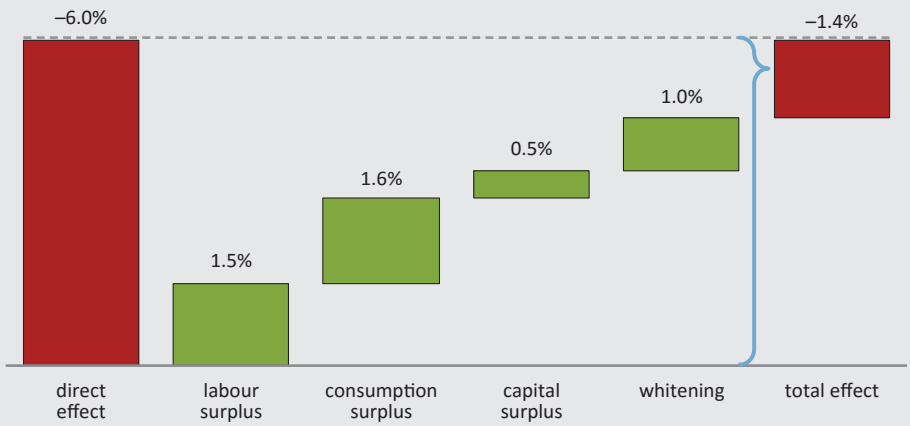
Figure 3
Laffer curve of labour taxes, with tax rates from 2007 and 2018



Note: In the case of the 2018 average effective labour tax rate, total tax revenues are normalised for 100 per cent. The blue and red circles show the tax rates calculated for the average wage, with various available allowances. The average tax rate pertains to average earners who do not claim any allowances. The Laffer curve was estimated on the basis of the 2018 tax structure.

especially employment as well as consumption, which entails an expansion in the tax bases (labour, capital and consumption tax revenues). By and large, the additional revenues from the increase of the tax bases offset most of the initial (static) revenue-reducing effect, even in the medium term. All the tax bases expand significantly, and labour tax receipts also increase significantly with the reduction in undeclared income (see the column 'whitening' in *Figure 4*). Therefore, in the medium term, tax revenues drop by merely 1.4 per cent. The simulation showed that the self-financing rate of the tax cut between 2007 and 2011 was roughly 80 per cent, even in the medium term.

Figure 4
Effect of the labour tax cuts in 2007–2011 on total tax revenues in the medium-term model

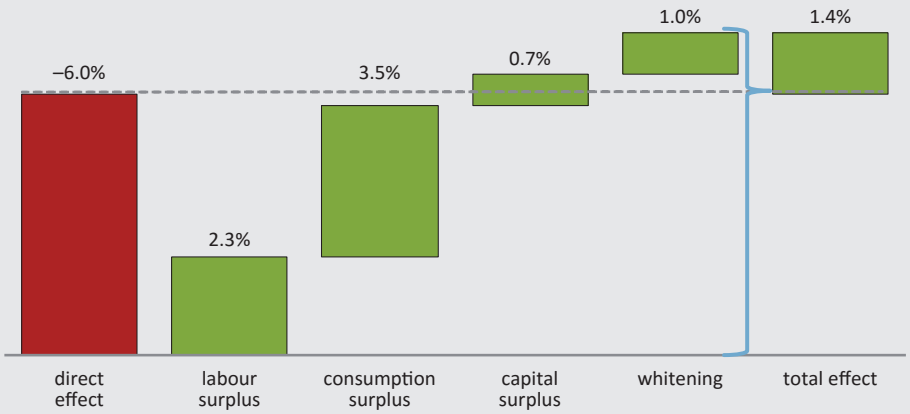


Note: The first column shows the direct (or static) effect on total tax revenues, while the next four columns show the dynamic effects by tax type as well as the impact of the reduction of the shadow economy (or whitening), as a percentage of the initial total tax receipts.

The calculations were also performed with the version allowing for human capital accumulation. Based on this, the long-term revenue-increasing effect of the tax cut more than offsets the initial loss in revenue: in the long run, budgetary revenues increase overall (by 1.4 per cent) as a result of the tax cut (*Figure 5*). This is because the model also captures the effect that – at lower labour tax rates – it is worthwhile to invest more in human capital, which employees as well as employers take advantage of. Of course, the higher quality of human capital increases potential economic performance, expanding tax bases even compared to our medium-term model.

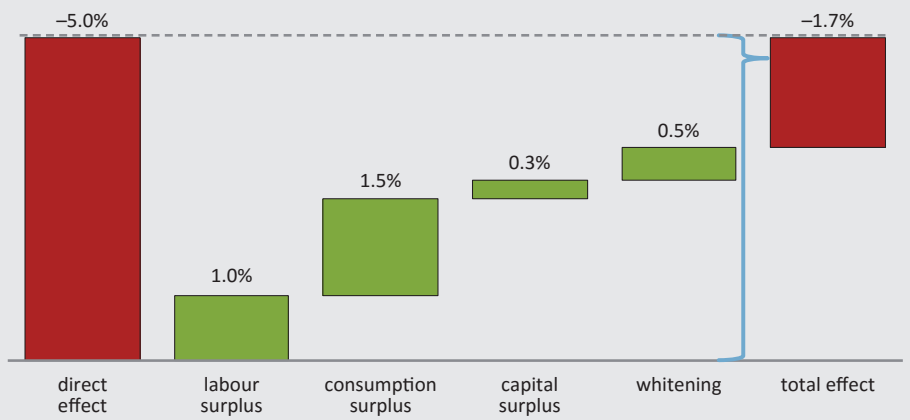
Besides the estimation of the effect of a past tax cut, the impact of a potential future tax cut was also simulated. The simulation analysed the effect of a 6 percentage point personal income tax rate cut. Based on the model capturing medium-term effects, total tax revenues fall by 1.7 per cent on account of the economic stimulus, so the self-financing rate is around 66 per cent in the medium term (*Figure 6*). Our finding that the self-financing rate of the tax cut in 2018 is lower than in 2007–2011 is attributable to the fact that the 2018 tax cut begins from a lower tax rate, where the Laffer curve is steeper.

Figure 5
Effect of the labour tax cuts in 2007–2011 on total tax revenues in the human capital-based (long-term) model



Note: The first column shows the direct effect on total tax revenues, while the next four columns show the dynamic effects by tax type as well as the impact of the reduction of the shadow economy, as a percentage of the initial total tax receipts.

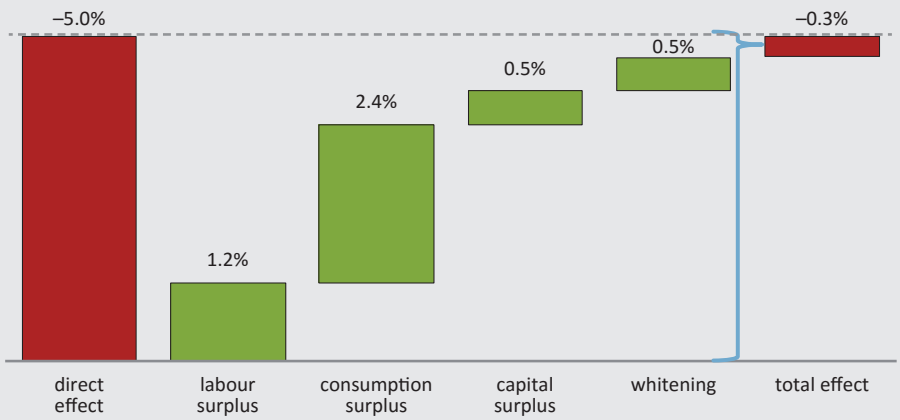
Figure 6
Impact of lowering the personal income tax rate from 15 to 9 per cent on total tax revenues in the medium-term model



Note: The first column shows the direct effect on total tax revenues, while the next four columns show the dynamic effects by tax type as well as the impact of the reduction of the shadow economy, as a percentage of the initial total tax receipts.

In the long-term model that takes into account human capital accumulation as well, similar to the 2007–2011 tax cut, the hypothetical tax cut launched in 2018 entails a considerable expansion in the tax bases, and therefore total tax revenues contract by a mere 0.3 per cent (*Figure 7*). Accordingly, the self-financing rate continues to be high, at 93 per cent.

Figure 7
Impact of lowering the personal income tax rate from 15 to 9 per cent on total tax revenues in the human capital-based (long-term) model



Note: The first column shows the direct effect on total tax revenues, while the next four columns show the dynamic effects by tax type as well as the impact of the reduction of the shadow economy, as a percentage of the initial total tax receipts.

It should be noted that the simulations assume a neutral labour market environment (not too tight, not too loose) in the initial position. If, for example, prior to the tax cut the labour market is characterised by a large labour shortage, the tax cut can lift employment less, and its indirect impact on tax revenues is smaller than presented above.

Finally, the results should be compared to other studies. The revenue-maximising rate of the Laffer curves estimated for other economies is typically higher than our estimate, both in the versions with and without human capital accumulation. This is because the model used here incorporated the effect of the tax rate change on the share of concealed income, and therefore the effect of changing the tax rate on the labour tax base is larger in our model.

To facilitate the comparison with the results of empirical studies, it must be taken into account that these papers typically quantify the effect of the labour tax cuts on the declared labour tax base over a few years following the tax cut. This impact mostly corresponds to the tax base-expanding effect of the tax cut in our medium-term model through the rising number of hours worked (see the column labour surplus in the *Figures 4–7*) and the reduction of undeclared income (see the column whitening in the *Figures 4–7*). According to our results, the static unit reduction of tax receipts between 2007 and 2011 would dynamically increase labour tax revenues by 0.4 units ([additional work + whitening]/direct effect), while a potential tax cut launched in 2018 would do so by 0.3 units. These values are close to the estimates of the empirical studies. The value is higher for 2007–2011 because in Hungary the tax rate was high prior to the tax cut.

7. Summary

The study estimated the Laffer curve of the labour tax rate in model versions with and without human capital accumulation, using an equilibrium model calibrated for the Hungarian economy. The first version captures the long-term effects of changing the labour tax rate, while the second captures the medium-term effects. The economic model used is based on *Trabandt and Uhlig* (*2011*), which was extended with a block that allows for the interaction between the tax rates and the magnitude of undisclosed incomes.

According to our results, the revenue-maximising tax rate is roughly 55 per cent in the medium-term model and around 40 per cent in the long-term model. This implies that following the tax reform after 2010, the maximum marginal tax rate shifted to the left of the Laffer curve's peak, where the slope is positive, considerably improving the efficiency of the tax regime.

The model calibrated for the Hungarian economy was used to estimate the impact of the tax cut on budgetary revenues for the period 2007–2011. The results show that the self-financing rate of the tax cut proved to be roughly 80 per cent over the medium term and fully self-financing over the long run. According to our calculations, the self-financing rate of a further cut to the 2018 labour tax rate would also be high: 66 per cent in the medium term and 93 per cent in the long run.

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Annex

Table 2
Main measures affecting the effective labour tax rates between 2007 and 2018

2007	• The tax base of the personal income tax taxed at 18 per cent was increased to HUF 1.7 million. Incomes over HUF 1.7 million were taxed at 36 per cent. • Pension contributions rose from 18 to 21 per cent between 2006 and 2007. • The cash health insurance contribution paid by employees rose from 2 to 3 per cent.
2008	• The contribution rate paid by employers fell by the same amount by which the rates paid by employees increased, so there was no change overall.
2009	• The tax base of the personal income tax taxed at 18 per cent was increased to HUF 1.9 million. • The health insurance contribution in kind dropped from 4.5 to 1.5 per cent for a contribution base of up to twice the prevailing minimum wage. • 50 per cent of employers' early retirement insurance contribution was taken over by the central budget, down from 75 per cent earlier.
2010	• The PIT rate falls from 18 to 17 per cent, and the cap of the consolidated tax base of the 17 per cent rate was raised to HUF 5 million. • The rate on the incomes of over HUF 5 million diminished from 36 to 32 per cent. • 25 per cent of employers' early retirement insurance contribution was taken over by the central budget, down from 50 per cent earlier. • Private pension fund contributions fell to 0 per cent, while private pension fund members' pension contribution jumped from 1.5 to 9.5 per cent. • The tax base of the PIT became the income plus the tax base supplement (27 per cent). • The labour market contribution rate dropped from 3 to 1 per cent.
2011	• The two PTI tax rates were both cut to 16 per cent. • Employees' pension contribution increased from 9.5 per cent to 10 per cent. • Family tax allowances (FTAs) were expanded: the allowance amounted to HUF 10,000 (per child) for one or two children and to HUF 33,000 (per child) for three children.
2012	• The consolidated tax base supplement shall not be determined for the portion of the income up to HUF 2.424 million, and above that a 27 per cent tax rate applies. • The cash health insurance contribution paid by policyholders rose from 2 to 3 per cent.
2013	• Super grossing was eliminated in the case of the gross monthly incomes of over HUF 202,000. • The cap on contribution payments was eliminated in the case of pension contributions. • The Job Protection Action Plan (JPAP) was introduced.
2014	• Besides spouse's combined personal income tax, the family tax allowance (FTA) can also be deducted from the 7 per cent health insurance contribution and the 10 per cent pension contribution.
2016	• Personal income tax fell to 15 per cent. • The FTA available for two children was raised from HUF 10,000 to HUF 12,500.
2017	• The social contribution tax dropped to 22 per cent. • The FTA available for two children was raised from HUF 12,500 to HUF 15,000.
2018	• The social contribution tax dropped to 19.5 per cent. • The allowance of those with two children increased from HUF 15,000 to HUF 17,500.

Banking Supervisors Tracing the Transition to IFRS 9*

Attila Háda

The paper presents the supervisory approach of the transition to IFRS 9, implemented in the credit institution sector from 1 January 2018. The author evaluates the impacts of the transition and describes the IFRS-specific items that require a different supervisory approach. One of the conclusions of the paper is that transition to IFRS9 had no major influence on credit institutions' capital adequacy situation. When assessing the objective of fair valuation and hedge accounting, it may be stated that those essentially support forward-looking, risk-based supervision. As a result of the introduction of the new impairment rules, prudential and accounting impairment approximated each other, but the management of expected losses not sufficiently covered by impairment is not explicit, and the author also makes a recommendation for a potential solution.

Journal of Economic Literature (JEL) codes: G21, M41, M48

Keywords: IFRS9, banking supervision, impairment, fair valuation, hedge accounting

1. Introduction

The analysis and processing of the data reporting submitted by credit institutions (banks) forms integral part of the supervisory work and serves as a basis for risk assessment. The reports necessary to fulfil the MNB's supervisory duties can be allocated to two major groups: data presenting financial and accounting information (FINREP[1]), and the data tables related to prudential (capital, liquidity, large risk) compliance (COREP[2]). The starting point of data reporting is always based on the accounting rules and information used by the banks. From 1 January 2018, the individual financial statements of credit institutions must be compiled, on a mandatory basis, according to the IFRS standards (*European Commission 2008*), adopted by the EU, instead of the Hungarian accounting rules, resulting in a major change in supervisory practices. The difficulties involved with this transition were further exacerbated by the fact that the new IFRS 9 standard (*European Commission*

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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[1] Financial reporting framework.
[2] Common reporting framework.

2016) on the treatment of financial instruments (classification, measurement, impairment and hedge accounting) also entered into force at this time, and thus the transition also had a major effect even on banks that had previously used IFRS. Due to temporary exemptions, exceptions to this included the cooperative credit institution sector and a few specialised credit institutions, but from 2019 all credit institutions must compile both the financial statements and the supervisory reports uniformly, on the basis of IFRS.

Summarising the IFRS-based credit institution data[3], the paper presents the composition of financial instruments, the related valuation methods and the various accounting policy decisions. Setting out from this, the paper describes the consequences of the transition to IFRS 9, the supervisory assessment of the IFRS-specific elements and the differences in the valuation methods. Accounting and supervisory objectives often differ, and thus it is necessary and expected that all stakeholders (market participants, auditors, supervisors) understand the differences and apply the related rules correctly. The key objective of the accounting regulation is to present, by compiling the annual accounts, a true and fair view of the financial situation, primarily for external stakeholders (e.g. investors, lenders). By contrast, the primary objective of the supervisory regulation is to ensure the stability of the financial system and protect the depositors of credit institutions, which necessitates the application of approaches different from the accounting valuation. While accounting focuses on the current situation and the presentation of a fair view, supervisory valuation prepares for an anticipated future economic downturn, and thus tries to reduce the sensitivity of the banking operation to business cycles (procyclical[4] operation). Accordingly, from time to time it applies more conservative approaches (e.g. prudent valuation, prudential filters, supervisory parameters used for capital requirement calculation).

The EU regulation containing the prudential requirements and capital adequacy rules (*CRR 2013*) refers to the IFRS standards for several basic terms (e.g. deferred tax assets, accumulated other comprehensive income), and thus the knowledge of the accounting background of these items is essential for the proper application of the supervisory requirements. In the paper, the summary of the data underlying the analysis always focuses on the elements stressed in the respective topic, and hence it deliberately does not follow the structure of the data tables in the supervisory balance sheet. The analysis does not intend to describe the IFRS rules in detail, but rather, setting out from those, it attempts to identify the supervisory issues that may arise and presents the accounting and prudential relations. A summary of the key differences is included in *Table 1*:

[3] Based on unaudited IFRS data of individual credit institutions for 2018, except *Section 4*.
[4] During the economic boom, bank usually lend more actively than desirable and take higher risk than justified, while during times of recession they cut back lending excessively, strengthening the cyclical nature of the economy.

Table 1
Key differences in accounting and prudential rules

Accounting and prudential topics	Method of treatment	
	Accounting treatment	Supervisory treatment
Basis of consolidation	Based on control	Based on the scope of activity (banking, financial)
Method of consolidation	Full, equity-based	Full, proportionate
Exposure value of assets	Book value	Adjusted book value, replacement value
Assessment of expected loss	Sensitive to business cycles, with outlook over one year	Independent of the business cycles, with annual outlook
Assets and liabilities measured at fair value	Fair value (exit price)	Adjusted fair value (prudent value), prudential filters

Source: Edited based on European Commission (2008) and CRR

For banking groups, accounting examines – for the purpose of inclusion in consolidation – significant influence, i.e. the existence of control. By contrast, the purpose of supervision on a consolidated basis is to identify the multiple use of own funds (*BCBS 1999:8–9*), and thus it is primarily aimed at the inclusion of financial sector entities. One important difference is that under consolidated supervision use of the equity method is not permitted, since it would not ensure the direct calculation of risk-weighted exposures in the course of quantifying capital adequacy. Different supervisory treatment can also be observed in defining the exposure values determined as a starting point for calculation of the capital requirement (e.g. the exposure value must be adjusted for the items already deducted from own funds). In addition, the prudential regulation, setting out from the accounting valuation, modifies[5] the exposure values at several places or calculates them using a special methodology,[6] with a view to increasing risk sensitivity. Additional differences can also be identified in fair valuation and the assessment of expected losses, which will be dealt with in detail in the following sections.

2. Fair valuation

In terms of the valuation methods selectable under IFRS 9, fair valuation is a dominant factor, and thus it is necessary to review it for the purpose of the valuation of balance sheet items. While the IFRS 9 standard defines the range of items to be measured at fair value, the principles and valuation techniques of fair valuation are regulated by the standard IFRS 13 (*European Commission 2012*). Although Hungarian accounting standards also provided for the fair valuation in

[5] E.g. probability of the drawdown of off-balance sheet items
[6] E.g. exposure values of derivatives, securities funding transactions, based on *Articles 111 (2) and 166(5), (7) of CRR*

the past, they did not prescribe the use thereof on a mandatory basis.[7] According to IFRS 13, the instruments are to be arranged in a fair value hierarchy based on the possibility of observing valuation inputs and the liquidity of the markets characteristic for the instrument. The standard is a principle-based one, it does not prescribe specific rules for the valuation methods of the individual instruments since those may be extremely diverse. It is an important principle that the fair value is not the mid-market price, but rather an exit price at which the respective asset can be effectively sold or paid for a liability between independent parties.

2.1. Fair value hierarchy

Due to the diversity of financial instruments, the variety of valuation techniques and the different availability of market prices, it is often difficult to compare the fair value of the individual instruments (e.g. upon market or model-based valuation). Consequently, the standards introduced the notion of the fair value hierarchy, where three different valuation levels have been defined from the perspective of the reliability of the market price setting (*Szücs – Ulbert 2017*). The key criteria of the classification are summarised in *Table 2:*

Table 2
Fair valuation hierarchy

Hierarchy levels of fair valuation	Basis of valuation	Valuation method
1. level	Quoted prices in active markets for identical assets or liabilities that the entity can access on the measurement date	Valuation based on market prices
2. level	Quoted prices for similar instruments in active markets	
	Quoted prices for identical or similar instruments in markets that are not active	
	Model-based estimated value, if all major inputs are observable	Model-based valuation
3. level	Model-based estimated value, if at least one major input is unobservable	

Source: Compiled based on European Commission (2012)

The assets/liabilities with the most reliable – for the purpose of valuation – directly observable and liquid market prices are allocated to Level 1 (e.g. based on market prices quoted on the exchange). Instruments that have no directly observable market price, but for which upon fair valuation all major valuation inputs are based on observable market data or can be determined based on the price of a similar instrument quoted on an available active market, are to be allocated to Level 2. If no market prices are available and there is significant valuation uncertainty, the instrument must be allocated to the lowest level, i.e. Level 3. *Table 3* illustrates the

[7] *Based on Section 59/A of Act C of 2000 on Accounting*.

breakdown of the various balance sheet items measured at fair value according to the end of 2018 hierarchy.

Table 3
Portfolios measured at fair value according to the fair value hierarchy
(31 December 2018)

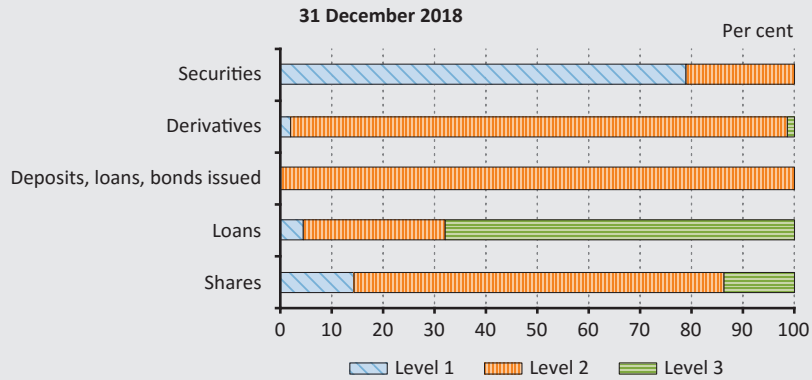
Instrument types	Level 1 (HUF billions)	Level 2 (HUF billions)	Level 3 (HUF billions)	Total (HUF billions)
Securities	3,513	934	0	4,447
Derivatives	15	788	9	812
Loans	6	41	95	142
Equity stakes	11	54	10	75
Deposits, loans taken, bonds	0	163	0	163
Total	**3,545**	**1,980**	**114**	**5,639**

Source: Data reporting ordered based on MNB (2018a)

The data in *Table 3* show that a major portion of the overall portfolio subjected to fair valuation includes Level 1 securities, which are typically Hungarian government securities. Level 2 assets include all types of instruments, but is dominated by securities and derivatives. For supervisory purposes, it is a positive fact that the ratio of Level 3 assets involving a high degree of valuation uncertainty is low (merely 2 per cent). The European Central Bank (ECB) launched an asset quality review, in which one of the key considerations was the revision of the valuation of Level 3 assets (*ECB 2014*). The review of the valuation requirements specifically covered the fair valuation requirements prescribed by IFRS 13 (*Dentgen – Gramatke 2014*), while the ECB took into consideration the potential value differences during the stress test that followed the asset quality review, as the adjustment of own funds. Loans and derivatives typically have no prices observable on active markets and are thus dominated by Level 2 and Level 3 assets. In such cases, additional valuation adjustments may be necessary for the purpose of determining the exit price, which is expected by the standard (e.g. for asset-type derivatives with positive fair value, credit valuation adjustment which also considers the non-performance risk of the counterparty[8]). Pursuant to Article 381 of CRR, banks are also expected to recognise a capital requirement for the CVA risks, which provides cover for the unexpected additional losses, while under the prudent valuation – which also includes supervisory considerations – additional value adjustments may also be necessary (e.g. close-out costs, future administration costs, model risk). Distribution of the individual instrument types by fair value hierarchy is presented by *Figure 1*:

[8] CVA: Credit valuation adjustment

Figure 1
Distribution of fair value hierarchy by instrument types



Source: Data reporting ordered based on MNB (2018a)

Figure 1 shows that the vast majority of the securities belong to Level 1 (77 per cent), since most of them are highly liquid assets with low credit risk. The derivatives, subject to mandatory fair valuation, are typically valued at Level 2 (97 per cent), since due to the unique contractual conditions usually no direct comparable market prices are available. The ratio of Level 2 and Level 3 asset within equities is high (e.g. strategic investments), since usually only listed securities may be allocated to Level 1. The fair value portfolio of other liability-side items is negligible; those are usually involved for risk management purposes, as part of fair value options. Such cases may include the fair valuation of a bond in the case of an issued bond and the hedging transaction that swaps the fixed interest thereof for variable interest (since it is mandatory to use fair valuation for the related hedging transaction). It may also be necessary to use fair valuation for liabilities in the case of refinancing directly connected to loans measured at fair value, due to the same reason.

2.2. Valuation adjustment due to the requirements of prudent valuation

As regards the supervisory requirements, Articles 34 and 105 of CRR contain the requirement that the credit institutions must – as the case may be – recognise additional valuation adjustments for their (bank and trading book) positions measured at fair value. The economic crisis of 2008 proved that liquidity drying up in markets may make fair valuation uncertain, and thus a more conservative approach may be necessary, primarily in respect of less liquid positions or those

with higher inherent valuation uncertainty. The amount of the adjustment reduces the value of assets and increases the value of liabilities, and thus it always has a profit-deteriorating effect. The item is special in the sense that – although it must be treated as a prudential adjustment – it does not form part of accumulated other comprehensive income, but rather adjusts the value of the respective instrument to a prudent value. All of this leads to a more conservative, supervisory approach of fair valuation, which expresses that in a given case the exit price determined during fair valuation may result in additional losses. The prudent valuation may overlap the valuation adjustments applied under fair valuation (e.g. non-performance risk, cost of finance, credit spreads), and thus the position may be exempted, where appropriate, from prudent valuation. It is an important difference that while the valuation adjustments used under fair valuation also appear in the accounting statements (they modify net income), the additional valuation adjustments recognised under prudential valuation only reduce the amount of own funds.

