

QUO VADIS

EUROPEAN UNION OF 27?

**The EU between internal tensions,
COVID-crisis and external challenges
– Polish and German perspectives**

Edited by Jürgen Wandel, Andreas Bielig, Katarzyna Kamińska

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INTRODUCTION

The European Union (EU) has been struggling for years with multiple crises such as the eurozone crisis, the migration crisis, Brexit and economic stagnation. The COVID-19 pandemic has become an additional challenge that not only requires considerable efforts from the member countries of the EU in economic, political and social terms, but also makes existing acute deficits and structural problems unsparingly apparent. In addition, the EU is exposed to various external and global challenges, such as ever-increasing political tensions with China and Russia. How does the EU and its member states respond to these various challenges and how does this affect the nature and further functioning of the European integration project?

These were the leading questions of a research project titled “Quo vadis European Union of 27? The EU between internal tensions, COVID-crisis and external challenges – Polish and German perspectives” which was conducted in 2021 at the Chair of German Economics at SGH Warsaw School of Economics together with partner institutions from Poland and Germany and with the support of the Konrad Adenauer Foundation in Warsaw. Its results were discussed at a German-Polish conference held at SGH Warsaw School of Economics on October 13 and 14, 2021. A total of 15 authors developed their ideas on the topic of the conference into 11 articles for this edited volume.

The first part of the book deals with challenges for European policy as whole and in relation to its member states stemming from structural inconsistencies of European institutions as well as with the functioning and future nature of the European Union. Thomas Apolte discusses if, and to what extent the agreement of the July 2020 EU summit has brought about a Hamiltonian moment, as it has been dubbed by the Germany’s new chancellor Olaf Scholz, at that time still finance minister. On this summit the EU’s 27 heads of state had decided on a huge rescue package to counteract the coronavirus-induced economic crisis which for the first time in EU’s history shall be financed by the issue of common debt by the European Commission. Some politicians and commentators view this noteworthy change in analogy to U.S. Treasury Secretary Alexander Hamilton, who in 1790 engineered a political agreement on public borrowing that helped transform the loosely confederated

13 former colonies into a more tightly bound federal union. Jürgen Wandel analyzes in more depth the EU's policy response to the economic fallout in the context of the coronavirus pandemic as manifested in particular in the Next Generation EU recovery plan and in the expansion of the European Central Bank's ultra-loose monetary policy. Drawing on a robust political economy framework he focuses on informational problems and political economy consequences with specific reference to Germany and Poland.

A manifestation of internal tensions in the EU is the ongoing dispute between EU institutions and member states about tying EU funds to certain basic standards around the rule of law and democracy at home and over the primacy of EU law over national law. Affected by this conflict are in particular Poland and Hungary, but also Germany. It is known from bureaucracy theory that self-interested civil servants are interested in increasing competences for their organizations that furthers their power and prestige (Downs, 1994; Niskanen, 1994). This also holds for the Court of Justice of the European Union, that plays an important, but often overlooked role in European politics through its attempts to further develop EU law (Vaubel, 2018). Against this background Bernard Łukańko and Grażyna Zboralska reflect on the boundaries of the primacy of European over national law, its potential impact for the economy and possible solutions referring to currently ongoing cases. Magdalena Bainczyk analyses the consequences of the German Federal Constitutional Court ruling on the European Central Bank (ECB) 's Public Sector Asset Purchase Program (PSAPP) in the context of the EU Recovery and Resilience Facility which it viewed an abuse of ECB's mandate and brought the country in conflict with EU institutions.

The second part of the edited volume focuses on monetary and banking policy issues in the European Union. In view of the threat of rising inflation David Burden, Maurice Daub and Lilli Zimmermann explore the accuracy of GDP and inflation forecasts in the Euro area. Johannes Alban and Andreas Igl analyze the effects of newly introduced securitisation repositories and disclosure requirements on the transparency of structured products and assess the side effects on the further development of the EU capital market (union) after Brexit and COVID-19. Waldemar Milewicz examines ownership structures in the German banking sector and the resulting lessons and consequences for the Polish banking sector.

The third and final part of the monograph discusses various aspect of issues of the digital transformation of the European society and economy. Digitalization processes challenge existing policies focusing on tangible products and assets, fixed geographic boundaries, limiting transaction costs and supply and demand scarcities (OECD, 2019, p. 3). Digital technologies, platforms and infrastructures transform

with immense speed innovation processes and entrepreneurship in our economies with broad implications for value creation and capture (Nambisan, Wright, Feldman, 2019, p. 1). This provides many opportunities for new products and business models (Teece, 2018) but also threats for established firms and market players (Domini et al., 2021). Olga Domakur and Bakhtiyor Mamurov refer to basic processes of digitalization with respect to economic effects and policy implications. Agnieszka Wójcik-Czerniawska discusses scenarios of a post-COVID digitalized world. Finally, Christian Rusche presents monitoring results of the status quo Artificial Intelligence in German economy, policy and society.

As a whole, this edited volume provides a multi-faceted look on economic developments and challenges in the post-Brexit EU in a crisis-ridden environment. We hope this inspires further research and discussion on the future development of the EU and its member countries.

Our special thanks go to all the authors of this edited volume, whose expertise made this book possible. We are especially grateful to the Konrad Adenauer Foundation for its financial support of this publication and the underlying economic policy dialogue between German and Polish scholars. Finally, we owe a great debt of gratitude to the reviewers for their extremely valuable comments as well as to all colleagues at the Chair of German Economics, the German-Polish Academic Forum, as well as the World Economy Research Institute and the Institute for International Economic Policy at SGH for their administrative support in realizing this research and book project

Warsaw, July 2022

Jürgen Wandel,
Andreas Bielig,
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Part |

**CHALLENGES FOR
EUROPEAN POLICY**

THE EU'S RESPONSE TO THE COVID-19 ECONOMIC FALLOUT: ROBUST POLITICAL ECONOMY CONSIDERATIONS WITH SPECIFIC REFERENCE TO GERMANY AND POLAND

Jürgen Wandel*

Nothing is so permanent as a temporary government program
(Friedman, 1984, p. 115).

1. Introduction

In 2020 the various lockdown measures and other precautions of European governments in response to the coronavirus pandemic triggered an unprecedented economic fallout that added another calamity to the European Union's multiple crises since 2008 and resulted in the worst economic crisis since the Great Depression.

Crises usually provide occasions to reconsider economic policy approaches for better or worth. On the one hand, various financial demands can suddenly be satisfied, old political concepts can be sold as new recipes for solving current problems, and objective or legal concerns can be ignored by pointing to the exceptional situation of the crisis. Often a stronger role of the government is propagated, as Pennington (2021, p. 21) pointed out, especially on the left and progressive political spectrum, where inspired by thinkers such as John Dewey (1927) and John Maynard Keynes (1931) “there is a long line of thinking which suggests that crisis situations require bold and radical experimentation by the state and its agencies”, because “on this view, only the state has the capacity to engage in the bold ‘transformational’ measures that might be required to ‘jolt’ society out of crisis events”.

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On the other hand, crises offer the chance to put an end to costly and ineffective government measures and pave the way for factual arguments and pragmatism.

And indeed, EU's major institutions perceive the COVID-19 crisis "a lifetime chance" (European Commission, 2020a) not only to cope with the immediate economic and social consequences of the pandemic, but also with current and future challenges. These are seen in profound technological and environmental changes and the preservation of social cohesion. In order to meet these challenges the EU assumes a guiding role and therefore has set up the largest anti-crisis and recovery package ever in its history. At its heart is a 750-billion-euro "Next Generation EU" (NGEU) plan (European Union, 2020) which is linked to the Multiannual Financial Framework for 2021–2027 (MFF) of €1.074 trillion¹. The initiative comprises grants and credit facilities for member countries financed by EU bonds. It is accompanied by monetary stimuli from the European Central Bank (ECB).

Against this background the paper discusses the appropriateness of this response of the EU-27 to overcome the coronavirus economic crisis and enhance growth performance in a sustainable manner. In doing so, it also analyzes in which direction the EU recovery policy may push the nature of the European Union. In the EU, there can be seen an ideal typical divide between the northern member states around Germany with a preference for more decentralized, market-oriented, rules-based economic policies and for fiscal solidity, and the south led by France that adheres to a more unified, statist, discretionary economic philosophy where fiscal spending is viewed as the key to prosperity (Brunnermeier et al., 2016, p. 4). It is also about the old question whether the European Integration is understood predominantly as the integration of markets or the integration of policies. While the integration of markets is about removing barriers in international competition, political integration means the unification and centralization of policies. There is usually a contrast between the two fields of integration, because market integration typically reduces the extent of government interference in the economy, but political integration increases it. Unlike market integration, political integration can go too far, because a centralization of political decision-making that goes beyond what is necessary for market integration strengthens the power of the state over its citizens (Vaubel, 2001). Where does the pandemic response shift the weight to?

To undertake this analysis, the study applies a robust political economy framework. It has been developed by Boettke and Leeson (2004), Leeson and Subrick (2006), and Pennington (2011) by synthesizing major insights of the Austrian

¹ These are the numbers in 2018 prices. In 2021 prices, the NGEU amounts to €806.9 billion and the MFF to €1.211 trillion. The volume of the funds is adjusted every year for inflation. For more details see European Commission (2021a).

School of Economics, Public Choice Theory and Institutional Economics into a unified analytical approach for evaluating economic policies. This framework draws attention to two central problems political decision-makers must overcome in order to ensure the workability of their suggested measures in real-world situations: First, they need to be able to gather and analyze the relevant information necessary for achieving the desired goals. Second, they must have the incentive to implement them properly. They must in other words both overcome a problem of knowledge and one of incentives. Hence, the robust political economy framework checks the feasibility of policies in the face of conditions that deviate from the neoclassical ideal assumptions of perfect knowledge and benevolence. The assumption of omniscience was questioned most eloquently and persistently by Friedrich August von Hayek, the most prominent representative of the Austrian School of Economics, the assumption of government benevolence by the Public Choice School of economics, in particular by James Buchanan and Gordon Tullock. Institutional economics have highlighted the importance of the right the rules of the game to cope with imperfect knowledge and motivations as they structure the incentives underlying individual action (Baumol, 1990).

In applying this analytical framework, the paper illuminates and draws attention to the contribution of these strands of economic thinking for the comparative analysis of economic policies and institutions. In doing so, it contrasts the standard view of political actors as a coherent entity willing and able to rectify crisis and market failures with an individualistic view that treats policymakers as self – interested individuals with limited knowledge. So the study also raises conceptual challenges to the standard view and shifts the terms of the debate over EU's appropriate anti-crisis policy from the potential performance of particular programs to the conceptual foundations that motivate such programs.

The remainder of this article is organized as follows: Section 2 presents the major goals and policy instruments of EU-27's response in the wake of the COVID-19 economic in order to identify the main features of the proposed economic policy concept. Section 3 analyses its knowledge dimension and section 4 highlights its possible political economy effects. Section 5 concludes.

2. Central anti-crisis measures

Besides coordinating the supply and distribution of vaccines against COVID-19 through Advance Purchase Agreements with individual vaccine producers, where the Commission secured the right to buy a specified number of vaccine doses

in a given timeframe and at a given price (European Commission, 2020b), at the heart of EU's response are huge fiscal and monetary stimuli.

Fiscal stimulus

Already on 23 March 2020 the finance ministers of the European Union suspended the Stability Pact, which was supposed to restrain the expansion of national debt, until further notice and so initiated a break with austerity policy, adopted in the aftermath of the 2008 financial crisis (Polleit, 2020). This break was deepened, when on 10 November 2020, the EU Member States in the Council and the European Parliament, with the support of the European Commission had agreed on a fiscal stimulus package worth an unprecedented €2.018 trillion in current prices (€1.8 trillion in 2018 prices). It consists of the EU's long-term budget (Multiannual Financial Framework – MFF) for 2021–2027 of €1.211 trillion (€1.074 trillion in 2018 prices) and the NextGenerationEU (NGEU) recovery fund, which provides additional €806.9 billion (€750 billion in 2018 prices) in funding. The NGEU is officially declared to be a temporary instrument aimed to “help repair the immediate economic and social damage brought about by the coronavirus pandemic” (European Commission, 2020a). However, this actually means not only to soften the immediate impact of the crisis on member countries, but also to make the European economy more sustainable and resilient to future crises. Hence, the EU Commission views the NGEU program also as a tool of directing the member states' economies toward political priorities, which it sees in particular in digitalization and climate change.

The centrepiece of NextGenerationEU is the Recovery and Resilience Facility which with a total value of €723.8 billion accounts for 90% of all available anti-crisis funds. It provides €338.0 billion in form of nonrepayable grants and the remainder €385.8 billion as loans to individual member states on favourable conditions. In addition, the NGEU allocates €83.1 billion to several existing EU programs and policies, among them cohesion and agricultural policy, Horizon Europe and the Just Transition Fund. The latter was set up with the beginning of 2021 as part of the European Green Deal to compensate for the socio-economic costs in regions that shall phase out the production and use of coal, lignite, peat and oil shale in the envisaged transition to climate neutrality. Together with the €540 billion of funds already in place for three immediate safety nets² passed in April 2020 the overall

² This measure targets workers, businesses and member states in order to help people keep their job during the crisis by covering part of the costs related to the creation or extension of national short-time work schemes.

EU's recovery package amounts to €2364.3 billion. The novelty of the NGEU is that it breaks with two common norms of EU cooperation: first, no large-scale redistribution to cushion economic crises and second, and most importantly, no common EU debt issuance (de la Porte, Jensen, 2021). With the NGEU, the European Commission became entitled to borrow on the markets, while repayment will take place over a long-term period until 2058 (European Commission, 2021a).

The rescue package was made possible after Germany unexpectedly departed from its traditional restrictive fiscal stance towards supporting the grant as a policy instrument and after the like-minded fiscally conservative frugal four (the Netherlands, Denmark, Sweden and Austria) also accepted the grant as an instrument in the NGEU. However, they demanded in exchange a high level of conditionality for the disbursement of grants. In order to receive funds from the anti-crisis package, each member state has to submit national plans describing how it will support the recovery of its economy and make it more resilient. Thereby, at least 20% of the resources must be allocated for digital transition purposes and 37% for greening the economy. Other investments should be implemented in line with the “do no harm” principle with regard to environmental objectives. In addition, the recipient countries must guarantee the rule of law (European Commission, 2021b).

According to a tentative study based on interviews by de la Porte and Jensen (2021, p. 392) Germany's change in position can be “explained by several factors, based on strategic considerations and learning from the policy response in the last financial crisis”. First, Germany wanted to strengthen the single market after the COVID-19-restrictions to support its export-driven economy, which heavily relies on trade with the rest of the EU. Second, they argue, the German government has provided significant state aid to its own companies during the COVID-19 crisis, “which ... put it under pressure to create a level playing field”. Third, Merkel wanted to avoid a similar situation as during the eurozone crisis where the insistence on fiscal solidity led to growing distrust in the EU countries that have been most severely affected by the crisis.

As of October 2021 the Commission has given green light to 18 national recovery plans, among them France with a volume of €40 billion, Italy with a volume of €69 billion, and Germany. The latter will receive a total of €25.6 billion euros in grants from the Corona Reconstruction Fund (RRF). Nearly 52% for the digital transition and 42% of its total allocation will be devoted to measures that support climate objectives (European Commission, 2021c; Bundesministerium der Finanzen, 2021). Among others, €2.5 billion are earmarked for the improvement of energy efficiencies of buildings and another €2.5 billion for purchase premiums for 800,000 climate-friendly vehicles (ZDF, 2021). However, the Commission has

withheld so far approval for Poland (€24 billion grants) and Hungary (7 billion grants) (Bruegel, 2021), because of disagreements over the rule of law (independence of courts and media freedom) and the primacy of European Union law over national law (Strupczewski, 2021). This issue will be discussed later in more detail.

Expansion and greening of monetary policy

Already in March 2020, the European Central Bank reacted to the crisis and expanded its already ultra-loose monetary policy even more with the pandemic emergency purchase program to support economic recovery. At first it had a volume of €750 billion. The program received a further boost in June and December 2020 with additional €600 billion, resp. €500 billion, bringing the total to €1850 billion. (European Council, 2021). Although the Governing Council announced on 9 September 2021 to slow down the pace of net asset purchases under its pandemic emergency purchase program, the ECB reiterated to keep its monetary policy unchanged with interest rates at their present low or even lower levels until the ECB holds that inflation will stabilize at 2% over the medium term (NZZ, 2021).

In addition, the ECB uses this crisis to intensify the greening of its monetary policy. This was confirmed on 8 July 2021 when the ECB president announced the new monetary strategy for the euro system (European Central Bank, 2021a; Vollmer, 2021). Besides the redefinition of the price stability objective as a symmetric of exactly two per cent inflation target over the medium term (instead of the hitherto aim of keeping inflation “close to, but below 2%”), the ECB is strongly committed to further incorporating climate change considerations into its monetary policy framework, e.g. in the areas of disclosure, risk assessment, collateral framework and corporate sector asset purchases.

3. Pretence of knowledge

The EU’s response to the COVID-19 induced crisis has at least two dimensions where what Hayek (1978) called pretence of knowledge can occur. The first is the health and disaster relief dimension. The second dimension concerns reinforcing growth and competitiveness of the EU’s economies and related to this strengthening resilience to future shocks. In both cases the crucial question to be solved is who at what level of the Union possesses the information needed to meet this challenges successfully.

The nature of the knowledge problem

Nobel Prize Laureate F.A. von Hayek has drawn attention in his work that in complex phenomena such as modern socio-economic systems, based on the division of labour, this knowledge is hard to come by³ Hayek (1937, 1945, 1978, 1988, 1989) has pointed out, that the crucial information needed is not about what is *technically* feasible, but about what consumers really want. Yet, this kind of knowledge is dispersed throughout society with a lot of important information accumulating in individual brains. Some knowledge is even tacit in the sense that people learned how to do things but they cannot possibly articulate it.⁴ In addition, since human behaviour continuously adapts to changing circumstances, often in unpredictable ways, the information is never constant. Together with human's irremediable limited cognitive abilities to capture all relevant information this makes the information inherently uncollectible for any centralized governance body.

Therefore, Hayek argued that from a comparative institutional perspective markets and other decentralized governance mechanisms that rely on competition are better placed to activate and productively use dispersed and highly localized knowledge than central authorities as they facilitate more learning and adaptation in complex conditions than in a centrally managed alternative. In a competitive market system relevant economic information such as preferences and the relative availability of resources are codified in the prices of goods, services, and resources that reflect supply-and-demand decisions and “the social desirability of activities is communicated...by the signals of profit and loss, which other economic actors can observe and act on” (Bourne, 2021, p. 108). It is this profit-and-loss mechanism that sorts out bad ideas that not enough people value highly and so incentivizes the constant re-allocation of resources towards more productive ends (Pennington,

³ See F.A. Hayek (1937) and (1945) on the “limits to knowledge” and Hayek (1967/1994) on complex phenomena. As Pennington (2021, p. 6) explains, “complex phenomena ... refer to systems where the elements that make up a greater whole do not interact in a linear fashion and where the number of elements and the character of their interaction is too vast for them to be comprehended by the scientific observer. While non-linear systems can be modelled, the relevant relationships cannot be characterised with sufficient quantitative precision.” This also holds for complex phenomena e.g. in natural sciences like the climate. For simple phenomena “it is possible from a given starting position to predict the outcomes that will be generated by the application of a stimulus into a system.” Physics, e.g., deals, though not entirely, with this kind of phenomena, which “allow for the derivation of predictive, quantitative regularities by the scientist” (Pennington, 2021, p. 6).

⁴ An example is how to catch a ball. Besides Hayek Michael Polanyi introduced the concept of tacit knowledge. In his book *The Tacit Dimension* (1996/2009) he coined the frequently quoted phrase that put the meaning of tacit knowledge in a nutshell, namely “that we know more than we know how to say”. Knowledge acquisition does not necessarily happen through the conscious and systematic acquisition of knowledge, but often occurs as implicit learning.