The detailed rules issued by the EBA[9] on the topic (*European Commission 2016a*) contain the requirements related to calculating the valuation adjustment. Market participants without major fair value positions have the opportunity, also considering the principle of proportionality, to determine the value of the adjustment using the simplified approach (0.1 per cent of the absolute sum of the assets and liabilities measured at fair value). As regards Hungarian credit institutions, it can be stated that – due to their size – they have no positions of major significance at the European level and usually their fair value can also be measured reliably (Level 1 assets). Based on the foregoing, the simplified approach is commonly applied, with the exception of banks whose parent company is registered abroad, which are obliged to use the core approach at the group level (assets and liabilities exceeding EUR 15 billion measured at fair value), since in their case the core approach, used by the parent company, must also be applied at the sub-consolidated level.

[9] EBA: European Banking Authority

3. Analysis of the balance sheet

3.1. Assets

When assessing the impact of the transition to IFRS 9, the starting point of the analysis is the aggregated balance sheet of the credit institutions, through which the valuation method selected for the various financial instruments can be presented. *Table 4* illustrates the change in the assets of banks that used IFRS in 2018:

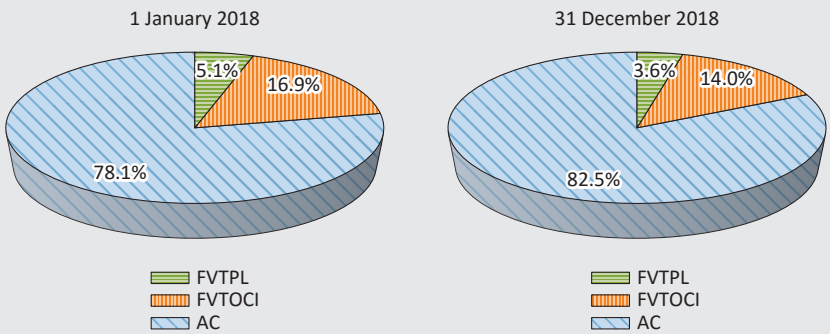
Table 4
Change in the 2018 balance of assets and their structure

	1 January 2018		31 December 2018	
Assets	**HUF billions**	**per cent**	**HUF billions**	**per cent**
Cash, interbank deposits	2,116	6.8	2,681	7.9
Investments, equity instruments	1,188	3.8	1,401	4.1
Debt securities	8,938	28.7	9,082	26.9
Loans	15,334	49.3	17,025	50.4
Derivatives	399	1.3	440	1.3
Other	3,141	10.1	3,145	9.3
Total assets	**31,116**	**100**	**33,774**	**100**

Source: Data reporting ordered based on MNB (2018a)

The data show that the growth in the balance sheet total in 2018 was mostly caused by the increase in the balance of loans and certain liquid assets (cash, interbank deposits). The share of loans within the balance sheet total exceeded 50 per cent by the end of 2018. Upon introducing the IFRS rules, one of the determinant elements is the use of fair valuation, which is mandatory for derivatives, while in the case of other instruments it depends on the assessment of certain conditions (e.g. assessment of business model). In *Table 4*, deferred tax assets are included in the other items, because in the past Hungarian accounting did not treat the accounting and tax differences separately in the balance sheet. *Figure 2* shows the ratio of banks using fair valuation among their financial instruments:

Figure 2
Valuation method of financial instruments



Source: Data reporting ordered based on MNB (2018a)

It is clear that among the financial instruments the ratio of assets valued at amortised cost (AC[10]) increased further, which was attributable to the surge in outstanding lending. The decrease in the portfolios measured at fair value mostly resulted from the change in debt securities. The bulk of the assets within the fair valuation category are valued directly through other comprehensive income (FVTOCI[11]), while the smaller part of them are valued through current year's profit or loss (FVTPL[12]).

From supervisory perspective, one of the consequences of fair valuation is that in the case of instruments not held to maturity the change in market factors underlying the calculation of fair value (e.g. benchmark yields) immediately appears in the value of the instruments. A typical case was, for example, when in the declining yield environment the fair value of fixed rate securities purchased earlier increased. All of this also had a positive effect on capital adequacy through the rise in shareholders' equity. However, the excessive recognition of unrealised gains may represent a supervisory risk of such a degree that it needs to be addressed. Fair valuation may also be undesirable in an economic stress situation or market turbulence, since it may make the capital adequacy ratio uncertain due to the excessive volatility of the unrealised profit/loss components. Namely, the purpose of own funds (particularly of CET1[13]) is to take stock of the profit/loss components, primarily of

[10] Amortised cost: The value of the financial asset or financial liability determined upon initial recognition, reduced by principal repayments, and increased or decreased by the accumulated amortisation of the difference of such initial value and the value at maturity, calculated using the effective interest rate method and adjusted, in the case of financial assets, for any recognised loss.
[11] Fair value through other comprehensive income
[12] Fair value through profit and loss
[13] Common Equity Tier 1

those already realised, that are definitely suitable for covering the loss. Accordingly, it can be stated in general that the application of the amortised cost of historical approach reduces the risks related to volatility, but in the case of certain portfolio elements (e.g. securities held for trading or sales) it is justified and useful to apply fair valuation due to the timely mapping of the risks arising from unrealised losses. All of this is essentially in line with the forward-looking supervisory objectives.

Fair value option

Fair valuation may also be applied on the basis of choice, the opportunity for which is provided by the fair value option, which permits the elimination or material reduction of the accounting inconsistency. Such cases may include when a bank, fearing a rise in market yields, concludes hedging transactions for the interest rate risk of its fixed-rate assets (e.g. loans, securities), where it swaps the fixed interest for variable interest, thereby eliminating its risks (of positive or negative sign) stemming from the change in market rates. If the sole purpose of holding the instruments is to collect the contractual cash flows and the contractual conditions satisfy the SPPI requirements, those should be measured at amortised cost (hedged transactions). According to the IFRS requirements, it is mandatory to measure the related derivative transactions of hedging purposes at fair value, while the hedged transactions would remain at amortised cost. In this case, there is a possibility to state the hedged items at fair value as well, and thus the profit/loss impacts stemming from the change in fair value may almost offset each other. Strict conditions apply to the use of hedge accounting and the inclusion in hedge relationships (e.g. preparation of hedge documentation, monitoring of hedge effectiveness), to which the application of fair value option may be an alternative. Namely, it is also true for the fair value option that the recognition of the profit/loss elements of opposite sign against each other reduces the volatility of own funds.

From supervisory point of view, application of the fair value option instead of hedge accounting is also favourable, if the effect of the first can be measured reliably, the risk management objectives are documented and the economic content of the transactions also supports it.

3.1.1. Loans

Loans constitute the most dominant part of banks' assets. Loans are debt-type financial instruments where the regulation permits recording at amortised cost, if the following conditions are met: One of the requirements comes from the business model, according to which the purpose of holding the instrument is to collect the contractual cash flow (exception: upon selecting the held for sale business model or fair value option, which are subject to fair valuation). The second requirement is that these cash flows should include only principal and interest payments; however,

this is conditional upon passing the SPPI[14] test. Interest payments may only consist of certain elements (time value of money, borrower's credit risk, defined profit margin). If the future cash flows of the respective loan (type) are not only of an interest and principal nature, it must be valued at fair value. Examples of this may include when the interest period of the loan and the period of the reference rate differ: in this case benchmark analysis must be performed in respect of the change in the cash flows. If the difference between the estimated cash flows is material, fair valuation must be applied. For the purpose of recording the instruments – in addition to the transaction interest – the effective interest rate must be also defined, which is an internal rate of return, which may be used for discounting the contractual cash flow due at different dates to the initial principal amount of the loan, while the difference between the transaction and effective interest rates is recognised gradually during the term (amortised) in the current cost (*Madarasiné et al. 2017:55–59*). The effective interest rate of financial instruments also plays an important role when establishing loan impairments, upon discounting the future cash flows payable by the borrower to present value. The composition of loans by valuation method is illustrated by *Table 5.*

Table 5
Changes in and distribution of outstanding lending by valuation method

	1 January 2018		31 December 2018	
Loans	**HUF billions**	**per cent**	**HUF billions**	**per cent**
Loans valued at amortised cost (AC)	15,163	98.9	16,883	99.2
Loans valued at fair value	171	1.1	142	0.8
Total loans	15,334	100	17,025	100

Source: Data reporting ordered based on MNB (2018a)

As part of the transition to IFRS 9, credit institutions conducted the SPPI test, based on which at the beginning of 2018 98.9 per cent of the outstanding lending satisfied the prescribed conditions, and thus they were stated at amortised cost at year-end. Fair valuation had to be applied on a mandatory basis for the remaining portfolio (merely 1.1 per cent) and the value change was recognised through profit/loss. Within the total outstanding lending as at the end of 2018, the ratio of loans valued at amortised cost rose by 0.3 per cent to 99.2 per cent.

In the case of loans, fair valuation must be used, for instance, when the reference rate stated in the contract contains leverage as specified in subsection B4.1.9 of the IFRS 9 standard, which during the tenor may overstate the price change in the market reference rates (e.g. reference rate tied to market index), and the cash flows

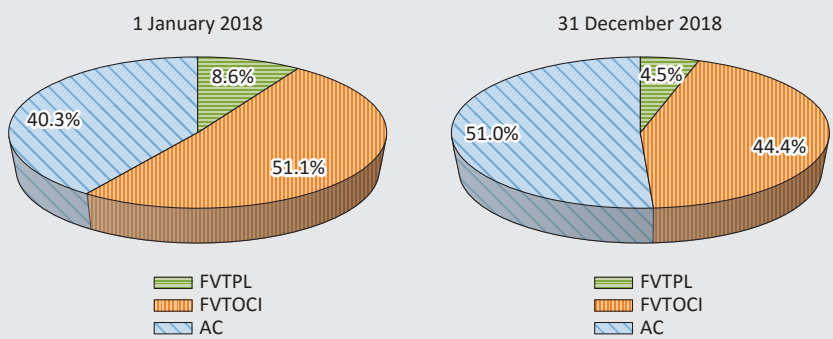
[14] Solely payments of principal and interest: proving that during the tenor the instrument contains only principal payments and interest payments directly related thereunto.

so generated may not comply with the notion of interest in the narrow sense. The exposures already impaired upon origination, referred to as POCI [15]exposures, were also recognised in the category subject to mandatory fair valuation; in Hungary this must be applied to the non-performing foreign-currency denominated mortgage loans previously converted into forint, in respect of which the MNB also issued a notice.[16] On the whole, the valuation effect of these exposures is negligible, also due to the small portfolio.

3.1.2. Securities

In the case of debt securities, the key difference compared to the loans is that almost half of the portfolio is measured at fair value. The securities portfolio of banks contain almost solely – due to their prudent operation – government securities, the market price of which can be measured on a daily basis. *Figure 3* shows that at the start of the year, fair valuation through other comprehensive income (FVTOCI) was the most common valuation category, while by the end of the year the portfolio stated at amortised cost prevailed:

Figure 3
Valuation method of securities



Source: Data reporting ordered based on MNB (2018a)

[15] Purchased or originated credit-impaired financial assets
[16] https://www.mnb.hu/letoltes/forintositas.pdf

Valuation through other comprehensive income is justified by the fact that for these liquid securities the business model also includes the intention to sell, in addition to collecting the contractual cash flows. Intention to sell may appear due – among other things – to satisfying a liquidity requirement suddenly appearing during the tenor of the instrument or for the purpose of capitalising on favourable price movements. Based on the 2018 data, it can be established that the ratio of securities measured at fair value decreased, which was partly attributable to the realisation of formerly profitable positions.

Other comprehensive income

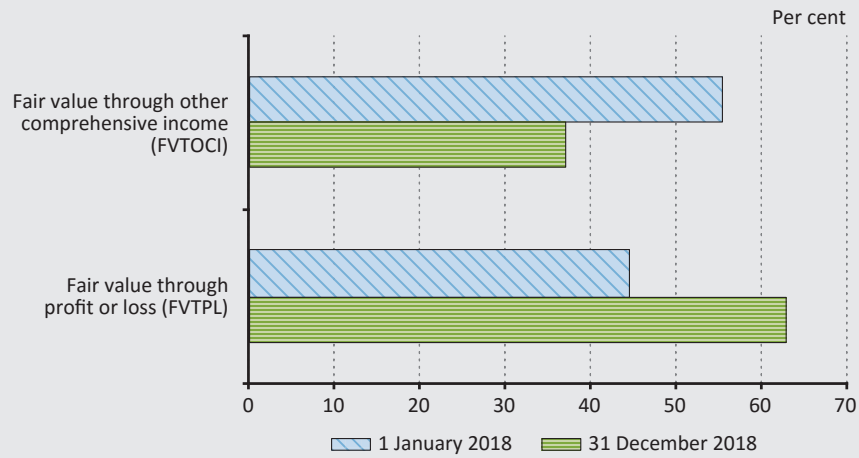
Other comprehensive income (OCI) is stated separately from the net income of the financial year. It includes unrealised profit/loss components resulting from fair valuation, which could make the net income of the financial year – mostly monitored by investors – volatile, and thus it is justified to present these items separately in the statement of other comprehensive income. These include, among other things, the valuation differences from the mark-to-market valuation of real properties, the positive or negative fair value adjustment of equity stakes/debt instruments, the fair value adjustments of certain hedging transactions and the fair value adjustments stemming from the credit institution's own credit risk. The accumulated amount of these appears directly both in shareholders' equity and own funds (as accumulated other comprehensive income), which will be dealt with also upon presenting the shareholders' equity items. Separation of the two income categories is also important for the purpose of dividend payments, as such may only be made from net income.

FVTOCI securities are always stated in the balance sheet at fair value, while the difference between the prevailing market value and the amortised cost is shown in shareholders' equity as accumulated other comprehensive income. The deferred tax effect related to the valuation difference must be also recognised here for these items. For the purpose of determining the valuation difference of securities valued through other comprehensive income it is also necessary to keep continuous records – in addition to the market value – of the amortised cost, which also serves as a basis for recognising the interest incomes stated in the profit and loss account. Upon derecognition of the instrument, the valuation difference recorded in the principal is realised and must thus be transferred from other comprehensive income to net income. FVTPL securities typically include instruments held for trading from the outset (predetermined, regular and frequent sales), but the fair value option may be used here as well upon initial recognition. Subsequent reclassification between the individual valuation categories is permitted only in exceptional cases, upon the change of the business model, which also limits the possibility of regulatory arbitrage (e.g. upon the occurrence unrealised loss reclassification of the instrument measured at fair value to amortised cost).

3.1.3. Equity stakes

Equity instruments are essentially subject to mandatory fair valuation. Exemption may be given in certain cases, e.g. in the case of equity stakes included in consolidation. If the fair value cannot be estimated reliably, application of the historical cost approach is permitted for the best estimation of the fair value. The distribution of equity stakes by the methods of fair valuation is illustrated by *Figure 4*:

Figure 4
Fair valuation of equity instruments



Source: Data reporting ordered based on MNB (2018a)

Based on the data reporting related to the end of 2018, it can be established that the ratio of equities measured at fair value through profit and loss rose substantially. Equities on the asset side are stated at the prevailing fair value, while on the liability side the valuation differences are stated as valued through profit or loss or through other comprehensive income. In the latter case, the fair value appears in the other comprehensive income as the (positive/negative) difference of the fair value and the amortised cost. Upon derecognition of these equities it is not permitted to transfer the valuation difference back to net income (while this must be done in the case of debt instruments), as it forms part of the prevailing equity.

3.1.4. Derivatives

For banks using IFRS for the first time, the valuation differences related to derivatives is a new element in the balance sheet. Compared to the earlier Hungarian accounting standards this may be regarded as a novelty only in the sense that the application of fair valuation is now mandatory on a uniform basis,

rather than an option. The fair value adjustment of derivatives must be recognised through net income, under assets (positive valuation difference of a profit nature) or under liabilities (negative valuation difference of a loss nature). Banks conclude, typically with credit institution counterparties, over-the-counter deals for trading or hedging purposes (e.g. interest rate or foreign exchange swaps). However, under IFRS 9 strict rules apply to the inclusion in a hedging relationship. Accordingly, hedging transactions in the economic sense are often[17] stated in the banks' balance sheets as held for trading, due to the absence of hedging documentation or hedge effectiveness. Inclusion in a hedge is also complicated by the fact that the hedging relationship must be documented in detail already upon the origination of the transactions and the hedge effectiveness must be presented on a continuous basis (*E&Y 2014*). This also means that upon the existence of the hedging relationship, the change in the fair value of the hedging and hedged transactions must move closely together during the tenor, in different directions (it must be effective). The fair value of derivatives is typically calculated by considering some kind of valuation input (e.g. the market yield curve determining the valuation of the instrument), by discounting the expected cash flows.

3.1.5. Deferred tax assets

The requirements related to the accounting treatment of deferred tax assets are included in the standard IAS 12 (International Accounting Standards, IAS) on income taxes (*European Commission 2012*). Since these are also subject to special supervisory treatment, it is justified to present the difference in more detail. Deferred tax assets arise from the different valuations of assets and liabilities according to accounting and taxation laws (e.g. temporary differences arising after fair valuation). The future tax effect of the valuation differences thus arising appear as deferred tax. Deferred tax assets also include unused tax loss and tax credits, which may be used to reduce future tax liabilities.

The asset or liability nature of the deferred tax depends on the type of the temporary difference (of a profit or loss nature) and the type of the underlying balance sheet item (asset/liability). Based on this there may be deductible (generating deferred tax assets) or taxable (generating deferred tax liabilities) differences. The nature of the temporary differences are summarised in *Table 6:*

[17] Roughly 30 per cent of the valuation differences of transactions classified as held for trading related to economic hedging transactions (based on the MNB F10 consolidated data reporting for end of 2018).

Table 6
Types of temporary differences

	Asset	Liability
Book value > Tax value	Taxable	Deductible
Book value < Tax value	Deductible	Taxable
Book value = Tax value	Neutral	Neutral

Source: Edited based on IAS 12

Deferred tax assets may include, for instance, impairments/provisions not recognised by the taxation law, or tax effects calculated on the negative fair value adjustments on the assets side. Deferred tax liabilities may include the positive fair value adjustment on the assets side or the recognition of development reserves (*BDO 2014*). A recognised deferred tax asset reduces the tax liability payable in the future, while a deferred tax liability will increase the tax payable in the future. One special rule is that the deferred tax on items stated in other comprehensive income must be shown in the balance sheet under the related item. Such cases include the deferred tax liability payable on the positive fair value adjustment of government securities measured at fair value through OCI (temporary difference).

Due to the high degree of uncertainties inherent in deferred tax assets (usability – of annually varying degree – based on business plans, time constraints, change of tax rate), the prudential regulations (Articles 36 and 48 of CRR) treat deferred tax assets that increase the profit/loss more strictly. These items must be allocated to categories defined by CRR (depending/not depending on future profit/loss; temporary/non-temporary difference). Depending on the nature of the item, upon quantifying the capital adequacy ratio, risk weighting and/or deduction from own funds must be applied, a summarised overview of which is presented in *Table 7.*

Table 7
Types of deferred tax assets and their supervisory treatment

Deferred tax assets	
Type	**Supervisory treatment under CRR**
Non-temporary differences depending on future profit/loss (tax loss carry forwards)	Must be fully deducted from own funds, and thus no risk weighting is necessary.
Temporary differences depending on future profit/loss	Deductible over specified limits (adjusted CET1 capital 10, 15 per cent), while for the part below the limit higher risk weight is to be applied.
Temporary differences not depending on future profit/loss	No obligation to deduct; 100 per cent risk weighting is to be applied as exposure.
Tax overpayments; current year tax losses of the institution carried back to previous years	Generates current-year receivable from the tax authority, 100 per cent risk weight is to be applied

Source: Compiled from Articles 38–39 and 48 of CRR

3.2. Liabilities

Customer deposits account for the largest part of the banks' outstanding liabilities (almost 80 per cent). Based on *Table 8* it can be found that in 2018 the rise in outstanding liabilities was also mostly caused by the increase in deposits.

Table 8
Change in the balance of liabilities in 2018 and its structure

	1 January 2018		31 December 2018	
Liabilities	**HUF billions**	**per cent**	**HUF billions**	**per cent**
Deposits	21,713	79.0	23,732	79.4
Loans taken	3,667	13.3	3,697	12.4
Issued securities	1,084	3.9	1,244	4.2
Derivatives	377	1.4	372	1.2
Other liabilities	656	2.4	843	2.8
Total liabilities	**27,497**	**100**	**29,888**	**100**

Source: Data reporting ordered based on MNB (2018a)

In addition, a minor rearrangement of the liability structure can be observed from refinancing loans to the benefit of issued securities. Thus, the surge in lending by banks, observed on the assets side, was typically financed by customer deposits – which are more stable than the interbank funds – and this is favourable in terms of liquidity. On the liability side, deposits and other liabilities are typically measured at amortised cost, while derivatives (loss-type differences) are subject to mandatory fair valuation. In exceptional cases, it is permitted to apply the fair value option for liability-side items as well, if there is some kind of accounting inconsistency. On the whole, it can be stated that valuation at amortised cost should be applied for the vast majority of liabilities (98.1 per cent); fair valuation appears only optionally (1.9 per cent) for some kind of hedging purpose, and thus it usually does not cause any major volatility in values.

3.3. Shareholders' equity

Shareholders' equity serves the safe operation of banks, and as such it is a starting point for determining own funds. Usually, the already realised capital elements (e.g. subscribed capital, capital reserve, retained earnings) can be included in full, while within accumulated other comprehensive income, which also contains unrealised

capital elements, prudential adjustments must be applied in certain cases. The components of and changes in the shareholders' equity are presented in *Table 9*.

Table 9
Change in the balance of shareholders' equity in 2018 and its structure

	1 January 2018		31 December 2018	
Equity	**HUF billions**	**per cent**	**HUF billions**	**per cent**
Paid-up subscribed capital	685	18.9	685	17.6
Share premium	581	16.0	545	14.0
Accumulated other comprehensive income (OCI)	170	4.7	90	2.3
Retained earnings	1,527	42.2	1,738	44.7
Profit or (-) loss of the financial year	412	11.4	515	13.2
Other	246	6.8	314	8.1
Total equity	**3,620**	**100**	**3,885**	**100**

Source: Data reporting ordered based on MNB (2018a)

The data in *Table 9* show that the equity increment is the result of profitable operations and the increase in retained earnings. It is also clear from the change in OCI in 2018 (decline of 53 per cent) that the portfolio may be extremely volatile, since it mostly contains yet unrealised profit elements (e.g. upon an interest rate increase the fair value of fixed-securities measured at fair value may decrease, or upon sales the difference is realised). The decrease was essentially attributable to the valuation difference of debt securities. The OCI reserve represents the accumulated fair value adjustment of the financial instruments valued through other comprehensive income, but the fair value adjustment of certain hedging transactions also should be allocated to this category (e.g. cash flow hedge effective portion). Depending on the changes in the market price, the fair value adjustment related to financial instruments may be both positive and negative.

For supervisory purposes, the unrealised capital gains/losses, which are stated in accumulated other comprehensive income, fully form part of the own funds. By contrast, the impact of the unrealised valuation differences recognised through net income (e.g. change in the foreign exchange rate) appears later in time, after the mid-year/year-end audit of the financial statements, if the accumulated profit/loss is positive. If the net profit/loss is a loss, it must be deducted from the own funds. International forums disagreed for a long time on the possibility of off-setting the unrealised profit/loss elements arising from fair valuation, since many of the actors argued for the former, more conservative measurement (the loss should be deducted from own funds, but the profit element should be ignored (*Seregdi et al. 2015:65*). Finally, the CRR permitted the full recognition of the unrealised fair value adjustments, but at the same time prudential filters are to be applied in

the future as well for addressing the differences in the accounting and prudential considerations. With this, the scope of the adjustment items – following the previous heterogeneous practices – became uniform in the practice of European institutions[18] related to the calculation of own funds (*Seregdi 2015:24*).

3.4. IFRS-specific elements of prudential filters

Accumulated other comprehensive income forms part of own funds in full. However, it has some special components, the profit/loss impact (be it positive or negative) of which should be eliminated, with special attention to the following IFRS-specific elements:

- Cash flow hedge reserves: it represents the positive or negative fair value of those hedging transactions that may be deemed effective. According to Article 33.1 a) of CRR, the fair value reserves related to gains or losses on cash flow hedges of financial instruments that are not measured at fair value, including projected cash flows, must be eliminated from own funds. This means that if the fair value of the hedging transaction is positive it must be deducted from own funds, and if it is negative, it must be added back to own funds. If the profit or loss on the hedged item is realised, the reserve of the hedging must be transferred to profit/loss, and thus the two items offset each other. The ineffective part of the hedging transaction – if the fair value of the hedging transaction (e.g. +100) exceeds the fair value of the hedged transaction (e.g. –80) – must be recognised immediately through profit and loss. Such transactions may include, for instance, the hedging of (the cash flow change) of a variable-rate issued bond with an interest rate swap. The purpose of the transaction is to avoid the growth in the cost of funds stemming from the increase in interest rates, and thus it swaps the prevailing variable interest for a pre-agreed fixed interest during the tenor. From a supervisory point of view, the problem is represented by the fact that in this way the presentation of the transaction is "one-sided": while OCI includes the fair value of the hedging transaction, the hedged transaction is stated at amortised cost and thus the fair value changes connected to the cash flows of those do not appear in the balance sheet until such time as the cash flows connected to the bond are realised. Hence, for supervisory purposes, the unrealised items must be eliminated from the own funds.

- Cumulative gains and losses due to changes in own credit risk on fair valued liabilities: a special element of measurement at fair value is that, in addition to the market factors, the bank's own creditworthiness (non-performance risk) must be also taken into consideration upon the measurement of liability items at fair value. The measurement of liabilities at fair value may take place based on a business model (instrument held for trading) or upon applying the fair value option. Part

[18] Credit institutions and investment firms falling under the scope of CRR

of the change in the fair value originating from own credit risk (e.g. the impact of the rise in the risk spread of the issuer of the bond) must be stated in the OCI reserves, if it does not cause major accounting inconsistency. Thus, situations may occur when – via a decrease in the value of liabilities – the increase in the bank's own credit risk leads to a rise in shareholders' equity. Recognition of these items cannot be justified from a supervisory point of view, since upon liquidation of the bank the debtor's actual receivable does not decrease, and hence the capital element thus recognised has no loss-bearing capacity. Accordingly, the valuation changes arising from the change in own credit risk must be eliminated from the own funds (*BCBS 2012*).

- Fair value gains and losses arising from the institution's own credit risk related to derivative liabilities: a similar situation also arises for liability-type derivatives when a deterioration in the bank's credit risk improves the profit/loss via a decrease in the fair value of the liability, which also has an undesirable positive impact on the capital position (*BCBS 2012*).