2021, p. 8). At the same time profits encourage risk taking by economic actors, while losses urge prudence in decision-making. In government, however, such incentives do not exist. It typically uses taxpayers' money to finance its activities, often regardless of its performance. Dissatisfied taxpayers have no exit option comparable to disappointed consumers that move to other supplier. The only incentives for the government is the "voice" option of negative media publicity and lost votes, but there is no threat of bankruptcy (Sobel, Leeson, 2008). Hence, free markets and other decentralized governance mechanisms have an advantage over centralized schemes, because with the price mechanism it has a communication system that reveals in an indirect way more knowledge than would be possible without it and so harness decentralized knowledge, and the built-in profit and loss mechanism provides feedbacks that incentivize the effective and desired uses of resources.

From this insight of the impossibility to achieve full knowledge and control about complex phenomena Hayek (1967, p. 65) demands an attitude of humility of what man can know and do without causing worse outcomes than before an intervention. Very often, unforeseen consequences end up destroying the good intentions of intervening central authorities. With respect to supranational structures like the EU Hayek's approach suggests "avoiding a policy regime which relies too heavily on a 'directive intelligence' at too great a territorial or geographical scale" (Pennington, 2021, p. 15). This holds for various issue including immediate disaster relief, tackling environmental problems and exploring prospective business ventures that boost economic growth.

Disaster Relief

The Hayekian perspective of the advantage of decentralized forms of governance in solving the knowledge problem recognizes that government action may be necessary in emergency situations such as wars, natural disasters or pandemics that may involve significant externalities or public goods problems and excessive transaction costs that might prevent an effective response from private agents. Nevertheless, government agencies and official still face a knowledge problem in disaster management. First, information is needed on how severe the disaster is? Second, what relief supplies are needed, who has them readily available, who need them the most, and if the needs differ in various geographic areas? Third, a feedback is necessary whether the initiated disaster-relief activities are working, and what might need modification (Sobel, Lesson, 2008).

All this information is as much dispersed and local as in the ordinary business life. For example, while demanders of relief know when, what and how much relief

is needed, they do not necessarily know who has the relief supplies they require or how to obtain them. Similarly, relief suppliers know what relief supplies they have, but they may be largely unaware of what is really needed, by whom, in what locations and quantities. Also in this situation, it is the price and profit and loss mechanism of the marketplace that provides the necessary incentives to grasp this information in a more productive way than centralized bodies can do. Therefore, if a profit opportunity emerges following a disaster, private firms have a great incentive to learn comprehensively about the potential to respond to the disaster quickly, flexibly and effectively, not the least because the first business firm to provide adequate relief stands to benefit considerably (Sobel, Leeson, 2008).⁵

An example from the corona-crisis that supports this theoretical reasoning is the high speed by which private firms responded producing masks, developing vaccines and feasible hygiene concepts (Haucap, 2021). Sinn (2021, p. 23) reports how private initiatives and firms in Bavaria quickly collected donations to support people and hospitals in Italian regions most hit by the pandemic. Even if the amount of support needed for relief might exceed the capability of private initiatives the above explained theoretical considerations suggest following the principal of subsidiarity. This implies that individual national governments should organize relief among member states. There is no need for supranational coordination of immediate disaster relief. When someone delivers aid to somebody else, he usually does so out of his own free choice and irrespective of whether individuals do the same or not.

When disaster relief is centralized and managed by ever higher layers of government such as by EU institutions on a supranational level, it necessarily becomes bureaucratized. Multiple layers of approval are involved before action may be undertaken which substantially slows government activities and information revelation (Sobel, Leeson, 2008). As Hayek (1945, p. 524) argued: “If we can agree that the economic problem of society is mainly one of rapid adaptation to changes in the particular circumstances of time and place, it would seem to follow that the ultimate decisions must be left to the people who are familiar with these circumstances, who know directly of the relevant changes, and of the resources immediately available to meet them. We cannot expect that this problem will be solved by first communicating all this knowledge to a central board which, after integrating all knowledge, issues its orders. We must solve it by some form of decentralization.”

⁵ The same holds for private non-profit agencies. If they that fail to respond they risk future donations. As Sobel and Leeson (2008) pointed out, “even the charitable activities of private individuals and non-profit organizations, which suffer somewhat from the absence of market prices to guide them, are likely to be directed toward satisfying the most highly valued needs”, because an efficient allocation of their resources increase their reputation and thus future profits.

Therefore, given these theoretical insights, it is not surprising that when disaster-relief management is highly centralized, such as on the supranational EU level, it often falls short of expectations. Sobel and Leeson (2008) demonstrated this convincingly in an in-depth case study on the Hurricane Katarina disaster based on extensive field work. A more recent case in point is the chaos and ultimate failure of EU Commission's attempt to centralize the supply and distribution of vaccines across all 27 member states in the context of the coronavirus crisis. The aim was apparently to achieve favourable prices through concentrating purchasing power and to demonstrate joint EU action and solidarity. In reality, however, it turned out difficult to reconcile various country-specific preferences, so that negotiations on prices and the liability for any problems that might arise from the new vaccine proved time-consuming, non-transparent and even counterproductive. Since, as Sinn (2020) explains, the EU wanted to buy at relatively low prices, producers expanded their capacities only slowly and actually had no incentive at all to supply EU countries first. Instead, they preferred to supply those countries that were willing to pay more. Accordingly, the EU Commission not only ordered far too late – only in November, but also too little, while the USA, for example, had already ordered enough quantities in July and many other countries in August. It would have been better to leave the procurement of the vaccines to the individual member states. If they all had bought for themselves, this would have driven up prices and thus accelerated vaccine production, because the suppliers would have invested earlier and more in building up production capacities. (Hölzle, 2021; Sinn, 2021; Gros, 2021). In Germany, vaccination itself proceeded extremely slowly compared to some other EU countries, Israel, Great Britain and the United States. Only when private general practitioners were allowed to vaccinate, too, speed increased. The inadequate digitization at health offices and schools and the sluggish disbursement of financial aid complete the picture of state failure in Germany's pandemic management. This led German economist Justus Haucap (2021) to conclude that whenever the government was engaged in disaster relief during the pandemic the results were bad. Similarly, if the central aim of Next Generation EU was really immediate disaster relief and economic recovery from the government-induced economic fallout, then help comes relatively late. In the most severe recession year 2020, the money was not yet available, and the full disbursement of all funds will last until 2026. More than 50% of Corona funds will not be disbursed until 2024 to 2026 (Darvas, 2020; Heinemann, 2021a).

Another problem that occurs when disaster relief is centralized, is that there is no way to evaluate effectively the ongoing success or failure of disaster-relief activities, because unlike for private providers of relief the resources under government's control are not affected primarily by performance measured by profit and loss and

so lacks an effective feedback mechanism. Consequently, political actors have little idea of whether they should expand their activities, shift their activities, or drop them altogether (Sobel, Leeson, 2008). For example, while some of EU's spending, in particular via the immediate safety nets of April 2020, may be justified to support workers and employers in the immediate term, the danger of such schemes is that they can turn into longer term 'stimulus packages' and then preserve the pre-pandemic pattern of employment. Examples are the support for tourism and travel, sectors relatively hard affected by the lockdown measures. It may be likely that there will be permanently less business travel, even after the Corona crisis, because more meetings will take place online. Hence, the support may prevent the reallocation of resources towards new consumer needs (Dorn, Fuest, 2021; Pennington, 2021, p. 13).

So, because even the most benevolent and effective director of a centralized governance mechanism cannot overcome the Hayekian knowledge problem also in disaster-management the role of government should be limited to the same extent that it should be regarding all other market activities. This means giving room as much as possible to markets and other decentralized governance mechanism. This is in line with the insides of Elinor Ostrom, the 2009 Nobel Prize winner in economic science. She has demonstrated in a variety of historical circumstances and institutional environments the frequent, though not universal, efficacy of decentralized governance. This does not only include the market mechanism, but also community-based mechanisms, where entities on the communal level freely choose their own mechanisms to manage problems, without government coercion or planning. This stems from the theoretical and empirical inside that individuals in their local situation are more effective at knowing what the right actions are than government officials removed from the daily life of the community (Boettke, 2010, p. 287). This does not mean that there is no role at all for the government. It may provide information to resource users or assist enforcement processes through court systems. Which mechanism – market, community, national and supranational government – is best suited depends on the nature of the problem that needs to be solved (Ostrom, 2012). Yet still the central epistemic problem remains. The farther away the decision-maker is from the problem to be solved and the less sufficient personal involvement in the success of managing the issue, the less likely is it to harness dispersed knowledge of the 'circumstances of time and place' (Hayek, 1945). "By decentralising decision-making to many different individuals and organisations, a greater level of experimentation is facilitated than in more centralized regimes, allowing for evolutionary learning while minimising the impact of inevitable mistakes" (Pennington, 2012, p. 39).

Prioritizing investment

These insights in the relative superiority of markets and other decentralized governance mechanisms in overcoming the knowledge problem applies also completely to the EU's attempt to prioritize and steer investment activities accordingly.

The Commission strongly encourages Member States to channel investment in the following seven so called flagship areas in order to advance the aspired green and digital transition (European Commission, 2021b): clean technologies and renewables, energy efficiency, sustainable transport and charging stations, rapid broadband services, digitalisation of public administration, data cloud capacities, and education and training to support digital skills. Invoking alleged market failures the section "Example of component of reforms and investments" suggests concrete investment objects (European Commission, 2021b). These involve facilitating the use of renewable energy and waste heat in district heating networks, supporting the development of electrolyzers and renewable hydrogen for industry (European Commission, 2021d), a larger supply of sustainable shared mobility services, including transport on demand, accelerating investment in recharging stations, the introduction of a scrapping scheme for the most polluting vehicles (European Commission, 2021e), or the expansion of comprehensive 5G and fibre coverage as well as the establishment of a European Edge Cloud infrastructure (European Commission, 2021f).

Germany's 1,250 pages national recovery and resilience plan covers similar areas of support. It identified hydrogen as a prospective alternative to fossil fuel dependent sectors of the economy, such as steel, cement, heavy-duty vehicles, chemicals or food shipping. For the promotion of the hydrogen economy Germany intends to spend alone 12% of the total expenditure of its €28 billion euro recovery plan. For greening the automotive industry it selected electromobility as the appropriate solution and attempts to boost it by allocating 19% of total spending to the promotion of the purchase of electrically powered vehicles as well as to the expansion of the charging station infrastructure. In construction it selected wood as "climate friendly" material and to foster digitalization it incentivizes investment in microelectronics and communication technologies. Also declared as a contribution to digitization, another €1.9 billion shall be spent on an investment program for the automotive industry and its suppliers (Bundesministerium der Finanzen, 2021).

As a whole, the Next Generation EU program follows the scheme of previous long-term development plans such as the Lisbon Strategy of 2000 and Europe 2020 of 2010. It seeks to reconcile economic growth with societal concerns, in this case in particular environmental issues, and attempts to steer the economic process

from above through the open method of coordination.⁶ This relatively centralized approach to economic governance and the economic policy suggestions resembles much the French post-war economic philosophy, which assumes that well-intentioned experts (technocrats) must and can orchestrate economic development better than free markets to reach politically desired ends (Brunnermeier et al., 2016). The resulting programs are indicative in nature which means that they leave member states and private economic subjects certain freedom to decide how they want to achieve the predefined goals, such as emission targets. So there is some room for experimentation across member states and, depending on what instruments individual countries apply, maybe even within. However, the suggestion of what components of investment should be supported and the disbursement of the funds in installments depending on the fulfillment of previously agreed-upon milestones and targets, which is monitored twice a year, reduces the intensity of both market and regulatory competition. It is further weakened by the European Central Bank's green monetary policy. As part of its asset purchase programs it has already been investing in green bonds, which it intends to increase in the future following the July 2021 decision to include sustainability explicitly in the ECB's new strategy. As a major buyer of green bonds, the ECB could ensure higher bond prices and a low interest rate in this market segment. (European Central Bank, 2021b). So actually the ECB assumes an industrial policy role and in doing so violates the hitherto practised principle of market neutral interventions (Vollmer, 2021).

Also in the case of strengthening competitiveness and mitigating environmental problems, it is the systemic discipline provided by competition with its profit – and – loss feedbacks that ensures that “more of the potentially useful objective facts will be taken into account than would be done in any other procedure we know” (Hayek, 1990, p. 68). While never guaranteeing successful innovation, it increases the *chance* of discovering beneficial innovations and the shutting down of deleterious ones. Centralized state-centred schemes of economic transformation lack such a systemic mechanism of fluctuating profit and loss signals to untangle relatively better from relatively worse decisions. This makes them inherently cumbersome and the consequences of flawed decisions are much more far reaching than if the decision-making power is more dispersed, because many economic agents are being guided in the wrong direction (Pennington, 2011). This could be the case with the selection of electromobility as the panacea to mitigate environmental problems

⁶ Besides setting priorities and quantitative targets at the EU-level for all member states (“benchmarking”), this methods includes an annual evaluation of member countries’ progress towards fulfilling the targets („peer pressing“) and country-specific policy recommendations (European Commission, 2010, p. 26).

in transportation. The EU implicitly compels the automotive industry in this direction through ever stricter EU-wide CO₂ emission targets and the threat of penalty payments for non-compliance.⁷ The German government pushes this technology through generous purchase subsidy schemes (Sinn, 2019). Thereby, the policy-makers assumes that electric vehicles (EVs) do not emit any CO₂. But this a classical broken windows fallacy a la Frédéric Bastiat. Evs, in fact, do emit substantial amounts of CO₂, but the exhaust is not seen directly as it is released somewhere else, namely at the power plant. In addition, the energy needed to recharge the cars also comes partly from hydrocarbons, because coal- or gas-fired power plants are still needed to ensure energy supply during the “dark doldrums” when the wind is not blowing and the sun is not shining. And even when they are charged with solar- or wind-generated energy, enormous amounts of fossil fuels are used to produce EV batteries in China and elsewhere, offsetting the supposed emissions reduction in Europe. A study ordered by the Austrian automobile association, ÖAMTC, and its German counterpart, ADAC, also confirms this conclusion. It found that a mid-sized electric passenger car in Germany must drive 219,000 kilometres before it starts outperforming the corresponding diesel car in terms of CO₂ emissions. However, passenger cars in Europe are usually used for only 180,000 kilometres, on average. In addition, EV batteries do not run long enough to reach that distance (Jungmeier et al., 2019). It is therefore not surprising that EVs obviously do not really meet consumer needs. In a round-table interview in Munich in June 2019, BMW’s director of development, Klaus Fröhlich stated that “there are no customer requests for battery-electric vehicles (BEV). None. There are regulator requests for BEVs, but no customer requests” (Forbes, 27 June 2019).

This does not mean that none of the relevant expenditures might generate some value, but this will largely be the result of fortuitous accident. In fact, given the sheer volume of public money spent on their favoured projects it would be a miracle if none of this expenditure did any good and had no payoff at all (Thierer, 2002, 2021). Yet, the cases of failed state-targeted projects outnumber the success story (for more detail see Lerner, 2009; Pack, Saggi 2006; Naudé, 2010). Prominent examples from Germany are the transrapid, cargo lifter, or the decline of the solar industry in 2011 and wind power sector since 2018 (Schnellenbach, 2019; Spiegel-

⁷ Most recently, the EU fleet-wide emission targets have been tightened through the Regulation (EU) 2019/631 of the European Parliament and of the Council of 17 April 2019. From 2030 onward, European carmakers must have achieved average vehicle emissions of just 59 grams of CO₂ per kilometre (EUR-Lex 2019). According to Sinn (2019) “even the most gifted engineers will not be able to build internal combustion engines (ICEs) that meet the EU’s prescribed standards.” If a company cannot produce EVs and remains at the current average emissions level, it will have to pay a fine of around €6,000 per car, or otherwise merge with a competitor that can build EVs.

Online, 2019). Similarly weak is the empirical evidence that China and other East Asian tiger countries owe their success to high levels of industrial policy and other forms of state interventionism rather than to freeing markets from government influence (Pennington, 2011; Zhang, 2015; Kroeber, 2016).

Common EU-wide action maybe warranted to alleviate cross-border environmental problems when the parties involved are remote and numerous (Vaubel, 2001; Dolan, 2014). Climate policy might be such a case given if one follows the conviction that CO₂ is the main driver of a harmful climate change. In this situation market-based instruments such as a comprehensive emissions trading system that establishes a price for pollution rights (i.e. for the right to use the atmosphere for waste disposal) as already installed in the EU since 2005 (for more detail see European Commission, 2021 g) is the appropriate tool. Surely, the setting of the target of overall greenhouse reduction and of the upper limit on total permissible CO₂ emissions inevitably faces a knowledge problem as it might be difficult to objectively determine “the” optimal number of permits, the best way to establish the initial allocation of emission rights (Dolan, 2014) and the trade-offs between environmental and other objects. But from a comparative institutional view this system allows for more experimentation to find out where and with what technologies emissions can be reduced at the least costs taking into account consumer needs than in an interventionist industrial policy approach that picks technologies and discriminates across sectors and even firms as it is done in Germany’s energy transition. In fact, since the country’s “Energiewende” is not linked to the European Emissions Trading System it actually only shifts CO₂ emissions, but does nothing to reduce it. As a result of the massive expansion of electricity generated from renewables German utility companies demand fewer emission rights leading to lower prices of these tradable emission rights. These cheaper pollution rights allow other EU and even other sectors in Germany to their emissions as long as the cap is not reached (Haucap, 2020). Likewise, it is far from certain that ECB’s green monetary policy will have a notable positive impact on the environment. As with a state – directed credit allocation, there is the risk of “greenwashing”, i.e. companies or states might present their businesses as environmentally friendly in order to benefit from low- or even negative-interest loans.

As with the previous long-term programs the philosophy behind the NGEU rests on the belief that what matters most for growth is innovative technology and large-scale financial resources (see e.g. European Commission, 2021b). While it is true that according to neoclassical growth theory technological progress in general improves productivity and hence raises prosperity (Solow, 1956). Yet, what ultimately matters, is not technology per se, but how technology and other production

factors are used – in a productive, unproductive, or even destructive way (Boettke, Piano, 2016). Baumol (1990) and other institutional economists like Acemoglu and Robinson (2012), North (1990), North et al. (2012) or Olson (2000) have demonstrated that this depends fundamentally on the formal and informal institutions, because they shape the incentives underlying individual action. Baumol (1990, p. 291) has demonstrated that e.g. medieval China, the most technologically, scientifically, and culturally advanced society of the world for many centuries, was unable to produce sustainable economic growth, because the rules of the game “have been heavily biased against the acquisition of wealth and position” through Schumpeterian entrepreneurship. Hernando de Soto (2000, 2016) has demonstrated that when property rights are defined and secure there is no problem to raise capital. So when EU countries lack behind technological developments this points to an unfavourable institutional and infrastructural environment for alert entrepreneurship. Otherwise new start-ups and venture capitalists would be spreading out naturally whenever profit opportunities are perceived. No central authority needs to tell private entrepreneurs where to invest and that they must digitalize their business. Digitization itself occurred out of the market process, which provides through the inherent price, profit and loss mechanism relatively effective signals if, to what extent, where and how to further digitize business models and processes. Hass (2015) from the Federal Association of the German Industry confirmed, that there is in fact plenty of investment capital available in Germany. Yet, it difficult to mobilize not the least in an environment of zero interest rates.

Although with Pigouvian neoclassical welfare economics it could be argued that positive external effects impede the digital modernisation, in practise the social benefits and hence the optimal amount of digitization cannot be pinned down. This would require that someone not involved in the transactions can be objectively measure these benefits. Yet, in the view of Austrian Economics costs and benefits are ultimately subjective and without the price mechanism societal preferences are difficult to reveal (Pennington, 2011, p. 229). So any support offered to boost digitalization is necessarily arbitrarily. Taylor (2016) demonstrates for the USA that even the most basic forms of government-sponsored R&D assistance are riddled with knowledge shortfalls in terms of predicting future economic or technological needs, because ex ante it is difficult to identify projects that have the greatest potential to increase innovation and economic growth.