4. Impairment under the IFRS 9 requirements

4.1. Supervisory considerations and experiences

The transition to IFRS 9 resulted in major changes, representing progress in the definition of the impairment requirements, in addition to the classification and valuation of the instruments. Namely, the former loss impairment concept, based on objective evidence – used by the IAS 39 standard (*European Commission 2008*) – was replaced by the approach based on expected losses, which attempts to address the "too little and too late" recognition of impairment during the crisis. Accordingly, under IFRS 9 the expected loss concept – on the whole – narrows the earlier gap between accounting and prudential expected losses (*Balázs -Tardos 2006*). The Basel Committee on Banking Supervision expects that the transition will reduce the former regulation's procyclicality strengthening nature. Since the former requirements only prescribed statement of already incurred losses, in the descending branch of the economic cycles this exacerbated banks' financial situation through abruptly recognised, large amounts of impairments (*Novotny-Farkas 2015:31–32*). The losses had an unfavourable impact on and curbed the risk appetite of market participants. However, the supervisory objective is to ensure that banks are well capitalised and support economic growth through lending even in the event of a financial crisis. This is why they must prepare in due course to cover the expected losses and recognise the necessary impairments to prevent them from burdening banks' own funds all at once. This is further supported by

the countercyclical capital buffer measures introduced in the meantime,[19] based on which in the event of overheating in the economy banks must recognise capital buffers, which they may use during economic downturns to maintain their lending activity (*MNB 2015*). The new standard strengthens the forward-looking nature of the impairment by prescribing various macro variables and scenario analyses, creating impairment models, taking into consideration broader credit information and breaking down impairment into three stages. In order to determine the impairment, the individual portfolio elements must be classified based on the following key criteria:

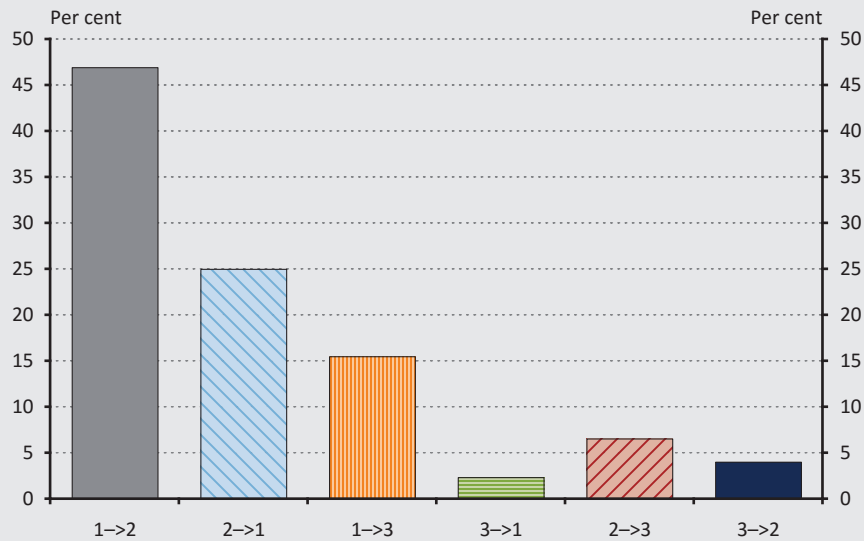
Stage 1: This includes assets of low risk from the outset, or for which the credit risk has not yet increased significantly since initial recognition. The expected loss must be quantified setting out from the defaults expected in the next 12 months (12-month expected loss). The standard does not preclude zero impairment, but it may be applied only in exceptional cases.

Stage 2: If the credit risk of the transaction has increased materially since initial recognition (underperforming loans), it must be reclassified to Stage 2. It is expected in all cases that the monitoring information available under the debtor and transaction rating are taken into consideration in full. The change can be typically identified on the basis of the rise in the probability of default (PD[20]). Impairment must be recognised from Stage 2 for the full life time of the transaction (for the expected losses arising from the defaults occurring during the entire term). For assets classified from the outset with low credit risk it is not necessary to identify the rise in credit risk, but this may take place only in exceptional cases.

Stage 3: If a transaction can be classified as impaired for the purpose of accounting, it must be reclassified to Stage 3, for which the standard provides specific examples (e.g. financial difficulties of the client, start of liquidation). The accounting impaired category is roughly the same as the impairment recognised on the basis of objective evidence under IAS 39, and thus the additional impairment recognised in Stage 2 may represent the biggest change compared to the previous practice. Naturally, the individual categories are not static, they are continuously changing (*Figure 5*).

[19] Capital buffers are capital requirements of macroprudential nature, in addition to Pillar 1 and 2, which must be satisfied by the highest quality (CET1) capital elements.
[20] Probability of default: the probability of a client becoming non-performing within one year.

Figure 5
Distribution of movements in 2018 between the individual impairment stages



Source: Data reporting ordered by MNB (2018a)

In analysing the movements in 2018, it can be seen that the most frequent reclassification occurs between Stages 1 and 2 and that 72 per cent of the movements are related to these two categories. The higher the impairment category the instrument has been allocated to, the lower the probability of reclassification to a lower category. While 25 per cent of the movements related to improvement from Stage 2 to Stage 1, only 6 per cent of the movements can be linked to recovery from Stage 3. It may happen that the instrument immediately switches two categories (between Stages 1 and 3), but in the present ascending lending cycle this occurs much less frequently; usually a gradual deterioration can be observed.

Stages 1 and 2 are characterised by group, portfolio level rating, while in Stage 3 impairment recognition at the individual transaction level becomes more common as a result of the better availability of individual information implying losses. In assessing impairment at group level, it is an important requirement to create homogeneous portfolios with identical credit risk characteristics in advance, while the expected loss is calculated by taking account of the observed probability of default (PD), the loss given default (LGD[21]) and the exposure at default (EAD[22]),

[21] Loss given default: the ratio of the loss arising from the client's default relative to the exposure outstanding on the date of the default.
[22] Exposure at default: the exposure outstanding at the time when the default occurs.

typically on the basis of impairment model (e.g. setting out from historical loss rates). However, historical experience may only serve as a starting point and must be adjusted in accordance with the expectation of the standards, also taking into consideration the lending cycle and future expectations, which represents one of the greatest challenge for banks.

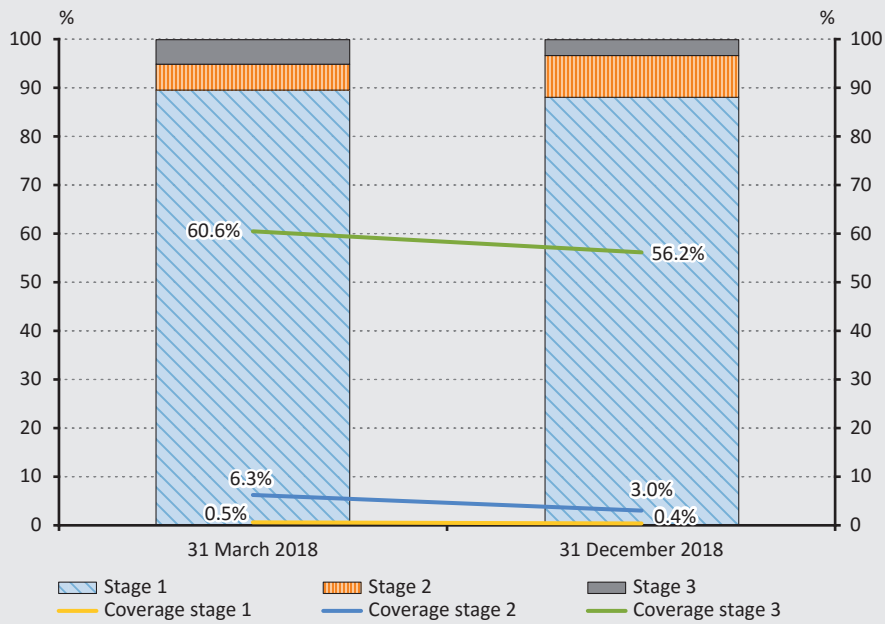
Among other things, the new requirements include the consideration of macro variables, the preparation of at least two scenarios (with positive and negative outcome) and the definition of the related probability weights. Subsequent testing of the models is an important requirement, according to which the results of the impairment model must be compared (backtested) annually to the actual empirical data. The assumptions of the model must be adjusted as necessary, which may be regarded as an iteration process, while the results of the backtesting must be regularly approved by an internal, independent organisational unit. This requirement also appears in Article 174.d) of CRR, for the internal rating based (IRB) risk parameters used in the supervisory capital calculation.

In the course of supervisory monitoring, the relationship between the individual impairment stages and overdue items deserves special attention. Namely, the standard relies on the rebuttable assumption that a significant increase in credit risk occurs, at the latest, when the loan is past due over 30 days (reclassification to Stage 2) and after 90 days the transaction becomes impaired (reclassification to Stage 3). Thus, when reclassification is not performed and the related higher impairment is not recognised, the entity must be able to justify this. Another important audit criterion is the comparison[23] of the definitions used for default, since there may be major definition differences in practice (*Bholat et al. 2016:23–25*), which must be specified. It may be practicable to harmonise the definitions which are close to each other (e.g. the notion of accounting impaired and supervisory default/ non-performing). One of the key criteria is to identify the increase in credit risk in due course, during which all relevant, available and forward-looking information must be taken into consideration, in respect of which the MNB also published an Executive Circular.[24]

The distribution of the loan portfolio among the impairment stages is an important supervisory issue, and the level of the related coverage by impairment must be also monitored; the relevant changes in 2018 are illustrated in *Figure 6.*

[23] "Non-performing" as per the MNB Decree (*MNB 2016*), "default" under Article 178 of CRR, "impaired" in Appendix A to IFRS.
[24] Executive Circular on using macroeconomic information and the factors indicating a significant increase in credit risk under the IFRS 9 standard (https://www.mnb.hu/letoltes/ifrs9-vezetoi-korlevel.pdf).

Figure 6
Distribution of the loan portfolio and coverage by impairment by stages



Source: Data reporting ordered by MNB (2018a)

The data in *Figure 6* show that roughly 90 per cent of the total bank portfolio belong to the best category of Stage 1, where no significant increase in the credit risk can be identified. Accordingly, the coverage by impairment is also the lowest here, i.e. at 0.5 per cent on average. As regards 2018, by the end of the year the share of Stage 2 had increased, but at the same time this was accompanied by a decline in the average coverage by impairment, which may have been also attributable to fine-tuning of the newly-introduced model-based methodologies. Coverage by impairment decreased slightly by the end of the year in Stages 2 and 3. For supervisory purposes, regular monitoring of the portfolios and analysis of outliers from the market average bear the utmost importance.

The experience gained so far in relation to the transition shows that upon determining the expected loss, as prescribed by IFRS, it was primarily the smaller banks using the standardised approach for capital calculation (formerly not modelling PD and LGD factors) that faced greater challenges. For these banks, the lack of databases related to historical empirical data and the provision of the human and IT resources necessary for the development of the models represented a general problem. In relation to the transition, the standard permits simplifications

(e.g. classification based on the number of days past due), but it emphasises that those should be applied as exceptions rather than as a general practice. The missing empirical data can be typically replaced by external, purchased databases. In most cases, the increase in credit risk occurs already before the transaction becoming past due, since the delay – according to the standard – is usually only the subsequent symptom of the client's payment difficulties, and as such it is unsuitable for enforcing the forward-looking approach. However, the timely identification of the rise in credit risk requires an extensive customer rating and monitoring system, which necessitates the continuous enhancement of the risk management tools.

Banks that use the IRB approach already had impairment models before the transition and also had to quantify the risk parameters underlying the expected loss (PD, LGD, EAD). However, during the estimation of the parameters, the accounting and prudential objectives may differ here as well (*Table 10*).

Table 10
Accounting and prudential differences in the estimation of risk parameters

		IFRS 9	CRR
PD	Measurement period	12-month (stage 1)	12-month
		Lifetime (stages 2,3)	
	Sensitivity to cycles	Sensitive to business cycles (point in time, PIT) with forward-looking information (macro indicators)	Cross business cycles (through the cycle, TTC)
LGD/EAD	Basis of estimation	Estimation aligned with currently expectable business cycles with forward-looking information (macro indicators)	(Downturn) estimation based on economic recession

Source: BCBS 2016

In the modelling of PD, two types of approaches developed in international practice: the cross business (credit) cycles (TTC, through the cycle) approach expected by the supervisory authority, and the method considering the changes in the cycles and capturing the changes in the near future (PIT, point in time). The impairment logic of IFRS 9 is closer to the PIT approach. The PIT approach takes into consideration the changes in the credit cycles and thus results in more volatile impairment. By contrast, the TTC approach assesses the probability of default based on a worst-case scenario, which represents a more balanced impairment level independent of cycles. Accordingly, the customer rating category using the PIT approach improves and deteriorates together with the credit cycle, while the TTC rating takes a relatively stable risk value. The time horizon of the PD estimation also differs: the supervisory authority asks for a forward-looking PD estimate for 1 year, while in accounting the probabilities of default expected during the lifetime of the transaction must be also taken into consideration. Upon estimating the loss given default, in the

supervisory approach the downturn LGD in a stress situation prevails, while the accounting approach is dominated by the forward-looking nature (both positive and negative information must be taken into consideration). Accordingly, the expected loss parameters to date may only be considered as a baseline at those applying the IRB approach, since those may be adapted to the accounting requirements only by transformation or the creation of parallel systems. The accounting expected loss may return higher or lower values compared to the supervisory expected loss due to its sensitivity to cycles.

In summary, the accounting approach is more conservative in respect of the PD parameter, while in terms of the LGD and EAD parameters the supervisory parameters are more prudent. Due to the sensitivity of the PD parameter, according to the Basel Committee on Banking Supervision, the accounting expected loss may often exceed the value calculated by the supervisory authority, particularly in the descending branch of the business cycle, due to the significant growth in the lifetime PDs (*BCBS 2016:11*). Although the forward-looking nature of the impairments increases, ensuring comparability and uniform implementation will pose greater challenges than before (*Gebhardt – Novotny-Farkas 2018:2*).

4.2. Treatment of the IFRS 9 additional impairment in the supervisory capital adequacy

From a supervisory perspective, one important question is how the additional impairments recognised under IFRS 9 at the time of the transition (typically in Stages 1 and 2) will influence own funds and risk exposures. Due to the stricter approach, the regulatory authorities fear that the recognition of additional impairment may suddenly have a negative impact on the amount of own funds. Therefore, the transitional arrangements of Article 473a of CRR permit banks to temporarily adjust in their own funds (static approach) the one-off negative impairment outstanding on 1 January 2018. According to the transitional arrangements, the reversed value of the impairments must be recognised over 5 years in a gradually declining amount (2018: 95%; 2019: 85%; 2020: 70%; 2021: 50%; 2022: 25%;). This means that while in 2018 95 per cent of the reversed difference can be included in own funds, from 2023 the total amount must be ignored. However, in order to get the full picture, those using the standardised approach must increase the risk exposures by the reversed impairments in the capital, since the starting point of the capital calculation is the net value (reduced by the prevailing impairment) of the individual assets. This is supplemented by the dynamic approach, based on which the impact of the potential subsequent (after 1 January 2018) impairment increment may be taken into consideration in impairment Stages 1 and 2, in addition to the one-off effects. Those using the dynamic approach must perform the calculation quarterly. This ensures that the impairment which may have risen sharply in meantime will only gradually burden the amount of own funds. Comparison of the calculation methods is illustrated in *Table 11:*

Table 11
Recognition of adjustments to own funds
(31 December 2018)

Type of impairment increment	Selected method	
	Static	Dynamic
IFRS 9 – IAS 39 (on 1 January 2018)	x	x
Δ Stage 1–2 (between 1 January 2018 and 31 December 2018)		x

Source: Based on CRR 473a

The application of transitional arrangements is optional, and only a few market participants took the opportunity. The impact on capital adequacy at sector level is shown in *Table 12.*

Table 12
Impact of CRR transitional arrangements on the capital adequacy ratio
(31 December 2018)

	With transitional arrangements	Without transitional arrangements
Own funds (HUF billions)	3,262	3,248
Risk-weighted exposures (HUF billions)	16,429	16,450
Capital adequacy ratio (per cent)	19.85	19.74

Source: Data reporting ordered based on MNB (2018a)

Based on the data, it can be stated that the impact of the adjustments due to the transitional arrangements on the banks' capital adequacy ratio in 2018 was minimal (–0.11 percentage point).

4.3. Treatment of the impacts of impairment on the calculation of the credit risk capital requirement by the applied approaches

In order to assess their capital adequacy, banks must quantify – based on predetermined rules – their total risk exposure value, the largest part of which is the exposure value calculated for credit risks. The regulatory authority provides two approaches for the quantification of these risks. The standardised approach, which allocates predetermined risk weights to the exposure values representing different credit risks. Banks with more advanced risk management frameworks may, subject to supervisory permission, use internal rating based approaches. The transition had a different effect on the own funds of actors not using the transitional arrangements, depending on which approach they use for the calculation of the capital requirement.

4.3.1. Treatment of impairment impacts under the standardised approach

Credit institutions using the standardised approach set out from the net exposure (reduced by impairment) for the quantification of unexpected losses. The reason for this is that in this case the regulation regards the impairment recognised by accounting as coverage recognised for the expected losses. In respect of the impairments, the CRR regulation differentiates general and specific credit risk adjustments, a notion that is not used by accounting. The general credit risk adjustments may be included in tier 2 capital up to 1.25 per cent of their exposure. As regards the IFRS 9 impairment categories, the possibility of inclusion in tier 2 capital arises in the case of impairments determined in Stages 1 and 2, due to its general nature (recognised for losses not yet incurred). At the same time, the position of *EBA* (*2017*) is very clear on the issue, according to which the impairments determined under IFRS 9 must be treated as specific impairments, as they can be clearly allocated to a specific exposure. Furthermore, these impairments do not satisfy the requirement of CRR, according to which they could be used freely and without restriction to cover losses. In Hungary, the general loan loss provision previously belonged to this category, but a major part of these balances has already been derecognised. Due to the different approach, the recognition of the impairment increment is more unfavourable for those using the standardised approach, since the impairment increment resulting from the expected loss quantified upon transition reduces own funds (without applying the transitional arrangements) through the decrease in shareholders' equity (retained earnings). Furthermore, the impairments allocated to Stages 1 and 2 cannot be taken into consideration as general credit risk adjustments, and as such they do not constitute an additional buffer to cover losses (*Deloitte 2016:5–9*).

4.3.2. Treatment of impairment impacts under the IRB approach

Credit institutions calculating the capital requirement using the IRB approach must set out from the gross exposure when determining expected losses, and they need to compare the expected loss calculated partly based on own and partly on supervisory parameters to the recognised impairment. If the expected loss is higher, the arising impairment shortfall must be deducted from the CET1 capital, while any impairment surplus may be included, to a limited degree, in tier 2 capital (up to 0.6 per cent of the credit exposures quantified by the IRB approach). For the purpose of impairment, the total (general and specific) impairment balance must be taken into consideration. Accordingly, those using the IRB approach may offset the impairment requirement arising upon transition to IFRS 9 in their own funds (e.g. by reducing the previously deducted shortfall), while credit institutions with a surplus may partially offset the burdens stemming from the increasing impairment requirements through limited inclusion in tier 2 capital. The only restrictive condition prescribed by Article 159 of CRR is that impairment surplus arising on exposures in default must

not be used to cover impairments shortfall on performing transactions. Based on the foregoing, it can be stated that over the longer run it will be necessary to revise the recognition of the impairments under IFRS 9 in the capital calculation, in order to ensure a more harmonised treatment of the different approaches.

4.3.3. Impact of the transition to IFRS 9 on banks' capital adequacy situation

Table 13 presents the impact of the transition to IFRS 9 on the first day (1 January 2018) on the banks' capital adequacy ratio (CAR), broken down by the capital calculation approach:

Table 13
Impact of the transition to IFRS 9 on banks' capital adequacy
(1 January 2018)

	Own funds	Capital adjustment due to transition to IFRS9	Adjusted own funds	Risk-weighted exposure value	Adjusted risk-weighted exposure value	CAR	Adjusted CAR	CAR impact of the transition to IFRS9
	HUF billions					per cent		
IRB banks	1,148	–7.7	1,140	5,703	5,703	20.13	20.00	–0.13
Standard banks	2,133	–52.5	2,081	12,029	11,977	17.73	17.37	–0.36
Total	3,282	–60	3,221	17,732	17,680	18.51	18.22	–0.29

Source: based on consolidated, annual audited data

The analysis is based on the consolidated audited annual accounts for end-2017 and on the revaluations reported on the first day of the transition (1 January 2018), without the transitional arrangements of CRR. The capital adjustment due to transition to IFRS 9 set out from the data reported in the banks' consolidated IFRS annual accounts for the end of 2018 (balances stated in the line "change in consolidated shareholders' equity due to IFRS 9"), which thus also includes the impact of the potential mid-year revisions. *Table 13* shows that on the whole transition to IFRS 9 had no major impact on the banks' capital adequacy (–0.29 percentage point). At the same time, the degree of the decrease was smaller at the IRB banks (–0.13 percentage point), which in part may be attributable to the more favourable treatment of the additional impairments in own funds.

4.4. Relation of impairment and supervisory capital requirement

For supervisory purposes, it is important to analyse and regularly monitor the coverage of the banks' portfolios by impairment, since the capital requirement to cover unexpected losses can be established only after this. The supervisory

authorities may revise, under Pillar 2[25] based on the supervisory parameters, the calculated level of expected loss, and in addition to this they may also determine an additional, prudential impairment level. Such cases include the impairment requirement prescribed by the ECB for non-performing loans (*ECB 2018*), which prescribes for new non-performing loans that impairments be gradually recognised, depending on the collateral coverage of the loan and the time elapsed since the default. The MNB recommendation *(MNB 2018b:6)* is narrower than that, as it prescribes a 100-per cent impairment level only for property financing project loans after a period elapsed since default. If a bank recognises a lower impairment and it is unable to justify it, an impairment shortfall arises, which – based on the present EU laws – may be prescribed in the form of an additional capital requirement. However, after the adoption of the bill amending the CRR, submitted by the *European Commission (2018)*, it will be also possible to adjust the shortfall directly.

The supervisory regulation focuses on the unexpected losses and in order to address this, it prescribes specific capital requirement for banks. The calibration of the regulatory capital requirement (Pillar 1[26]) assumes the proper coverage of the expected loss and only quantifies the capital requirements for the (unexpected) losses in excess of that. Accordingly, if the supervisory authority believes that the recognised impairments do not cover the expected losses, an additional capital requirement arises, while the method of prescribing this is not straightforward. Due to this, the present national supervisory practices are also not uniform in the sense of whether they prescribe the expected loss shortfall in the form of an accounting impairment (as the adjustment of net income) or in the form of an additional capital requirement. Recognition of the shortfall calculated for expected losses in the financial statements raises the risk that it may not comply with the IFRS 9 impairment principles, since it also includes prudential considerations. On the other hand, prescribing expected loss as an additional capital requirement reduces transparency, since the risks of banks under Pillar 2 will not be comparable. In such case, in my opinion, it would be practicable to differentiate the nature of the established impairment shortfall based on whether it arises from non-compliance with the IFRS principles or from prudential non-compliance. If the supervisory authority identifies any shortfall due to non-compliance with IFRS 9, the direct (accounting) adjustment through net income is justified. Additional impairment impacts of prudential nature could be recognised as an adjustment to own funds. The additional capital requirement under Pillar 2 would be prescribed in addition to this, which in this way would become comparable also between the individual

[25] Internal capital adequacy assessment and supervisory review process (ICAAP-SREP), during which the supervisory authority may prescribe additional capital requirement for the unmanaged/not properly managed risks, in excess of the mandatory Pillar 1 (8 per cent) capital.
[26] Minimum capital requirement, corresponding to 8 per cent of the total exposure (e.g. for credit, market and operational risks).

institutions, since it would solely include the capital requirement of surplus risks arising from unexpected losses. For the summary of this, see *Table 14*.

Table 14
Proposal for the accounting and prudential treatment of losses

Total loss (120)			
Expected loss level required by the supervisory authority (100)			Capital requirement expected by the supervisory authority for unexpected losses (20)
Expected loss stated in the accounting statements (80)	Impairment shortfall identified by the supervisory authority (20)		
	Non-compliance due to IFRS9 (5)	Other prudential non-compliance (15)	
Treatment of arising difference	***Impairment adjustment in the financial statements***	***Impairment adjustment in own funds***	***Prescribing additional capital requirement***

5. Summary and conclusions

The paper presented the accounting valuations used by the credit institutions in relation to the transition to IFRS 9, due from 2018, and analysed the key accounting and prudential differences based on those. Although the accounting information obviously serves as an important source for the supervisory work, it must be amended in several areas due to the different supervisory objectives. In relation to fair valuation, it can be found that it does have risks, but on the whole it supports the concept of forward-looking supervision. By briefly presenting hedge accounting and fair value option, the paper highlighted the important role of those not only in the translation of the market risk management tools to accounting, but also in the reduction of the volatility of the capital position.

The notion of expected loss prescribed by IFRS 9 narrowed, but did not eliminate, the gap between prudential and accounting impairment, which may be mostly observed at the parameter estimations related to expected losses. The accounting impairment is more sensitive to business cycles, and thus it may be higher, but also lower than the impairment (expected loss) prescribed by the prudential requirements. The capital adjustments recognised as part of the transition to IFRS 9, and the transitional arrangements on the whole had no major impact on the credit institutions' capital adequacy. At present, the method of treating the shortfall in expected loss established by the supervisory authority is not uniform, but by

default it would be practicable to treat the differences as an adjustment to own funds. However, if the shortfall clearly stems from non-compliance with the IFRS 9 principles, the adjustment of accounting impairment is necessary and justified. At the same time, the prescription of expected losses as an additional capital requirement considerably complicates the comparability of the ratio of the credit institutions' additional capital requirement prescribed under Pillar 2 and thereby the comparability of risks.

With the development of the IFRS standards, the number of topics requiring highly qualified professional judgement has further increased (e.g. assessment of impairment and fair valuation models, issues of hedge accounting), and thus compliance with the new requirements, uniform implementation, providing market participants, auditor and supervisory authorities with comparability and transparency will be equally essential for the future successful (co)operation.

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Geopolitical Shifts in the Evolving New World Order*

György Szapáry – Dániel János Plósz

Recent geopolitical developments point to the emergence of a multipolar new world order. Globalisation brought about by the internationalisation of trade and the diffusion of technology has radically changed the impact of world powers. A hegemon today is much better able to extend its influence and enforce its interest worldwide. The purpose of this paper is to look at what are the key requirements for a country to reach world power status in the current globalised world and discuss which countries meet the conditions to have a credible chance of becoming a dominant player in the emerging new world order. The paper concludes that China is best positioned to challenge the economic dominance of the United States. The European Union does not punch its weight in influencing global policies, and the question is whether it will be able to or want to assume the responsibilities of a world power. For the Visegrad 4 countries and the other Central and Eastern European countries, as members of the European Union and NATO that are situated at the cross roads between East and West, it is of vital interest to reflect on what geopolitical shifts one can expect in the decades ahead.

Journal of Economic Literature (JEL) codes: O10, O20, O30

Keywords: hegemony, world order, Visegrad Countries, United States of America, China, Russia

1. Introduction

Recent geopolitical developments point to the emergence of a multipolar new world order. China's rise as an economic world power and Russia's new-found assertiveness are challenging the hithertofore generally undisputed unipolar world order dominated by the United States. Around the world and even in some quarters in the United States itself, many perceive that the American hegemony

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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is on a course of rapid decline. However, geopolitical changes have typically been slow, often taking several centuries before a dominant world power was replaced by another. Sometimes the change was relatively peaceful, sometimes it was the result of a brutal war. In ancient times, hegemons' power and influence were at a regional level by current world standards. Athens and Rome basically ruled the Mediterranean basin, with extensions into Central and Northern Europe by the Romans. At its apogee, the Ottoman Empire spanned from Western Asia to parts of Europe and Africa. These were vast and populous territories with inhabitants belonging to different cultures speaking different languages. That region is rightly considered as the "cradle" of civilisation, although the contribution of ancient China to western civilisation must also be recognised.[1] Still, these ancient empires ruled over only a small part of the globe.

In the 19th and the first half of the 20th century, Great Britain came close to being a dominant world power even by current standards, as it possessed colonies in Asia, Africa, the Caribbean and territories in Oceania, had a dominant presence on the seas and enjoyed a decisive role in international trade and finance, with the pound sterling as an international reserve currency. Its hegemony abruptly disintegrated after WWII with Great Britain losing its colonies and the United States taking over dominance over the seas, international trade and finance, innovation and technology, and the US dollar becoming the universally accepted world reserve currency. Following the collapse of the Soviet Union in 1991, the United States has come to dominate the world in ways unmatched at any time in human history.

Globalisation brought about by the internationalisation of trade and the diffusion of technology has radically changed the impact of world powers. A hegemon today is much better able to extend its influence and enforce its interest worldwide. Hence, the contest for influence now plays out at the global level, but only a few have a shot at becoming a serious challenger. No respectable thinker would contend that America will cease to be a dominant world economic power in the foreseeable future, but it is a reality that its relative influence in the world order will decline as challengers emerge. America's lead is increasingly contested, or at least not looked upon as "natural".

Many authors have studied the rise and decline of world powers. *István Szilágyi* (*2018*) presents a broad overview of the theory of geopolitics and provides an extensive bibliography. He points out that the importance of production, trade and access to the seas were already mentioned by *Friedrich Ratzel* (*1897*) in the second half of the 19th century. Ratzel wrote of five great powers: England, Russia,

[1] China has been the source of many innovations, such as papermaking, printing, gunpowder and the compass, to mention the most well-known ones.

China, United States and Brazil and expressed the idea of a European community defending the two wing forces (United States and Russia). Szilágyi also mentions that *Rudolf Johan Kjellén* (*1917*) made a distinction between hegemons with world power and those with continental influence, with the Austro-Hungarian Monarchy belonging to the latter group in his opinion.

George Modelski (*1988*) developed a long-cycle theory which attempts to capture elements of regularity in the operation of world powers. He sees a connection between war cycles, economic supremacy and world leadership. He suggests five cycles since 1500, each corresponding to the existence of a hegemonic power: Portugal in the 16th century, the Netherlands in the 17th century, Great Britain in the 18th and 19th century and the United States in the 20th century. *William Thompson* (*1988*) and *Paul Kennedy* (*1988*) also focus on major wars and economic power in the rise and decline of global leadership.

Zbigniew Brzezinski (*2012*) already talks about the waning of America's global appeal and the decline of its international influence. He writes that "if America falters, the world is unlikely to be dominated by a single preeminent successor, such as China" (p.75). Rather, "in the absence of a recognized leader, the resulting uncertainty is likely to increase tensions among competitors and inspire self-serving behavior" (p.76). Behind these arguments is the author's conviction that America must remain strong to preserve world order. A similar concern surfaces in the thoughts of *Robert Kagan* (*2012*). His greatest concern is "not really whether the United States can afford to continue playing its role in the world. It is whether the Americans are capable of solving any of their most pressing economic and social problems" (p.130). This is a relevant point, since many empires dissolved as a result if internal strife which made them weaker and the target of external interference. *Henry Kissinger* (*1979*) considers the United States as the guarantor of world peace and together with President Richard Nixon recognised early that America had to establish diplomatic ties with China, a potential challenger of US influence in East Asia, but also a potential partner in opposing the territorial ambitions of the Soviet Union.

George Friedman (*2012*) argues that the United States did not intend to be an empire: its world dominance was a consequence of events, few of which were under the control of America (p. 14). This bears little relation to reality. To become a superpower, a country must possess some objective geographical conditions, and if it has the good fortune to have them as America does, it is the ambition of its people and their leaders who will make their country a hegemon. *Kagan* (*2012*, *pp. 10–11*) is right that the attitude of the United States does not fit the perception of the "reluctant sheriff" which only goes to war because it has to. It did go to war to

defend itself from distant threats and to preserve its economic interests in Cuba against the Spanish, in Indochina against the communists and in the Middle East.

The purpose of this paper is to look at the major requirements for a country to reach world power status in the current globalised world and to discuss which countries meet the conditions to have a credible chance of becoming a dominant player in the emerging new world order.

2. Requirements for becoming a world power

Size matters. A large, robust economy standing on firm footing is a *sine qua non* for having a claim to becoming one of the world leaders. GDP is the main indicator with which we measure the size of an economy. GDP depends on the number of workers in a country, and so the size of the population matters. GDP also depends on the productivity of workers, which in turn is determined by the technology used. Countries which are world leaders in innovation and use state-of-the-art technologies are best at boosting productivity and maintaining a competitive edge over others in the goods and services markets. Innovation is based on know-how that one gains through education. A system of education which is good at training people who can best perform the jobs of the future from the lowest skilled ones to the highest skilled levels is a must for a country vying for world leadership.

Hegemons exercise their influence through trade. Diversified, competitive exports resting on a structure of production of goods and services needed and imported by other countries gives clout to the exporting country. Possessing vast and varied natural resources is also an asset, as it reduces reliance on others for raw materials, and the latter can be also valuable export commodities. The larger the territory of a country, more likely it is that it will possess natural resources. Furthermore, the size of the territory of a country also matters from the perspective of being able to accommodate large populations.

Other attributes matter as well. In the current globalised world, a country whose currency is widely used as a means of international payments renders substantial benefits to its issuer, an “exorbitant privilege” as Valéry Giscard d’Estaing referred to these benefits when he was France’s minister of finance. *Barry Eichengreen* (*2011*) gives an excellent description of the rise of the US dollar to international prominence in trade and debt financing and as a global reserve currency. He also discusses the benefits that this dominance provides to the United States in the form of seigniorage, low interest rates and the capacity to finance large budget and current account deficits. In fact, increasing international financial integration has increased the systems’ reliance on the US dollar. This reliance has provided

the US with the ability to use the global financial system to serve its own security goals (*Leonard et al. 2019*). One example of this ability are the sanctions imposed by the US against Iran.

There are indispensable conditions for a national currency to become a dominant player. First, a large enough quantity must be available to lubricate international transactions, and the markets must have confidence in the stability of the currency. Only large, strong economies can fulfil these conditions. Second, the currency must be freely convertible, the debt instruments labelled in that currency must be liquid, and the capital market must be transparent and backed by solid financial and legal systems. The political stability of the issuer country also matters as political instability undermines confidence in the currency. Generally, a country that wants to be a dominant power on the world scene will want to gain international prominence for its currency.

Last but not least, there are two other requirements for a country to reach world power statute: military might and the ambition to be a world player. The two generally go hand in hand, as ambition feeds decisions to devote substantial resources to defence spending and military strength raises the level of ambition. Access to the seas is important from both the military and international trade perspective. Throughout history, empires enjoyed sea access either by their original geographic location or by conquest such the Ottomans and the Habsburgs, with the territory of the latter also boosted by marriage contracts.

To sum up, in the current globalised world the requirements for a country to play a dominant role in shaping the new world order are a large population and vast geographic territory, access to the seas, a strong economy measured by the size of its GDP, leadership in innovation and technology, trade and currency dominance, military strength and willingness to become a world power. We purposefully do not discuss the role of the State in the economy, because the mix between private and state ownership cannot be directly linked to hegemony. However, there is evidence that heavy intervention by the State in the economy constrains competitiveness, but what constitutes the right degree of the role of the State from the point of view of achieving world power status is open to debate. We also leave aside a discussion of the role of the political regime as a factor. One certainly hopes that democracy will spread across the globe and countries striving for world power role will be democratic. If in recent history America's lead has been accepted and sometimes even asked for in many parts of the world, it is because America has been looked upon as a freedom-loving democratic country governed by the rule of law. Yet again, there is no universal direct link between the political regime and world power, as we have also seen dictatorships and autocratic regimes attempting to shape the international order.

3. The qualifiers

Table 1 ranks countries by population. China with 1.4 billion and India with 1.3 billion inhabitants are the world's most populous countries based on 2017 data. The US comes in third with 325 million people. Indonesia with 261 million, Brazil with 207 million, Pakistan with 197 million and Nigeria with 189 million inhabitants are the next four most populous countries. The European Union, although it is not a single country but comprises 28 countries forming a unified market, has a combined population of about 500 million and the 19 countries of the euro area cover a population of approximately 340 million.

Table 1
Most populous countries, 2017–2019
(million people)

Country	2017	2018	2019
China	**1,390.1**	**1,395.4**	**1,400.2**
India	**1,316.9**	**1,334.2**	**1,351.8**
European Union (EU–28)	**502.5**	**502.9**	**503.4**
United Kingdom	66.0	66.5	66.9
Visegrad Countries	63.8	63.8	63.8
Eurozone (EA–19)	**338.5**	**338.5**	**338.5**
Germany	82.7	82.9	83.0
France	64.6	64.7	65.0
Italy	60.6	60.5	60.7
United States	**325.3**	**327.4**	**329.6**
Indonesia	**261.4**	**264.2**	**267.0**
Brazil	**206.8**	**208.3**	**209.8**
Pakistan	**197.3**	**201.0**	**204.7**
Nigeria	**188.7**	**193.9**	**199.2**
Bangladesh	**163.2**	**164.9**	**166.6**
Russia	**144.0**	**144.0**	**143.9**
Japan	**126.7**	**126.5**	**126.2**

Note: Forecast from 2018.
Source: IMF World Economic Outlook, April 2019

Russia ranks first in terms of the size of its territory, followed by Canada, China and the United States (*Table 2*). India, the second most populous country, only ranks eight in terms of the size of its territory. Canada, Brazil and Australia occupy large land areas, but have relatively small populations. The EU–28 have a combined land area of circa 4.4 million square kilometres, larger than that of India.

Table 2
The 10 largest countries
(Thousand square kilometres)

Country	Area
Russia	17,098
Canada	9,985
China	9,707
United States	9,373
Brazil	8,516
Australia	7,692
European Union (EU–28)	4,388
India	3,288
Argentina	2,780
Eurozone (EA–19)	2,762

Source: https://www.worldometers.info/geography/largest-countries-in-the-world/

From these two data sets, the clear frontrunner to challenge the hegemony of the United States would be China, with Russia and the EU as possible candidates, but let us look at the other requirements before drawing any conclusions.

There are several ways of measuring the economic strength of a country: the size of its GDP relative to world GDP, its per capita GDP and its importance in world trade. Between 2001 and 2018, the United States' share in global GDP fell from 31.5 per cent to 24.2 per cent. Among the challenger countries, China's performance is spectacular. In 2001, its share of world GDP was 4 per cent, increasing almost fourfold to almost 15.8 per cent by 2018 and fast approaching that of the United States (*Table 3*). Real GDP per capita on the basis of purchasing power parity was forty times higher in the Unites States than in China in 1980, but by 2018, it was only 3.5 times higher (*Table 4*). This is still a large gap, but the improvement in living standards has been enormous in China in recent decades. It is worth noting that the fastest period of the catching up in per capita GDP of China started in the early 1990s, i.e., only about 25 year ago, making this rapid convergence even more remarkable. While the share in world GDP of other potential challengers has also increased, their advances have been far smaller than of China. The performance

of the Visegrad 4 (V4) countries[2] is also remarkable. Although their share in global GDP is small, it increased by about 30 per cent to 1.3 per cent between 2001 and 2018, largely due to the strong performance of Poland, the largest country in this group, and Hungary.

Table 3
Share in world GDP, 2001–2018
(in per cent, based on current US dollar prices)

Countries	2001	2010	2018
United States	**31.5**	**22.7**	**24.2**
European Union (EU–28)	**26.8**	**25.8**	**22.1**
United Kingdom	4.8	3.7	3.3
Visegrad Countries	1.0	1.4	1.3
Eurozone (EA–19)	**19.6**	**19.2**	**16.1**
Germany	5.8	5.2	4.7
France	4.1	4.0	3.3
Italy	3.5	3.2	2.4
China	**4.0**	**9.2**	**15.8**
Japan	**12.8**	**8.6**	**5.9**
India	**1.5**	**2.6**	**3.2**
Brazil	**1.7**	**3.3**	**2.2**

Source: Calculation based on IMF World Economic Outlook, April 2019

Table 4
Ratios of real GDP per capita in PPP terms compared to the United States, 1980–2018

Countries	1980	1990	2001	2018
China	40.38	24.25	11.52	3.46
India	22.46	20.40	17.36	7.95
Russia	n. a.	1.77	3.08	2.14
Brazil	2.56	3.43	3.98	3.88
Japan	1.40	1.20	1.34	1.42
EU–28	1.37	1.42	1.46	1.45
V4	n. a.	2.95	2.74	1.89

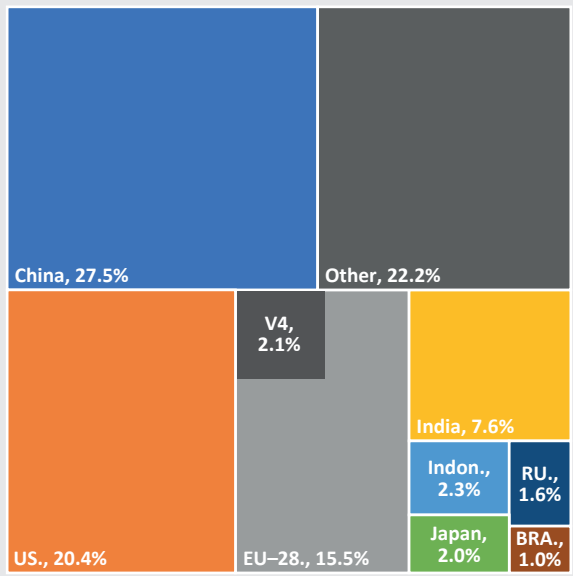
Note: 1995 is the first available data for V4.
Source: Calculation based on IMF World Economic Outlook, April 2019

[2] V4 countries: Czechia, Hungary, Poland, Slovakia.

Figure 1 shows the estimated contribution to global GDP growth in 2018. China is the leader with 27.5 per cent, followed by the United States (20.4 per cent), the European Union (15.5 per cent) and India (7.6 per cent). It is worth noting that, within the European Union, the contribution to global GDP growth of the V4 countries amounts to 2.1 per cent, more than that of Russia (1.6 per cent) or Brazil (1 per cent).

These various GDP figures of the major countries are an indication of their potential influence on the world economy that may possibly encourage these countries' ambition to play a significant role in building a new world order.

Figure 1
Contribution to real global GDP growth, 2018



Notes: V4: Visegrad Countries: Czechia, Hungary, Poland, Slovakia, Indon.: Indonesia, RU: Russia, BRA: Brazil.

Source: World Bank

A country's share in international trade is another benchmark indicator for its influence in the world economy. The US share in world exports declined from 11.9 per cent to 8.7 per cent between 2001 and 2018, while that of China rose from 4.3 per cent to 13 per cent during the same period (*Table 5*). As for imports, during the same period, the share of the United States declined from 18.1 per cent to 13.3 per cent, while that of China rose from 3.9 per cent to 10.9 per cent (*Table 6*). The United States' share in imports is still somewhat higher than China's share, but with regard to exports China has overtaken the United States. The share of the EU–28,

at about 13 per cent, remained essentially unchanged in the field of exports and declined somewhat in imports, falling from 14.7 per cent to slightly more than 13 per cent. By contrast, the share of V4 countries rose both in exports and imports, a significant trend that underscores the competitiveness gains in these countries.

Table 5
Share in world exports, 2001–2018
(in per cent)

Countries	2001	2010	2018
China	4.3	10.5	13.0
European Union (EU–28)	13.0	12.0	12.8
Visegrad Countries	*1.6*	*2.5*	*3.0*
United States	11.9	8.5	8.7
Japan	6.6	5.1	3.8
Russia	1.6	2.6	2.3
India	0.7	1.5	1.7
Brazil	1.0	1.3	1.2

Source: International Trade Center

Table 6
Share in world imports, 2001–2018
(in per cent)

Countries	2001	2010	2018
United States	18.1	12.8	13.3
European Union (EU–28)	14.7	14.3	13.3
Visegrad Countries	*1.9*	*2.6*	*2.9*
China	3.9	9.1	10.9
Japan	5.5	4.5	3.8
India	0.8	2.3	2.6
Russia	0.7	1.5	1.2
Brazil	0.9	1.2	0.9

Source: International Trade Center

Another way of evaluating the relative economic strength of a country is to look at the number of the world's largest companies owned and operated by it (*Table 7*). Among the top Fortune 500 companies, 126 are American and 111 are Chinese. In the four EU countries which make it into the top ten (Germany, France, Great Britain, the Netherlands), there are in total 94 top 500 companies. Here again China stands out as the major challenger to the US, while Europe is falling behind.

Table 7
TOP 500 companies by countries, 2018

Countries	Number of companies	Total Revenues (million USD)
USA	126	8,881,646
China	111	6,765,498
Japan	52	2,900,464
Germany	32	2,019,931
France	28	1,675,121
Great Britain	20	1,133,731
South Korea	16	844,899
Netherlands	14	960,460
Switzerland	14	756,021
Canada	12	425,169

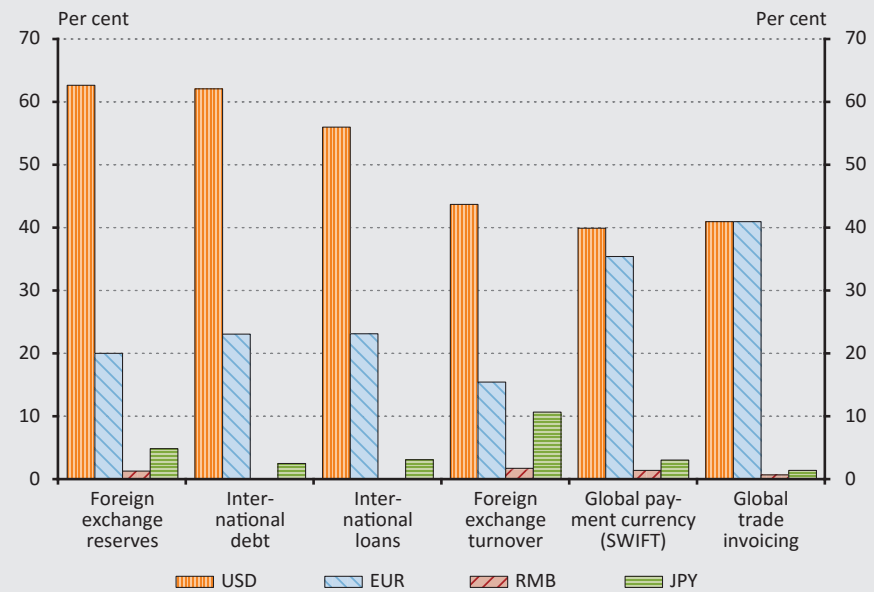
Source: Fortune 500 Companies

As mentioned earlier, widespread use of a country's currency in international financial transactions gives the issuer country clout and influence in international relations. *Figure 2* and *3* show that the US dollar currently dominates the composition of foreign exchange reserves (62 per cent), the international debt market (62 per cent), loan transactions (56 per cent) and foreign exchange turnover (42 per cent). The euro comes in a distant second, except in trade invoicing where its share, at 40 per cent, is the same as that of the US dollar. The goal of the European Commission is to expand the international role of the euro in order to increase the financial autonomy of the monetary union. Currently, via swaps the US dollar serves as the backstop for international banks and the US is the largest supplier of safe assets in the form of US treasury bills and bonds.[3] In order for the euro to play a stronger role in international transactions, the Banking Union would have to be completed, measures aimed at creating a true capital market union would have to be introduced, the ECB would have to accept providing large euro swaps if needed and a European safe asset would have to be created. All of this is easier said than done in the EU context, because it requires a commitment to higher cooperation at the political level – for instance, risk sharing – than is currently contemplated. For the euro to play the same role as the US dollar in the international monetary system, the EU also needs to forge a common foreign policy in matters of global significance, since divergence will weaken confidence in the currency.

[3] *Leonard et al.* (*2019*)

The Chinese renminbi currently has an insignificant weight in international financial transactions. However, China's plan is to progressively increase the international role of its currency by allowing the issuance of renminbi bonds both offshore and onshore (Panda bonds). In 2016, the renminbi was included in the SDR basket with a weight of 10.92 per cent. China foresees a more prominent international role for its currency, but that would require capital market liberalisation and implementing a more transparent system of financial regulation and exchange rate policy. China is cautiously moving in that direction, and hence it can be expected that the renminbi will play an increasingly important role on the international scene, but it is a long way ahead before the renminbi will be able to challenge the US dollar or the euro as a global currency.

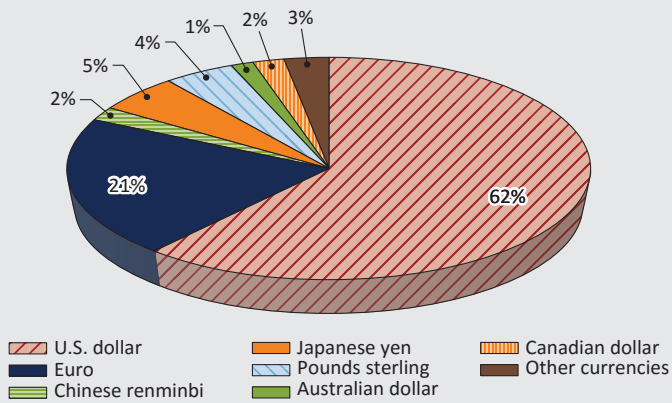
Figure 2
Importance of different currencies in the international monetary system, 2017Q4



Note: Data as at 2017Q4 or latest available.

Source: ECB (https://www.ecb.europa.eu/press/key/date/2019/html/ecb.sp190215~15c89d887b.en.html)

Figure 3
Official foreign exchange reserves by currency, 2018 Q4



Source: IMF

Finally, let us look at defence expenditures. Although the amount of military spending does tell a story about the military strength of a country, it is only an imperfect indicator of true military might. Salaries in the military and the cost of production of the same weaponry can vary greatly from country to country. The true military strength is defined by the type of weaponry and their available numbers, most typically whether a country has nuclear capabilities, a large naval force, military bases around the world, etc. Moreover, given the secrecy generally surrounding military spending, the available numbers might not always show the true extent of defence expenditure. With these reservations in mind, the amount of money spent year after year on the military nevertheless provides a good impression of the ambitions harboured by a country.

As *Table 8* shows, the United States spends by far the most on defence in dollar terms, (USD 706 billion, representing 3.4 per cent of its GDP in 2018), followed by the EU–28 (USD 263 billion, or 1.4 per cent of GDP), China (estimated at USD 250 billion, or 1.9 per cent of GDP), India (USD 66 billion, or 2.4 per cent of GDP) and Russia (estimated at USD 61 billion, or 3.8 per cent of GDP). Except for China, defence expenditures declined in all countries under consideration between 2011 and 2017 and only increased in a few in 2018. In China, the military spending rose by over 80 per cent from 2011 to 2018. China is expanding its naval forces and has started to build up naval bases. Among the countries under review, the United States, Russia, the United Kingdom, France, China and India possess nuclear weapons (outside this group of countries, Israel and Pakistan also have nuclear weapons).

Table 8
Defence expenditures, 2011–2018
(million USD)

Country	2011	2012	2013	2014	2015	2016	2017	2018
United States	740,744	712,947	680,856	653,942	641,253	656,059	685,957	706,063
European Union (EU–28)	260,639	242,432	247,420	249,073	217,216	219,077	230,641	262,991
United Kingdom	*62,852*	*58,016*	*62,258*	*65,658*	*59,492*	*56,964*	*55,344*	*61,508*
France	*53,441*	*50,245*	*52,316*	*51,940*	*43,474*	*44,191*	*46,036*	*52,025*
Germany	*48,140*	*46,470*	*45,931*	*46,102*	*39,813*	*41,590*	*45,580*	*51,009*
Italy	*30,223*	*26,468*	*26,658*	*24,448*	*19,566*	*22,373*	*23,852*	*25,780*
China	137,967	157,390	179,880	200,772	214,093	216,031	227,829	249,997
Russia	70,238	81,469	88,353	84,697	66,419	69,245	66,527	61,388
Japan	60,762	60,012	49,024	46,881	42,106	46,471	45,387	46,618
India	49,634	47,217	47,404	50,914	51,295	56,638	64,559	66,510
Brazil	36,936	33,987	32,875	32,660	24,618	24,225	29,283	27,766

Notes: Data for China are estimates for the entire period and data for Russia are estimates for 2011 and 2012 by the Stockholm International Peace Research Institute (SIPRI). Data for the other countries are from NATO. 2018 data are estimates.

4. Toward a multipolar world order

History has taught us that hegemons tend to emerge time and time again, but they end up being challenged. The decline of a dominant world power and the emergence of a new hegemon has taken generally a long time, often lasting centuries. In today's world of rapid technological changes and increasing global competition, the geopolitical shifts will be significantly faster than in previous centuries.

Looking at today's developments, it seems obvious that the *relative* power of the United States to shape and direct global events is diminishing. The '*Pax Americana*' as we have known it since the Second World War is coming to an end. That does not mean by any means that America will not remain a world leader for decades to come. America has a strong economy based on its leading role in innovation and technology and its capacity to attract talent from all over the world. It possesses vast natural resources and has a determining position in international trade, while the dominance of the US dollar in the international monetary system provides it with benefits that no other country currently enjoys. The country lies between two oceans and has the means and will to remain the strongest military power. Zbigniew Brzezinski adds another dimension to America' strength which he calls "reactive mobilization", defined as social mobilisation in the face of danger that prompts

national unity.[4] Brzezinski cites the "Remember Pearl Harbor" as a slogan that mobilised the country's war effort. A more recent example of this national unity is 9/11, when tens of millions of cars flew a flag, so much so that even a Hungarian company received orders to supply American flags.