Dutch Disease effect and zombification

A danger of huge influxes of money into a country as the NGEU provides might be a Dutch disease effect⁸ (Sinn, 2020, p. 65ff). This could in particular be a problem for the countries in the southern periphery that were hit hardest by the eurozone crisis. Transfers and cheap credits may boost demand and create jobs in domestic sectors that do not compete internationally, such as restaurants or hairdressers. This upholds or even increases wage in these non-tradable sectors. In order to prevent the outflow of employees to these sectors, branches that produce tradable goods must offer similar high wages although they do not face higher demand or have no advances in productivity. That in turn leads to higher production costs, lower profitability, and a further decline of exports. Yet, the external resources enable citizens to buy the needed goods abroad and so maintain or even improve their living standard. Hence in the end, any aid is free imports (Rajana, Subramanian, 2011). This poses no problem for the economy as long as the influx continues. But when it shrinks or stops the high dependence on external funds in whatever form causes trouble. This is even more so, because the NGEU's grants and credits in conjunction with the persistently low interest rates and lax credit requirement of ECB's ultra-loose monetary provide firms soft budget constraints (Kornai, 1986). This prevents the much-needed creative destruction and the constant reallocation of resources. Instead, the soft budget constraints bring about a zombification of firms⁹ and the cementation of economic structures, which further hampers the economic convergence in the European Union (see also Schnabl, 2018). Hence, although the cheap money enables a decent life, it provides no incentive to innovate and increase international competitiveness.

4. Political economy effects

Given political actors had all necessary knowledge to steer economic processes precisely towards their desired ends, it is still not sure that the political process

⁸ For more details on the Dutch disease effects of external monetary influxes see e.g. Acosta et al. (2009) regarding remittances or Rajana and Subramanian (2011) on foreign aid.

⁹ Following the paper by Caballero et al. (2008) zombie companies are those that are unable, in the long-term, to cover their debt-servicing costs from profits. Yet, they are *kept alive* by banks continuing to lend them money to pay their existing loans. This phenomenon was observed first in Japan after their real estate and stock market bubble burst in the early 1990s on which Japan's central bank reacted with a similar extremely expansionary monetary policy. Lately the Bank for International Settlements (BIS) documents this phenomenon for the Eurozone (see. e.g. Banerjee, Hofmann, 2018).

incentivizes them to do so. As Public Choice scholars pointed out, the people who make public decisions are just as self-interested as anyone else.¹⁰ They do not suddenly become angels, just because they work in the government (Butler, 2012, p. 57). Self-interest, however, does not necessarily imply that people are selfish, but that they follow their own goals. This may include gaining, maintaining and increasing power, prestige and income, but also furthering the common good based on the politicians' personal convictions. In pursuing these ends they balance the costs and benefits of decisions just as people in the marketplace for goods and services. After all, even the best-intentioned politicians first need to get elected into office and then find enough supporters to implement their ideas (Buchanan, 1954; Tullock, 1976; Mitchell, 1984).

In the following three groups of political actors will be distinguished and analyzed with regard to their interests in creating and shaping the anti-crisis response: national governments of member states, EU institutions and voters.

4.1. The interests of national political actors

Representatives from national governments of member states have an interest to use EU-policies to maintain or increase their power and ensure re-election at home. Typically, given short election-cycles, political actors prefer measures that lead to immediately visible and flashy results over instruments that yield benefits only in the long-run and that concentrate short-term benefits on small, easily identifiable groups of voters, while spreading long-term costs to the mass of unorganized voters or into the future (Gwartney, Wagner, 1988). The reason is that “decisions in the market to either buy or abstain from buying are a direct signal to sellers, whereas in the political process voters do not have the same extent of feedback opportunities with respect to public policy offerings because they vote only periodically for representatives and their vote is rarely decisive” (Boettke et al., 2007, p. 138).

Commonly, the preferred policies are protectionist measures against foreign competitors, regulatory barriers to domestic competitors as well as bailouts for insolvent firms or jurisdictions and subsidies. For EU member states the supra-national EU level provides an arena to preserve or even increase these targeted benefits for their clientele. Thereby, it allows national governments to bypass the will of their voters. They can initiate legislative acts for which they do not have a majority in the national parliament at home via the European level. While the

¹⁰ Public Choice pioneer and Nobel laureate James Buchanan underscored: “Don’t expect politicians to behave differently. They behave according to their interests” (Interview with the Federal Reserve Bank of Minneapolis, 1995).

national parliament has not much influence on how its government votes in the Council, the national parliament is obliged to transform the adopted directives into national law. So, in fact national parliaments have not much control of the European policy of their governments. At the same time, national governments can play the game of tied hands pretending that certain adopted measures result from binding decision of EU institutions (Vaubel, 2001). The problem is, however, that the interests among member states differ depending on the individual economic situation and policy preferences. Therefore, other member states must be convinced or compensated in negotiations in the Council for agreeing to certain measures. Typically the preferred measures can be grouped into two categories: (1) raising rivals' cost to eliminate institutional or regulatory competition in the Union, and (2) spending.

Raising rivals costs

Measures that raise rivals' cost seek collusion with other government over regulations to eliminate institutional competition while preserving target benefits for interest groups on which national governments' re-election depends (Vaubel, 2001, p. 16f). This strategy is facilitated by the fact that meanwhile nearly 80% of all EU legislation can be decided by qualified majority rather than by unanimous vote (European Council, 2020a). A relatively recent example is the 2018 reform of the posted workers directive that tightens rules for workers that are employed in other EU countries on contracts that foresee that they only guarantee the host country's minimum wage, while allowing taxes and social charges to be paid in the worker's home nation. French President Macron has been lobbying for new stricter rules throughout the EU member countries to restrict labour cost competition and eliminate the competitive advantage of countries with less costly labour market regulations, in particular in the Eastern European member states (Deutsche Welle, 2017).

As another attempt to raise rivals' cost can be interpreted climate policy. Under the presidency of the EU Commission Ursula von der Leyen from Germany, who was appointed to this office in July 2019, this has become a central EU priority (von der Leyen, 2019). She initiated the Green Deal in December 2019, setting out a plan for how to turn green transformation into an economic growth opportunity for Europe. It was also intended to be the priority under Germany's presidency of the Council of the EU from July to 31 December 2020. However, dealing with the pandemic became the dominant issue. Nevertheless, the idea of green transformation has been incorporated into the NGEU, which prescribes that almost 40% of all grants must be devoted to this end. And in July 2021 a EU climate law has

been passed that sets ever ambitious goals to make the EU the first climate neutral continent by 2050.¹¹

For German policymakers, prioritizing climate policy across the EU is important for two reasons. First, within the country the green agenda is quite popular, which, among other things, can be seen in the high support for the Green party in recent elections (Bürgin, Oppermann, 2020). Therefore, except for the Alternative for Germany (AfD), in fact none of the traditional German parties dares to question the green transformation. Speeding up the green transition on the European level can thus be viewed as an attempt to shape the EU in its own image to please voters, in particular as the country that has already pushed quite ahead with an ambitious energy transition that wants to abandon fossil fuels and nuclear energy completely (Dyson, Goetz, 2012). Related to this is the second reason. Germany's energy transition has turned out to be extremely expensive. It is based on a 20 years guaranteed feed – in tariff scheme with purchase guarantee and grid priority for renewables. This, however, has led to the highest electricity prices in Europe¹² that not only hurts in particular poorer households, but also weakens competitiveness of energy-intensive industries and incentivizes them to relocate to less expensive member states (Milbradt, 2020). Increased pressure and incentives from EU institutions for member states to accelerate their energy transition (towards climate neutrality) decreases the possibilities for German firm to vote by feet. Against this background, urging all member states to speed up transforming their energy system into a green direction can be understood as an attempt to raise rivals' cost (Haucap, 2020). Surely, EU member states are free how to achieve the ever stricter emission targets. There is neither an obligation nor so far much will to follow Germany's model (Haucap, 2020). So they can and do resort to completely emission-free nuclear energy. But in the field of transportation, the greenhouse gas fleet targets leaves not too much room for other choices than electromobility (Sinn, 2019).

Even if governments are not really convinced of the need for a green transformation, the appeal to greening provides an ideal justification for rent-provision and rent-seeking. Therefore, it is not surprising that this prioritization of grants in the NGEU did not meet big resistance. It is not difficult to greenwash investment projects just to receive the subsidies.

¹¹ See EUR-Lex (2021). This European Climate Law writes into law the goal set out in the European Green Deal for Europe's economy and society to become climate-neutral by 2050. The law also sets the intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels, and ensuring that the transition to climate neutrality is irreversible (European Commission, 2021h).

¹² In 2020 the price for electricity was 30.88 cent/kWh. In France electricity costs only 17.65 cent/kWh and in Poland 13.43 cent/kWh. See Energie Marie (2022).

Spending and redistribution

At the heart of the NGEU is spending. Together with the new MFF it ensures substantial funding not only for the new green and digital agendas, but also for continuing traditional redistributive EU policies such as the support for agriculture or cohesion. This avoids trade-offs between these policy areas and allows national government to serve traditional interest groups (de la Porte, Jensen, 2021).

The difficulty in financing this unprecedented amount of expenditures is that the EU institutions so far have not much own resources, except for customs duties, value-added-tax-based and Gross National Income (GNI) – based contributions from the Member States, and additionally since 1 January 2021, the contribution based on the non-recycled plastic packaging waste (European Commission, 2021i). Therefore, more spending can only be financed either through higher transfers from other countries, or through implicit or explicit mutual liability guarantees, or through common EU debt as it has now been decided in the context of the anti-pandemic response. A joint borrowing scheme enables in particular poorer EU countries to take out cheap loans using the creditworthiness of their richer neighbours, which act as guarantors. This situation requires, however, convincing the more frugal and prosperous countries of the need for such spending and eventually offering them some sort of compensation to buy their support for more spending.

De la Porte and Jensen (2021, p. 389) argue that the agreement on the NGEU in the European Council was possible due to “concessions made on the central lines of conflict, especially the fiscal dimension and the rule-of-law.” Germany, under whose EU Council presidency the NGEU was adopted, accepted the grant as an instrument for reasons explained in section 2. France had advocated for more spending and common debt already prior to the pandemic (see e.g. Macron, 2017). Together with Italy and Spain it is considered as one of the countries hardest hit by the COVID-19 pandemic during the first wave, with a negative impact on economic growth. Furthermore, similar to these southern European countries it has had a high level of accumulated national debt prior to the pandemic, which limits further fiscal expenditure at the national level (see also Drachenberg, 2020). Therefore, these countries were highly interested in common debt issuance and receiving large unconditional grants to uphold their economies and welfare state. Yet, the so called “frugal four” countries agreed to grants only in exchange for a high level of conditionality for the disbursement of grants related to reform requirements, fiscal responsibility and rule of law. Poland and Hungary, which argued for a strong link between the NGEU and the MFF (Friends of Cohesion, 2020), because they have hitherto been net beneficiaries from the latter, supported conditionality with

regard to reform progress and fiscal soundness (Euractiv, 2020), but resisted the rule-of-law link by threatening to veto the adoption of the MFF and NGEU. They gave up their resistance when it was agreed not to specify details and procedures to enact rule of law allegations (Politico, 2020).¹³

In the end, conditionality on macroeconomic reform progress has been integrated in the NGEU as well as the possibility to halt a grant if there are serious deviations from meeting milestones and targets (European Council, 2020b). However, how these conditionalities will be monitored remains to be seen. As in other delicate issues this passage is formulated at a high level of abstraction, leaving much room for interpretation (de la Porte, Jensen, 2021). As the lessons from the stability and growth pact show, rules are usually not applied when deemed politically inopportune (Berthold, 2016, 2017). So essentially, this huge anti-crisis stimulus package seems to continue or even increase wealth redistribution from the north to the south without serious checks and balances about where and how the money is spent.

4.2. The interests of EU institutions

It is well known from bureaucracy theory that servants in bureaucratic agencies are interested in the growth of their organization, because every increase in competences, budgetary resources and personnel increases their power and prestige.¹⁴ The new anti-crisis recovery mechanism of the EU enables European institutions to increase their power through additional competences, resources and more centralization of decision-making. This concerns in particular the EU Commission, the European Court of Justice and the European Central Bank (ECB).

¹³ In particular, it foresees the European Commission to refrain from implementing the mechanism while a member country challenges its legality at the Court of Justice of the European Union (Politico, 2020).

¹⁴ For more detail on bureaucracy's interest to strive for centralization and extension of its power see e.g. Mises (1983), Anthony Downs (1994), Gordon Tullock (1965), Niskanen (1971, 1975, 1994). According to Parkinson's Law, developed by the British naval historian and author Cyril Northcote Parkinson, state bureaucracies grow simply because they are there or because they have grown in the past. The reason is that if, for example, a new central bureaucracy is created, this simultaneously gives rise to an interest group that exerts its influence to enforce its organizational interest. This means, the newly created bureaucracy uses its means of power to ensure its survival and to promote its own growth. In his original essay of 1955 (Parkinson's Law, *The Economist*, Nov., 19, 1955) Parkinson pointed out that although the number of navy ships decreased by two thirds, and personnel by a third, between 1914 and 1928, the number of bureaucrats had still ballooned by almost 6% a year.

EU Commission: new fiscal competences and conditioning

The new fiscal dimension of the NGEU gives the European Commission the (temporary) competence for taking common EU loans on financial markets (up to €750 billion on the capital markets on behalf of the Union), and gives it the responsibility for managing the grant instrument. To partially repay the loans, a new additional own resource has been introduced as of 1 January 2021, the so-called plastic levy. Further own resources to enlarge EU's financial leeway and direct economic activities are discussed. These include a carbon border adjustment mechanism to limit the carbon leakage, a digital levy to be introduced by 1 January 2023, the extension of the EU Emissions Trading System (ETS) to the aviation and maritime sector, and a financial Transaction Tax (European Council, 2020c, points A29 and 147).

Further power to the Commission over member states may accrue through the conditionality of the funds. The Commission assesses whether member state plans meet the requirements in the commitment of funds in the NGEU and eventually also monitors accepted plans with the possibility to halt a grant, if the plan is not followed accordingly. As has been mentioned in the previous section, to what extent the Commission will make use of this competence remains to be seen. What relatively quickly could have been seen is that during the assessment process of national recovery plans it did not only take into account the green and digital condition, but also the rule-of-law dimension. The latter refers to the correct use of funds, precluding corruption, but also to the independence of the judiciary and other democratic institutions, and the freedom of the media (de la Porte, Jensen 2021). Contrary to the compromise brokered by Germany at the December 2020 EU summit, which foresaw that the European Commission will refrain from implementing the legally binding rule of law mechanism while a Member State challenges its legality at the Court of Justice (Banks, 2020), the EU Commission has nevertheless activated the instrument “money for the rule of law” towards Poland and Hungary. They are accused of curbing judicial independence, media freedom and LGBT rights. This resulted in the suspension of the disbursement of the grants from the NGEU¹⁵ and growing tensions between the Commission and these two member states.

Poland has in return challenged the primacy of EU law over national law. It argues Brussels has no right to interfere with the judicial systems of EU member states (EU Observer, 2021) and contends that the judicial reforms implemented

¹⁵ If approved, Poland could get 23 billion euros in EU grants and 34 billion euros in cheap loans, while Hungary can expect €7.2 billion in grants (Strupczewski, 2021).

since 2015, when Poland's ruling Law and Justice (PiS) party assumed power, were needed to remove communist-era influence in the judiciary and speed up proceedings.¹⁶ The European Commission responded by asking the European Court of Justice (ECJ) to impose a daily penalty payment on Poland for as long as the Court's ruling of 14 July 2021 to the dismantle Poland's "Disciplinary Chamber" (Forthomme, 2021) is not followed. The Disciplinary Chamber was created in 2017 as a body at the country's Supreme Court with the power to discipline judges, including those of the lower courts. Its consists of judges selected by the National Council of the Judiciary, whose members are chosen by the parliament, where the ruling Law and Justice (PiS) party holds a majority. Didier Reynders, European Commissioner for justice, justifies the rule of law conditionality referring to a link between the national recovery plans and the country-specific recommendations in the European Semester, which for Poland concern the independence of the justice system (Euronews, 2021).

The European Court of Justice and the supremacy of European law

The Court of Justice of the European Union (CJEU) is an institution that is often overlooked, but that plays an important and active role in European politics and in explaining the process of centralization. It is frequently referred to as the "engine of integration." As Vaubel (2001) explains, the Court of Justice does not confine itself to interpreting the European treaties, but it is also engaged in the "further development of the law". In this context, already in 1964, it ruled, based on the *Costa versus Enel* case of 15 July, that European law should generally take precedence over national law, including the constitutions of the Member States. However, this principle has never been inscribed in any of the European Treaties. Nevertheless, the Court of Justice assumed responsibility for ensuring that the precedence principle is followed, which includes the right to impose penalties on Member States who infringe it (EUR-Lex, 2010). In the recent past, the CJEU has twice imposed such fines on Poland. One is the above mentioned fine in context of Poland's controversial Disciplinary Chamber. The second fine was pronounced in May 2021 in case of the Turów lignite mine near the border with the Czech Republic and Germany. The EU Commission has ordered to close down the mine for environmental reasons, but Poland has ignored this ruling. Subsequently, the CJEU has decided Poland must pay the European Commission €500,000 for each

¹⁶ For more detail on judiciary reform see Śledzińska-Simon (2018). Polish court delays ruling on primacy of EU law.

day it continues to extract lignite at the Turów mine (Politico, 2021a; Wilczek, 2021). Yet, the CJEU has not much power to force member states to comply and pay the fines. The court's authority rests upon voluntary acceptance, since it has no state monopoly on the use of force to enforce its decisions on member states. They submit to the authority of the court only insofar and as long as it is to their advantage (Wagener, Eger, 2014, p. 126).

A further instrument at hand to discipline member states is Article 7 of the Treaty on European Union. It allows to suspend certain rights from a member state, such as voting rights within the Council, when a member is considered to persistently breach the EU's core values (freedom, democracy, equality, the rule of law, and respect for human rights). Yet, imposing this sanction is difficult, too, because, although the sanctions itself require only a qualified majority, *identifying* the breach of values requires unanimity by the European Council excluding the state concerned. So, it is sufficient that only one member state vetoes the identification process as has been the case with Poland in 2017. On 20 December 2017, the European Commission had triggered Article 7 in relation to Poland's judicial reforms, because of fears it may remove the separation of powers between the executive and the judiciary. But Hungary's prime minister Viktor Orbán, who himself faced the same threat, signalled to block any Article 7 procedure against Poland and vice versa (Euractiv, 2021).

Against this background, the rule of law conditionality, which was adopted on 16 December 2020 (EUR-Lex, 2020) and links funding from EU's budget to rule of law considerations, gives both the Court and the Commission an additional, and eventually more powerful tool to nudge member states to follow EU rulings (Piana, Nato, 2021). The threat to withhold funding disbursement may trigger high public pressure in the respective member state on the government from the electorate, interest groups, opposition parties and the media not to forgo a considerable amount of money (see e.g. Bielecki, 2021).

An illustration is the debate about the ratification of EU's Recovery and Resilience Facility in Poland in May 2021. The link of the use of the money to refrain from violating the rule of law did indeed put the Polish government into a dilemma as it already promised to the Polish society billions of euros that will flow to Poland (Poland In, 2021). Interestingly, however, the issue split the Polish political landscape along unexpected lines. The junior member of the ruling coalition – the United Poland party – opposed to the fund, arguing it would lead to the creation of a federal Europe by letting the EU take on common debt, and also links the use of the money to not violating the rule of law. Yet, while the biggest opposition party, the pro-EU liberals from Civic Coalition, abstained from voting in the parliament, the

smaller opposition Left party unexpectedly lent the ruling coalition led by the Law and Justice (PiS) party the necessary votes to ratify the program. (Politico, 2021b). This case indicates that the “money for rule of law” tool can indeed create internal turmoil in member states. But it still cannot compel compliance, if relevant political forces in the country in question value sovereignty higher than money.¹⁷ After all, as Brexit has shown, member states still can opt for exit the Union, which is, however, from the viewpoint of bureaucracy theory not in the real interest of the EU bureaucratic elite and establishment. Any country leaving the EU undermines the EU’s institutions power and attempt to cartelize regulation. Even worse, it may provide counterfactuals that life in prosperity and peace is possible outside EU rules.