America feels that it is destined to lead the world. American exceptionalism is ingrained in the leaders of the United States and is shared by many in the population. It is rooted in its history of fighting for freedom, democracy and equality. It can be best captured by the famous Gettysburg speech of Abraham Lincoln when he proclaimed the "government of the people, by the people, for the people" and it is enshrined in the Bill of Rights. As Robert Kagan writes,[5] even today "presidents and politicians speak of the 'leader of the free world' (Barack Obama), the 'indispensable nation' (Madelaine Albright) upon which the 'world is counting' for 'global leadership' (Hillary Clinton)". However, the "America First" slogan of Donald Trump suggests that America is becoming increasingly reluctant to assume the responsibility of global leadership, even as it is prepared to wield its economic and military power to pursue its own economic interests and security goals. Good examples of the US using its economic power in defence of its perceived interests are the trade war with China, the threat of imposing tariff on imports from the EU to the United States and, as a way of dividing the unity of Europe, the US endorsement of Brexit, coupled with the offer to the UK a fast track to conclude a free trade agreement.

The picture unfolding from the data and the discussion presented in this paper is that China is the best placed to challenge the economic dominance of the United States. Its large population, vast territory, rapid economic growth, strength in innovation and technological developments, and its leading role in international trade all predestine China to be a world leader. Its ambition to be part of shaping the new world order is also clear. While the dominance of the United States in international organisations such as the IMF, the World Bank and the UN is still prevalent, China is member of over 300 international and regional organisations and its weight in these organisations is on the rise. The Belt and Road and 17+1[6] initiatives and the Chinese investments in the United States, Europe, Asia, Africa and South America reveal a strategy on the part of China of expanding its economic ties well beyond the confines of its national borders and reaching out across the globe. A true leader of the world needs a strong army to back up its aspirations and China is building up its military strength even as it stresses that it is for defence purposes and we have no proof to believe otherwise. A challenge that China is facing is the aging of its population as a result of the decades long "one-child only"

[4] *Brzezinski* (*2012*), p. 60.
[5] *Kagan* (*2012*), p. 14.
[6] The 17+1 cooperation is an initiative by China aimed at intensifying and expanding cooperation with Central and Eastern European countries. It comprises 12 EU Member States and 5 Balkan countries.

policy. That policy was changed recently, but it will take many years before this aging can be halted. China has the room and ability to raise productivity that can offset the shrinking of the labour force, but aging is a factor which will be a constraint on growth. This, however, will not prevent China from becoming a world power.

Russia could be another challenger and it certainly wants to play a role in shaping the emerging new order. It has the military might, but its economy is on a relatively weak footing for the time being, relying heavily on the oil and gas industry. That will certainly change over time so that Russia is among the powers that will play a defining role in the new multipolar world order.

The European Union has the size, the economic and innovative strength and the military power to be an important player in world affairs, but the fact that it does not have a common foreign policy and a unified view on such questions as a common defence policy and the macroeconomic role of an EU-wide budget limits its influence. Unfortunately, Brexit drives a wedge between the United Kingdom and the EU, fragmenting European unity. Henry Kissinger has a grim view of Europe when it says that there is "*a continuing weakening of European relevance because of Europe's loss of a sense of global mission*".[7] *Carl Bildt*, the former Prime Minister of Sweden, rightly suggests that the EU "*should establish a political process at the European level that develops the ability to act independently and, at the same time, forges new mechanisms for encouraging unity among member states*".[8] Considering the diverse interests of the Member States, this will require some time. However, Europe can usefully intermediate in helping to solve regional conflicts and can be an initiator of and driving force behind good causes, such as for instance the protection of the environment.

The future of world power politics is technology. "*Data and technological sovereignty, not nuclear warheads, will determine the global distribution of power and wealth in this century*" notes *Joschka Fischer*, former German Foreign Minister.[9] In the realm of the platform economy, such as Microsoft, Apple, Alibaba, etc., artificial intelligence and Big Data, Europe is a distant third behind the US and China. As *György Matolcsy* (*2019*) writes, "*disruptive new technologies tend to redistribute power, economic strength and financial resources globally….the European elites lost the American option for winning together in the new tides of disruptive technologies*" (p. 32). In part this is a consequence of the lack of single market in research and capital finance. To meet the challenges of the future and maintain competitiveness, Europe needs retooling and reskilling. While all individual countries have a responsibility in this process, EU-level government support is indispensable. In the case of China, the determining role of government in

[7] *Henry Kissinger*, Nobel Prize Forum, Oslo, December 11, 2016.
[8] *Fischer* (*2019*).
[9] *Bildt* (*2019*).

innovation is not in doubt. In the US also, the role of the government in supporting innovation has been essential through spending on space exploration and defence. The EU needs to work toward achieving digital sovereignty and this cannot be done without a concerted EU-level policy.

The question is how the multipolar world order will function. Will there be peace or war? Nuclear peace? Or regional wars where the interests of competing hegemons clash? Will there be well defined geographic spheres with the dominance of a specific world power? One could imagine a world order in which China plays a dominant role in Asia, the United States in Latin America, Russia in Eurasia and Europe in Africa. Or will the competing hegemons want to shape events across the globe? These are the questions to be asked and everyone can speculate about the outcome. One thing seems to be sure: the US hegemony over the world will fade as challengers gain power. The influence of China and Russia and later perhaps that of India in shaping the course of world events will increase. Europe will need to be more unified in key policy areas if it wants to defend its interests and keep its rightful place among the world leaders in an increasingly competitive environment. The EU must engage with China while upholding its traditional ties with the US. The Belt and Road initiative and the 17+1 cooperation must not be looked at as a divisive factor between the eastern and western parts of Europe – as some like to present it – but as an opportunity to forge closer ties with China.

All told, there is a need for strong, democratic countries which are world leaders to maintain peace and order in the world. To conclude with Robert Kagan's words: "*There can be no world order without power to preserve it, to shape its norms, uphold its institutions, defend the sinews of its economic system, and keep the peace*".[10] In the future, this will be a shared power between two or three hegemons and it will be their responsibility to maintain the world order Kagan is referring to.

Finally, let us recall that over the centuries, the V4 countries were often caught up in the rivalries among powers trying to extend their dominance in Europe. Today, they are members of the European Union at the east-west and north-south crossroads of trade routes in Europe. They are also valuable members of NATO. It is of vital interest for the V4 countries and the other Central and Eastern European countries to reflect on what geopolitical shifts one can expect in the decades ahead.

[10] *Kagan* (*2012*), p. 139.

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A Breakthrough Idea in Risk Measure Validation – Is the Way Paved for an Effective Expected Shortfall Backtest?*

Gyöngyi Bugár

This research note is a kind of "call for attention" to recent developments in backtesting financial risk measures. This topic is relevant in relation to the regulatory monitoring of the performance of internal risk models used by banks in determining the minimum capital requirements for trading book portfolios. Backtesting is a process for checking the validity of risk estimation models. In his seminal work, Gneiting (*2011*) *has proven that a prominent risk measure, Expected Shortfall* (*ES), lacks a property called elicitability. This finding has triggered a huge controversy on the issue of whether ES is backtestable at all. Due to the significant contribution of Acerbi and Székely* (*2017, 2019*) *among others, the above-mentioned debate can be adequately and convincingly closed because there is a (re)solution. In particular, one can arrive at the conclusion that, building on its joint elicitability with Value-at-Risk* (*VaR*)*, it is possible to introduce a so-called ridge backtest for ES. In fact, there is still an open question as to when and how the regulatory authorities will* (*re*)*act.*

Journal of Economic Literature (JEL) Codes: D81, G21, G28

Keywords: banking regulation, ES, elicitability, backtestability, ridge backtest

1. Introduction

The recently published, new Basel III standards (*BCBS 2016*) provide a revised framework for determining the capital charge for market risk in internal models with a shift from VaR to ES (*Bugár – Ratting 2016*). This is a risk measure for better capturing tail risk which has some more favourable properties such as coherence (see *Artzner et al. 1999*).

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* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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However, as *Gneiting* (*2011*) demonstrated, ES has a serious disadvantage compared to VaR because it is not elicitable. This has led some to conclude that this risk measure is not backtestable at all (see for instance, *Carver 2013*). Others such as *Tasche* (*2014*) and *Acerbi – Székely* (*2014*) were definitely convinced that this is not a real problem. The latter authors emphasised that elicitability has not even been exploited in the backtests of VaR. The lack of elicitability in the case of ES has proven to be a challenge and has exploded into a lively debate in the literature, especially between financial mathematicians and statisticians focused on the question of whether ES is a proper risk measure to substitute VaR in banking regulation. One theoretically prominent applicant for this purpose might be the α-expectile which is both elicitable and coherent (for $\alpha \geq 0.5$).[1] Its practical implementation, however, is excluded because it lacks any economic meaning. Despite ES having established a foothold in Basel III and being used as the proposed, new measure in determining the capital charge for trading book positions, the Basel Committee still supports VaR for backtesting purposes.

In light of the recent developments in backtesting methodology, there is an urgent need to revise the current system. The present work attempts to highlight the ideas and results that serve as a basis for this far-reaching conclusion.

2. Value-at-Risk versus Expected Shortfall

According to *McNeil et al.* (*2015*), the most modern approach in quantitative risk management is to identify the risk of a portfolio as a statistical quantity describing the return (loss) distribution of the portfolio over some predetermined time horizon. Examples include the variance proposed by *Markowitz* (*1952*), VaR as well as ES, the latter ones are the two measures adopted by banking regulation.

VaR is a quantile-based risk measure (*Dowd–Blake 2006*), i.e. the negative α-quantile of the return (X) distribution at a given significance level α

$$VaR_\alpha(X) = -q_\alpha(X) \tag{1}$$

It follows from eq. (1)

$$VaR_\alpha(X) = -F^{\leftarrow}(\alpha), \qquad 0 < \alpha < 1 \tag{2}$$

[1] See e.g. *Ziegel* (*2016*) for a proof.

$F^{\leftarrow}(\alpha)$ above is the generalised inverse of the distribution function $F(x)$ for the random variable X (see *Embrechts et al. 1999*), i.e.

$$F^{\leftarrow}(\alpha) = inf\left\{x \in \mathbb{R} \middle| F(x) \geq \alpha\right\}, \tag{3}$$

where *inf*{.} refers to the infimum, namely the greatest lower bound of the set indicated in brackets.[2]

The VaR methodology has been adopted in the form of the so-called standard model for regulation in the banking sector since 1993 with the purpose of assessing regulatory capital in order to cover market risk-related losses. The dynamic progress of the financial sector coupled with high-speed product innovations raises more and more problems and challenges for regulators to cope with. Among other things, the subprime crisis and its escalation into a global financial crisis underlined the disadvantages of VaR as a risk metric. During that period of financial turbulence, banks' losses far exceeded the regulatory capital requirements "calibrated" using VaR.

The unreliability of VaR as a risk measure has been strongly articulated by researchers as well as risk experts since the start of 2000s. A number of studies were published highlighting the "weaknesses" of VaR. Furthermore, in 2002 the Journal of Banking and Finance devoted a special issue to the problems in risk measurement theory and their applications in risk management. *Szegö* (2002) even used the provocative title "No more VaR (this is not a typo)" for an editorial note. However, the "distress signals" by representatives of risk measurement theory were not taken seriously by regulators in the banking sector until the outbreak of the subprime crisis in 2007.

The risk measure also known as Conditional Value-at-Risk (CVaR) and Tail-VaR was eventually adopted as Expected Shortfall (ES) in the Basel regulation.[3] At a given significance level α (over some predetermined time horizon) ES is a conditional expectation, namely the expected value of loss (negative return) exceeding VaR. According to *Acerbi – Tasche* (*2002*), it can be formulated as follows.

$$ES_{\alpha}(X) = VaR_{\alpha}(X) + \frac{1}{\alpha}E(X + VaR_{\alpha})_{-}{}^{4} \tag{4}$$

[2] If the α-quantile is single-valued then VaR_{α} can be determined as the negative inverse of the distribution function at α, namely $VaR_{\alpha}(X) = -F^{-1}(\alpha)$.
[3] For details see *BCBS* (*2016*) and *Bugár – Ratting* (*2016*)
[4] The meaning of $(\alpha)_{-} = -min(\alpha,0)$. It is called the negative part of α.

For continuous return distributions, eq. (4) takes the form as below.

$$ES_{\alpha}(X) = \frac{1}{\alpha}\int_{0}^{\alpha} VaR_{p}(X)dp \tag{5}$$

ES has very attractive theoretical and empirical properties compared to VaR. It accounts for losses beyond VaR, which is especially important in case of fat-tail distributions. It is also a coherent measure of risk complying with the coherence-axioms proposed by *Artzner et al.* (*1999*). By contrast, VaR is not coherent because it lacks subadditivity. Therefore, it can occur that the risk of a portfolio measured by VaR can be higher than the sum of the risk of its components. Furthermore, ES has two favourable technical properties. It is continuous with respect to the confidence level and convex with respect to the control variables, the latter being relevant in portfolio optimisation. In order to optimise within the mean-ES framework, as shown by *Rockafellar – Uryasev* (*2000*),[5] one must solve a simple linear programming problem. This makes ES very appealing in asset allocation.

Besides the lack of elicitability, there are other deficiencies with ES. Among these, as shown by *Csóka et al.* (*2007*), it is worth mentioning that in evaluating the risk of a portfolio from the perspective of general equilibrium theory, spectral risk measures (the generalisations of ES) do not take into account the relation of the examined portfolio to the market portfolio. As a consequence, the application of ES as a risk measure can lead to under- or overestimation of portfolio risk.

3. Model validation

In general, the term model validation refers to the process of verifying whether a model provides reliable predictions. In the risk industry and financial regulation, the method of model validation is referred to as backtesting. As expressed by *Acerbi – Székely* (*2017*), backtesting is a "reality check for its [i.e. the model's] output". In other words, it is a technique which is used to evaluate the accuracy of the forecasting method by comparing ex-ante predictions of some statistic to ex-post realisations of the random variable it refers to. The challenge is that neither the real value of the statistic nor its distribution can be revealed. The only thing which can be found out ex-post is just the realised value which can be regarded as a single random draw (an element of a sample).

[5] They used the name CVaR for ES.

In particular, in risk measurement theory the statistic considered is a point estimator of a risk measure, for example that of VaR or ES given by eq. (2) and (4), respectively. Return (X) is the corresponding random variable and $F(x)$ denotes the unknown distribution function of X. By relying on a particular model, namely on a certain method or algorithm, with which the risk measure applied is estimated, our task is to evaluate the predictive performance based on a time series (sample) of realised returns (x_t) and compare them to the risk measure predictions (y_t). The latter means the estimated value of the relevant risk measure given at time $t - 1$ for time point t. This process generates another challenge, especially in the case of ES backtests. As the real value of ES cannot be observed, risk measure predictions must be tested against return outcomes. This can be referred to as "apples-with-oranges" comparison (see *Acerbi – Székely 2019*).

There are two important types of model validation. In the case of absolute validation, the predictive performance of a given predetermined model is evaluated. This is the traditional approach aimed at backtesting a single internal model by financial regulators. For that purpose, the corresponding methodology is hypothesis testing.

The other type of model validation is relative validation or model selection as termed by *Acerbi – Székely* (*2014*). This is relevant when the aim is to rank different models based on their forecasting ability. In such a situation, the property called elicitability can prove to be very beneficial.

4. Elicitability and backtestability

4.1. The relevance of elicitability in backtesting

Elicitable statistics possess the property that they minimise the expected value of a scoring function. The role of the scoring function is to quantify the discrepancy between the forecasted and realised value from the distribution. The scoring function must be strictly consistent, which means that the scoring function has a finite mean and its expected value has a unique minimum. A formal definition of elicitability can be given as follows (see *McNeil et al*. *2015*).

Let $R{:}X \rightarrow R(X)$ be a risk measure defined on the distribution function $F(x)$ of the random return X. The risk measure R can also be interpreted as a statistic T (or a statistical functional) defined on F, so that $T{:}F \rightarrow T(F)$. The relationship above can be expressed as $R(X) = T(F)$.

A statistic T of a risk measure is elicitable if there exists a strictly consistent scoring function $S:\mathbb{R}\times\mathbb{R}\to[0,\infty)$ such that for any random return X with finite mean

$$T(F)=argmin_{y\in\mathbb{R}}E\big(S(y,x)\big) \tag{6}$$

where $E(.)$ denotes expected value. Please, note that the values of the scoring function must be non-negative.[6]

As is well-known in forecasting theory, the mean is elicitable, and the appropriate scoring function is $S(y,x) = (y - x)^2$. It can be shown that VaR is elicitable for strictly increasing distribution functions.[7] ES, however, as *Gneiting* (*2011*) has pointed out is not elicitable. It is worth mentioning that *Bellini – Bignozzi* (*2015*) have shown the same from a standpoint of financial risk measurement theory by characterising all the elicitable risk measures. Variance, which was introduced by *Markowitz* (*1952*) as a risk measure, is also not elicitable (*Lambert et al. 2008*). The above mentioned examples are summarised in *Table 1*. In the case of elicitable statistics, the relevant (canonical) scoring function is also given.

Table 1
Examples of elicitable and non-elicitable statistics

Statistic	Elicitable?	Scoring function
Mean	Yes	$(y - x)^2$
Variance	No	Does not exist
VaR_α	Yes	$(1 - \alpha)(y - x)_{\{x < y\}} + \alpha(y - x)_{\{x \geq y\}}$ *
ES_α	No	Does not exist

*Note: * This can also be expressed with absolute value:* $|1_{\{x \leq y\}} - \alpha\ |\,|y - x|$.
Source: Author's work based on Acerbi – Székely (2017)

The lack of elicitability in the case of ES has proven to be a challenge leading to some flawed conclusions. In the meantime, it has been confirmed that this property is only relevant in relative model validation (see e.g. *Davis 2014*, *Acerbi – Székely 2014*, *Fissler et al. 2015*). Therefore, one can draw the conclusion that this property has nothing to do with absolute model validation.

The importance of elicitability in backtesting stems from the fact that it makes possible to evaluate predictions (y_t) given by different risk estimation models relying only on the realisations of the random variable, namely a sequence of realised

[6] For further reference on the properties of scoring functions and elicitable risk measures, see *Bugár* (*2019*).
[7] See e. g. *McNeil et al.* (*2015*) for a proof.

returns (x_t). Indeed, if a risk measure is elicitable, the competing models can be ranked by computing the mean score over a certain period of time (T).

$$\overline{s} = \frac{1}{T}\sum_{t=1}^{T} S(y_t, x_t) \tag{7}$$

The competing models can be ranked based on the concept that a smaller mean score indicates a better forecasting model.

While backtesting has long been a practice in the financial industry and regulation, according to the best of our knowledge, its formal definition was only recently given in a valuable contribution by *Acerbi – Székely* (*2017*).

4.2. Defining backtestability

A statistic T of a risk measure is backtestable if there exists a backtest function $Z : \mathbb{R} \times \mathbb{R} \to \mathbb{R}$ such that for any random return X with finite mean

$$E\big(Z(y,x)\big) = 0 \text{ if and only if } y = T(F) \tag{8}$$

A further requirement is that the backtest function Z above must be strictly increasing in the prediction y, that is

$$E\big(Z(y_1,X)\big) < E\big(Z(y_2,X)\big) \quad \text{if} \quad y_1 < y_2 \tag{9}$$

It is remarkable that becktestability is defined with the intention of being capable of differentiating over- and underestimation. Indeed, positive values in eq. (8) indicate overestimation, while negative ones underestimation, respectively. The scoring functions do not possess such a directional property. It is also obvious that worse predictions are located farther away from zero.

Acerbi – Székely (2017) pointed out that becktestability implies elicitability with y-convex scoring function which can be determined as follows.

$$S(y,x) = \int^{y} Z(t,x)dt \tag{10}$$

given that the integral above exists.

One real challenge, however, is that the elicitability of a risk measure proved to be a necessary condition of backtestability. This means that a non-elicitable statistic cannot be backtestable. As a special case, it follows that ES is not backtestable. At this point, the adversaries of ES might relax, but this is not the end of the story…

On the other side, elicitability with a strictly *y*-convex and smooth scoring function (i.e. continuously differentiable with respect to *y*) implies backtestability. In this case, the backtest function can be identified as

$$Z(y,x)=\partial_y S(y,x) \tag{11}$$

Based on this there is a straightforward conclusion that VaR is backtestable (given that it may impose certain restrictions on the return distribution[8]). *Table 2* shows some examples of backtestable and non-backtestable statistics, and for the former ones the relevant backtest function is also given.

Table 2
Examples of backtestable and non-backtestable statistics

Statistic	Backtestable?	Backtest function
Mean	Yes	y – x
Variance	No	Does not exist
VaR_α	Yes	$(1-\alpha)_{\{x<y\}} - \alpha_{\{x>y\}} + c_{\{x=y\}}$*
ES_α	No	Does not exist

*Note: * The constant c above must be in the interval [–α,1 – α]. For details see Acerbi – Székely (2017), p. 10.*

Source: Author's work based on Acerbi – Székely (2017)

In analogy with the methodology of how elicitability can be exploited in model selection (relative model validation), one can apply the realised backtest function for ranking competing models by calculating the mean backtest value over a period *T* based on a sequence of risk measure predictions (y_t) as well as realised returns (x_t)

$$\overline{z}=\frac{1}{T}\sum_{t=1}^{T} Z(y_t,x_t) \tag{12}$$

Unlike the test formulated by eq. (7), the test above is directional, so with a positive (negative) value it is able to detect the tendency for over-(under)estimation. It is also important to emphasise that similarly to the test given by eq. (7), it also cannot be used for absolute model validation. In this case, a backtesting procedure must be hypothesis testing, as mentioned earlier. In fact, the proper backtesting procedure for absolute model validation is proposed and described by *Acerbi – Székely* (*2017*).

[8] See *Acerbi – Székely* (*2017*) for details.

4.3. Sharpness of a backtest

According to the definition given by *Acerbi – Székely* (*2017*), a backtestable statistic $T(F)$ admits a sharp backtest if the expected value of the backtest function depends only on the predicted (y) and the true value of the statistic [$T(F)$]

$$E\left[Z(y,X)\right]=\phi\left(y,T(F)\right) \tag{13}$$

where ϕ is strictly increasing in y and strictly decreasing in $T(F)$.

As shown in *Table 2*, the backtest function of the mean is: $Z(y,x) = y - x$. Let m denote the prediction value and μ be the real value of the mean. Then $E[Z(y,X)] = m - E(X) = m - \mu$, which proves that the backtest of the mean is sharp. VaR, by contrast, does not admit a sharp backtest.[9]

The existence of a sharp backtest is of key importance because it results in predicting the real (true) value of the given statistic. Furthermore, a sharp backtest can be regarded as a direct measure of *prediction discrepancy* as it indicates the difference between the predicted and real value.

5. Ridge backtesting as the solution to the debate

5.1. Formal definition of a ridge backtest

The concept of ridge backtesting was introduced by *Acerbi – Székely* (*2017*). It builds on a concept of higher order or joint elicitability (see *Acerbi – Székely 2014*, *Fissler et al. 2015* and *Fissler – Ziegel 2016*).

The formal definition (see *Acerbi – Székely 2017*) can be given as follows. A statistic T_2 admits a ridge backtest

$$Z(y_2,y_1,x)=h(y_2)-vS(y_1,x) \tag{14}$$

if it can be expressed (up to a strictly monotonic function $g:\mathbb{R}\to\mathbb{R}$) as the minimum of the expected scoring function S of an elicitable auxiliary statistic T_1 such that

$$\begin{aligned} T_2(F)&=g\left(min_{y\in\mathbb{R}}E\left(S(y,X)\right)\right)\\ T_1(F)&=argmin_{y\in\mathbb{R}}E\left(S(y,X)\right)\end{aligned} \tag{15}$$

In (14), $v\in\{\pm1\}$ is the sign of g' (the derivative of g) and $h(x)\equiv vg^{-1}(y)$.

[9] See *Acerbi – Székely* (*2019*) for details.

As can be seen from (14) in the case of a ridge backtest the prediction of an auxiliary elicitable variable is involved in the backtesting procedure of the intended (in itself non-backtestable) statistic. The latter coincides the attained minimum of the expected value of the former one's scoring function.

5.2. Ridge backtest for the variance

As mentioned earlier, the variance does not comply with the requirements of a backtestable statistic, because it is not elicitable. However, there is a possibility to develop a ridge backtest utilising that the variance can be expressed as the minimum of the expected value of the mean's scoring function. Indeed, in line with (15)

$$\begin{aligned} V &= min_{m\in\mathbb{R}} E\left[(X-m)^2\right] \\ \mu &= argmin_{m\in\mathbb{R}} E\left[(X-m)^2\right] \end{aligned} \tag{16}$$

It follows that the backtest function of the variance can be written as

$$Z(v,m,x) = v-(x-m)^2 \tag{17}$$

V and μ above denote the real values of the variance and the mean, while v and m stand for the predicted values, respectively.

The backtest of the variance is sharp up to a quadratic bias $B(m) = (m-\mu)^2$ which indicates its sensitivity to the accuracy in the prediction of the mean (see *Acerbi – Székely 2019*).

5.3. Ridge backtest for ES

Based on the representation given by *Rockafellar – Uryasev* (*2002*)

$$\begin{aligned} ES_\alpha &= min_{v\in\mathbb{R}} E\left[v+\frac{1}{\alpha}(X+v)_-\right] \\ VaR_\alpha &= argmin_{v\in\mathbb{R}} E\left[v+\frac{1}{\alpha}(X+v)_-\right] \end{aligned} \tag{18}$$

Acerbi – Székely (*2019*) have shown that ES admits a ridge backtest with the corresponding backtest function as follows:

$$Z(e,v,x) = e-v-\frac{1}{\alpha}(x+v)_- \tag{19}$$

where α is the given significance level, e and v denote the predicted values of ES and VaR, respectively. The test above can be applied both for model selection and absolute model validation.

The expected value of the backtest function can be expressed as

$$E\left[Z(e,v,x)\right]=e-ES_{\alpha}-B(v) \tag{20}$$

It can be seen from eq. (20) that the ES backtest above is sharp up to the bias

$$B(v)=E\left[v+\frac{1}{\alpha}(X+v)_{-}\right]-ES_{\alpha}\geq 0 \tag{21}$$

which is positive for any v, and zero if the prediction of VaR is exact, i.e. $v = VaR_{\alpha}$. *Acerbi – Székely* (*2019*) demonstrate that for continuous return distributions the bias can be approximated as the quadratic function of the discrepancy in VaR prediction[10]

$$B(v)\approx\frac{f(-VaR_{\alpha})}{2\alpha}(v-VaR_{\alpha})^{2} \tag{22}$$

where f denotes the density function of the return distribution. The bias is tiny if the difference is small between the predicted and real value of VaR. It is also remarkable that $B(v)$ has a prudential effect[11] in a sense that non-accurate VaR prediction (a bad VaR estimate) increases the discrepancy between the predicted and real value of ES (see eq. (20)).