Yet, Poland and Hungary are not the only countries that object to the primacy of European law. Even Germany, whose Federal Constitutional Court (Bundesverfassungsgericht) has generally approved EU policies in the past, recently came into conflict with the Court of Justice of the European Union. Germany’s Constitutional Court ruled against the European Central Bank (ECB) ’s €2.2 trillion PSPP – Public Sector Purchase Programme setting the ECB a deadline until August 5, 2021 to further justify its programme. (Forthomme, 2021; Focus, 2021). In doing so, Germany’s highest court declared for the first time a judgment of the CJEU *ultra vires* (i.e. acting beyond its power) and not applicable in Germany. It argued that the ECB is abusing its mandate with its quantitative easing (QE) program, because it does not respect the “principle of proportionality”. As a result, the court issued the ultimatum and asked the German Central Bank, the Deutsche Bundesbank, to comply with its ruling and to stop buying government bonds under the ECB’s QE program in the next three months (Bundesverfassungsgericht, 2020). The European Court of Justice, backed by the European Commission, reacted dismissive of the ruling, reiterating that the issue was in the EU’s judicial authority and that the CJEU alone has jurisdiction to decide whether EU bodies are breaking EU law. In June 2021, the European Commission, headed by German EU Commission president Ursula von der Leyen, even initiated an infringement procedure on Germany.

From a political economy viewpoint, the CJEU reaction is understandable. The judges of a higher body have a self-interest in their court having to decide cases that are as important and interesting as possible, because their power and prestige depend on it. So, since the European Court of Justice is responsible for applying European law, the European judges have an interest in ensuring that European law grants the Union the broadest possible competences. It therefore jealously

¹⁷ And in fact, from a pure economic point, it is far from certain that the loss of EU funds would be a disadvantage considering the above mentioned Dutch disease effects and ambiguous poor fate of government-sponsored fiscal stimuli.

watches that its power is not disputed by other courts, in particular the highest courts of the member states, which are its main rivals. These latest cases against Poland, Hungary and Germany also confirm the observation that the CJEU practically never rules against other EU institutions. In doing so, it puts into question its role as an independent actor in the check of balance mechanism of other EU institutions. Actually, these conflicts reflect a struggle for power and a battle over the very nature of the European integration. Is it about creating a federal state with own sovereignty or preserving a commonwealth of independent states where the competences of supranational institutions result solely from the authorizations of the member states (Wiwo, 2021)?

New justifications for ECB's ultra – loose monetary policy

The European Central Bank is another institution of European Union that is to benefit from the anti-COVID-19-crises measures in terms of more power and upholding its *raison d'être*.

Its ultra-loose monetary policy with zero and negative interest rates it pursues since 2016 (for the interest on the main refinancing operations.), resp. 2014 (for the rate on the deposit facility) has put it into a dilemma (Mayer, Schnabl, 2021). Since the ECB has hesitated to lift interest rates during the recovery phases, it can no longer tighten its monetary policy when inflation picks up, because the bond markets in the more fragile EU member countries such as Italy, Spain, or Greece will then collapse (Heinemann, 2021b). In this situation, the ECB is looking for further justifications to continue its expansionary course. The pandemic and alleged urgent reaction to climate change provide these new reasons and allows keeping the highly indebted countries financially afloat (Wiwo, 2021). In March 2020, while assuring to fight the economic consequences of the COVID-19 outbreak, ECB President Christine Lagarde emphasized on twitter that “there are no limits to our commitment to the euro”.¹⁸ Still in the same month the ECB's Pandemic Emergency Purchase Programme (PEPP) was initiated, officially as a temporary asset purchase programme, totalling €1,850 billion (European Central Bank, 2021c).

This continuation of this expansionary policy course shows two things. First, in line with the findings of Ludwig von Mises (1976/96) and Baumol et al. (2007, p. 70) politicians usually do not abandon wrong policy measures, because “either governments don't want to lose face, or, more commonly, politically powerful interest groups impede the ability of governments to abandon their interventions”.

¹⁸ See Twitter (2020).

So far ECB's policy has done nothing to reverse low growth, poor productivity and high debts in the eurozone (Schnabl, 2018). Second, and closely related to that, the new asset purchase programme PEPP and the greening of monetary policy indicate how a policy that initially was designed as a temporary measure due to exceptional circumstances, namely zero interest rates to overcome the eurozone crisis, can become the new norm (Bagus, 2021). The problem, however, is that if the ECB leaves monetary policy extremely easy, it risks an uncontrolled rise of inflation. So actually the ECB is trapped by its own policy.

4.3. Rational ignorance of voters

Policies that further political actors self-interest be it on the national or supranational level are encouraged by the rational ignorance of voters (Downs, 1957; Caplan, 2007). Rational ignorance occurs when the cost of educating oneself on an issue exceeds the potential benefit that the knowledge would provide.

As Anthony Downs (1957) pointed out in "An Economic Theory of Democracy (1957)" voters base their decision if and how to vote on a cost-benefit comparison. In order to find out which policies are really appropriate to solve certain problems in the long run, voters would have to spend a lot of time and effort to become comprehensively familiar with a wide variety of issues and to inform themselves. However, this effort is likely to exceed by far the benefit from voting, because one's individual vote has little effect on policy. Therefore, it is rational for most voters not to inform themselves thoroughly on political issues (Caplan, 2007, p. 94), e.g. on what drives the high electricity prices in Germany, who benefits most from EU funds and the ultra-loose monetary policy of the ECB, and even much less to take action. Citizens then either abstain from voting or they vote following emotions, labels, simple slogans or ideologies or what they think is in the best interest of the country or general public (Caplan, 2007; Olson, 1986), rather than sophisticated expertise. Slogans such as resilience against future pandemics, saving the planet, managing a technological revolution, and social cohesion are in particular suitable to ensure popular support. As Keynes (1936, p. 383) said, "the ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood."

Since at the supranational EU level the vote of the individual voter counts even less, voters are even less incentivized to become thoroughly informed about European politics. But even if information costs were low, the complexities of the decision-making process on the EU level makes it even harder for voters to identify and punish misconduct. How should the blame for a wasteful policy be divided between

the various political entities, e.g. the Bundestag and Bundesrat at national level, and the Commission, Council and EU Parliament on the EU level? Even if the electorate managed to uncover bureaucratic excesses, they hardly have any instruments to discipline unelected officials (Caplan, Stringham, 2005). Former president of the EU Commission Jean-Claude Juncker once put the incentive structure for political decision-makers on the EU level in a nutshell as follows: “We decide something, put for discussion and wait a while to see what happens. If there is no great outcry and no protests, because most people do not understand what has been decided, then we continue – step by step, until there is no turning back”.¹⁹

5. Conclusion

Like its predecessors, the Lisbon – Strategy and “Europe 2020”, the Corona-crisis recovery measures as laid down in the NGEU put again a strong emphasis on central coordination and control of economic processes in the Union for achieving overarching goals while downplaying the self-coordinative and self-healing powers of the free market and other decentralized governance mechanisms. Although the importance of structural reforms is still acknowledged, the emphasis of the NGEU is on financial stimulus and incentives to steer economies into a desired direction, in particular towards greening and digitalization of European economies. This is accompanied by the continuation of the ultra-loose monetary policy of the ECB, which may in fact may mean amount to monetizing of the common debt. At the same time, the recovery plan also follows the decades-long tradition of using EU funds to transfer money across members states and to uses crisis situations for centralizing more competencies (see also Sinn, 2020).

From a robust political economy perspective, this approach entails serious epistemic and motivational problems. Although emergencies like a pandemic and negative and positive external effects might necessitate state action, in the view of the robust political economy approach these should be taken if ever possible in a decentralized measure to ensure that as much as possible “knowledge of the particular circumstances of time and place” is taken into account. This requires in particular bringing market forces into action to activate dispersed knowledge and allow for a constant testing of solutions against one another to reveal the relative

¹⁹ Own translation from German: „Wir beschließen etwas, stellen das dann in den Raum und warten einige Zeit ab, was passiert. Wenn es dann kein großes Geschrei gibt und keine Aufstände, weil die meisten gar nicht begreifen, was da beschlossen wurde, dann machen wir weiter – Schritt für Schritt, bis es kein Zurück mehr gibt” (cited in Koch, 1999, p. 136).

strength of these findings through the account of profit and loss and to communicate it through the changes of relative prices. Absent the competitive discovery process (Hayek, 1978) there is likely to be an increased risk of large scale decision failure, the effects of which are likely to be felt across the whole of society (Pennington, 2021). While in contrast to Germany's energy transition the NGEU does not prescribe particular green technologies and so allows for a certain trial and error learning, together with the EU climate law, and by conditioning payments it nevertheless tries to use a golden rein to push all member states towards a green (and digital) transformation. Yet, whenever central authorities lure with targeted benefits this also entails serious political economy problems. The NGEU not only incentivizes rent-provision and unproductive rent-seeking in and across member states, but also might further the centralization of EU decision-making and expand bureaucratic power of European institutions over member states as the battle over the rule of law conditionality and the supremacy of European law indicate. The most significant danger in this context stems from the creation of a shared pool of debt at the European level. Referred to as Hamiltonian moment by German finance minister Olaf Scholz it might turn out as a new step towards the federalization of the EU thereby installing a permanent transfer union under the pretext of solidarity.

At the same time, common debts and more centralized EU resources in form of the MFF and the NGEU indicate that, in the long term, the EU governance may adopt more and more the French style of policy making with a preference for top-down supranational collective actions, public expert bureaucratic agencies and the "primacy of politics". The prospect to push the EU into this direction has been eased with Brexit, which removed a powerful adherent of decentralization, financial self-responsibility and market-oriented approaches. However, the more this centralized bureaucratic approach gains control over property, prices and choices, entrepreneurship becomes riskier, more costly and more dependent on subsidies and collusion with bureaucrats. In the end, such a centralist model of Europe may spread mistrust across civil society, kill initiative and self-regulation. Therefore, from a robust political economy perspective, it is unlikely that this strategy succeeds making the EU greener, more digital, and more resilient to better adapt to current and future challenges. In this view, unleashing free-market forces and entrepreneurship is the best way to achieve these goals. This implies enforcing the price mechanism instead of prohibitions and defining emission threshold, and giving preference to flexible, decentralized solutions with clear accountability as well as relying on open discovery processes of innovations rather than resorting to the pretence of knowledge of political actors and their advising experts about technological options.

In his 1974 Nobel Prize acceptance speech *The Pretence of Knowledge* Hayek (1989, p. 7) suggested that policymakers should aim to “cultivate a growth by providing the appropriate environment, in the manner in which the gardener does this for his plants.” Not so long ago, EU institutions have been oriented that way and successfully fostered economic freedom and liberalization across Europe through the establishment of a single market (Wohlgemuth, 2007). Yet, the crises since 2008, and in particular the pandemic, have empowered governments and put the economy into an ever-tightening straightjacket of regulations and restrictions. Thereby, it is forgotten what actually made Europe rich and powerful in the past. As Mokyr (2016) shows, it was the political fragmentation alongside a significant intellectual and cultural unity through Latin Christendom where national boundaries mattered little. This fostered intense competition across sovereign jurisdictions for people, capital and ideas and allowed the free circulation and distribution of ideas on a remarkably large transnational market that propelled ever-more innovation. If a ruler treated his subjects badly, e.g. by imposing intolerable tax burdens or oppressing religious minorities, people almost always had the option of fleeing to a neighbouring country (Raico, 1994; Vaubel, 2001; Mokyr, 2016, 2017). Therefore, as the German ordoliberal economist Walter Röpke (1960, p. 244) put it: “Decentrism the essence of the spirit of Europe. To try to organize Europe centrally, to subject the Continent to a bureaucracy of economic planning, and to weld it into a block would be nothing less than a betrayal of Europe and the European patrimony.”

A move back into this direction is not impossible. The resistance shown by the “Frugal Four” (Austria, Denmark, The Netherlands and Sweden) against a too generous NGEU recovery plan suggests that a political basis for a more decentralized and fiscally responsible Union is still there. Much depends, however, on whether Germany, the EU’s largest economy and by far the largest net contributor to the recovery fund²⁰, will return to frugality or not. The chances after the September 26, 2021 federal elections that gave a majority for the centre-left social democrats, are, for the time being, not good.

²⁰ According to the German newspaper Handelsblatt (2020), the country is expected to contribute around €50 billion more to the fund than it will receive from it.

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EUROPEAN LAW AND NATIONAL LAW: SELECTED REFLECTIONS REGARDING THE LIMITS TO THE PRINCIPLE OF THE PRIMACY OF EU LAW

Bernard Łukańko*, Grażyna Zboralska**

1. Introduction

Until recently, the matter of primacy of European law was not particularly thought-provoking from an academic perspective, as all relevant questions seemed to have been clarified. The case law of the European Court of Justice (ECJ), German Federal Constitutional Court and Polish Constitutional Court defined the principle and recognised it, with several reservations. While in Germany, the Federal Constitutional Court case law comprised certain controversial passages, they were somewhat hypothetical in nature.¹ Similarly, while the 2005–2010 Polish Constitutional Court jurisprudence² hinted at potential solutions in case of constitutional conflict with European law, this was a rather hypothetical occurrence as well. Since 2020, the situation has been different: the Federal Constitutional Court's ruling of May 2020 regarding bond purchases by the European Central Bank and Polish

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¹ The so-called Solange II decision of the Federal Constitutional Court (ruling of October 22nd 1986, Ref. No. 2 BvR 197/83, Federal Constitutional Court decision No. 73,339) is an example thereof, wherein it has been emphasised as follows: “So long as the European Communities and in particular the case law of the European Court of Justice of European Communities, generally ensure effective protection of fundamental rights as against the sovereign powers of the Communities which is to be regarded as substantially similar to the protection of fundamental rights required unconditionally by the Constitution, and in so far as they generally safeguard the essential content of fundamental rights, the Federal Constitutional Court will no longer exercise its jurisdiction to decide on the applicability of secondary Community legislation cited as the legal basis for any acts of German civil courts or authorities within the sovereign jurisdiction of the Federal Republic of Germany, and will no longer review such legislation by the fundamental rights standard contained in the Constitution.”

² Judgements of the Polish Constitutional Court of May 11th 2005, Ref.No. K 18/04, and of November 24th 2010, Ref.No. K 32/09.

Constitutional Court's case law of July and October 2021 are particularly noteworthy (Judgement of the Polish Constitutional Court, 2021a, 2021b). Most recent Federal Constitutional Court and Polish Constitutional Court case law has made the issue of limits to primacy topical again.

This paper comprises concepts of the application, justification and scope of primacy of law from the viewpoint of the European Court of Justice, German Federal Constitutional Court and Polish Constitutional Court, as well as a brief description of issues resulting from the different positions of the ECJ and national constitutional courts, including an attempt to sketch possible solutions to avoid judicial competence-related conflicts. The scope of the paper only allows a few selected issues to be addressed. New comprehensive studies of the matter can be found in reference literature (Pracht, 2022; Kalb, 2020). The problem of applying primacy of law has been the subject of multiple treatises and monographs (Berger, 2016; Kruis, 2013).

It is too early to consider matters of risks and consequences of national court case law relevant to the economy and resulting from judicial competence-related conflicts, in particular from aforementioned recent Polish Constitutional Court 2021 adjudication. Publicist speculation is too abundant and definitive factors too few for us to be able to showcase the risks to the economy.

In practical terms, showcasing the primacy of European law and its limits is of fundamental importance to business, as it concerns the question of practical application of law by national courts and tribunals, and by European courts – the ECJ and European General Court. Therefore, opinions expressed in case law rather than views presented in literature are of supreme importance. This paper focuses primarily on positions of the European Court of Justice, German Federal Constitutional Court and Polish Constitutional Court. Disputes concerning limits to the primacy of law would require a discussion of adjudication. Nonetheless, much remains unclear. For example, no written justification is as yet available for the most recent ruling of the Polish Constitutional Court of October 2021. Therefore, it will be explored very briefly.

2. What does primacy of European law mean in practice?

The primacy of applying European law means that national law practitioners, such as administrative authorities or courts, must refrain from applying national legislation, should they conclude that such legislation infringes³ EU law (Łazowski,

³ Cf. e.g. ECJ judgement of June 28th 2001, C-118/00, Gervais Larsy, item 52.

2011, p. 279). The aforementioned applies to national laws and constitutional provisions as well (Oppermann et al., 2014, p. 148). It thus follows from this principle that the application of national law contradicting European law shall be prohibited, and that national law shall be adjusted accordingly (Oppermann et al., 2014, p. 155). The principle of primacy also applies to more recent Member State regulations⁴, which means that the classic *lex posterior derogat legi priori* principle not apply in this case (Oppermann et al., 2014, p. 148). The German Federal Constitutional Court and Polish Constitutional Court have accepted the primacy of European law as an underlying principle (Oppermann et al., 2014, p. 148; Wentkowska, 2011, p. 511). The primacy of application means that national regulations contradicting European law shall remain valid e.g. for third-country issues, but shall not be applied in any EU-related matters (Thiele, p. 131; Sensburg, p. 325).

The primacy of application concerns primary law, i.e. the founding, reform and accession treaties, the Charter of Fundamental Rights⁵, protocols and annexes⁶, general principles of law and secondary law (Walter, 2009, p. 10), i.e. EU regulations and non-implemented EU directives⁷ as well, if a direct effect can be affirmed.

3. Sources of European law primacy

It must be emphasized that the principle of the primacy of European law was not enshrined in the European Treaties. Only the draft of the Constitutional Treaty of 2004 contained such a provision in Article I-6 with the following formulation: “The Constitution and law adopted by the institutions of the Union in exercising competences conferred on it have primacy over the law of the Member States.” However, the Constitutional Treaty was rejected in referenda in France and the Netherlands (Oppermann et al., 2014, p. 16).

At the moment, the primacy of EU law is enshrined in Declaration No. 17 to the Treaty of Lisbon of December 13th, 2007. This Declaration states:

The Conference recalls that the Treaties and the law made by the Union on the basis of the Treaties take precedence over the law of the Member States, in accordance with the settled case-law of the Court of Justice of the European Union, under the conditions laid down in that case-law.

⁴ Judgment of the ECJ of 8 September 2010, C-409/06, Winner Wetten.

⁵ Cf. Art. 6 TEU – it belongs to primary law Hatje, in: Schwarze, 2012, para. 6.

⁶ Cf. Art. 51 TEU.

⁷ On the direct effect of non-/badly transposed directives, cf. Fischer, in: Fischer, Keller, Ott, Quarch, 2012, para. 142ff.

In addition, the Conference has decided that the Opinion of the Legal Service of the Council of June 22nd 2007 on primacy of European law, as set out in document 11197/07 (JUR 260), shall be annexed to this Final Act. The Opinion of the Council Legal Service stipulates:

It results from the case-law of the Court of Justice that the primacy of EC law is a cornerstone principle of Community law. According to the Court, this principle is inherent to the specific nature of the European Community. At the time of the first judgement of this established case law (*Costa/ENEL*, July 15th 1964, Case 6/641 (1) there was no mention of primacy in the treaty. It is still the case today. The fact that the principle of primacy will not be included in the future treaty shall not in any way change the existence of the principle and the existing case law of the Court of Justice.

According to Article 51 of the TEU, protocols and annexes to the treaties form an integral part of the treaties. Declarations, on the other hand, do not form an integral part of the treaties, but may be taken into account for purposes of interpretation.⁸ Consequently, European law lacks an explicit provision comparable to Article 31 of the German Constitution.⁹

This shortcoming of an explicit regulation of the primacy of EU law is, therefore, rightly criticised in the literature, e.g., as follows: “(...) such non-inclusion of the primacy of law in the EU Treaty showcases two factors: firstly, the primacy – in the wake of a crisis triggered by the lack of constitutional spirit – continues to be officially hidden. Secondly, politicians continue to prove incapable of “recognising” the primacy of EU law (Rössler, 2012, p. 127), which was created by judicial law – and thus in the end probably fortunately – in a concealed manner. Consequently, the enforcement – and, above all, moulding – of the primacy of European law as developed by the ECJ in its case law depends on the practical application of law by courts, the ECJ and national constitutional courts in particular.

4. Justification of the primacy of EU law

The justification of the autonomy and primacy of European law is validated differently by the ECJ, German Federal Constitutional Court and Polish Constitutional Court¹⁰.

⁸ Such is the prevailing opinion across reference literature, see. e.g. Becker, in: Schwarze, 2012, Art. 51, para. nos. 9, 10.

⁹ This rule reads: “Federal law shall take precedence over Land law”.

¹⁰ See in detail e.g. Bergmann, 2018, p. 249ff.

4.1. ECJ

The primacy of European law has already been developed by the European Court of Justice in the early days of European integration¹¹. In the judgement of February 5th 1963 in the van Gend and Loos case, the ECJ expressly showcased the independence of European law:

It must be concluded that the Community constitutes a new legal order of international law, for the benefit of which the states have limited their sovereign rights, albeit within limited fields, the subjects of which comprise not only the member states but also their nationals. Independently of the legislation of member states, community law not only imposes obligations on individuals but is also intended to confer upon them rights which become part of their legal heritage. These rights arise not only where they are expressly granted by the treaty but also by reason of obligations which the treaty imposes in a clearly defined way upon individuals, as well as upon member states and institutions of the community.

In the *Costa E.N.E. L.* judgement of July 15th 1964¹², which will be quoted extensively for reasons of its fundamental nature, the ECJ emphasised:

Unlike ordinary international treaties, the EEC Treaty has created its own legal system which, upon the entry of the Treaty, has been incorporated into the legal systems of member states, which their courts are obliged to apply. For by establishing a community for an unlimited period, endowed with its own organs, with legal capacity, with international capacity to act and, in particular, with genuine sovereign rights deriving from the limitation of the competence of the Member States or the transfer of sovereign rights of the Member States to the community, Member States have, albeit in a limited area, limited their rights of sovereignty and have thus created a body of law which is binding on their nationals and on themselves.

Such incorporation of community law provision into the law of individual Member States and, more generally, the wording and spirit of the Treaty, produce the effect of it being impossible for Member States to invoke *ex post facto* unilateral measures against a legal order adopted by them on the basis of reciprocity. Therefore, such measures do not prevent the applicability of the community's legal order, as the executive force of community law cannot vary from one state to another in deference to successive domestic laws without jeopardising the attainment of the objectives of the Treaty set out in Article 5 (2) and giving rise to the discrimination prohibited by Article 7.

¹¹ This resulted in an “emancipation from the classical discourse of international law towards a completely new nature of law” (Terhechte, 2014, p. 347).

¹² Case 6/64.

Obligations entered into by Member States in the Treaty establishing the community would no longer be unconditional, but merely contingent, if they could be called into question by subsequent legislation passed by signatory states. The primacy of community law has been also confirmed in Article 189, pursuant to which the regulation is 'binding' and 'directly applicable in all Member States'. Subject to no reservations, this provision would be quite meaningless if a state could unilaterally nullify its effects by means of a successive legislative measure which could prevail over community law.

It follows from all observations that the law stemming from the Treaty, an independent source of law, could not, because of its special and original nature, be overridden by domestic legal provisions, however framed, without being deprived of its nature as community law and without the legal basis of the community itself being called into question.

In the subsequent case law, the primacy of European law was explicitly extended to provisions of national constitutions. Setting a precedent in the ruling of December 17th 1970 in the case of "Internationale Handelsgesellschaft"¹³, the ECJ stated:

The uniform application of Community law would be impaired if, in passing decisions with regard to the validity of acts of Community institutions, national law standards or principles were to be referred to. The validity of such acts can only be appraised in accordance with Community law, as the law created by the Treaty, originating in an autonomous source of law, cannot, for reasons of its autonomy, be overridden by any national legislation if it is not to be deprived of its character as Community law, the legal basis of the Community itself called into question. Therefore, the validity of a Community act or its application by a Member State cannot be affected once it is claimed that fundamental rights as conferred upon it pursuant to the constitution of that State or its structural principles constitution have been violated.

The ECJ adheres to this opinion. The constant case law confirms the thesis of the unrestricted supremacy of European law over national law, including laws of constitutional standing. The ECJ judgement of May 18th, 2021 in the case of *Forum Judecatorilor et al.* may be referred to as an example regarding matters of the rule of law and independence of the judiciary¹⁴. The judgement reads:

Thus, in accordance with the principle of the primacy of EU law, the unity and effectiveness of that law cannot be affected by the fact that a Member State references provisions of national law, even if of constitutional status. According to standing case-law, effects of the principle of the primacy of EU Union shall be binding on all institutions of a Member State, without this being precluded in particular by national provisions on

¹³ Case 11/70.

¹⁴ Joined Cases C-83/19, C-127/19, C-195/19, C-291/19, C-355/19 and C-397/19.

the assignment of judicial competence, even if of constitutional status (cf. to that effect, judgements of February 26th 2013, Melloni, C-399/11, EU:C:2013:107, paragraph 59, and of March 2nd 2021, A.B. et al. [Appointment of judges to the Supreme Court – Appeal], C-824/18, EU:C:2021:153, paragraph 148, and case-law referred to therein).

4.2. Primacy of EU law from the viewpoints of the German Federal Constitutional Court and Polish Constitutional Court

The German Federal Constitutional Court recognises the principle of the primacy of European law, while perceiving its source in the national constitution rather than in EU law itself¹⁵. Primacy arises by virtue of the national law of consent (Simon, 2016, p. 85). Consequently, the law of consent becomes the limit for the primacy of applying EU law in Germany¹⁶. Therefore, as showcased by the Federal Constitutional Court in its aforementioned Solange II decision, a review of fundamental rights is not excluded (Simon, 2016, p. 87). Furthermore, as proven by the aforementioned so-called Maastricht ruling, an option arises to review competences (Simon, 2016, p. 86), as well as an *ultra vires* (Simon, 2016, p. 90; Flick, 2001, p. 93) and identity¹⁷ review¹⁸ (Simon, 2016, p. 89) established pursuant to the so-called Lisbon ruling. The Federal Constitutional Court reserves the right¹⁹ to review actions of EU institutions as to whether they remain within or have exceeded the scope of competences conferred upon them by Member States. According to the Federal Constitutional Court, while the right of review shall remain with it only, a preliminary ruling filed with the ECJ shall be mandatory in all such proceedings as an expression of interjurisdictional dialogue²⁰. However, according to the Federal Constitutional Court, such a review shall concern only secondary law.

The Polish Constitutional Court takes a different view in this respect in its judgement of October 7th, 2021, Ref.No. K 3/21, wherein it subjected primary law to scrutiny (yet on grounds of the problem lying in the (lack of) transfer of

¹⁵ Community power “originates with Member States and can only have an effect on the German sovereignty system pursuant to the German legal enforcement order” (German Federal Constitutional Court 89, p. 190) so-called Maastricht Judgement.

¹⁶ Reviewed, for example, on basis of Article 23 of the Constitution.

¹⁷ In the so-called Mangold decision, the Federal Constitutional Court specified requirements for the *ultra vires* act, declaring a need for a qualified infringement of competence – cf. decision of the Federal Constitutional Court of January 4th 2014, 2 BVR 2728/13.

¹⁸ Judgement of June 30th 2009, 2 BvE 2/08 *et al.*, Federal Constitutional Court 123, p. 267ff.

¹⁹ Source literature references reservations regarding the primacy of EU law application – cf. A. Thiele, *Europarecht*, Altenberge 2016, p. 133ff.

²⁰ The Federal Constitutional Court has also taken advantage of the option in practice – cf. ECJ C 64/14, OMT programme.

competences²¹). We tend to agree with A. Thiele, who briefly characterises the Federal Constitutional Court's view as follows:

European legal acts must safeguard the protection of fundamental rights, considered indispensable under Article 23 of the Constitution. In the event of a general short-fall in aforementioned protection, the Federal Constitutional Court would declare the respective legal act inapplicable in the German legal system. European legal acts must respect the EU order of competences. 'Ultra vires legislation' would not be covered by consent law (....) and would therefore not be applicable in the German legal system. The ECJ must first be called upon in such cases. In addition, an obvious and structurally significant breach of competence must be identified. EU legislation shall not breach the identity of the German constitution. The exact definition of the above remains unclear, the reference to ultra vires legislation in particular (Julius-Maximilians-Universität, 2022).

With regard to multiple issues concerning the application of the primacy of EU law, the Polish Constitutional Court followed a path identical to that chosen by the German Federal Constitutional Court. For example, it is undisputed that EU Member States are masters of the Treaties, and integration can only take place within the adopted constitutional framework (Garlicki, 2015, para 409). Therefore, the control of EU competences has not in principle been excluded in the Constitutional Court's ruling on the Accession Treaty of May 11th 2005, Ref.No. K 18/04 and on the Lisbon Treaty, Ref.No. K 32/09 (ruling of November 24th 2010). In the decision on the Banana²² Market Order, the German Federal Constitutional Court did not rule out a subsidiary constitutional complaint against secondary legislation, while setting very high requirements regarding the justification of reducing fundamental rights protection before the ECJ. The Polish Constitutional Court took a similar approach in its ruling of November 16th 2011, Ref.No. SK 45/09.

The latest development in the German Federal Constitutional Court's case law is the ruling of May 5th, 2020 (BvR 859/15; Bundesverfassungsgericht, 2020a). Therein, the Federal Constitutional Court declared the decisions of the European Central Bank (ECB) on the government bond purchase programme partially unconstitutional. In the judgement, the BVerfG states²³ that in the Public Sector

²¹ Art. 3 para. 1 and Art. 4 para. 2, TEU. See also Deutscher Bundestag (2021b).

²² Decision of June 7th 2000, 2 BvL 1-97, Federal Constitutional Court 102, 147.

²³ See paragraph 165 of the judgement: "A programme of the ESCB to purchase government bonds, such as the PSPP, which has significant economic policy implications, must be proportionate (see ECJ, Judgement of June 16th 2015, Gauweiler et al., C-62/14, EU:C:2015:400, para. 66 et seq.; op. cit., para. 71). In addition to its suitability for achieving the desired objective and its necessity, this requires that the monetary policy objective and economic policy effects are identified, prioritised and weighed

Purchase Programme (PSPP) decisions, the ECB only took into account the “monetary policy objective”, but not the “economic policy effects” of the programme, resulting in “a violation of the principle of proportionality” and “an obvious and structurally significant overstepping of competence” (Bundesverfassungsgericht, 2020b). Thereby, the German Federal Constitutional Court explicitly adopts a different assessment to ECJ’s previous appraisal, which considered the PSPP to be compatible with powers of conferral²⁴. The German Federal Constitutional Court has criticised the ‘ECJ’s handling of competence delimitation: “The Court’s interpretation of the principle of proportionality and the determination of the European System of Central Banks’ mandate based upon it therefore exceed the mandate granted to it pursuant to the second sentence of Article 19(1) of the TEU” (Bundesverfassungsgericht, 2020a). According to the German Federal Constitutional Court, “the proportionality of the PSPP presupposes that the monetary policy objective and the economic policy effects are identified, weighted and balanced against each other” (Bundesverfassungsgericht, 2020a)²⁵.

The ruling produced consequences in the form of infringement proceedings initiated by the EU Commission in June 2021, yet²⁶ discontinued in December 2021 following the Federal Government’s response (Deutscher Bundestag, 2021a). The Federal Government’s promise “to use all means at its disposal to actively avoid a repetition of an ultra vires finding in the future” evoked strong criticism in the

against each other. Admittedly, the monetary policy objective of the PSPP is not (yet) objectionable in principle. However, its unconditional pursuit, ignoring the economic policy effects associated with the programme, blatantly disregards the principle of proportionality from Article 5(1) sentence 2 and (4) of the TEU. The violation of the principle of proportionality is structurally significant, and consequently the ECB’s action is to be qualified as an ultra vires act”.

²⁴ Judgement of the ECJ of December 11th 2018, Weiss *et al.*, Case C-493/17.

²⁵ <https://www.bundesverfassungsgericht.de/SharedDocs/Pressemitteilungen/DE/2020/bvg20-032.html>, (accessed: 15.03.2022).

²⁶ “Commission closes infringement case against Germany following its formal commitment to clearly recognise the primacy of EU law and the authority of the Court of Justice of the European Union. The Commission has today decided to close infringement proceedings against Germany concerning the Federal Constitutional Court’s judgment of May 5th 2020 in relation to the European Central Bank’s Public Sector Purchase Programme (“PSPP”). The Commission considers it appropriate to close the infringement proceedings for three reasons. First, Germany has given very clear commitments in its reply to the letter of formal notice. In particular, Germany has formally stated that it reaffirms and recognises the principles of autonomy, primacy, effectiveness and uniform application of Union law, as well as values enshrined in Article 2 of the TEU, in particular the rule of law. Secondly, Germany expressly recognises the authority of the Court of Justice of the European Union, whose decisions are final and binding. The country also considers that the legality of acts of the Union institutions cannot be made dependent on the examination of constitutional complaints before German courts, but can only be reviewed by the Court of Justice of the European Union. Thirdly, with explicit reference to its duty of loyal cooperation enshrined in the Treaties, the German government undertakes to use all means at its disposal to actively avoid a repetition of an ultra vires finding in the future” European Commission (2021).

legal literature regarding questions of judicial independence (Verfassungsblog, 2021). On the other hand, the opinion of the former President of the German Federal Constitutional Court, retired professor Andreas Voßkuhle (Voßkuhle, 2021), who criticised the ECJ vehemently, should be noted here as well. His claim that the EU Commission intends to instigate a European federal state using “backdoor measures” and supposition of a “tacit collusion” by the EU Commission and ECJ were met with strong criticism (Gutschker, Schuller, 2021). While it is very difficult to accept such opinion, it cannot simply be disregarded in view of professor Voßkuhle’s position in the judiciary. In the past, professor Roman Herzog, former Federal President and Federal Constitutional Court Justice, had also been critical²⁷ of the future development of law by the ECJ (Rösler, 2012, p. 136²⁸). Such criticism had also been voiced, for example, in the German Federal Constitutional Court’s OMT proposal²⁹: which states that “the German Bundestag and Federal Government cannot (...) simply allow an obvious and structurally significant usurpation of sovereign rights by European Union institutions”, as well as in the academic literature³⁰.

5. Resolution of the jurisdictional conflict

It can well be stated that the dispute regarding the primacy of EU law firstly concerns the justification of such primacy and secondly primacy limits, especially with regard to national constitutions³¹. As emphasised in the literature³², this is a dispute regarding the right of sole decision from the viewpoint of the ECJ, and the right of final decision from the viewpoint of the perspective of the German Federal Constitutional Court. Such a jurisdictional conflict³³ is *de lege lata* unsolvable (Simon, 2016, p. 94) as long as both actors (Member States and the EU with the Commission as guardian of the Treaties and the ECJ itself) are not willing to exercise greatest restraint and consideration. There is no supreme instance to resolve the issue. Neither a ruling by a national constitutional court, nor infringement proceedings and a ruling by the ECJ will bring necessary legal certainty if called into question again.

²⁷ See also critical political science studies: Höreth, 2008, p. 21ff.

²⁸ With further references.

²⁹ Federal Constitutional Court 134, 395.

³⁰ Cf. e.g. detailed study by Städter, 2013.

³¹ Cf. in detail Posch, 2010, p. 135ff.

³² See in detail Kalb, 2020.

³³ Cf. also Proelss, 2014, p. 105ff.

On the other hand, the inconsistent interpretation and handling of European law is something that can very much endanger the cohesion and goals of the EU. The reference for a preliminary ruling by a constitutional court (tribunal), which the German Federal Constitutional Court explicitly mentions as an element of dialogue, is of fundamental importance as it ensures the uniformity of the interpretation of EU law. According to the express provision of Article 267 of the TFEU, the ECJ alone is authorised³⁴ to interpret European law (Schima, 2015, p. 72).

6. Conclusion

Conflicts of competence between the ECJ and national constitutional courts can only be managed, if the issue is seen as legal rather than political and if a restriction is placed on the exercise of the claimed competence at the national level. European law-friendly interpretation (Knop, 2013) is essential, otherwise, in extreme cases, the EU legal community risks breaking up because Member States could transfer politically contentious issues into their constitutions and thus jeopardise the uniform application of European law. An *ultra vires* legal act at EU level cannot be ruled out. However, there are instruments, such as action for annulment and the preliminary ruling on validity, which provide a solution to the problem, in semblance to solutions applied in cases of unlawful basis for EU legislation³⁵. Dialogue and restraint on the part of national constitutional courts in exercising the competence they claim is the best way to avoid jeopardising EU law uniformity. Such an example is the non-exercise of the claimed competence, as explicitly showcased in the aforementioned Solange II decision of the German Federal Constitutional Court. Such restraint is also possible on part of the ECJ. Such tendency is already evident in ECJ case law. ECJ's judgment of December 5th, 2017 in Case C-42/17 Taricco II is a case in point regarding the statute of limitations for offences against EU financial interests. Indeed, in Italy, statutes of limitation for criminal offences are considered part of substantive law. An earlier ECJ judgement (September 8th, 2015, C-105/14, Taricco) referenced the need for effective deterrent sanctions, but did not address issues related to the Italian Constitution. Thus, the issue at stake in the Italian Constitutional Court's referral was whether the national criminal justice should render national statutes of limitation inapplicable due

³⁴ Cf. decision of the Polish Supreme Court of April 28th 2010, III CZP 3/10 on preliminary rulings exceptions.

³⁵ Judgement of the ECJ of October 5th 2000, ECJ, Case C-376/98, Germany v. Parliament and Council, Tobacco Advertising Directive I [2000] ECR I-2247.

to EU law obligations, or whether the principle of legality of penalties enshrined in the Italian Constitution should prevail, and – consequently – the short statutory limitation period apply. According to the ECJ, national constitutional identity could take precedence over European law herein. Thus, in exceptional cases, the ECJ is prepared to accept the primacy of national constitutional identity over EU law. Issues of fundamental importance have to be raised under such circumstances, such as the “principle of legality in relation to criminal offences and penalties” in the *Taricco II* judgement.

An explicit anchoring of the primacy of European law in one of the reform treaties is an alternative to the restraint of national constitutional courts and the ECJ, a solution very desirable legally, yet politically unlikely. Another solution involves an explicit enshrinement of the primacy of EU law application in national constitutions. The statement by the Federal Republic of Germany in the aforementioned discontinued infringement proceedings may indicate that such a path cannot be ruled out. An another solution involving a review of EU law against the constitution of a Member State may result in problems on a scale as yet unknown. Yet, a major impact on the functioning of the EU and e.g. the internal market is an undesirable and unpredictable outcome. The issue of the free movement of workers is a case in point.

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JUDGMENTS OF THE GERMAN FCC IN THE PSAPP CASE AND THEIR CONSEQUENCES FOR THE CONSTITUTIONAL ASSESSMENT OF THE EU RECOVERY AND RESILIENCE FACILITY

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1. Introduction

For decades, the Federal Constitutional Court of Germany (hereafter FCC) has played an important role as an actor contributing to Germany's domestic and external policies (Góralski, 1986; Lamprecht, 2011, p. 145 ff, 259 ff), including the policy of European integration (Grimm, 2021, p. 321; Bainsczyk, 2017). I deliberately use the term politics rather than law, since at least some of the FCC's rulings, which are after all based on very generally formulated constitutional principles, in fact resolve dilemmas of a political, social or economic nature. This includes the FCC's ruling of 26 February 2020 considering the criminalisation of assisted suicide services unconstitutional¹, and the FCC's ruling of 24 March 2021 on constitutional complaints against the Federal Climate Change Act² (Roguska, 2021, p. 128–136; Stoczkiewicz, 2021, p. 296 ff).

The resolution of fundamental political disputes by a judicial body is a subject of discussion both within the general public and within jurisprudence. In academic discourse, this issue is often analysed in connection with the concepts of judicialisation, judicial activism versus judicial self-restraint (Brodecki, 2007;

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¹ BVerfG, Judgment of the Second Senate of 26 February 2020–2 BvR 2347/15, ECLI:DE:BVerfG:2020:rs20200226.2bvr234715.

² BVerfG, Order of the First Senate of 24 March 2021–1 BvR 2656/18, Climate Change, ECLI:DE:BVerfG:2021:rs20210324.1bvr265618.