In order to illustrate the relative size of the bias given in (22), we considered four distributions: the standard normal and Student's t for three different degrees of freedom.[12] Based on the calculations shown in *Table 3*, the relative size of the bias, i.e. $B(v)/|ES|$ as the function of the (relative) error in the VaR prediction $(v – VaR)/v$) is shown in *Figure 1*. In calculating VaR and ES, as a significance level, α = 2.5 per cent has been applied. It is worth mentioning that a negative error in VaR prediction indicates underestimation, while a positive one detects overestimation.

It can be seen in the figure that the graphs are asymmetric, indicating that the relative size of the bias is more sensitive to VaR overestimation than it is to underestimation. Within a wide range of error in the VaR prediction, however, the relative size of the bias can be kept small. Indeed, between –30 per cent and 20 per cent VaR-prediction error, in all cases (except the normal distribution[13]) the relative size of the bias proves to be under 10 per cent.

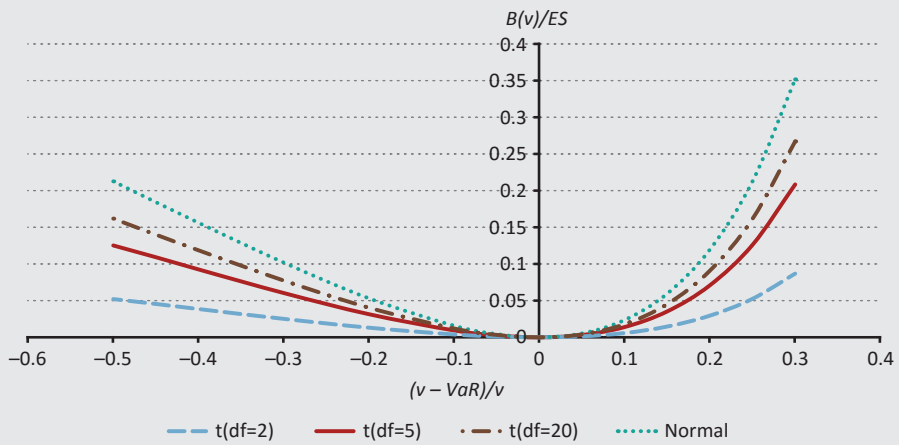
[10] See *Acerbi – Székely* (*2017*, *2019*)
[11] It is due to the non-negativity of the bias.
[12] Please note that the former can be generated from the latter for the degree of freedom converging to infinity.
[13] Even in this case it is only slightly higher than 10 per cent for VaR underestimation and around 12 per cent for its overestimation.

Table 3
VaR, ES and the multiplier of the quadratic discrepancy for the standard normal and different Student's t distributions
(α = 2.5 per cent)

Distribution	VaR_α	ES_α *	Multiplier **
Student's t *(df = 2)*	–4.30	–8.40	0.22
Student's t *(df = 5)*	–2.57	–3.52	0.61
Student's t *(df = 20)*	–2.09	–2.97	1.00
Standard normal	–1.96	–2.34	1.17

*Note: * ES for t-distributions has been calculated based on the formula given by Zhang (2016). ** The multiplier is the term in (22) that is equal to f(–VaR)/2α.*

Figure 1
Relative size of the bias as a function of VaR prediction error for four different distributions
(α = 2.5 per cent)



Source: Author's own calculations based on Acerbi – Székely (2019)

It might be surprising at first glance that the bias proves to be stronger for distributions with thinner tails. This can be regarded as an additional "clever feature" of the proposed backtest and can be explained as a penalty for applying a model with a wrongly specified tail shape (see *Acerbi – Székely* (*2019*)).

The novelty of the most recent contribution of *Acerbi – Székely* (*2019*) is the introduction of the term "realised ES". It can be formulated as

$$\widehat{ES}_\alpha = \frac{1}{T}\sum_{t=1}^{T} v_t + \frac{1}{\alpha}\left(x_t + v_t\right)_- \tag{23}$$

The possibility of its meaningful definition is due to the fact that the ES backtest is sharp. Indeed, the average z-score (the realised value of $E[Z(e,v,X)]$ given by eq. (20)) can be written as the difference between the average predicted and realised value of ES

$$\overline{z}_{ES_\alpha}(e_t, v_t, x_t) = \frac{1}{T}\sum_{t=1}^{T} e_t - \frac{1}{T}\sum_{t=1}^{T} v_t - \frac{1}{\alpha}(x_t + v_t)_- \tag{24}$$

The significance of this finding is that it makes it possible to compare the predicted (ex-ante) and realised (ex-post) value of ES, and eventually – in the wording of *Acerbi – Székely* (*2019*) – to perform "apples-with-apples comparisons".

6. Summary and conclusions

This note attempts to draw attention to the existence of an effective backtesting methodology for ES. This risk measure has recently been adopted in the Basel regulation for determining the capital charge for trading book positions in internal models. While it can be regarded as a progress from the side of academics and financial experts, the adoption of ES seems to be contradictory in the sense that VaR has been kept for model-backtesting.

The non-elicitability of ES proved to be a big challenge. Furthermore, the formal definition of becktestability and revealing its connection to elicitability involves another challenge. In a recent breakthrough paper, it was pointed out by *Acerbi – Székely* (*2017*) that ES, the risk measure which already has a foothold in banking regulation, is not backtestable. In the same paper, however, the authors have shown the possibility for ES to admit a so-called ridge backtest which requires the prediction of VaR, which is elicitable, to be involved. It is built on the idea that ES is jointly elicitable with VaR shown by Fissler – *Ziegel* (2016). One appealing property of a ridge backtest is that it has limited sensitivity to the prediction of VaR and the direction of the bias is known. Furthermore, building on the concept of a sharp backtest, in the most recent contribution *Acerbi – Székely* (*2019*) have shown the possibility of introducing the notion of "realised ES" which can serve as an ex-post measure of tail risk.

These significant results pave the way for effective backtests of ES. Therefore, the methodology is ready to be applied and awaits the (re)actions of financial regulators. Promising progress in this respect is that the backtest of ES developed by Acerbi and Székely is currently under scrutiny by the risk team of the Bank of Italy, as it is being implemented to the central bank's own portfolio. The feedback seems to be very positive so far (*Cesa 2019*). The initial recognition of the method

and growing interest in the results are also indicated by a recent podcast where Acerbi was interviewed[14] on their proposed new methodology developed together with Székely.

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[14] The interview was conducted by Cesa and Osborn and is available at https://www.risk.net/risk-management/6950496/podcast-acerbi-on-backtesting-es-and-frtbs-patchwork-rules (see under the reference of *Cesa – Osborn* (*2019*)).

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America's Post-Obama Foreign Policy Dilemmas*

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The book aims at outlining a "*grand strategy*" (a comprehensive interpretation of the global situation and global events by arranging apparently conflicting efforts into a single system) that explains the steps and efforts in the USA's foreign politics. Brand thinks that the USA did not change its foreign policy radically after the Cold War. It would be wrong to say that this foreign policy has not been efficient and that it was especially harmful to the world. It is not true that the USA missed the opportunity offered by the collapse of the Soviet Union. It is also not true that the US-dominated world order has ended and there is no alternative to accepting the changed status quo and to integrating among the other nations. On the contrary, the author argued that the USA did not change its Cold War methods – the trade deals, military interventions, supporting local opponents to aggressive authoritarian regimes, economic liberalism and promoting human rights. Although certain foreign policy moves deserve criticism (e.g. military interventions in Iraq, Somalia and Libya); the goal of creating a stable and gradually expanding alliance system has been accomplished. It is not a true statement that the USA has lost its leading position, but its advantages are indeed decreasing. In 1994, the USA produced 25 per cent of global GDP (the 2015 figure was 22.4 per cent) and accounted for 40 per cent of total global military spending (the 2015 figure was 33.8 per cent). In 1994, China produced 3.3 per cent of global GDP (the 2015 figure was 11.8 per cent) and accounted for 2.2 per cent of the total global military spending (the 2015 figure was 12.2 per cent). Encouraged by the narrowing power gap, authoritarian regimes aim at changing the status quo.

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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Brand thinks that maintaining the US-led global order depends on a few fundamental principles: Well-functioning systems should not be changed radically; it is enough to tackle current challenges only. The USA must see that the primary key to its global influence is its military supremacy. To maintain it, it needs to increase its military spending to 4 per cent of its GDP. A more efficient exploitation of the existing alliance system is also crucial. Dividing up military tasks and encouraging specialisation could lead to a more cost-effective protection for the US-led alliance which might require new allies (e.g. Brazil, Vietnam, India, United Arab Emirates) even to the detriment of old ones. Military force must be used in a disciplined way only. The USA continues to promote economic and political freedoms in the world and should rely on military interventions in the current circumstances as well, but it is imperative that it should not engage in protracted, endless wars. Finally, the public also must take seriously the fundamental principles that have made the USA successful. The political elite must make the basics of the strategy that has been successful for 25 years desirable.

Offshore balancing used to be a topic of academic discourse; since 2012, however, analysts have seen it assume an important role in Washington's decision making. The USA would do best if it did not rely on military means to enforce its global influence (its key regions are Europe, East Asia, Persian Gulf), but returned to the continent. Foreign policy experts agree that major influence in any key region by the adversaries must be prevented. Globalists wish to primarily deploy military force, while advocates of *offshore balancing* think that supporting other nations would be more expedient, which would not be isolationism, but say that ideological interventions (e.g. humanitarian aids) should be abandoned unless something puts the status quo at grave risk. This strategy would cost between 100 and 200 billion US dollars less but would still not push the US budget into the black. Brand thinks that this strategy's security benefits are overrated in terms of combatting terrorism and the nuclear arms race. He thinks that key regions could fall under the influence of adversaries if allied small states do not feel the proximity of the US military and are strong enough to resist if they are attacked. An aggressive power could, therefore, put the nations in key regions under pressure without direct aggression as well.

Obama upheld the consensus in many aspects and the USA's military spending was still three times as much as that of the country ranked second to it. Obama also promoted liberal values all over the world. His military actions were narrower and more precise and he wanted to correct Bush's mistake (overexpansion in Iraq) and shifted the focus to East Asia. The author thinks that Obama's approach relied primarily on diplomacy, which sometimes discouraged allies, for example when the promised retaliation for Assad's chemical attacks did not take place. Overall, less loss of human life and less use of resources (e.g. by eliminating al-Qaeda leaders with drone strikes) still led to good results. His Afghanistan campaign was, however,

unsuccessful. The war became costly and failed in the long run. Obama did not assess Russia's militancy correctly, he did not move to hold Russia back in time and could not stop Russian attacks (including in Ukraine). NATO does not spend enough on the protection of its eastern borders; it is, therefore, not protected from Russian attacks. After the shift in the balance of power, Obama strengthened diplomatic relations in East Asia and funded military development projects.

Brand thinks that Trump's election means that American voters are no longer satisfied with the decades-long consensus, i.e. that America should also intervene in other countries' affairs, promote multilateral agreements, advocate the values of democracy and freedom and make free-trade deals. Trump's election success was supported by a steep increase in social disparities, the stagnation of (lower) middle-class wages, and dissatisfaction with global free trade. Trump could also choose isolation from the world and building an "American fortress". This would, however, be positive in the short run only (obligations under international relations and military spending would decline, the forced return of illegal immigrants would increase blue-collar wages, and industries impacted by free trade would become strong again). Brand thinks, however, that this strategy's results would be the opposite in the long run.

The other path would be building a USA that places more emphasis on its international interests, but in the existing international setting. This would mean a stronger assertation of the USA's interests, acting against countries that misuse free trade and break its rules and expecting more from allies for the protection given to them. This would also mean higher military spending, engaging in minor military interventions, although stronger assertion could entail more aggression which could alienate allies. Trump's campaign speeches and the early measures of his presidency imply that he identifies himself rather with the American fortress idea, but Brand thinks that international relations are deeply embedded, the Congress is determined and public opinion also leans towards upholding and developing the current global status quo.

After the Cold War, the USA did not have any military opponents. Brand thinks that nowadays, however, Russia and China are aggressive in the field of armaments, and the spread of various military technologies could turn North Korea or Iran into real threats. The USA's military supremacy is not obvious anymore. The US Army set the so-called 1.7 goal in 2012 (it can support a war with full force while being capable of imposing burdens that are unbearable in the long run on the enemy on other fronts) but it is not enough. Cost-cuts would be accompanied by aggressive major and medium-sized powers filling the power vacuum, which might gravely threaten the liberal world order and national interests.

The desirable option is that the USA spends again as much on military developments as it is necessary to leave its primacy unquestioned. This would be an economic and political burden, but only this could guarantee a relatively peaceful and free development of the world. Brand thinks that Trump regards global politics and trade relations as a zero-sum game. But the author thinks that his presidency will not lead to the American fortress policy and that the USA will spend more on keeping its military leadership, will be able to strengthen its global influence and will continue to promote the values of freedom and free trade in the world.

Brand's approach is an interesting one. He first outlines an ideal type (offshore balancing, America fortress, international nationalism), then shows how the actors moved in the light of them. He demonstrates that offshore balancing is not much cheaper and does not ensure much more security. The American fortress policy is based on economic nationalism and withdrawals from military alliances, which would not help to uphold the USA's hegemony. Brand thinks that post-Obama presidents should move towards international nationalism. He more or less protects Obama, who made mistakes but did not embrace offshore balancing, while Trump fights against America's tradition of internationalism, undermines America's soft power and it is unclear whether he would upgrade the army to the level necessary. Brand is not pro-Trump, he condemns him for withdrawing from the Pacific Trade Agreement and the Paris Climate Agreement and the Iran Nuclear Deal. He is also angry for Trump's uncourtly style and thinks that his presidency has its risks.

Brand's book not only describes and assesses Obama's and Trump's foreign policy efforts, it also tells what he thinks would be right. He is not alone. Wess Mitchell (who later became Trump's Assistant Secretary of State for European and Eurasian Affairs) and his co-author wrote a study[1] during Obama's second term. In their study they wrote that the USA is doing the right thing if it maintains intense relations with countries surrounding the three countries they consider dangerous (Russia, China and Iran)—from the Baltics to the Balkans, Saudi-Arabia, Thailand, Vietnam and Japan. These "border-control countries" are key partners. Their trust in the USA must be upheld, and the surrounded dangerous countries will test them (annexing Crimea, making artificial islands near China, setting up terrorist groups and funding them in the Middle East). The USA must give all support to global border-control states, no matter what they do (e.g. a military coup or grave violations of democratic rules or deteriorate the rule of law), because those are their own affairs.

[1] Grygiel, J.J. – Mitchell, A.W.: *Nyugtalan határvidék (The Unquiet Frontier)*. Publishing House of the Antall József Knowledge Centre, 2017.

Summing it up, Brand has written a great book. He not only shows what Obama and Trump have done, but also explains what they could have done. He also praises them if he thinks that they avoided the worst scenario. He has his own ideas about what Trump should do (should have done) while he has an agenda (perhaps one from Wess Mitchell) different from what Brand thinks good. The reader might think that Brand is a bit out of pace and does not deal with what is ahead of us now, i.e. geopolitical answers to the challenges of the post-globalisation robotic age, but with what we have left behind.

Long-Term Sustainable Econo-Mix*

Ferenc Tóth

Barnabás Virág (editor):
Long-term sustainable econo-mix
Magyar Nemzeti Bank, Budapest, p. 490
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The latest publication of the book series of the Magyar Nemzeti Bank was presented at the Pre-Forum Session of the Eurasia Forum held in Budapest. This year, the book – edited by Barnabás Virág – entitled "Long-term sustainable econo-mix", was published, which examines the issues of sustainable, long-term economic growth and development. The purpose of the book, containing novel ideas, is to walk the Reader through the topics that most strongly determine our future in the pivotal times of our age. The book also aims to contribute to the renewal of economic thinking, which commenced after the crisis of 2008/2009, but is proceeding slowly for the time being.

The present economic prosperity comes at an increasingly high price, which calls for an overhaul of our thinking related to the economy. The book intends to highlight the fact that we are in the 24th hour, and thus it is high time to think differently about the functioning of our economies. The global economy experienced enormous development after World War Two. Hundreds of millions people emerged from extreme poverty and became part of the global middle class. However, the price of this development is that the Earth is no longer capable of absorbing the environmental burdens of the global economy. Everyone feels the drastic changes in the biosphere and the climate also in their own environment, while economic development takes place in conjunction with unprecedented debt and massive wealth inequalities. Growth in its previous form can no longer be maintained, not only in the long run, but in the short run either.

Meanwhile the digital revolution has commenced. According to some opinions, this may result in changes to our life in the next one hundred years that were experienced over the entire history of mankind to date. In order to ensure that

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– under these circumstances – the world develops on a path that is sustainable in ecological, social and financial terms as well, we must think fundamentally differently than in past centuries. In this renewal process it became unavoidable to reform economics as well, which – in its capacity as a science dealing with the functioning of economies – must play a central role.

The book also mentions a few specific examples of this problem. One of the core theses of the economic courses is that economic output is created, under the use of proper raw materials, as a result of some sort of optimal interaction of human and physical capital. It is mentioned only as a side note that this production process has unfavourable effects on the natural environment (known as negative externalities). By contrast, in real life we see that these side-effects may ruin the whole world, burying under itself everything we have referred to until now as Planet Earth or the global economy. The very first lectures should start by stating that natural capital is one of the main pillars of the functioning of the economy, and that the preservation and development of this capital is as important as everything that is learned about human and physical capital.

The mystification of GDP, as the number one economic indicator, is a similar problem. Starting from the economic policy classes through the statements of politicians to financial analyses, the realisation of as high GDP growth as possible appears as an objective overshadowing everything else. Meanwhile, GDP – as a statistical indicator – provides no information whatsoever on the changes in the financing processes underlying the functioning of the economy, the change in social inequalities or on the effects exerted on the natural environment. The world uses, as the most important target variable, an indicator that is not really suitable for surveying and assessing long-term sustainability and the welfare of a country.

According to the authors of the book, in the future we will face at least five large, global sustainability challenges. These include the unsustainable ecological consequences of our economic and social life, the demographic transformation, the impact of the extremely fast technological progress, geopolitical challenges and the process of the digitalisation of currencies.

The first key challenge, i.e. the exhaustion of the natural assets and overpopulation, leads to problems that question the *sustainability* of earlier *growth models and scenarios.* Management of these problems calls for urgent changes in a number of areas from the organisation of the economy through financial investments and tax regimes to social attitudes. The book presents the framework for green growth. Within the production and consumption chain, organic cooperation must be achieved, which includes the alteration of the energy mix, the changes in consumer habits, the targeted incentives for investments and innovations, as well as conscious and comprehensive waste treatment and recycling. A fundamental transformation of

incentives must be achieved, in the course of which the real costs of environmental burdens must be integrated into economic decisions. One opportunity for this is a strong regulatory intervention, the planning of which, however, will represent a major challenge, since abrupt intervention in the functioning of the economy may generally entails short-term growth sacrifice.

Green taxation is expected to spread widely, which will contribute to containment of the activities polluting the environment, observed globally. In the future, green taxes – which make environmentally harmful activities more expensive and encourage the implementation and development of solutions replacing polluting activities – may account for an increasingly large part of fiscal revenues. Green funding is a distinctive element of the green economy, the importance of which is well reflected by the fact that – according to the World Bank's estimate – in the next decades infrastructure investments in the amount of USD 89,000 billion should be implemented to attain the goal set forth in the Paris Climate Agreement, i.e. that the rise in the average temperature should not exceed two degrees Celsius. The answer to the fundamental question as to who and how will finance all this urgently needs to be found. The majority of the governments traditionally active in infrastructure development are already struggling with the problem of high debts, while private agents have never been too keen on financing projects which involve high risks and only generate returns over the long run.

In terms of *demography* we face different challenges by regions. In 1950, the population of the world was only 2.5 billion. This figure was three times as high by 2015 and by 2050 the number of inhabitants on Earth may come close to 10 billion. According to the UN's forecast, the population of Earth will continue to rise until 2100, peaking at 11 billion. However, the demographic trends by far not will be distributed evenly. In Europe and in a large part of the developed world, it is the decrease in population and the ageing of societies that will generate challenges, while the population may increase to the largest degree in Africa, and dynamic growth may also continue in certain regions of South America and Asia. Meanwhile, it will become an even more general phenomenon that an ever higher ratio of the population will live in urban areas. The age of megacities will set in, where a stronger and more complex ecosystem of economic and social life, innovations, high quality education and transport systems will be formed around the cities. Demographic changes may have major economic and several other consequences both in the developed and less developed areas: they may increase environmental burdens, alter tax regimes and the labour market, may impact labour productivity, change consumption and saving rates, the structure of growth, and long-term effects may also appear even in inflation and through that in monetary policy as well.

One of the important questions of the future is whether average people will be able to keep pace with the astonishingly rapid transformation of *technology* and manage

the significant social and economic impact of this. The penetration of robotisation and artificial intelligence reduces labour demand and shortens production chains. The digitalisation of services facilitates accessing such services from increasingly remote locations and presumably in this case as well the larger part of the services will be rendered by emerging countries with lower wage costs. Theoretically, as a result of technological progress, mankind may find a solution to a number of problems it has been trying to resolve for decades (think for example of cures for formerly incurable diseases, significantly increasing healthy life years, space research or environmental protection). However, if we lose control it can easily happen that processes undermining the existing social and economic foundations will commence.

The periods of technological revolutions were most often characterised by an increase in *social inequality.* In much of the world, there are significant wealth and income inequalities at present as well. Continuously renewing education and training systems adjusted to economic needs should play a central role in the resolution of the problem. The jobs of the future will increasingly require creativity, critical thinking and advanced social skills, and thus, in addition to mastering basic IT skills, the development of education should focus on these skills.

Information will become the new commodity of our world, while data will become the "new oil". An increasingly large slice of our economic and social relations will move to the virtual space. Both corporations and consumers may benefit from the collection of data, but the risks related to the ownership, generation and storage of data will also increase. Proper responses to the protection and sustainable usage of data and the attainment of inclusive digitalisation should be found both at corporate and regulatory level.

One of the main chapters of the book is about the *future of money,* to which a central bank obviously pays special attention. One reason for this is that – presumably after the IT sector – financial intermediation may be the first sector where digital changeover will be implemented the fastest. The currency of the future – in the longer run – no doubt will be fully digital. However, as regards implementation, there are several competing solutions on policymakers' desks. It has not yet been decided whether digital currency will only represent the transformation of the physical form of the currency or we shall move to a fully new financial system also in terms of content. The process has already commenced. We may not notice that even today we already "pay" for many services with information instead of cash.

The book dedicates a separate chapter to analysing the role of the financial system in sustainable development. In the past centuries of financial intermediation the key role of physical collaterals was a general phenomenon. Until the 1970s, even

currencies could be exchanged for gold, while loans secured by physical collateral (e.g. a house or production lines) account for a major part of lending even today. In the future information will serve to an increasing degree as collateral. This will represent great opportunity for BigTech companies, which already have huge databases and may become serious competitors to traditional banks.

The next great challenge appears in the area of *geopolitics.* Following hyperglobalisation, which lasted until the financial and economic crisis commenced in 2007, the most important geopolitical trend may be the move from the unipolar world order to multipolarisation. New cooperation, new forms of thinking, new solutions and new values will develop. Eurasia, created through the deepening relations between Europe and Asia, may become the most important new cooperation. In this process the Central and Eastern European region, and particularly Hungary, may serve as a gateway to the Eurasian continent, gaining increasing geopolitical importance. In the 21st century, we will live in the interconnected world of networks and fusions, where holistic approaches will bear the utmost importance.

The form of globalisation, as known until now, will also change. While in the 1980s and 1990s globalisation primarily meant the accelerating and widening flow of goods and capital, in the first decades of the 2000s we learnt that the labour force had also become more mobile. Our age is about the globalisation of the services sector, while the fierce and global competition for the commodity of the future, i.e. information, is already taking shape. As an increasingly larger slice of the financial and economic life moves to the virtual space, the obtainable information becomes an ever more important "product". Meanwhile, new forms of employment will also appear on the labour market. The camp of digital nomads – performing their work in the digital space, not tied physically to a specific country or city – is becoming larger and larger. Countries that are able to win these new types of employees the fastest will secure a significant competitive advantage.

Last but not least, the book also touches upon the *fundamental reform of economics*, in the form of a summary. In the disputes about sustainable development the renewal process of economics, which has already started, must continue. As part of the reform of economics, a new measurement framework will be necessary. The present economic indicators, e.g. GDP, do not measure welfare accurately, since they are not able to quantify subjective factors, such as a sense of happiness, for instance. In addition, they ignore – among other things – the role of limited natural resources and the issue of ecological sustainability. The development of indices eliminating the aforementioned shortcomings has already commenced. It follows from the foregoing that the system of national accounts should be also placed on entirely new foundations, which necessitates the creation of a multidisciplinary welfare and sustainability science, speaking a common language, which integrates

the results of psychology, sociology, game theory, network research, geosciences and political science. Already in the near future vast, real time databases and much larger and faster computing capacities than the current ones may be at our disposal. The authors of the book belong to the camp of optimists and believe that the development of measurement science and the integration of the results of related branches of sciences may as well bring a new golden age for economics.

Finally, it should be noted that it is a great value of the book that in addition to the interesting analyses, the questions raised by it makes the Reader think deeply, encouraging us to find our own answers. Among other things, this is one reason why it can be recommended to all Readers for whom it is important to shape our sustainable future.

The Global Economy is in Danger: On the Book of György Szakolczai through the Lens of Post-Keynesian School*

István Ábel

György Szakolczai:
John Maynard Keynes, a nemzetközi gazdaság keynesi rendje és a Nemzetközi Valutaalap (*John Maynard Keynes, the International Economic Order and the International Monetary Fund*)
Közgazdasági Szemle Alapítvány (Economic Review Foundation), Budapest, 2018, p. 418.
ISBN: 978-963-89769-3-2

1. Keynes' proposals: success or failure?

In addition to providing rich biographical details, *György Szakolczai's* book offers exciting insights into John Maynard Keynes's work in international finance. However, it is not a biography but much rather an impressive picture of the era, a story, containing worthy proposals and lessons which are highly relevant even today. In this paper, I compare Szakolczai's claims with today's post-Keynesian approach. Szakolczai does not refer to and does not express a shared view on post-Keynesian theories, however, by presenting Keynes's work he does a great service to the renaissance of Keynesian economics. In the light of global imbalances and the threat of a trade war, Keynes's proposals are highly topical even today. Szakolczai suggests a return to these proposals. The writer of this review hopes for more than that. He hopes that Keynes's work will not only be treated as economic policy proposals, but also considered as elements in the renewal of economic theory. In order to understand our current world, we need a completely new approach in economic theory. In order to renew economics, it is worth going back as far as Keynes.

Keynes always approached an issue in a manner that took into account not just the interests of one nation, but the global interests of mankind. Szakolczai states that this starting point could have been justified by the global trauma caused by World War II alone, but in the face of the bipolar world order that emerged after the cataclysm, such a viewpoint was condemned to failure from the outset.