Bierć, 2018; Kaleta, 2010). A significant objection raised by critical voices is the fact that decisions of essentially political nature, crucial from the social and economic point of view, are taken not within the framework of democratic decision-making processes, by bodies with direct democratic legitimacy, but by judges, who are a small group, admittedly highly competent, but only in a narrow field. Moreover, attention is drawn to the problem of so-called pilot judgements, i.e. judgements changing fundamental solutions in the social and economic area³, usually adopted by a majority vote by a parliamentary body. So-called pilot judgments are issued as a result of a legal remedy being brought by individuals representing a group that has failed to secure a majority in democratic decision-making processes. An example of a pilot ruling in this sense is the FCC's ruling of 24 March 2021 on climate change, which followed four constitutional challenges brought jointly by a few dozen individuals, and which dealt with complex scientific issues outside the field of law, i.e. assessments of the impact of current levels of CO₂ emissions on the environment and measures taken to reduce emissions. The pilot judgments raise at least two important questions as to how the consideration of the goods protected by constitutional law, including the right of the sovereign to make important decisions about the affairs of the state (in the German doctrine, this is the principle of democracy in Article 20(2) of the Basic Law of the Federal Republic of Germany and the related right in Article 38(1) of the Basic Law of the Federal Republic of Germany) should be weighed against other, sometimes imprecisely defined and thus court-created constitutional rights of the individual (Sachs, 2021, p. 711). The second question is whether filing constitutional complaints is not an *ultima ratio*, when there is a lack of in-depth political debate, primarily within parliamentary bodies, about problems fundamental to the state, but also about alternative methods of solving them. This does not change the fact, however, that the "winner" in such proceedings is the constitutional court itself, which strengthens its constitutional position.

The FCC's rulings on European integration fit into the above context. Since the early 1970s, the FCC has been formulating the terms of Germany's participation in the European Communities and then in the European Union. The rulings in these cases are issued primarily as a result of constitutional complaints⁴ (Cf. Table 4. A compilation of FCC rulings in cases related to European integration; Balczyk, 2017, p. 115 ff.), lodged by those who question the cross-party consen-

³ Not in terms of ECHR's case law.

⁴ Constitutional complaints have also been brought in the case of the purchase of sovereign bonds on the secondary market by the European Central Bank, as well as the Next Generation EU instrument, as discussed below.

sus on Germany's participation in European integration and the direction of European integration, especially in a context of permanent progressivism, in accordance with the motto of an ever-closer union among the peoples of Europe (Article 1 of the Treaty establishing the EU, hereinafter as TEU)⁵.

The FCC has independently developed its jurisprudential doctrine on European integration, creating a series of legal institutions designed to protect the primacy of the German Basic Law, the core of statehood, but also its position as a constitutional body co-shaping German policy (Bainczyk, 2017). Accordingly, the FCC has developed a number of constitutional law institutions that have been the subject of reception, and in legal doctrine there is also talk of the migration of constitutional ideas (Choundry, 2009), not only to other member states, but also within EU law. This is no doubt the principle of respect of constitutional identity, Art. 4(2) TEU, (Franziskus, 2017, marginal number 24), or the doctrine of EU law *ultra vires* instruments (Bainczyk, 2017, p. 176 ff, p. 211 f; Bainczyk, 2020b). In its 2009 judgment on the Treaty of Lisbon,⁶ the FCC defined in detail not only the limits of Germany's further integration into EU federalisation or supranational processes (German Föderalisierung or Supranationalisierung)⁷ but also its position as the court having the final word in disputes, including with the EU institutions, about the limits of these processes: "The Federal Constitutional Court has already opened up the way of the *ultra vires* review for this, which applies where Community and Union institutions transgress the boundaries of their competences. If legal protection cannot be obtained at the Union level, the Federal Constitutional Court examines whether legal instruments of the European institutions and bodies keep within the boundaries of the sovereign powers accorded to them by way of conferral (...) whilst adhering to the principle of subsidiarity under Community and Union law (Article 5.2 ECT; Article 5.1 second sentence and 5.3 Lisbon TEU). Furthermore, the Federal Constitutional Court reviews whether the inviolable core content of the constitutional identity of the Basic Law pursuant to Article 23.1 third sentence in conjunction with Article 79.3 of the Basic Law is respected (see BVerfGE 113, 273 <296>)"⁸.

The aforementioned constitutional law institutions, the conditions for Germany's participation in European integration, intensively developed by the FCC since the 1970s⁹, were until 2020 never applied in such a way as to prevent Germany's

⁵ Official Journal of the European Union, C 202, 7 June 2016.

⁶ BVerfG, Judgment of the Second Senate of 30 June 2009–2 BvE 2/08, ECLI:DE:BVerfG:2009:es20090630.2bve000208.

⁷ BVerfG, Judgment of the Second Senate of 30 June 2009–2 BvE 2/08, thesis 247.

⁸ Idem, thesis 240.

⁹ BVerfG, Order of the Second Senate of 29 May 1974–2 BvL 52/71, Solange I-Beschluss.

participation in ever closer European integration. The doctrine of constitutional law, extensive and based on the traditional notion of state and international organisation,¹⁰ was a kind of the sword of Damocles for the progressive European policy of the German Federal Government. It was unexpectedly used almost 50 years after its invention, and the word “invent” is used deliberately in view of the FCC’s law-making activity, especially during the period when Article 24 of the German Basic Law was in force as the grounds for ‘Germany’s membership in the European Communities, in the widely commented (Grimm, 2021, p. 346ff; Hilpold, 2021, pp. 159–192; Wyrozumska, p. 47–70; Balczyk, 2020a, p. 257–271), judgement of the FCC of 5 May 2020¹¹. This judgment creates an important context for Germany’s financial obligations in connection with the mobilisation of the Recovery and Resilience Facility. It is a legal context; a constitutional and EU context, but also a political one, in the relationship between FCC, Bundestag and Federal Government on the one hand and the European Commission and Germany on the other. The subject of the following short analysis will not be constitutional law aspects of the ruling in question, but the aforementioned political and institutional context, due to the ongoing proceedings before the FCC in the relevant case¹², this time far more important in terms of the political system than those subjected earlier to constitutional law review: OMTs (Outright Monetary Transactions)¹³ and PSAPP (the Secondary Markets Public Sector Asset Purchase Program).

¹⁰ Cf. BVerfG, Judgment of the Second Senate of 30 June 2009–2 BvE 2/08, thesis 233: “The Basic Law does not authorise the German state bodies to transfer sovereign powers in such a way that their exercise can independently establish other competences for the European Union. It prohibits the transfer of competence to decide on its own competence (*Kompetenz-Kompetenz*) (see BVerfGE 89, 155 <187–188, 192, 199>; see also BVerfGE 58, 1 <37>; 104, 151 <210>). Even a far-reaching process of independence of political rule for the European Union brought about by granting it steadily increased competences and by gradually overcoming existing unanimity requirements or so far prevailing rules of state equality can, from the perspective of German constitutional law, only occur as a result of the freedom of action of the self-determined people. According to the constitution, such integrational steps must be factually limited by the act of transfer and must, in principle, be revocable. For this reason, withdrawal from the European union of integration (*Integrationsverband*) may, regardless of a commitment for an unlimited period under an agreement, not be prevented by other Member States or by the autonomous authority of the Union. This is not a secession from a state union (*Staatsverband*), which is problematical under international law (...), but merely the withdrawal from an association of sovereign states (*Staatenverbund*) which is founded on the principle of the reversible self-commitment.”

¹¹ FCC judgment of 5 May 2020, file no. 2 BvR 859/15, 2 BvR 1651/15, 2 BvR 2006/15, 2 BvR 980/16, ECLI:DE:BVerfG:2020:rs20200505.2bvr085915.

¹² BVerfG, 2 BvR 547/21, ECLI:DE:BVerfG:2021:rs20210415.2bvr054721.

¹³ BVerfG, Judgment of the Second Senate of 21 June 2016, file no. 2 BvR 2728/13 ECLI:DE:BVerfG:2016:rs20160621.2bvr27281.

2. The FCC does NOT have the final word: the judgement of 5 May 2020 on PSAPP

Acts of EU law aimed at resolving the financial crisis in certain Member States have, for more than ten years, been the subject of intense constitutional law review by the Federal Constitutional Court of Germany (Barcz, 2014; Balczyk, 2017, p. 335ff). It should be recalled that the first FCC's rulings on financial assistance mechanisms concerned aid to Greece¹⁴. This line of jurisprudence was developed by the first request for a preliminary ruling in the history of 'Germany's EU membership. It concerned OMTs which the FCC submitted to the CJEU in 2014¹⁵. The CJEU in its judgement of 2015 did not take account of the position of the FCC¹⁶ (Claes, Reetsmann, p. 917–968), but the dispute was not further escalated by the FCC, which ruled on the case in 2016¹⁷ (Balczyk, 2017).

Similarly, the decisions of the Council of the European Central Bank (hereinafter: ECB), concerning the PSAPP programme, became the subject of 4 constitutional complaints filed with the FCC in 2015. In connection with these complaints, in July 2017 the FCC filed a preliminary question with the CJEU for the second time in the history of Germany's membership in the European Union. The CJEU delivered its judgment in December 2018.¹⁸ Here, it once again failed to take into account the FCC's interpretation and ruled that “nothing has been identified that would call into question the validity of Decision 2015/774 of the European Central Bank (EU) of 4 March 2015 concerning a programme for the purchase of public sector assets on secondary markets, as amended by Decision 2015/774 of the European Central Bank (EU) 2017/100 of 11 January 2017.” This was, then, the second conflict between the FCC and the CJEU, but this time it was not mitigated by the German constitutional court as in 2016. Instead, there has been an escalation of the dispute following the 'FCC's 5 May 2020 ruling.¹⁹

The FCC's judgment in question is ground-breaking in that this time the German constitutional court vetoed both the ECB decision and the CJEU judgment, treating these acts as being outside the scope of powers delegated by the EU mem-

¹⁴ BVerfG, Judgment of the Second Senate of 7 September 2011–2 BvR 987/10, ECLI:DE:BVerfG:2011:rs20110907.2bvr098710.

¹⁵ FCC's decision of 14 January 2014, file no. 2 BvR 2728/13, 2 BvR 2729/13, 2 BvR 2730/13, 2 BvR 2731/13 and 2 BvE 13/13, ECLI:DE:BVerfG:2016:rs20160621.2bvr272813.

¹⁶ CJEU judgment, following a preliminary question from the FCC, of 16 June 2015 in the case C-62/14, *P. Gauweiler and Others v Deutscher Bundestag*, ECLI:EU:C:2015:400.

¹⁷ BVerfG, Judgment of the Second Senate of 21 June 2016, file no. 2 BvR 2728/13.

¹⁸ CJEU's judgement of 11 December 2018, file no. C-493/17, *Weiss et al.*, EU:C:2018:1000.

¹⁹ For criticism of the judgment by many representatives of German jurisprudence cf. *Deutscher Bundestag* (2020).

ber states in the treaties. For the first time, it also explicitly applied the principle of the supremacy of the constitution in the process of European integration²⁰. The FCC's judgment may have been "provoked" to some extent by the CJEU, which had shown no willingness to cooperate with the FCC and had twice found FCC's concerns about ECB actions unfounded. This hypothesis is confirmed by the statement of FCC Judge P.M. Huber, who commented on the judgment in question as follows:

The problem is that the CJEU has not really listened to us in both proceedings for a preliminary ruling on the ECB. In my idea of a pooling of courts, we take each other seriously and see ourselves as players on the same level. [...] It seems that the judges in Luxembourg are not properly aware of how much negative sentiment there is in Europe, not only between constitutional courts. When one constitutional court with eight judges struggles for two years before starting a preliminary ruling procedure, it should carry a completely different weight from a question put by some district court²¹.

The FCC found the constitutional complaints of the three applicants on the violation of their right to elect the Bundestag under Article 38(1) in conjunction with the principle of democracy under Article 20(1) of the Basic Law and the clause declaring this principle inviolable in the current constitutional order to be justified. The above-mentioned right was infringed by the failure of the Federal Government and the Bundestag to take steps against the ECB's overstepping its monetary policy powers under the PSAPP and against the infringement of the member states' powers of economic governance. Qualified, obvious and structurally significant overstepping of the ECB's competences, as listed in Articles 119, 127 ff. TFEU and Article 17 of the Statute of the ECB was that the ECB failed to analyse and prove that the measures adopted complied with the principle of proportionality. This assertion is not prejudiced by the judgment of the CJEU of 11 December 2018, which, as far as the assessment of the ECB measures is concerned, is incomprehensible to the FCC and was issued in breach of the principle of delegated competence and therefore constitutes an *ultra vires* act.

²⁰ FCC's judgement of 5 May 2020, thesis 106: "The supremacy of the Constitution (Art. 20(3) GG) obliges constitutional organs participating in the execution and in the further shaping and development of the integration agenda (*Integrationsprogramm*) to ensure that its limits are respected [...]. In this regard, constitutional organs have a lasting responsibility for ensuring that institutions, bodies, offices, and agencies of the European Union adhere to the European integration agenda (*Integrationsprogramm*) [...]. This responsibility corresponds to a right afforded citizens as the electorate vis-à-vis the constitutional organs, enshrined in Art. 38(1) first sentence GG, which compels the constitutional organs to ensure that the restriction of their right to democratic self-determination resulting from the execution of the European integration agenda (*Integrationsprogramm*) does not go beyond what is justified by the permissible transfer of sovereign powers to the European Union [...]."

²¹ A statement by FCC justice P.M. Huber of 12 May 2020 in *Süddeutsche Zeitung*.

In this ruling, the FCC also applied the principle of inclusive liability, well-established in case law (German *Integrationsverantwortung*; Arnauld, Hufeld, 2018, marginal number 26–38), which, in the case of the judgment in question, meant imposing obligations on the constitutional public authorities to influence the ECB to comply with the FCC judgment and to assess the compatibility of the measures adopted with the principle of proportionality: “Based on their responsibility with regard to European integration (*Integrationsverantwortung*), the Federal Government and the *Bundestag* are required to take steps seeking to ensure that the European Central Bank conducts a proportionality assessment. They must clearly communicate their legal view to the European Central Bank or take other steps to ensure that conformity with the Treaties is restored”²² and “German constitutional organs, administrative bodies and courts may participate neither in the development nor in the implementation, execution or operationalisation of *ultra vires* acts. This generally also applies also applies to the *Bundesbank*.”²³

The FCC’s judgment of 5 May 2020, which therefore dealt with a secondary issue from the point of view of changing the rules of EU fiscal policy, i.e. only violations of the proportionality principle, was “enforced” in a symbolic way. On 26 June 2020 the Bundesbank forwarded the ECB documents to the Federal Ministry of Finance, and the Minister of Finance stated that the documents sent showed that the ECB Council’s proportionality analysis of the share buyback decision was “acceptable” (German *nachvollziehbar*). In light of the above, the Bundesbank may be involved in the execution of PSAPP decisions. On 27–28 June 2020 (Saturday – Sunday), the documents were available to parliamentarians as confidential, and on 29 June 2020 the confidentiality of parts of the documents was lifted. On 30 June 2020, the parliamentary factions CDU/CSU, SPD, FDP and BÜNDNIS 90/DIE GRÜNEN requested a vote on the resolution, which was adopted on 2 July 2020 by the votes of these parties, with Die Linke abstaining and the AfD faction objecting²⁴. The resolution observes *inter alia*: “The Bundestag considers the statements provided by the ECB on the proportionality assessment it conducted to be comprehensible and the requirements set forth in the Federal Constitutional Court’s judgment of 5 May 2020–2 BvR 859/15 *inter alia* – to be fulfilled. This notwithstanding, the *Bundestag* in any case continuously discharges its ‘responsibility with regard to European integration’, including with regard to monetary policy decisions taken by the ECB Governing Council.”²⁵ In the plenary debate, several FDP and CDU/CSU MEPs

²² FCC’s judgement of 5 May 2020, thesis 232.

²³ FCC’s judgement of 5 May 2020, thesis 234.

²⁴ Cf. German *Bundestag*, Minutes of plenary proceedings 19/170, p. 21283.

²⁵ *Bundestag* document, *Bundestagsdrucksache* – BTDrucks 19/20621.

submitted dissenting positions, pointing out that the documents provided by the ECB were partly confidential, moreover in English, and their content was insufficient to meet the conditions formulated in the FCC judgment of 5.05.2020.²⁶

At this very sitting, there were rejected the DIE LINKE motion “Finding political solutions to the conflict regarding the monetary policy of the European Central Bank – amending the EU Treaties and securing a monetary policy dialogue with the Bundesbank”,²⁷ the FDP motion “Proportionality assessment meets deadline – taking seriously the lasting mandate to ensure respect for the limits of monetary policy”²⁸, and a draft resolution submitted by the AfD of 26 June 2020 “Ensuring critical reflection and effectiveness in the *Bundestag* ‘s exercise of its so-called responsibility with regard to European integration vis-à-vis the ECB Governing Council and its decisions”²⁹.

This “enforcement” of the 5 May 2020 ruling did not meet with any critical response from the FCC. In fact, applications were filed with the Court, supported by 1,734 persons, to order the Bundesbank, the Federal Government and the *Bundestag* to enforce the FCC’s PSAPP judgment, as in the opinion of the applicants the above actions had been insufficient. In addition, a request was made to inspect documents submitted to the Federal Government and the *Bundestag*. The requests were rejected by the FCC in a decision dated 29 April 2021,³⁰ first of all on formal grounds. The FCC was of the opinion that the assessment of the actions should be a subject of a new proceeding. However, the FCC also made a substantive assessment in its reasoning for the decision and found the actions of the ECB, the Federal Government, the *Bundestag*, and the Bundesbank to be sufficient. Furthermore, the FCC observed that the submission of dissenting opinions by four MPs and motions by Die Linke, FDP and AfD proves that a substantive debate on the fulfilment of the conditions of the FCC ruling of 5.05.2020 is taking place.

This landmark FCC ruling, as already noted, was met with an unequivocally negative assessment by the European Commission (2020; cf. Court of Justice of the European Union, 2020), which initiated infringement proceedings against Germany in early June 2021. The Commission claimed violations of the principle of autonomy, primacy and effective application of EU law, as well as violations of the jurisdiction of the CJEU, as the FCC should reopen the preliminary question before

²⁶ cf. German *Bundestag*, Minutes of plenary proceedings 19/170, pp. 21356–21358, annexes 7 and 8.

²⁷ BTDrucks 19/20552.

²⁸ BTDrucks 19/20553.

²⁹ BTDrucks 19/20616.

³⁰ BVerfG, Order of the Second Senate of 29 April 2021–2 BvR 1651/15, ECLI:DE:BVerfG:2021:rs20210429.2bvr165115.

ruling that the acts of the ECB and the judgment of the CJEU (sic! CJEU as a judge in its own case) were issued outside the scope of the competence delegated to the EU and are therefore so-called *ultra vires* acts. The initiation of proceedings by the Commission was severely criticised by representatives of German jurisprudence and the arguments put forth were fundamental: “The matter at hand is the fundamental understanding of European integration: is the European Union a federal state (German *Bundestaat*), with its own sovereignty, or is it still an association of states (German *Staatenverbund*), whose competence is based on and limited by the mandates granted by the Member States, since it is only the Member States which have original and therefore sovereign state power? The Commission is attempting, by means of infringement proceedings, to advance its concept of EU centralism”. Furthermore, in the same article: “Thus, the Commission is attempting, by means of infringement proceedings, to undermine the Lisbon Treaty ruling and seal the EU’s dominance over the Member States” (Degenhart et al., 2021, p. 22; differently Derksen, 2021, pp. 938–945). In the same text, the authors called on the Federal Government to react strongly against the demands of the European Commission and to unconditionally defend the FCC, which cannot be subordinated to the CJEU. This would in fact violate Article 79 (3) of the Basic Law of the Federal Republic of Germany, referred to in German legal doctrine as the perpetual clause.

The conflict over the PSAPP, which in fact concerned a fundamental issue from the point of view of the functioning of the EU and the wording of the Treaties, namely the prohibition of the EU financing the debts of Member States, was brought to an end in a way different from that postulated above. In fact, the Federal Government did not “defend” the judgment delivered by independent judges. In August 2021, the Federal Government responded to the European Commission. Again, a very limited substantive debate took place in the Bundestag on the fundamental issues of preserving German sovereignty in the process of European integration³¹.

The position of the Federal Government was undoubtedly effective, as on 2 December 2021 the European Commission (2021) closed the proceedings against Germany. Still, it raises serious concerns from the point of view of established solutions of German constitutional law. It is worth quoting at this point the Commission’s communication on this issue, which cites the relevant arguments of the German Government: “In particular, Germany has formally declared that it affirms and recognises the principles of autonomy, primacy, effectiveness and uniform application of Union law as well as the values laid down in Article 2 TEU, including in particular the rule of law. Second, Germany explicitly recognises the authority of

³¹ Cf. BTDrucks 19/32004.

the Court of Justice of the European Union, whose decisions are final and binding. It also considers that the legality of acts of Union institutions cannot be made subject to the examination of constitutional complaints before German courts but can only be reviewed by the Court of Justice. Third, the German government, explicitly referring to its duty of loyal cooperation enshrined in the Treaties, commits to use all the means at its disposal to avoid, in the future, a repetition of an *ultra vires* finding, and take an active role in that regard” (European Commission, 2021).

The position of the Federal Government was neither based on the principle of respect for constitutional identity in the process of European integration, which is protected by the FCC. In light of previous constitutional law doctrine, Germany only conditionally accepts the principles of autonomy, primacy, effectiveness and uniform application of Union law, provided that the EU laws do not violate unchangeable principles of the Basic Law and were not issued outside the scope of the integration programme. Furthermore, the position of the Federal Government ignores the principle of the tri-partite division of powers and the principle of the rule of law in the context of the independence of judges and respect for final judgments of courts, although in response to parliamentary questions on the matter in August 2021, it asserted the following: “The Federal Government took into account the position of the Federal Constitutional Court when preparing information for the European Commission. The Federal Government’s information was then brought to the attention of the Federal Court of Justice”³². According to the European Commission’s communication, the Federal Government overturned the FCC’s jurisprudential doctrine, which had been shaped over almost 50 years, with the FCC’s position as the ‘court of final word’ with regard to respect for the inviolable principles of the German Basic Law, as well as respect for the limits of the powers transferred to the EU under the so-called *ultra vires* control. In the context of the above-mentioned principle of the division of powers, and in particular of judicial independence, the Federal Government’s obligation “to avoid, in the future, a repetition of an *ultra vires* finding, and take an active role in that regard” is problematic.

Both the “enforcement” of the FCC’s PSAPP judgment and the initiation of proceedings by the European Commission for Germany’s violation of EU law, the position of the Federal Government and the conclusion of the proceedings against Germany by the European Commission call into question the meaning of parliamentary democracy (no debate on the fundamental problems of fiscal integration) and the position of the FCC as the court of the final word, exercising control over

³² BTDrucks 19/32004.

respect for constitutional identity and the separation of powers between the Member States and the EU.

Examining the PSAPP case from this angle is vital because of the pending Recovery and Resilience Facility proceedings. Will in this case, too, the executive prevail over the legislature and the judiciary, and will the progressive centralisation policy prevail over the law, at least the national law, co-shaped by a body that for long decades has tried to resist unconditional federalisation/supranationalisation/centralisation of the EU? The analysis of both cases may also help to clarify the direction of the EU's evolution, as well as the direction of Germany's actions in this regard.

3. Who will have the final word with respect to the Recovery and Resilience Facility?

The Council Decision 2020/2053 of 14 December 2020³³ created the EU Recovery and Resilience Facility and empowered the Commission to borrow funds on capital markets up on behalf of the EU up to EUR 750 billion. According to Art. 311 (2) sentence 3 TFUE, the rationale for the decision, it would have come into force only after its approval by the member states, in accordance with their respective constitutional requirements. The fulfilment of these constitutional requirements in Germany meant that the consent of the federal bodies, i.e. the Bundestag and the Bundesrat, had to be obtained in the form of a federal law. The law in question was passed on 25 March 2021 with 478 votes in favour (CDU/CSU, SPD, FDP), 95 votes against (AfD, non-party MPs, CDD/CSU) and 72 abstentions (Die Linke, FDP). A total of 645 votes were cast (Deutscher Bundestag, 2021). On 26 March 2021, the Bundesrat unanimously accepted the law adopted the day before by the Bundestag (Bundesrat, 2021).

Five constitutional complaints were filed against the law. One was signed by 2,281 people gathered in a social movement known as the Bündnis Bürgerwille (2021). This complaint was supported by nearly 40 professors, most of whom are economists, some of whom had previously filed a complaint against the PSAPP, resolved by the FCC ruling of 5.05.2020. Along with the complaints, interlocutory motions were filed to prevent the federal law from taking effect and thereby blocking the Recovery Facility. The complainants argued *inter alia* that the authorisation of EU debt is a violation of the existing treaties and is therefore an *ultra vires*

³³ COUNCIL DECISION (EU, Euratom) 2020/2053 of 14 December 2020 on the system of own resources of the European Union and repealing Decision 2014/335/EU, Euratom, Official Journal of the EU of 15 December 2020, L series no. 424, p. 1.

act. The Member States will be obliged to be responsible for one another's debts, which violates the fundamental EU treaty principle that member states act in fiscal policy on their own responsibility and are not liable for the debts of others. The approval of EU debt also has the effect that the Bundestag is no longer master of its right to determine the budget. It will be the Commission that determines whether, when and in what amount a country is to repay its debt. Moreover, the cap for the countries' liability is set so high that Germany could potentially be responsible for repaying the entire sum of EUR 750 billion. It should be noted that none of the above objections were analysed in the explanatory memorandum to the bill, which was prepared by the Chancellor's Office for the bill in question in the section analysing the bill's effects³⁴.

Doubts as to the compatibility of the Council's decision with the Treaties and of the act with the German Basic Law have been expressed not only by the complainants, but also by other stakeholders. In this regard, in particular the report drawn up by the Federal Court of Auditors (German *Bundesrechnungshof*) should be mentioned (Bundesrechnungshof, 2021; cf. Schäffers, 2021). It points out crucial negative aspects of the adoption of the financial instrument, including the fact that the Fund organises financial transfers between member states based on debts and creates a system of liability in which member states are held mutually responsible for their debts. In fact, there is a joint ownership of debts and liability for them, which creates a kind of censorship in the functioning of the EU. Although the debts incurred are to be paid over the next 30 years, there is currently no binding repayment plan. This is to be the subject of future negotiations between member states. It may turn out in the future that it will simply not be possible to adopt the next EU budget for this reason, or that repayment of the debts will be postponed until the future and other EU projects which are important for the future will be blocked. Germany's Federal Ministry of Finance distanced itself from the report, but it was submitted to the Bundestag and the Bundesrat before the vote on the bill in question.

Law experts in academia have also raised systemic and legal doubts. M. Herdogen qualified the financial instrument as a major shift of competences in violation of the treaty provisions, above all the prohibition on financing a Member State's budget deficit from the EU budget (Article 125 (1) TFEU). The creation of the fiscal union is completely inconsistent with the principles underlying the functioning of the Economic and Monetary Union, adopted in the Treaty of Maastricht in the early 1990 s. It is also a serious shift of competence to give the European Commission the

³⁴ BtDrucks19/26821, Entwurf eines Gesetzes zum Beschluss des Rates vom 14. Dezember 2020 über das Eigenmittelsystem der Europäischen Union und zur Aufhebung des Beschlusses 2014/335/EU, Euratom (Eigenmittelbeschluss-Ratifizierungsgesetz – ERatG).

power to distribute the funds coming from the EU loan, especially since the criteria for granting these funds are not directly related to the purpose of their spending. M. Herdegen also points out that funds for Member States only to a limited extent relate to combating the effects of COVID-19, and above all to climate protection, digitalisation and modernisation. Decisions on the priorities of state development for decades ahead should be taken by the national parliament, which must not be reduced to the role of an executive body. M. Herdegen points to the inconsistency of the Recovery and Resilience Facility with the provisions of the Basic Law of the Federal Republic of Germany; in particular, it infringes the right of the Bundestag to establish the budget, as well as the budgetary provisions of the German Federal Constitutional Act which restrict the state's ability to acquire debt, Article 115 (2) of the Basic Law of the Federal Republic of Germany, (Herdegen, 2021).

On 26 March 2021, the FCC issued a decision³⁵ which bans Germany's President from signing a federal law which consents to Germany's being bound by Council Decision 2020/2053 of 14 December 2020. This ruling was unique in the FCC's case law. It indicated, on the one hand, the lack of the usual consensus between the FCC and the German President to refrain from taking sovereign acts until the FCC had resolved the matter, at least at the stage of the application for interim measures. On the other hand, it demonstrated constitutional law concerns about the contested act. This FCC ruling aroused intense interest in European public opinion as it implied the possibility of blocking the consent to the decision by Germany and thus blocking the EU Recovery Instrument, since under Article 311 (3) TFEU the adoption of a decision requires the unanimous agreement of all member states (Niedobitek, 2018, marginal number 16–19).

On 21 April 2021, however, the FCC published a decision denying the request for interim measures³⁶. The FCC's ruling does not end the proceedings in the case. The final decision will be issued in the so-called main proceeding, which according to the FCC's indication may take three years due to *inter alia* a possible submission of a preliminary question to the CJEU as to whether the Council's decision is an *ultra vires* act, i.e. issued outside the scope of EU competence.

The April 2021 decision is significant. The refusal of interim measures means that the German President could sign the law agreeing to the Council's decision on the Recovery and Resilience Facility. Practically at once, F.W. Steinmeier took advantage of this opportunity and signed the law in question on 23 April 2021 (Der

³⁵ BVerfG, Order of the Second Senate of 15 April 2021–2 BvR 547/21, ECLI:DE:BVerfG:2021:rs20210326.2bvr054721.

³⁶ BVerfG, Order of the Second Senate of 15 April 2021–2 BvR 547/21, ECLI:DE:BVerfG:2021:rs20210326.2bvr054721.

Bundespräsident, 2021). The FCC made what it called a summary consideration of the merits of the allegations raised in the complaints (German *summarische Prüfung*), i.e. made a preliminary assessment of the allegations of violations of fundamental rights by the provisions of the Federal Law on the Council's decision in a relatively extensive statement of reasons. However, it should be noted that the reasoning is, by the standards of FCC jurisprudence, chaotic. One gets the impression that economic and political considerations outweigh the concerns of constitutional law. On the one hand, there are significant constitutional reservations concerning the Recovery and Resilience Facility, flagged by the FCC³⁷ as well as by representatives of constitutional authorities and legal science. On the other hand, there is a political necessity to adopt a solution proposed by the Franco-German duo.

It is worth quoting here excerpts from two theses of the FCC's 15 April 2021 decision: "(106) Such a delay in the entry into force of the 2020 Own Resources Decision would hamper, if not thwart, the achievement of its economic objective. It would not only destroy the impetus for economic development in the European Union provided by the NGEU recovery instrument but would also, according to the Federal Government's assessment – which the Federal Constitutional Court must respect in this regard – raise considerable doubts as to the EU's further economic development after the COVID-19 crisis. (...)" "(107) According to the Federal Government, delaying the entry into force of the Decision would also significantly strain foreign and European relations. Since the 2020 Own Resources Decision stemmed from a Franco-German initiative, the Federal Government fears considerable tension in Germany's relations with France, an undermining of the credibility of its foreign and European policy and a further threat to cohesion among the Member States of the European Union (...)"

It should also be noted that the failure to grant interim measures in this case will mean that a possible FCC ruling indicating a breach of the constitutionality of Germany's membership of the EU will in practice have very limited significance,

³⁷ BVerfG, Order of the Second Senate of 15 April 2021 – 2 BvR 547/2, thesis 94: "The constitutional complaint lodged in the principal proceedings is not manifestly unfounded either. Given the concerns raised by the applicants, it can at least not be ruled out completely that Art. 4 and Art. 5 of the 2020 Own Resources Decision in particular exceed the limits of the authorisation contained in Art. 311(3) TFEU. Nor can it be ruled out that in certain constellations, which are more precisely defined in Art. 9 of the 2020 Own Resources Decision, the authorisation of the European Commission to borrow up to EUR 750 billion on capital markets would make Germany liable for this debt and that this would affect the *Bundestag's* overall budgetary responsibility enshrined in Art. 110 in conjunction with Art. 20(1) and (2) in conjunction with Art. 79(3) GG." Cf. (thesis 95) "Yet on the basis of a summary examination it does not appear highly likely that the Act Ratifying the EU Own Resources Decision and the underlying 2020 Own Resources Decision constitute a violation of the *Bundestag's* overall budgetary responsibility that would necessarily require the issuing of a preliminary injunction".

although the FCC has been very clear about the possible consequences of a ruling on the unconstitutionality of the law authorising the Recovery and Resilience Facility³⁸. As previously mentioned, the FCC stated that proceedings in this case could take up to three years if a question is referred to the CJEU for a preliminary ruling on the allegation of *ultra vires* acts³⁹. In this context, a question legitimately arises as to whether the judiciary is willing and able to keep up with very dynamic decision-making processes, above all in the executive, both national and EU, which are subject to a kind of “enforcement” by the legislative and judicial branches.

4. Conclusion

The crisis triggered by the COVID-19 pandemic has exacerbated the already existing tendency for European policy-relevant issues to be managed by the executive, be it the Member States or the European Commission. Of course, this does not mean that the government of each member state is equally active, as exemplified by the currently implemented Recovery and Resilience Facility. Undoubtedly, mixed crisis management (executive bodies of member states, European Commission, ECB) is not based on the principle of sovereign equality of member states (also Article 4(2) TEU), but rather on de facto leadership, which does not stem from the Treaty-based EU system model, and on the contrary, in the analysed cases, fundamental doubts arise as to the compliance of actions taken with the applicable EU law – the so-called *ultra vires* acts. This makes it all the more important to maintain a lively democratic debate in the member states, irrespective of their actual status in terms of creating European policy, on issues that are crucial for the future of the EU, but above all for the peoples of Europe. A space must be preserved for critical reflection, for pointing out flaws and for seeking better solutions, because such a space determines the quality and intellectual standing of European democracies.

³⁸ BVerfG, Order of the Second Senate of 15 April 2021–2 BvR 547/2, thesis 111: “If the Federal Constitutional Court were to find that the 2020 Own Resources Decision constitutes an *ultra vires* act or hold, contrary to the summary examination in the preliminary injunction proceedings, that it encroaches upon Germany’s constitutional identity, it would be incumbent upon the Federal Government, the *Bundestag* and the *Bundesrat* to restore the constitutional order by all means available to them. They would have to find ways to stop the continued implementation of the 2020 Own Resources Decision, work towards obtaining the required rescission or amendment of the Decision – even if that required the consent of all other Member States – and take suitable action to limit its domestic impact to the greatest extent possible (...). This action would include asserting repayment claims (Art. 9(5) to (8) of the 2020 Own Resources Decision) that had already accrued, opposing an update of the 2020 Own Resources Decision or not approving a new multiannual financial framework.”

³⁹ BVerfG, Order of the Second Senate of 15 April 2021–2 BvR 547/21, thesis 105.

National constitutional courts should support the existence and effective functioning of such an area, as the principle of national sovereignty and the principle of democracy are enshrined in the constitution of each member state. The latter principle has, after all, been the basis for the development of the FCC's jurisprudential doctrine on European integration since the Maastricht Treaty judgment. The constitutional court itself should not divest itself of such a function. If decisions to borrow EUR 750 billion are made and are to be executed within a few months, the court must also act quickly enough. Crisis management and the pressures of political and economic processes should not be the sole determinants of the jurisprudence of constitutional courts that are, after all, independent.

The PSAPP case illustrates the above processes and the impression of the dominance of the executive bodies and their, in this case, centralist vision of the EU is deepened by the position of the German Government on the FCC ruling of 5 May 2020. The case of the Recovery and Resilience Facility also fits into the model outlined above. The European Union is currently witnessing structural shifts of competences in the fiscal and other areas, which go beyond the treaty framework. They need to be subject to substantive debate in the member states, also in terms of their compatibility with national constitutions, and this is still decided by constitutional courts, not by national governments, the European Commission or the CJEU.

The above comments are based on the actions of the German authorities, but are not limited to this single member state. On the contrary, the demand for a democratic national and international debate on the future of the EU is universal, as is the criticism of the domination of the executive bodies, or the demand for an adequate, timely, and substantively balanced jurisprudence of the constitutional courts.

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ALEXANDER HAMILTON AND THE EU SUMMIT OF JULY 2020: A COMMENTARY*

Thomas Apolte**

After Emmanuel Macron and Angela Merkel had launched the EU Recovery and Resilience Facility, Olaf Scholz compared the decision in an interview he gave to DIE ZEIT magazine on May 20, 2020 to the re-organisation of public finances by Alexander Hamilton, first Secretary of the Treasury of the newly founded United States. Combined with far-reaching delegation of fiscal policy competences to the US federal government, Hamilton's financial reform consisted primarily in assuming the debt of the member states of that time. For the first time in the young United States' history, their federal government took on debt. Some continue to see this move as a liberating measure; to others, it continues to be a fall from grace. It goes without saying that Olaf Scholz supports the former belief. It was, in all actuality, a milestone on the path of 13 individual states, by and large still autonomous, to form the nation we know today as the United States. At the time, nobody could have foreseen that a three-year-old organism would one day become more than a nation state – that it would flourish into a world power with economic, military, political and, last but not least, ideological claims to leadership.¹²

From 'today's perspective, the USA neither wants to nor will be able to maintain its claim to leadership. Yet after World War II, they had both the capacity and desire to do so, in particular in ideological terms. For it was they who had insisted that it was political systems rather than differences between various peoples per se that would ultimately decide if their states behaved aggressively or peacefully, whether in relation to third parties or internally. They thought in terms of political constitutions rather than ideological imprints. Therefore, having trusted the Germans to lead the way to a liberal democracy, they were ultimately proven right.

* This commentary is the English translation of a blog post that appeared in German in the online journal *Wirtschaftliche Freiheit* on July 24, 2020. See <http://wirtschaftlichefreiheit.de/wordpress/?p=27731> (accessed: 14.03.2021).

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In that sense, they recommended their own constitutional mindset as a model by demonstrating how a constitutional rule of law, democracy and market economy can lead to freedom and prosperity. Not even the racism that stood in stark contradiction to this thinking, especially in the South, as well as the fall from grace of the Vietnam War, could permanently disrupt this role model function, as both factors were perceived as serious but nevertheless partial deviations from a fundamentally sound principle.

After the end of the Cold War, things gradually began to change. The increasing economic and ideological polarisation of the American society began stealthily robbing the country of its role model function. At the same time, a growing proportion of US Americans grew weary of their 'country's position as a global order-keeping power. Instead of continuing to provide global public security goods, the concept of returning to narrower economic and political interests has been increasingly popular for decades. This is not about the ghostly presence of Trump; it was there before, and it will outlast the Trump era. Insofar as considerable stakes in conjunction with comparable constitutional principles are at play here, the following question emerges in this context: who, if not the EU, can fill the vacuum left by the US on the global political stage, if the guiding principle of liberal democracy is to play any role at all in the future world order? But if at all, the EU is at best ideologically equipped to fit such role; in military and political terms it is most certainly not. Ultimately, the US Constitution of 1787 was primarily driven by security policy considerations. The confederation that had existed up until that point, the thirteen individual states, would in all probability not have been able to withstand the threat posed by their former colonial power. This is another parallel between today's EU and the United States of that time. For today, too, the threat is considerable: Putin's Russia is taking ever more aggressive action at the gates of the EU and using almost any means to destabilise the free world. China is increasingly seeking to influence the world order in its own interests. Both are attempting to endorse themselves ever more clearly as an alternative to the ostensibly decadent and nihilistic Western liberalism. At the same time the US is progressively losing its capacity to assume ideological leadership while becoming increasingly less willing to assume military headship. The EU must therefore act and, if the need should arise, ally itself for that purpose with states less prominent in economic, political and military terms, such as Canada, Australia or New Zealand, but which still stand by the liberal values of the West without any ifs or buts. A global crisis, such as the COVID-19 pandemic, could well provide the necessary impetus. In this spirit, Olaf Scholz quoted Winston Churchill in the ZEIT interview by saying, "Never let a good crisis go to waste".