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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Keynes's greatness was not recognised in his time, but posterity discovered it. *Ann Pettifor* (*2018*), a well-known representative of the post-Keynesian school compares the genius of Keynes to that of Darwin. Darwin's theory of evolution is broadly recognised, but Keynes's work was not accepted by the economics profession, however much he was a well-known person. The revolutionary new ideas of both Darwin and Keynes met with huge opposition from their contemporaries. According to *Pettifor* (*2018*), Darwin was challenged by arguments in favour of the myth of creation, while resentments against Keynes's ideas fed the restoration of classical microeconomics through an obsession with creating microeconomic foundations for macroeconomics.

According to *Pettifor* (*2018*), we left the management of the global monetary system to the free will of speculators and capital markets. Crisis management is merely controlling the financial anarchy, often by putting a greater burden on tax payers. The fact that the 2007–2008 crisis hit developed regions which traditional economics considered as unquestionable models already implies an anomaly. György Szakolczai's book does not include such post-Keynesian statements, but he also points out that today we still fail to take those reasonable steps for prevention which already Keynes considered to be critically necessary.

According to the post-Keynesian school, the reason why we tackle the problem the wrong way lies in the traditional interpretation of monetary theory and the mainstream views of macroeconomics: "If we continue to fail to consider Keynes's warnings, and if we continue to fail to listen to his implications on monetary theory and macroeconomics, the occurrence of further severe crises will continue to be unavoidable in the future" (*Pettifor 2018*).

2. Long shadows of the very beginning

In 1919, Keynes attended the Paris Peace Conference that concluded World War I, and outlined a plan for credit and financing relief necessary for reconstruction. He put forward the idea that defeated powers could use the bond market to raise the funds necessary for the payment of reparations. The bonds would be guaranteed by the victorious powers, ensuring marketability. Keynes hoped that his proposal would constitute a general framework for an international financial system that would serve the development of individual countries, while also ensuring the stability of the global economy. Wilson, the American president, rejected his proposal on the grounds that the U.S. had already made major sacrifices, and therefore he did not think that Congress would support a European bond issue. Instead, he suggested the use of the usual market channels. *Pettifor* (*2018*) mentions that Wilson's rejection letter was drafted by a J.P. Morgan banker, Thomas Lamont, and thus it can be suspected that this suggestion for the usual market channels might have created a great business opportunity for the private bank.

This failure did not put Keynes off, but rather inspired him to argue powerfully against the erroneous decisions of the Peace Agreement in his work *The Economic Consequences of the Peace* (*Keynes 1919/1971*). Keynes's book became a world-wide success. The Versailles negotiations had a lasting impact on Keynes. Szakolczai demonstrates that this was the place where international economic and financial issues became the focus of his attention for the rest of his life. According to *Pettifor* (*2018*), Keynes's views, expressed here, had a significant impact on and led to the success of the construction of the Bretton Woods system in 1944. However, this only happened after the 1928–1933 crisis and then the catastrophic war had caused the suffering of and claimed the lives of tens of millions of people. Szakolczai does not consider the establishment of the Bretton Woods system as Keynes's success, but as his fatal failure.

3. Keynes on the balance-of-payments problems following World War II

After the Second World War, loans to finance the large import volumes needed for rebuilding were not available. The majority of the world's gold reserves were in the USA. The United States accumulated large balance-of-payments surpluses due to US exports linked to reconstruction. European and Asian countries with balance-of-payments deficits faced US dollar shortages. Analysing the forces that correct imbalances, *Keynes* (*1946*) saw that as a result of the reconstruction, countries that previously had balance-of-payments deficits became able to achieve export surplus with the United States. This was also supported by domestic market demand in the USA. Keynes warned that these natural balancing mechanism should not be disturbed by levies or export incentives in the Unites States, because they would restrain growth in exports to the US.

However, there are no such balancing mechanisms correcting the current US–China balance-of-payments disequilibrium, because debt is denominated in USD, the currency of the debtor. If the creditor country (China) is willing to accumulate any amount of US dollar reserves, there is nothing that could force the debtor country (USA) to reduce its balance-of-payments deficit with China. As a direct consequence of the export-oriented development strategy of China and other emerging markets, these countries have no interest in an endeavour of the United States to reduce the balance-of-payments deficit with them.

According to the post-Keynesian argument (*Kregel 2015a, 2015b*), Keynes's proposal for setting up an international clearing union should be reconsidered in order to remedy this problem.[1] Szakolczai proposes the same and presents Keynes's proposal

[1] *Costabile* (*2009*) provides a very thorough analysis, examining the question from different aspects. She is also in favour of Keynes's proposal. There is a common element in the approaches of Costabile and Kregel: they both consider that the key currency status of the dollar can be terminated by adopting an international unit of account which is not the own national currency of any country.

in details. The proposal was elaborated for the Bretton Woods Conference in relation with the establishment of the International Monetary Fund (IMF) with the aim of setting up an international monetary system to release national economic policies from the constraints resulting from the international payment system. The purpose of Keynes's proposal was to introduce a supranational unit of accounting, the *bancor* to be used in international settlements. Balance-of-payments disequilibrium would have been recorded in bancor, and countries facing financing needs could have automatically taken loans in bancor within certain limits. If a country had exceeded these limits, correctional measures would have been applied. Within the given limitations, the system would have ensured autonomy for national economic policies in an integrated global economy, and it would have restored the stabilising function of capital flows.

4. Keynes's theoretical innovations: monetary theory and macroeconomics

Keynes's solution was facilitated by his new monetary theory. Instead of the theory of money which provided a framework for the gold standard system, he took an approach moving towards the modern theory of credit money or the theory of endogenous money often referred to as MMT (modern monetary theory). He clearly saw that money is created through lending, and loans allow investments to be made. With this view, he followed Joseph Schumpeter's approach.

Keynes (*1936*) outlined his theory of money and theory of the rate of interest in Chapters 13–15 of *The General Theory.* With these theories he went against the general opinion. Placing money and the rate of interest at the centre of the examination and challenging the arguments of classical economics, he demonstrated that a high level of unemployment is not caused by high wages, but by a high level of interest rate. According to the arguments of classical economists, the rate of interest is determined by the interaction between the demand for investment capital and the supply of savings, and therefore it is determined by economic activity, and not the other way around, i.e. it is not a factor that actively shapes economic activity.[2]

5. Global imbalances today

Szakolczai calls for a return to Keynes's proposals with a view to tackling global imbalances, however, his book does not deal with the applicability of these proposals to the current circumstances. For this, according to *Jan Kregel* (*2019*), first we have to identify the contemporary features of international finance and trade. The context around the establishment of the Bretton Woods system after World

[2] *Ábel et al.* (*2019*), *Chick – Tily* (*2014*), *Pettifor* (*2018*)

War II was very different from the one around us today. One of the main goals of the establishment of the International Monetary Fund (IMF) was to ensure a secure system and institutional stability for international payments, as a precondition for the normalisation of trade relations. The ultimate goal was to facilitate trade. Money and the monetary system were just tools for achieving this. Today we face the opposite of that. Money and capital flows have become major players (*Kregel 2019:4*).

The international monetary system which was set up to solve international payment problems hindering the expansion of trade became unsuitable for tackling the balance-of-payments disequilibrium. Following the collapse of the Bretton Woods system,[3] trade was smoothly financed by internationalised private banks. Global investment markets underwent a rapid expansion, which further fuelled the growth of imbalances and the persistence thereof.

Disequilibrium in the balance-of-payments within the Bretton Woods system was rather temporary and the magnitude of such imbalance remained limited, since there was a correcting mechanism acting as a balancing force. This mechanism involved both market automatisms and various forms of extra-market institutional intervention which were in interaction with each other.

In the period following the collapse of the Bretton Woods system, the US dollar continued to play a central role as the leading key currency, but with the changeover to floating currencies it lost its earlier stabilising role. Maintaining the exchange rate parity between gold and the US dollar would have required economic policy corrections in the United States aiming at reducing the trade deficit by restraining domestic consumption and controlling the budgetary deficit. However, the floating exchange rate of the US dollar generated an unfettered increase in the trade deficit, since that could be financed in the national currency (USD). This is the world of the Triffin dilemma, where there is no mechanism that would prompt the United States to reduce its domestic consumption or change the exchange rate so that it would support the correction of the imbalance.

6. China's trade surplus and the US deficit

The period following the 1970s when the US dollar played the role of the key currency is often described as Bretton Woods II (*Dooley et al. 2003, 2014*). China has now achieved a significant balance-of-payments surplus with a number of countries and has accumulated an exceptionally large surplus with the United States.

[3] The collapse of the Bretton Woods system was caused by the suspension of the US dollar's convertibility into gold in 1971, i.e. by the decision to make the US dollar a floating currency. Concurrently with this decision by Nixon, an import duty surcharge of 10 per cent was imposed.

China entered the global market as an emerging country, and it followed the typical path of emerging countries. The reason why traditional economics considers capital investments in emerging countries as especially advantageous is that utilising the resources available in these countries when entering the global market allows productivity advantages to be gained with the use of modern technologies. However, the improvement in productivity does not allow increases in wages because wages are suppressed not through productivity, but the global wage competition between assemblers. In many countries, the improvement of industry was not accompanied by an increase in the share of domestic value added in industrial exports which could have improved national prosperity. However, China was exceptionally successful[4] in this field. Experiences show that the share of domestic value added in exports contributes to growth in domestic income, but the basic tendency of global value chains shows an opposite direction, a decrease in domestic value added in exports. For that reason, income inequalities between developing and developed countries have been steadily increasing.

7. Contradictions in today's international monetary system

Elimination of the US trade balance deficit could trigger a global recession. According to the calculation of *Truman* (*2005*), the deficit of the US had a positive impact on economic growth in other countries between 1999 and 2004, contributing 1.7 percentage points to global GDP growth. The deficit was financed by capital inflows from less advanced countries to the more advanced United States. This is the paradox of capital flow pointed out by *Prasad – Rajan – Subramanian* (*2007*), since preferably capital should flow towards capital-poor countries, contributing to global growth. The inflow of foreign savings which finance the US deficit could be eliminated by a shift of direction of capital flow which could trigger a depreciation of the US dollar and an increase of interest rates in the US. However, a brake on the rate of economic growth in the US would also put a brake on global growth. These unsustainable balances do persist and their persistence is supported by a threatening alternative, the financial terror, using the expression of *Larry Summers* (*2004*). Before handling this delicate imbalance, the global financial crisis broke out in 2007–2008, which threatened the collapse of the American and European banking system. A number of analysts saw a link between the operation of the global monetary system, the imbalances and the crisis; and several recommendations were

[4] According the data of UNCTAD (2018), China's domestic value added in exports increased by 12 percentage points between 1995 and 2014, while the increase was only 6 percentage points in 27 other developing countries where, in addition, the base was significantly lower.

made on reforming the system.[5] Various elements of these ideas practically revived Keynes's proposal for an international clearing union.[6]

8. The topicality of Keynes

Several parts of Szakolczai's book address the need to update the Keynes Plan. Keynes's proposal includes many important elements, but in order to implement them we should analyse the actual situation as a starting point. Szakolczai's book is an excellent work if it were to be understood as a logical experiment, just as *Costabile* (*2009*) also addressed the topicality of Keynes's proposals. It would be misleading to draw economic policy conclusions from these proposals without taking into account the technical and practical context. *Costabile* (*2009*) highlights that Keynes's proposal for *bancor* substitutes the key currency role, and since bancor is not the national currency of any country, it eliminates unilateral advantages and disadvantages entailed by the key currency role.

In the current era, among the global imbalances, the main problem has been the deficit of the United States and the surplus of China, for almost decades now. Therefore, this wording in Szakolczai's book is ambiguous: "It has been virtually the main aim of the International Monetary Fund to impose the full burden of correction on debtors and to exempt creditors from the consequences of irresponsible lending, thus causing enormous moral risk" (*p. 94*). This criticism might be justified in the case of many of the debtors, but not in the case of the true big debtor, the United States. In the last 75 years, the IMF has witnessed a lot of success, but even more failures. In line with the changes, the IMF itself has also changed. One could imagine a lot about the economic and political role of many creditors, including China, and in general about the motifs of international capital. However, it is unthinkable that the IMF would want to pick China for the purpose of exemption in respect of irresponsible lending. Referring to Keynes or to his proposals with such and similar statements is not appropriate, not least because his wordings were associated with the problems topical at the time. In view of the current trends, he would obviously use a different wording. It is worth learning from the analytical framework that Keynes applied and the theoretical approaches that he proposed, advancing towards a new theoretical system on the path he embarked on. Szakolczai's book is a great work on Keynes's life and struggles, and his objectives

[5] The proposal of the Governor of the People's Bank of China to use the SDR created by IMF as Keynes's bancor in international settlements instead of key currencies attracted a high level of response (*Zhou 2009*).

[6] The clearing union and the bancor, an international unit of accounting are central issues of Szakolczai's book. The details of some versions of the plan are presented in Chapters 7 and 8 (pp. *101–141*). The plan for a clearing union also played an important role in the negotiations at Bretton Woods aimed at preparing the establishment of the International Monetary Fund, of which a true picture is provided in Chapters 10 and 11 (*pp. 173–210*). Bancor would play a supranational role in the settlement of international payments, but it would not be a national currency of any country. In contrast to the US dollar, bancor would not be issued by a central bank of a nation, and therefore its operation and its effect are fundamentally different from those of national currencies used in international payments today.

and proposals. It is undisputable that Keynes' theories are still relevant today, but they should be interpreted in the light of the circumstances prevailing today. And this is exactly what post-Keynesian economics wants to do. One of the conclusions of this approach is that the exploration of technical and practical questions requires a renewal not only in economic policy but also in economic theory.

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Doing What Has to Be Done*

Katalin Botos

Raghuram Rajan:
I do what I do
Harper Business Publisher, London, 2017, p. 325
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Raghuram Rajan is an internationally acclaimed financial expert who served as governor of the Reserve Bank of India (RBI, the central bank of India) in 2013–2016, and his book is entitled: *I do what I do.* Having read it, one might perhaps feel that the title "I do what I have to do" would have been more apt. In his work, which is a summary of his studies and speeches, the author describes what he focused on during his time at the helm of the central bank, the topics he considered appropriate to comment on and the practical steps he took to boost India's economy, and especially the clout of the central bank.

Rajan is committed to society, including all its classes, even the poorest people, while being an ardent supporter of free markets and capitalism. Accordingly, even though the book discusses and answers professionally relevant issues, it is not for experts only, but for anyone interested in social and global problems. This review gives a brief overview of Rajan's impressions, actions and experiences as central bank governor. As the first man of the RBI, Rajan considered himself an influential *public servant* who was nonetheless committed to the people. He placed a great emphasis on central bank independence. He was responsible for managing 17,000 bank officers and USD 400 billion.

Rajan continuously assessed the country's macro indicators. At the beginning of his term, India's growth got off to a promising start at 5-5.5 per cent. In 2013, he pointed out the rapid improvement in the country's important indicators: government debt fell from 73 to 66 per cent compared to the mid-2000s (while central government debt stood at merely 46 per cent). External debt was even more favourable at 21 per cent of GDP, mostly comprising long-term liabilities. The deficit-to-GDP ratio increased on account of the crisis, but it was pushed down by

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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1 percentage point in Rajan's first year, 2013. The balance of payments was partly influenced by the fact that large mining projects were stopped or delayed, since goods imports rose. The final chapters contain his statements before and after the eruption of the international crisis, which brought him international recognition.

1. Start of Rajan's central bank policy

At the time of Rajan's appointment, the Indian economy was in dire straits and the rupee was in free fall. India was among the "Fragile Five" developing countries, which scared off foreign investors. Therefore, the first task of the new central bank governor was to stabilise the country and restore the confidence of foreign investors. He had to show a clear intention to reduce inflation and strengthen the international role of the rupee, in other words demonstrate that despite the difficult circumstances, steps were planned towards full convertibility.

Previously, inflation had been measured using the wholesale price index, but the option of switching to the consumer basket was discussed. The central bank did not want to use the consumer price index because it would have been unable to influence the government's overspending, which sometimes undercuts consumer prices. Therefore, Rajan set up an expert committee to establish *inflation targeting*. He had to decide on the interest rate policy to be pursued. Should interest rates be kept high to curb demand or reduced to encourage growth through lending? In his book, he uses the analogy that the central bank was trying to be an *owl* among doves and hawks. Taking advantage of the market environment produced by the otherwise great crop yields, he gradually increased interest rates, and then slowly decreased them after inflation receded. The principles determined by the committee turned out to be right and bore fruit as expected.

The public and politicians found it hard to stomach that price hikes could not simply be prevented by direct intervention, i.e. capping food prices. Rajan argued that reducing average inflation across the country was in the interest of all social classes. The structure of consumption was transformed, the share of food declined steadily, while that of very wage-intensive services increased. The prices of these, however, depend on food prices. If the latter are high, all incomes, even those of farmers, will be *worth less in real terms* when spent. But if inflation is low in the country, it reduces the wage costs of agricultural work and thus also the wage pressure. Although people realise the improvement of real indicators slower than the nominal "veil of money", beyond the short term, the policy is confirmed even if food prices do not drop enough, since the price drops of the other products influencing the consumer price index could be large. This improves the average standard of living. The overall price index did indeed fall, to 6 per cent.

Many people castigated the central bank for "killing" investments with the prevailing interest rates. However, the interest rates did not depend solely on the central bank base rate, but also on the risk premium added by commercial banks. The government tied the interest rate on retail investors' savings to government bond interest rates, which sometimes caused slight distortions in banks' interest rate mechanisms. At the same time, savers and pensioners did not complain because interest rates were high, but, conversely, because they were low. Rajan maintained that as regards performance, factor utilisation was high in the economy, and therefore monetary easing would only strengthen inflation trends. He also argued for relatively high interest rates by claiming that if monetary value falls sharply, savings start to flow towards tangible assets such as gold. Since India is not a gold-producing country, this places a great burden on the balance of payments, exacerbating the foreign currency problem caused by the country's trade deficit. As India relies heavily on imports, its balance of payments is always in deficit, foreign currency demand pushes the exchange rate down and exchange rate developments influence inflation. Thus Rajan believed that one of his first measures should be to stop the exchange rate weakening and acquire foreign, and preferably cheap, funds to cover the deficit. He was lambasted for keeping interest rates near the upper edge of the band, but he believed that the rupee's stability hinged on the relatively high interest rates. He managed to acquire the necessary external financing on account of the highly consistent monetary policy and its successful communication on the one hand, and by guaranteeing a predetermined and favourable repayment exchange rate to the banks providing the funds on the other hand. This attracted huge sums, well beyond expectations. Rajan was able to introduce beneficial measures in easing foreign currency rules, indicating that in the long run, the goal was to bolster the rupee. He progressed cautiously with liberalisation. For example he did not support investment banks' efforts to issue USD-denominated government bonds abroad. Although this would have been alluring to investors, at a time when developing countries were attempting to offload their foreign currency bonds, Rajan did not consider it useful for India to move in the opposite direction. Instead, he urged banks to issue so-called "Masala bonds" in rupees, which were a good quasi-sovereign proxy. To provide more liquidity to the corporate bond market, the RBI initiated an amendment to the central bank legislation that allowed high-quality *corporate* bonds to be used as instruments in repo transactions with the central bank. (The Fed's post-crisis "innovation" was also used by the RBI, although not directly with companies but through banks.)

2. Financial inclusion

Rajan believed that the next major task was to improve access to credit. Experience showed that people often turned to usurers and rarely took out bank loans. That is why he considered it important to improve the banking system, establish branches

and expand services in underdeveloped areas. He also paid attention to deepening the financial system in a way so that those who had some knowledge should be able to profit from it by choosing the appropriate services. At the same time, he set out to spread and enhance financial awareness.

Rajan believed that improving and accelerating the different forms of payment was just as important as ensuring the availability of credit. This is because lenders usually expect some level of savings. But this is difficult if customers need to cover long distances or wait for a long time to get paperwork done just to open a deposit account. Rajan encouraged banks to provide easier ways of opening accounts, although banks – wary of issues related to identifying owners and fraud – dragged their feet, and thus usually requested detailed documents. However, Rajan thought that the losses caused by fraud did not outweigh the advantages of smoother account opening. Accordingly, the central bank regulated the conditions of opening accounts, requiring merely proof of permanent residence. To avoid disputes, he proposed forms to the banking association that clearly stipulated the RBI's requirements.

The development of the payment system also advanced when *post offices* received payment functions. Even though post banks do not extend loans, they are a huge help. Using them to make deposits may facilitate borrowing and transfers.

There are 900 million (mostly basic) mobile phones in India, and therefore it was obvious that they should be used to conduct payment transactions. India's payment system is mature, the central bank has three large technology centres and a robust financial and payment network. Rajan maintains that their text message alert system was more advanced than in the US. However, the publication of the records on non-performing borrowers and the sharing of negative experiences within the financial system acted as slight deterrents and encouraged timely payments.

Another big help was the operation of *credit information bureaus* that also informed costumers about insurance options. Rajan called for the development of a system that would help small enterprises against large corporations, by creating an opportunity to sell their outstanding claims on the market.

The government requires the (mainly state-owned) banks to ensure the financial inclusion of the poor, who often fall prey to usurers. Therefore, interest rates were capped on loans to small businesses, and usually no collateral could be demanded from them. However, interest rate caps need to be set to cover the fixed costs related to lending, monitoring and collection and also generate profits. Rajan argues that it is an impossible trinity to require banks to really strive to perform this mandate while prohibiting them from requesting collateral. He suggests that requesting collateral is acceptable if offered, but then lower rates should be charged.

He also believes that repayments should be flexible. If the insolvency is not due to the negligence of the debtor but inescapable consequences (such as crop losses in a region in the case of agricultural loans or unemployment in the case of student loans), banks should not classify the loans as non-performing. Debtors, however, should not be relieved from all responsibility; debt relief and the option of bankruptcy should be designed so that debtors feel the repercussions (loss of wealth, exclusion from borrowing) and only use this solution as a last resort.

One of the main principles of finance is that customers should be cautious, but the expertise of customers varies widely. That is why Rajan considered it important to improve ordinary people's financial literacy and called for basic financial skills to be included in the school curriculum and the establishment of cheap, high-quality financial *distance learning*. He had high hopes for strengthening the ties between the IT industry and the banking system and the widespread use of IT in banking.

3. The state and state-owned banks

Rajan paid special attention to the operation of state-owned banks. The highly centralised Indian government views banks as proxies of the state and keeps them under tight control. This not only includes the central bank's regulatory role, but also government agencies that can be used for direct intervention. Due to the large number of regulatory authorities and the overlaps between them, Rajan proposed to dissolve the banking department of the finance ministry, which exercised supervisory functions in tandem with the central bank but with broader powers. Although the Indian Bank Board Bureau (BBB) was composed of experts and independents and takes part in the professional assessment of banks' board members, in the case of state-owned banks, the Appointments Committee of the Cabinet has the final say. The author believes that the BBB should take over these decisions, and, as it gains experience, the BBB itself would also become superfluous. It could transform into a National Bank Investment Company, a custodian for the government's stake in banks. The government's banking department should fulfil other functions: preparing expected banking projects, coordinating actions (e.g. determining the conditions for opening bank accounts) or concentrating on institutional development (e.g. setting up organisations for collecting debt). The central bank should only focus on prudential regulation and recall its representatives in banks' bodies.

Currently, the functioning of banks' boards, the process of lending, the management of collateral and pledges as well as the monitoring of outstanding loans leave much to be desired. As Rajan writes, state-owned banks (especially those that received state aid) are in a particularly weak position when faced with the credit applications of large customers. Their professional operation would be ensured if their managers'

skills and remuneration would match those in the private sector rather than being manually controlled by the authorities.

The most difficult task of the sector was cleaning up bad debt and bank consolidation. Banks amassed a large amount of non-performing loans, and the sector needed to shed that.

India saw its first comprehensive asset quality review and report on the situation of the banking system in 2015. The central bank's policy was roundly criticised, as the more stringent asset rating systems it introduced hindered lending. However, the problems did not arise from the ratings: they originated earlier because banks had been nursing along huge stocks of problem assets. The slowdown in lending and the credit crunch was caused by the excessive amount of bad debt rather than the level of interest rates or the scarcity of capital. There was capital for housing loans and consumer credit at state-owned banks as well, because, interestingly enough, there was not much difference between state-owned and private banks in terms of growth in outstanding loans. At the same time, a general credit crunch could definitely be observed in the country. Although private banks mushroomed during Rajan's tenure, their capitalisation fell well short of state-owned banks. The new banks' more dynamic lending to the private sector could not offset the shortage of credit arising from the more muted operation of large, state-owned banks. The crux of the problem was the financing of state-owned banks' large corporate projects.

During bank consolidation, the concept of "bad banks" (isolating bad loans and putting them into separate institutions) was considered, but according to Rajan this would have only meant kicking the can down the road. He believed that all banks should clean their balance sheets and perform a capital increase instead.

Banks' predicament can also be caused by transactions when companies consciously "steal" the money received from the bank, by diverting it to their own, foreign operations through overbilling and deals disguised as imports. Yet Rajan was aware that only a smaller portion of the bad loans were due to conscious, corrupt acts, and the majority were attributable to excessive lending during the boom and the bank managers who were unable to handle the new situation. In the absence of an operational bankruptcy law, the central bank had to find temporary solutions. A database containing the lenders taking part in the transactions was created, and then the Joint Lending Forum agreed on a solution, similar to bankruptcy proceedings, excluding certain lenders. In 2015, the restructuring of the loans that certain banks rolled over only to avoid designating them as "non-performing assets" was scrubbed. The large infrastructure projects where the repayment deadlines were not in line with the companies' earnings potential were reviewed, and contractual adjustments were allowed, taking into account rollovers. Temporary debt-for-equity swaps were permitted, thereby crowding out the old owners who

were unable to provide a capital injection and promoting the rapid entry of new owners. After that, banks could start financing more promising ventures with renewed momentum.

4. The technocrat and politics

Rajan's term as governor was not extended in 2016. This may have been partly due to the *controversy surrounding demonetisation*. The essence of the action against "black money" or demonetisation was the *changing of the banknotes*. This usually led to tensions in other countries as well. In hindsight, some argued that Rajan opposed the measure, while others claimed that he was responsible for it. The central bank was forced to give an expert opinion on the government's plans. Rajan writes that he listed the counterarguments, including that the poor would have to shoulder more of the burden. However, the framework necessary for the technical implementation was developed by the central bank. Demonetisation occurred one month after Rajan stepped down. (According to some in 2019, the process caused actual distress to ordinary Indians, and independent pundits say that the policy did not really achieve its objective.)

Of course, demonetisation was by no means the only actual point of contention for the RBI governor, because Rajan underlined that – as the governor of the central bank and the macroeconomic crisis manager of the country – he had to warn the government about issues critical from the perspective of financial stability. In a 2014 speech, he examined thorny economic and political questions, focusing on crony capitalism, since that was often a factor behind bad bank loans. Rajan believes that if India, free and independent for 70 years, wants to avoid the middle-income trap, it should make use of all the opportunities offered by democracy.

He argues that change can only happen if the quality of public services improves and reliance on the state is reduced. Both can be achieved only in the long run. Rajan claims that the solution lies in good private sector jobs that help pay for private healthcare and high-quality education. However, this also calls for enhancing healthcare and education. In other words, *to get rid of bad public services, good public services are needed*. Therefore Rajan proposed linking the system of benefits to the education of the children from poor families and supported the introduction of coupons that could only be spent on clothes, food and healthcare.

He realised that even an economy the size of India is impacted by international developments. Due to the diminishing export opportunities, producing for the domestic market became more important. Nevertheless, this should not be achieved by limiting imports and encouraging exports because free trade is also important for India. Finding the right balance is essential. The development of smaller enterprises and services is a key component of growth.

5. Summary

For Rajan, his appointment as governor was like when a child is let into a candy shop, because he could do what he was proficient in and what he loved. After reading his book, it can be concluded that an exceptionally wise man with a sense of responsibility held the reins at the RBI for three years. He was not simply a financial technocrat but an expert in national and world economy developments. Wherever they live, central bankers, financial experts and politicians can all take away something from his work and essays.

Report on the Session of the Money and Capital Market Section and on the Panel Discussion of the Innovation Section of the Annual Congress of the Hungarian Economic Association in 2019*

Ferenc Tóth – Judit Potóczki – Anikó Szombati

The annual congress of the Hungarian Economic Association (HEA), celebrating the 125th anniversary of its foundation, was held between 5 and 7 September 2019 for the 57th time, in Nyíregyháza. This meeting is the one of the most traditional and at the same time the largest annual conference of the community of Hungarian economists. At the conference, seven thematic section meetings were held, in addition to the opening and the plenary meetings. The keynote speeches were delivered by *György Matolcsy*, Governor of the Magyar Nemzeti Bank (MNB), *István Nagy*, Minister of Agriculture, *László Domokos*, President of the State Audit Office, and *Bertrand Bonhomme*, Michelin Group's Director for Sustainable Development. This report provides information on the meeting of the Money and Capital Market Section and on the panel discussion of the Innovation Section.

As in the previous years, the Money and Capital Market Section attracted the largest audience. Moderated by *Márton Nagy,* presiding chair, Deputy Governor of the MNB and President of HEA's Financial Section, panel discussions with the top bank managers and key players in the financial sector were conducted on the following four topics: a) Criteria for the sustainable banking sector; b) Prospects for the capital markets in light of the 2019 regulatory changes; c) Fostering the instant payment system and electronic payments; and d) Experience gained from the launch of the Bond Funding for Growth Scheme.

The panel discussion of bank managers at the morning meeting took stock of the criteria for a sustainable banking sector and the factors that may make the banking sector even better. It is a rare occasion when eight outstanding personalities from the banking sector meet and discuss the key issues of the sustainable banking sector

* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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together. The participants of the panel discussion, in addition to *Márton Nagy,* were *Éva Hegedüs,* Chairperson and CEO of GRÁNIT Bank Zrt, Secretary General of HEA, *Ádám Balog,* CEO of MKB Bank Nyrt. and Vice President of HEA, *László Bencsik,* Deputy CEO of OTP Bank Nyrt., *László Harmati*, Deputy CEO of Erste Bank Hungary Zrt., *Pál Simák,* Chairman and CEO of CIB Bank Zrt., *Balázs Tóth,* Chairman and CEO of UniCredit Bank Hungary Zrt, and *József Vida,* Chairman and CEO of Magyar Takarékszövetkezeti Bank Zrt. In his opening speech*, Márton Nagy* noted that compared to the size of the banking customer base there are still too many banks in Hungary. In the first set of questions, he raised the issue as to *whether the profit of banks is sustainable.* In connection with this, additional questions included the optimal degree of financial deepening (on the household and corporate market), how fast it should be achieved, whether in parallel with financial deepening we can also expect consolidation and increased efficiency, and whether the structure of profit (interest and non-interest income) will change and if so, in what way. *Márton Nagy* noted that the profitability of banks in Hungary was outstanding in 2018 (the ROE of 14.6 per cent was the highest in the region). The banking sector of the CEE region achieved one of the most dynamic growth rates globally as well. The data clearly reflect that – in parallel with convergence – there is still significant room for further financial deepening. The bank executives agreed that there is great growth potential in lending to households, since outstanding lending is still low compared to the region. The lag is smaller in the area of corporate loans, which is mostly attributable to the MNB's funding for growth schemes. Due to the low level of interest rates, the interest margin (and thus interest incomes as well) is stagnating or decreasing, and accordingly profitability may also decline, although opinions differed in respect of the latter. Some of the participants took an optimistic view of the situation and anticipated an increase in interest revenues. Expenditures are dominated by IT expenses and wage costs. The cost-to-income ratio of the banking sector is high in a regional comparison. Over the longer run, digitalisation may reduce the cost of banking operations to a great extent. Opinions varied on the anticipated developments in consolidation. One of the commercial bank representatives did not find this necessary, while the executive of another bank emphasised quite the opposite, saying that sustainable operations cannot necessarily be financed with less than half a million household customers per bank.

The second topic was *lending to households and the housing market:* who is eligible for a loan today and who is able to buy a home? *Márton Nagy* said that the housing market had seen a rapid upswing, but new supply was limited and the renewal of the stock of dwellings was slow. In Budapest, prices rose by roughly 170 per cent in five years and the annual dynamics continue to be strong. The Home Purchase Subsidy for Families and the prenatal baby support loan may substantially transform the household market. According to the latest data, the share of these products already reached 40 per cent within new loans. The following issues were raised in

the topic: How easy is it for the public to obtain a loan in the current situation? Can the range of customers eligible for bank loans broaden? Can we expect a sharp rise in housing loans? Do banks experience any overheating on the housing market? The banking sector increasingly supports the realisation of the economic policy objectives both on the corporate and household markets. What role may the public schemes play and what kind of realignment can we expect on the household market as result of this? In the past, it was essentially the affluent clients and those with large, regular incomes who were eligible for mortgage loans; however, the Family Protection Action plan broadens the range of borrowers. In connection with the prenatal baby supporting loan, an additional major upswing may be expected in retail lending, which, however will reduce the borrowing of personal loans. It can be said that today it is easy to get a loan in Hungary, and the lending process is increasingly quick; however, in Budapest prices are already so high that it may cause a problem. In connection with the housing market and mortgage lending, it is important to know how many buyers purchase flats for investment purposes and whether they compare the yield and the risk with the yield of government securities. Some believe that house purchase for investment purposes is already declining now. The banking sector found it a challenge to accustom the population to fixed-rate loans.

After this, the expected impact of the *Bond Funding for Growth Scheme* (BGS) was discussed. The MNB set a facility amount of HUF 300 billion for bond purchases, and it purchases bonds only with a rating over B+. Up to September, 125 companies reported their intention to participate in the Bond Funding for Growth Scheme; half of the registered companies have their registered office outside of Budapest. 81 per cent of the companies financed by banks have a PD value (probability of default) belonging to ratings of B+ or higher. Today, BGS is one of the most important capital market stimulation programmes. It is necessary, because the Hungarian bond market has a substantial lag even within the CEE region. The bond market represents a good transition between loans and the stock exchange. A company can get used to being rated, it can learn that it must think for the long term, and thus a bond market rating and a bond issue are a good entry path to the stock exchange. At the same time, further capital market deepening is essential. Bank executives believe that the facility amount of HUF 300 billion will be exhausted in a short time. BGS plays an important role in reducing the underdevelopment of Hungarian bond market, while bonds may be regarded as long-term, safe liabilities. Roughly 400–500 domestic enterprises, with B+ ratings that are eligible for listing, can be expected. The possibility of a guarantee, securing the corporate bond, also came up as an issue for consideration.

FinTech was the next exciting topic for discussion by the banking executives, with the title "*Synergy and/or risk?*". In the Hungarian banking sector there is still plenty

of room to boost digitalisation, since digital maturity can still be deemed low, and Hungary – which lags behind the digital champions, such as Estonia, but even behind the intelligent followers, such as e.g. Finland – can be still classified as a "user" (preceding e.g. Slovenia, which is part of the "latecomer" category). FinTech solutions have an increasing user base globally, primarily in the area of payment services and insurances. At the same time, the FinTech solutions used globally by digitally active consumers have expanded sharply since 2015 also in the area of savings, investments, budgeting and financial planning, and lending. On the whole, it can be stated that in the area of payment services FinTech companies are already major competitors to the traditional actors and are also becoming increasingly attractive in the area of insurance and investments. The new FinTech companies are not complex banks, but rather appear only in certain banking segments. Today, customers have still greater trust in banks, although FinTech companies can access their customers more easily. Branches without personal service are also popular, but a personal relationship is still important for many, particularly in the countryside. The transaction levy is a key competition issue with FinTech companies, since if they are exempted from the rules of mandatory payment of the levy, applicable to banks, it may lead to unequal competition conditions. Regulation also plays an outstanding role in the area of avoiding supervisory arbitrage. All in all, banks need to adopt FinTech solutions and digital technology, as these offer great opportunities. At present, several banks are conducting negotiations for the involvement of FinTech companies, since they see the opportunity of automating as many functions as possible and having digital solutions through cooperation with them. The sales process must be shortened, but this is also conditional on banks' access to various databases. Alipay was mentioned as an example, which extends loans to entrepreneurs within a matter of minutes, applying artificial intelligence. At the same time, Márton Nagy also emphasised the importance of cyber security.

The last topic of the banking executives' discussion was *the effect of the Hungarian Government Security Plus* (MÁP+) *on the banking sector.* It was mentioned that the Treasury's share in sales is still low, i.e. below 30 per cent. More than 70 per cent is distributed by banks and brokers. For the government, the ratio of new funds reached 53 per cent, while the rest of it includes funds from the redemption of previous government securities. Purchase for cash accounted only for 10 per cent of the issues. Until 2023, sales by banks generates a cost of at least HUF 175 billion for the government and households, and this does not include the proprietary portfolio, i.e. the extra cost of "double financing" government debt. *Márton Nagy* believes that the current sales structure of household government securities should be revised. According to the banking executives, it would be unfavourable for the banking sector if in the future MÁP+ could only be sold by the Treasury. MÁP+ also absorbed funds from the real estate funds, other investment funds and bank deposits. Banks' proprietary MÁP+ portfolio is negligible, and in respect of this

the Government Debt Management Agency prescribed a call option, and thus it is the decision of the Government Debt Management Agency, rather than of the bank, when it "asks for it back". At some of the banks, government securities can be purchased free of charge. All in all, MÁP+ is a successful product, generally recommended to clients by bank advisors. In relation to social responsibility it was mentioned that a well-functioning banking sector may lead – through economic growth – to an improving government debt path, and in addition, banks pay banking tax and transaction levy, through which they also contribute to the reduction of government debt.

The topic of the second panel discussion was entitled "*Prospects for the capital markets in light of the 2019 regulatory changes*". The role of the moderator was fulfilled by *Gergő Szeniczey*, the MNB's Executive Director for Prudential and Consumer Protection Supervision of Money Market Institutions, while the participants included *Károly Régely,* Managing Director of Concorde Értékpapír Zrt., *Róbert Cselovszki,* Chairman and CEO of Erste Bank Hungary Zrt., *Bálint Szécsényi,* Managing Director of Equilor Befektetési Zrt., *András Temmel,* Secretary General of the Association of Hungarian Investment Fund and Asset Management Companies, and *Richárd Végh*, CEO of the Budapest Stock Exchange.

In the past period, a number of EU-wide regulations were published, of which it is worth mentioning MIFID II, which is of the utmost importance for investment service providers and affected the fund management market probably the most. At present, a number of proposals are being negotiated, as a result of which in the future presumably additional legal norms related to the capital markets may arise. Topics of the most important proposals: EU framework for hedged bonds, facilitation of the cross-border distribution of collective investment funds, more proportionate and more efficient rules affecting investment firms, easing access for smaller companies to capital market financing, strengthening the oversight of central counterparties, and the community financing framework. Market participants perceive the major changes in the past period as a "regulatory tsunami", which represents a great challenge for the specialists. This includes, among other things, tightening the statutory requirements related to contact between service providers and clients. The smaller, independent companies are in a particularly difficult situation, which is further exacerbated by the shortage of experts. Some were of the opinion that the market was overregulated. As a result of the regulation related to money market funds, the role of these funds became marginal in Hungary. Clients coped well with the situation, the attitude of the Hungarian financial supervisory authority was supportive and proactive, and the fact that the regulatory processes took a consultative nature supported adjustment.

In relation to the capital market development strategy, it was mentioned that there are major reserves in capital market financing in Hungary, but also in Europe,

compared to the North American and Asian capital markets. At the EU level, the market capitalisation of the listed companies reaches 100 per cent of GDP, while this ratio is 20 per cent in Hungary. The five-year strategy of the Budapest Stock Exchange has set the goal of doubling market capitalisation in Hungary. At present there are 300–400 companies in Hungary eligible for listing, which need major capital for their growth.

The bond portfolio of non-financial corporations as a percentage of GDP is at a lower level than in the EU, and thus the MNB's bond scheme, with a facility amount of HUF 300 billion – launched on 1 July 2019 – is particularly important, as it contributes to the diversification of corporate funds.

The online "budget" products, i.e. the prevalence of FinTech applications via sophisticated personal customer service, was an important topic. The appearance of Roboadvice changes the previous vision. FinTech companies revamp investment services and the market for the distribution of investment funds by their low costs and standardised solutions, but at present personal relations and particularly the existence of trust is still a key factor for many investors. The Hungarian service sector can be deemed successful in the application of FinTech solutions.

Bonds related to sustainability were one of the key topics discussed by the panel. Regarding attitudes on sustainable development and investment vehicles, it was mentioned that the variety of green products is extremely wide globally, starting from green bank accounts and recycled, biodegradable bankcards through the various green loans aimed at enhancing energy efficiency to derivatives related to carbon emission quotas. Consumers may meet green products primarily on the capital markets, but at present there is no uniformly approved definition and European framework for green investments and green products.

The third topic of the section was *fostering the instant payment system* (IPS) *and electronic payments.* The moderator of the panel discussion was *Lajos Bartha*, Executive Director Financial Infrastructures and Banking Operations of the MNB, while the participants included *Tamás Kovalovszki*, Director of K&H in charge of daily finances, deposits and investments, *Tamás Foltányi*, Managing Director of Erste Bank Hungary Zrt., Deputy CEO in charge of IT and Operations, *Mihály Veres*, CEO of Nemzeti Mobilfizetési Zrt., *Ákos Kalmár*, Deputy CEO of T-Systems Magyarország Zrt. and *Eszter Hergár*, the MNB's Director for Social Relations.

Lajos Bartha demonstrated that in Hungary payments are still dominated by cash. More than 80 per cent (in 2017: 84.8 per cent) of retail payment transactions were conducted using cash. This has major disadvantages: high social costs, tax evasion, and the informal economy. In the next step the key features of the instant payment system, to be launched in March 2020, were presented: operation will

be continuous 24 hours a day, including weekends and bank holidays. The limit for domestic forint credit transfers is below HUF 10 million, the time limit for execution with the use of secondary identifiers is 5 seconds, in the course of which instant clearing and settlement will take place. Request for payment will be available, while the sending of positive feedback is optional and the sending of negative feedback is mandatory. The system is characterised by open standards and interoperability. The IPS may be supplemented with value-added smart services (e.g. open banking, i.e. PSD2), the development of which is expected by the MNB from the banks. The largest value added in the instant payment infrastructure is represented by the request for payment. The auxiliary services that may be built on this include the payment of monthly bills and services for monthly fees, the replacement of postal money orders, purchase, blocking and limit management in the case of non-time critical transactions, the management of payment due dates and due date reminders. Market participants expect the regulators to be flexible and constructive, as auxiliary services improving the efficiency and the acceptance of ISP may only be implemented in this way.

The opportunities to use instant payments are wider than those of the present card payments or credit transfers, since it permits on-site payment for products or services, which is important particularly for time-critical transactions. This means that it can serve as an electronic alternative in all payment situations where at present the only solution is cash. The transfer of money directly between private individuals is an outstanding opportunity. In addition, there are a number of traditional functions, such as shopping at physical points of acceptance, payment of bills or online shopping. However, the advantages inherent in instant payment can be fully realised only if based on it widely usable innovative payment solutions are available for households and businesses. The MNB provides support for the development of interoperable auxiliary services based on open standards (secondary account identifier, request for payment message, guidance for the payment processes in certain payment situations, QR code standard).

In technical terms, the question of security bears the utmost importance also in relation to instant payments. There will be no time in the individual transactions to examine whether or not there is fraud; however, artificial intelligence will be able to decide this in a matter of seconds. Technology must now be implemented that has never been created or used by anyone before. It will be also a key question how fast instant payment can spread in the merchant chains.

For actors in the banking sector, access to critical mass is an important business issue. This will be achieved when the services attract new digital clients from the formerly non-digital customer base. There are successful examples of this, such as Sweden or China, but there are also negative ones, such as Italy and Belgium, where value-added services were launched, but insufficient numbers of customers

switched to the new services. In Hungary as well, it will only be successful after 2020, if interpersonal services spread quickly.

Eszter Hergár noted that – simultaneously with the start of the instant payment system – the MNB will launch a wide-ranging social information and educational campaign. This supports the national strategic programme, announced by the government eighteen months ago, aimed at enhancing the financial awareness of the population. The sixth part of this seven-point strategy is to foster the use of modern, cashless payment instruments. The MNB ordered surveys, according to which the key considerations of households include price, transparency, flexibility and security; accordingly, in the competition commencing from March 2020, consumers will make their decisions based on these criteria. However, the shift in attitude takes place extremely slowly, since this is also a question of culture. In order to raise the awareness of young people, the pilot programme entitled "Cashless Schools" was launched in 15 schools, based on the experience of which, another 250 schools would like to adopt the programme. It is also of paramount importance that instruction in basic financial and economic skills be started in primary schools as well.

The instant payment system, as an electronic means of payment, will also contribute to the reduction of cash payments, but Hungary is still very far from being a cashless economy. By 2030, half of all payment transactions may be electronic, as electronic payment turnover may increase substantially over the next 10 years. The goal is that in 2030 the ratio of electronic payments should be around 45–50 per cent. This can be achieved with 200 million new electronic payments annually. It should be mentioned that – in technological terms – the financial sector is ready for this already even now; however, obviously there are certain social groups in the society for whom cash is still important.

All in all, we can say that implementation of the IPS is also important in terms of competitiveness, since in the absence of this banks would lose customers.

The topic of the last panel discussion of the section was the *experience gained from the launch of the Bond Funding for Growth Scheme*. The moderator was *Viktória Nagy*, head of the MNB's Structured Finance Strategy Directorate and member of the Presidium of HEA's Financial Section. The participants were *Balázs Bíró*, partner at Deloitte and head of the CEE financial advisory business, *András Kazár,* executive of OTP in charge of capital market advisory services, *Kinga Oravecz*, department head at ERSTE Bank Hungary, and *István Máté-Tóth*, Deputy CEO of the Budapest Stock Exchange. *Viktória Nagy* said that in terms of its corporate bond market Hungary has a great lag both by European and regional standards. The primary purpose of BGS is to enhance the efficiency of the monetary policy transmission mechanism. In addition, the secondary goals are also important: BGS generates

competition for bank loans, which may facilitate the development of a sounder funding structure. In addition, a suitably liquid and developed bond market may increase financial stability, in the event of a crisis it provides the central bank with the opportunity to intervene directly, speedily and efficiently, thereby mitigating the impacts of a future crisis, while gaining experience in capital market funding may also support the efficient realisation of the corporations' fund raising in the longer run.

The BGS framework relies strongly on the European Central Bank's corporate sector purchase programme (CSPP). The issuers of the bonds may be non-financial corporations with registered office in Hungary. The ratio of purchases by the central bank from each bond series must not exceed 70 per cent. Within the scheme the central bank may use a maximum of HUF 300 billion for the purchase of bonds, which amounts to 0.7 per cent of GDP. The currency of the purchased bonds may only be forint, the credit rating of the purchased bonds must be minimum B+, the agreed maturity may be minimum 3 and maximum 10 years, and the purchase may be executed both on the primary and the secondary markets. The size, activity and sector classification of the applicants to date is extremely heterogeneous and diversified and great interest is shown for the programme in all sectors. According to the September data, more than 145 companies registered for the scheme, while their combined balance sheet totals came close to 15 per cent of GDP. The credit rating reports of the companies that successfully passed the credit rating phase are available on the websites of the MNB and the rating agencies.

Market participants are of the opinion that it is important for the corporate bond market in Hungary to gain momentum, for the achievement of which BGS is a very good initiative. For corporations, the scheme is advantageous not only in terms of the diversification of their funding structure, but also as part of a learning process pointing to the capital market. The corporate sector received BGS very positively, with a large number of interested parties. They emphasised that BGS was launched at an ideal time, since yields are at a historic low. They believe that this external incentive was very much necessary to support the development of the Hungarian corporate bond market. According to the market participants who attended the meeting, roughly 100–150 larger companies may be able and eligible to participate in the scheme. Corporations regard BGS as an additional source of market funding, relying on which they may primarily increase their investments. The credit rating of the corporations and their bonds, and compliance with the prospectus represented a major, but manageable task for many of the applicants.

Although keen interest in the scheme was already observed before its launch, the participants of the panel discussion urged all companies contemplating a bond issue

to learn about the opportunity provided by BGS and to take the first step as soon as possible, register in the registration interface on the MNB's website[1].

The Innovation section, which met in parallel with the money and capital market section, held its meeting in English, and thus in addition to the Hungarian speakers, foreign speakers could also share their views on Hungary's opportunities to foster innovation and the challenges hindering innovation. The section on the challenges of innovation commenced with the presentation of *Magdolna Csath,* professor of National University of Public Service and member of the National Competitiveness Council. Analysing the notion of innovation, she took stock of a country's innovation capacity and the position of Hungary in a European comparison of factors such as education and research, i.e. the basic conditions of innovation. The key conclusion of the presentation was that the two most important basic conditions of innovation are human resources and entrepreneurship. While investment in human resources essentially takes place through education and the improvement of healthcare, and results can be achieved through this, fostering entrepreneurship primarily depends on a favourable social environment. All in all, it is an essential condition of long-term development and progress that the economy should be based on innovation, which necessitates the continuous, lifelong development of knowledge and skills.

Thereafter *Anikó Szombati*, the MNB's executive director for digitalisation and the development of the FinTech sector made a presentation on why and how the MNB supports innovation in the financial sector. The baseline of the presentation was that – although the digitalisation of financial services and the channelling of innovative ideas and FinTech solutions to the operation of banks and insurers may offer major and tangible advantages to both clients and service providers – in Hungary market pressure alone is unable to enforce material changes in this area, and thus the encouragement and support of the MNB is also necessary. Within the scope of this activity the MNB places special emphasis on competition under equal terms, potential risks and consumer protection issues, to prevent negative, unintended side-effects from the spread of innovative solutions. The MNB's innovation platform, the Innovation Hub, and the new framework facilitating faster market entry, i.e. the Regulatory Sandbox, were created as a result of comprehensive work based on an in-depth survey of the FinTech ecosystem and market needs. Here, the MNB, in its capacity as the supervisory authority, provides financial institutions offering new products and services with the opportunity to test to what degree their ideas work and how customers receive them, in a controlled environment and on a small scale. In this way, risky schemes can already be identified at an early stage and it is also easier to convince policymakers if any legislative change is necessary for the purpose of applicability. In 2019, an independent executive directorate was set up

[1] https://mnbpoll.mnb.hu/Survey.aspx?surveyid=105083665&lng=hu-HU

with a view to emphasise digitalisation and FinTech support to a larger degree, and in autumn 2019 the MNB's detailed FinTech strategy was also published.

Participants in the panel discussion after the presentations included *László György*, state secretary of the Ministry for Innovation and Technology in charge of economic strategy and regulation and member of the presidium of HEA's General Government section, *Anikó Szombati*, *Kevin A. Murray*, CEO of Citi Hungary & CEE region, and *Ferenc Pongrácz*, executive director of Tungsram Group in charge of innovation and chairman of HEA's IT Section. The participants presented the innovation achievements of their own area, among other things, the industrial innovations at Tungsram Group, which fosters the spread of additional innovative solutions by using them in manufacturing and agriculture. We also learnt how global service providers such as Citibank are able to create innovation hubs and centre by concentrating their capital, one of which is the group dealing with cyber risks, headquartered in Budapest, but there are also other major centres engaged in FinTech development in Dublin and Tel Aviv. In addition to the foregoing, management of the 2010 economic crisis by the Hungarian government may also be regarded as an innovative approach, which – ignoring the formerly known scenarios – provided a fast and successful solution.

Of the messages of the panel discussion it is the importance of the government's role in fostering innovation which should be highlighted, since in Hungary the large number of small- and medium-sized enterprises is usually not sufficiently prepared to participate smoothly – either as supplier or partial contributors to researches and developments – in the innovation projects controlled by large companies. As Magdolna Csath also mentioned in her presentation, enhancing the quality of innovation, as one of the most important parts of competitiveness, is not only a question of money, as fostering entrepreneurship is equally important. This may also be supported by the state, if in addition to granting financial subsidies it also plays an active role in supporting information flows.

INSTRUCTION FOR AUTHORS

Manuscripts should be submitted in accordance with the following rules.

- The length of the manuscripts should be limited to 40,000 characters (including spaces) but a ± 50 per cent deviation is accepted. Manuscripts should be written in Hungarian and/or English.
- Papers always begin with an abstract which should not exceed 800–1,000 characters. In the abstract a brief summary is to be given in which the main hypotheses and points are highlighted.
- At the bottom of the title page a footnote is to be given. The footnote contains every necessary information related to the paper (acknowledgement, relevant information etc.). This is followed by the name of the institution and position the author works at, e-mail address in Hungarian and English.
- Journal of Economic Literature (JEL) classification numbers should be given (three at least).
- Manuscripts should be written in clear, concise and grammatically correct Hungarian and/or English. Chapters and subchapters should be bold.
- Manuscripts should contain the list of references with the first and surname of the authors (in case of non-Hungarians the initials of the first name are required), the year of publication, the exact title of the book, the publisher, the place of publication. In case of papers, the exact title of the journal, the year, the volume, and the pages should be indicated. References in the text should contain the surname and the year separated by comma. When citing, the exact page be indicated.
- Tables and figures are to be numbered continuously (chapters and subchapters should not contain restarted numbering). Every table and figure should have a title and the units of quantitative values are to be indicated. Tables and figures are to be made by MS Word and Excel in Hungarian and English. Notes and sources are to be put directly at the bottom of the tables, figures.
- Equations should be aligned to the right and should be numbered continuously in parenthesis. (Chapters and subchapters should not contain restarted numbering.)
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- Manuscripts should be sent as attachment by e-mail in MS Word file. Figures and tables should be sent in MS Excel file both in Hungarian and English.
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Thank you!

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