But while the Churchill quote may be an apt description of the current situation, the comparison between the EU Recovery Fund and Alexander Hamilton's financial reforms is flawed in one crucial aspect: Hamilton's financial reform came in 1790, so it followed the enactment of the American Constitution in time and substance, which had come into force three years earlier. By contrast, the EU remains in a constitutional condition comparable to the times of the Confederation of 13 colonies in America over the eleven years preceding 1787. It can be therefore concluded that hopes that the Recovery Fund could provide a boost to EU's constitutional development in a similar manner as Hamilton's reforms did in the United States at the time are based on a reversal of the direction of action. Instead of going from state formation to financial constitution, as it was back then, the EU now wants to move from financial constitution to state formation. The American founding fathers associated with Alexander Hamilton and James Madison had realised even before 1787 that such a reversed direction of action would not have worked. Therefore, they had vehemently pushed ahead to draft the constitution. Today's enthusiasts, on the other hand, have not recognised this, believing almost unconcernedly that the reverse direction of action works as well. Once the EU runs up debt, Macron suggested almost euphorically in the wake of the EU summit agreement, European unification will pick up speed all by itself – and, obviously, in the right direction. After the Scholz interview in *DIE ZEIT*, many journalists and politicians made similar comments without taking into account the fundamental difference between the original “Hamilton moment” and the EU recovery programme.

In the meantime, we had to witness painfully the consequences of this difference during the EU summit of July 2020. After almost five days of heated arguments, where even the word “hatred” made the rounds, an agreement was reached to scale down EU grants from EUR 500 to EUR 390 billion, offer a couple of discounts to the “Frugal Four”, and concede to Hungary's head of government, Viktor Orbán, to stop insisting on linking financial allocations to compliance with rule-of-law rules. At the end of the day, the most fundamental values of the Union seemed to be negotiable. Admittedly, this can also be interpreted differently: we have a weighty Recovery Fund, we are committed to the rule of law (at least formally), and we even have reached an agreement on this in the end, even if at Council level only. While one could reasonably argue about the general effectiveness of such an economic stimulus programme and about the resulting indebtedness of the EU, the overall picture is probably better than naught, given the magnitude of the current crisis. Yet the path leading us to this outcome leaves a memory of an undignified spectacle while the never openly admitted yet obvious negotiability of the rule of law is unsavoury. Even worse, all of the above said is at least an

indication that in its current condition the EU is probably not equipped to shoulder the fiscal responsibility of the kind it has taken on with this package. In fact, for purposes hereof, the word “condition” refers to the legal constitution of the community rather than to the overall mood.

What is the actual problem at hand? Why did Hamilton’s reform turn the US into a functioning state, while the Recovery Fund so readily compared to Hamilton’s achievement has almost plunged the EU into a serious crisis? The difference primarily involves the following: the US Constitution stipulates that the population of the member states send their senators and representatives to Congress to directly represent them on the federal level. Presidential elections follow the self-same principle. Consequently, a new political entity with its own competences was formed on the federal level, which, unlike that of the EU, does not arise from governments of individual states. The independence of this new political entity from the governments of the thirteen states made it capable to act and provided legitimacy as well as a degree of separation of powers that typically allows states to act in the spirit of freedom. This was the foundation that Hamilton needed to build on when introducing his financial constitution, and to restart the country, which was vital given the threats of that time. In contrast, in the EU it is still the member state governments that have the task of regulating matters at the EU level. It is from them that all European policy action is derived until present. In essence, the EU has no political authority independent of the member state governments, and all the competences gradually acquired by the European Parliament have not changed this. For all in all, it has still only a right to have a say. Therefore, nothing works without the consent of member state governments, at least nothing of importance.

As long as this remains the case, extensions of fiscal competences, EU taxes, EU debt and large-scale spending programmes will cause one thing, above all: they will breed discord. Every head of government is under domestic political pressure in his or her own country, and operates under such pressure. While arguments regarding national egoism abound, it would be political suicide for heads of states and governments to act otherwise. Therefore, it makes no sense to complain or demand that leaders change their behaviour. It would resemble an attempt to teaching a cat not to hunt mice. After all, fiscal policy decisions are subject to unanimity, for good reason given the absence of a constitution worthy of the name. Therefore, those in charge have to let themselves be humiliated, even by shady types of the likes of Viktor Orbán – and this, of all things, with regard to fundamental values.

In view of the pandemic crisis, the EU had and has to take action; it could not have resigned from a solution akin to a Recovery Fund without giving up on itself. Yet, the dream that this could have been a Hamiltonesque igniting spark will

remain just that: a dream, in the hope that it will not turn into a nightmare. It is tragic that many conservatives insist on the underlying yet structurally deficient capacity of the EU to act, deriving nation state primacy from the misleading legitimacy pattern of apparent decentralisation. Those who cling to such patterns of thought and refer to them – falsely – as decentralisation overlook the fact that we urgently need institutional and constitutional preconditions to provide Europe-wide public goods. Without such preconditions, Europe will not be able to harness the future. Without them, Europe will be unable to participate in the process of developing a climate policy which is globally effective and compatible with the principles of freedom and a market economy. Without them, Europe will not be able to meet urgent security challenges forged by autocrats of this world in view of the dwindling protective role of the USA. Without them, we will have to watch Putin divide and break up the EU, perhaps the only remaining future globally relevant bastion of liberal democracy, tolerance and open society as countries such as Russia and China increasingly bring global political institutions under their control while the US successively abandons them in favour of bilateral interest politics. We will have to watch autocrats with their anti-liberal concept of society take control of the provision of global public goods, and shape the institutions needed for them.

Such – and many others – will be the tragic consequences of a conservative policy designed to keep nation states big and the EU as small as possible. Yet, the consequences will be just as tragic if countless well-meaning left-wing individuals indulge in the illusion that everything will be fine and dandy if only the “good guys” in political circles are given mounds of money in the belief that it will be put to good use to promote solutions seemingly wonderful at first glance. For all their good intentions do not change the fact that such policy will lead us astray unless all actions are underpinned by an orderly set of rules: a constitution worthy of the name. Without it, everything ends in a chaotic marathon of money distribution, which, without sense or reason, inevitably lets funds flow to those that shout the loudest and to where the most unscrupulous politicians drive the flow through intrigue.

The belief that the constitution will develop all by itself, if one already begins with that which should actually only build on it, is a momentous mistake. That is why we need to reopen an EU constitutional debate. To do this, bold steps have to be taken. We must give up the idea that we can still afford 27 security policies and 27 armies in times of a declining democratic world power (USA), a rising autocratic world power (China), and aggressive policies of Putin and other regional dictators. We must recognise the ridiculousness of local politicians campaigning for “climate-neutral” cities, as if they were of any use, while the EU as a whole is still

unable to provide the world with a concept that would be truly useful by offering a solution to climate issues on the only level appropriate for climate-related matters: the global level. If we are to consider Hamilton a role model, we have to be driven by the paramount insight that a union such as the EU just like the US in its time, must first be afforded the capacity to act, and that for this the sequence of related actions is of decisive importance. This is: The constitution comes first, providing the ability to act and the legitimacy for everything else that follows.

Part II

**MONETARY AND
BANKING POLICY**

THE ACCURACY OF PRIVATE AND INSTITUTIONAL GDP AND INFLATION FORECASTS IN THE EURO AREA

David Burden*, Maurice Daub**,
Lilli Zimmermann***

1. Introduction

Rational economic agents align their decisions and actions according to their expectations. Therefore, their forecasts should be as precise and accurate as possible in order to provide the best decision making grounds. Given the recent turbulences in the world economy the expectation formation process has become more complicated as the future economic outlook is highly uncertain given the increasing amount of unexpected shocks.

In this paper we examine, whether and to what extent the quality of private and institutional GDP and inflation forecasts changed after the outbreak of the financial crisis. Using data for the period December 2002 – December 2020 we analyse the accuracy of private sector inflation and GDP forecasts in comparison to ECB forecasts. Subdividing the data into the pre-crisis period and the post-crisis period allows us to analyse whether the accuracy has changed over time.

Our paper is structured as follows: Section 2 provides an overview over the existing literature. Section 3 describes the characteristics of the forecasts published by the Consensus Economics Forecast Poll as well as the ECB forecasts published as macroeconomic projections on a quarterly basis. Section 4 lays out the methodological technique for the data analysis and presents the results. Section 5 concludes.

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2. Literature Review

There is a wide range of literature examining the accuracy of macroeconomic forecasts (e.g. Bachelor, 2000; Blix et al., 2001; Novotný, Raková, 2010; Cabanillas, Terzi, 2012; Frenkel et al., 2012, 2013, 2017, 2020). Especially individual private sector forecasts have been the focus of research lately as these are crucial for policy makers to assess the market perception of the economic development. In this respect the analysis of survey data as compiled by the Consensus Economics Forecast Poll (CE) has gained importance. A number of researchers have examined the forecasting quality of the Consensus Economics Forecast in comparison with inter- and supranational organizations.

Bachelor (2000) analysed the performance of macroeconomic forecasts from CE and IMF as well as OECD, including GDP and inflation, for the G7 countries from 1900 to 1999. His statistically significant results indicated that Consensus Economics generally outperforms institutional forecasts. Additionally, these were less biased to optimism than the institutional forecasts.

Blix et al. (2001) examined the GDP and inflation forecasts of CE for the period from 1991 to 2000. Generally, the inflation forecasts performed better than the GDP forecasts and inflation was rather over- and GDP rather underestimated. They also compared the survey forecasts with the IMF and OECD forecasts. Their results indicate that institutional forecasters performed on average worse than the private forecasters.

Frenkel et al. (2012) examined the current account forecast of CE for the period from 1989 to 2009 for the G7 countries and the euro area. The analysis found the private sector forecasts to be biased and the forecasters to display herding behaviour. Furthermore, their results also implied that private forecasters who tend to herd have a higher forecast accuracy.

Frenkel et al. (2013) expanded the previous analysis to cover further key macroeconomic variables, including GDP and inflation. They examined whether private sector forecasters showed an (anti-) herding behaviour to the IMF or OECD forecasts. Their results indicated an anti-herding behaviour, whereas the behaviour was stronger for IMF forecasts. Frenkel et al. (2017) analysed CE forecasts on foreign exchange markets and found them to be mostly biased. They observed significant differences in the forecasts for industrialized and emerging countries; emerging market countries displayed significantly more destabilizing expectations. The authors also found that the forecasters consider the Balassa-Sammuelson effect.

While most researchers focus on the overall rationality and accuracy of private sector forecasts in comparison to institutional forecasts, meanwhile there are research articles available on the impact of the financial crisis on the accuracy of forecasts.

Novotný and Raková (2010) examined IMF, European Commission and OECD forecasts for the euro-area GDP, inflation and the USD/EUR exchange rate forecasts and compared them among others to CE forecasts. Generally, private sector forecasts performed better, mainly for the current year forecasts, than the institutional forecasts. Further, they found that following the global financial crisis (since 2009) the CE forecasts did not perform as good as compared to the institutional forecasts than before the crisis. Also, their results indicate the unbiasedness of inflation forecasts, whereas in the following year GDP forecasts were found to be biased upwards by all institutions. They also found that CE generally had higher forecasting errors for GDP compared to inflation.

Cabanillas and Terzi (2012) examined GDP forecasts of the European Commission for the period from 1969 to 2011. They found forecast quality to deteriorate during the height of the financial crisis and return to pre-crisis levels thereafter. In contrast, the ECB's forecast quality was found to be similar during the period, while CE performed worse.

Frenkel et al. (2020) used CE forecasts from 1995 to 2014 to determine whether forecasters of major exchange rates show (anti-) herding behaviour towards the market consensus, using the exchange rates of the US Dollar vs. the Japanese Yen, the British Pound and the Euro. Similarly, the results from Frenkel et al. (2012) displayed anti-herding behaviour, whereas the effect was stronger for the Japanese Yen and the British Pound than for the Euro. They also found that the (anti-) herding behaviour is unrelated to the forecast error and did therefore not affect the performance of the forecasters. To examine the impact of recessions or crises they examined the period before and after the financial crisis individually, whereas they observed slightly stronger herding behaviour before the crisis.

This paper will build on the existing work and examines whether the accuracy of private sector inflation and GDP forecasts in comparison to the ECB forecasts has changed after the outbreak of the financial crisis.

3. Private and Institutional Forecasts

3.1. ECB Macroeconomic Projections

We use the ECB's macroeconomic projections as institutional forecasts. Since December 2000, these are formed by ECB and ESCB employees¹ and published by the ECB, usually in the middle of the month, on a quarterly basis. Based on various national and EU-wide macroeconomic models the forecasts are derived for the current year and the following two to three years. The forecasts are published in form of a forecasting range.²

These forecasts and their assumptions are derived by a task force and do not necessarily represent the opinions of the members of the ECB's governing council or the governing bodies of the national central banks. The forecasts are published after, but created before the ECB's governing council meetings. Hence, monetary policy decisions of the month of publication are not taken into account.

3.2. Consensus Economics Forecasts

In order to evaluate the quality of private sector GDP and inflation forecasts we use survey data taken from the Consensus Economics Forecast Poll (CE). These include monthly forecasts for the current and the following year. The CE publishes inflation and GDP forecasts by retail as well as investment banks, asset managers, economic research centers, insurance companies, and analytics firms. The respondents' answers are published in the middle of each month. In those months in which the ECB publishes forecasts as well, the ECB forecasts usually precede the CE forecasts. Consensus' data is especially useful for the analysis of market perception of economic developments, as it not only supplies a single forecast figure, but delivers micro data containing individual forecaster's projections and names (Frenkel et al., 2012, 2013). This adds an incentive to provide adequate forecasts.

¹ In Q1 and Q3 only by ECB employees, in Q2 and Q4 as an aggregate of the forecast of the national central banks.

² Since June 2013 also point forecasts are given and in June, September and December 2020 instead of the ranges they provided alternative scenarios based on different possible future developments in regard due to the COVID-19 pandemic.

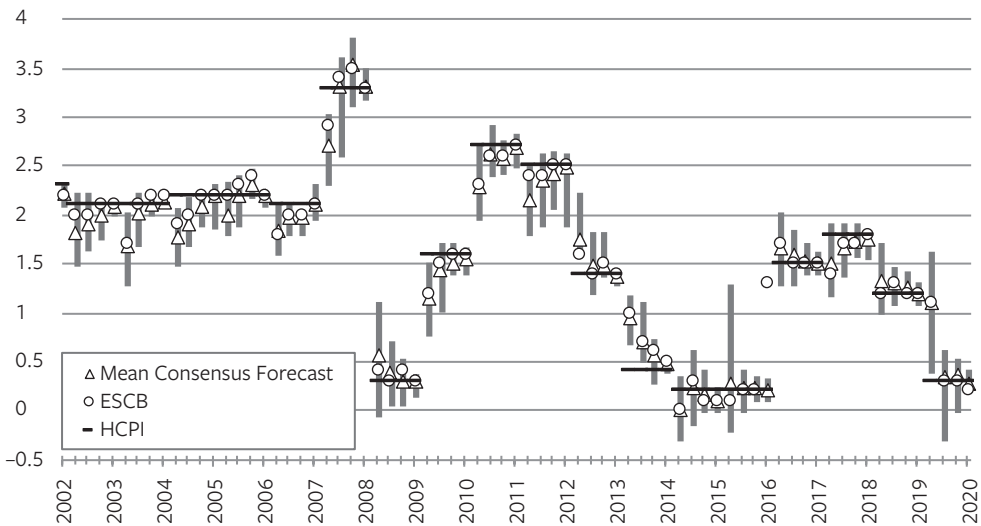
4. Empirical Analysis

4.1. Data Set

For our analysis, we examine the survey data from Consensus Economics Forecast Poll (CE) as well as the ECB’s forecasts for inflation and GDP for the current and following year for the euro area. Since CE forecasts are published monthly, while the ECB’s are published on a quarterly basis, we only use the corresponding months in which both institutions, the ECB and the CE publish their forecasts.

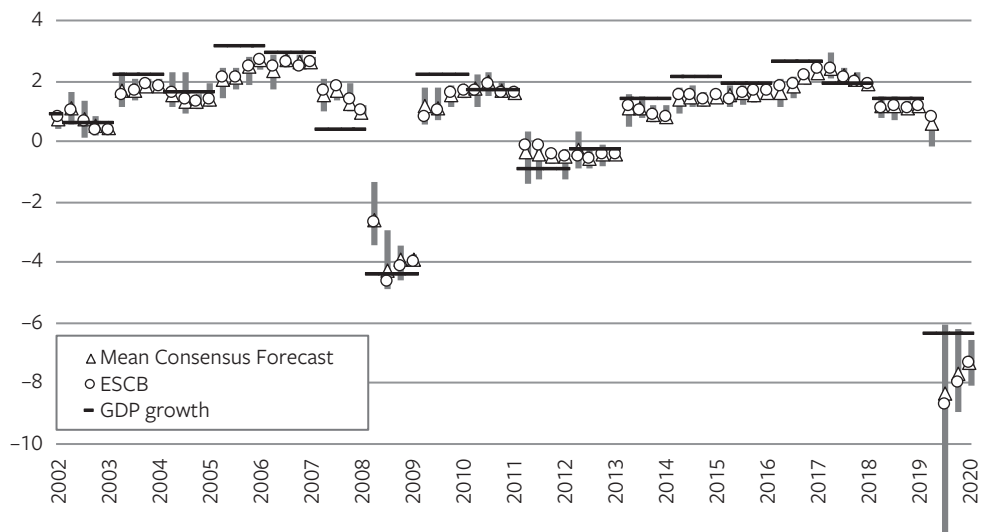
Our data set spans 73 periods from December 2002 to December 2020, incorporating 4080 forecasts for inflation and 4099 for GDP from 60 respectively 59 private sector forecasters. It is to be noted that not every private organization responded in every period. The ECB has published forecasts for every period examined.

Figure 1. Expected and realized inflation from December 2002 to December 2020



Source: ECB, Consensus Economics Forecast Poll, Eurostat.

Figure 1 illustrates the inflation data used. Whereas, the triangles represent the mean values of the individual Consensus inflation forecast, the grey bars the range of the Consensus forecasts and the squares the ECB forecasts. The black solid line represents the realized values according to Eurostat. Accordingly, the ECB’s forecast error is the difference between the lines and the squares, and the average forecast error of Consensus is the difference between the lines and the triangles.

Figure 2. Expected and realized GDP growth from December 2002 to December 2020

Source: ECB, Consensus Economics Forecast Poll, Eurostat.

Figure 2 depicts the GDP data used in an analogous way to the inflation data. Noticeably, forecasts at the end of the year are generally closer to the realized values. This is presumably explained by the shorter forecast period and the fact that parts of the actual/realized ex-post data for the past months is already available. Also, GDP forecasts seem significantly less accurate than the inflation forecasts, especially with regard to the number and strength of outliers. While the actual inflation figures are captured mostly within the range of the CE forecasts (86%), this is only the case for less than half of the actual GDP figures (38%).

Especially in the case of GDP, the large existing deviations can be attributed to the unexpected exogenous shocks. For example, in Q1 2009 this was the outbreak of the financial crisis and in Q2 2020 the emergence of the COVID-19 pandemic. In general, it can be said that the individual consensus forecasts spread considerably. The range is particularly wide in times of economic uncertainty. With respect to individual inflation forecasts, this most strongly affects Q1 2009, Q1 2016 and Q1 2020, and in terms of GDP forecasts, Q1 2009 and Q2 2020. Moreover, it is noticeable that such outliers in the inflation forecasts quickly normalize, whereas they tend to last longer in the case of GDP.

To measure the forecast quality we use, as common in the literature, the Root Mean Squared Error (RMSE) approach (Burden et al., 2021; Tanaka et al, 2020)

and benchmark the forecasts against the realized ex-post values published officially by Eurostat. Our calculations are based on the following formula.

$$RMSE = \sqrt{\frac{1}{n} \sum_{i=1}^n (y_i - \hat{y}_i)^2}$$

Where n is the number of observations for the respective month, y_i is the individual GDP forecast of the respective institution, \hat{y} is the ex-post realized GDP value. The calculation of the RMSEs for the inflation forecasts are performed in an analogous way.

Table 1. Summary Statistics (December 2002 to December 2020)

	Current year				Following year			
	Inflation		GDP growth		Inflation		GDP growth	
	CE	ECB	CE	ECB	CE	ECB	CE	ECB
Mean of forecasts	1.56	1.56	0.74	0.67	1.60	1.58	1.47	1.50
RMSE of forecasts	0.24	0.23	1.03	1.07	0.85	0.83	2.47	2.51
Mean of realized values	1.57	1.57	0.78	0.78	1.54	1.54	0.79	0.79
No. of forecasts	2.096	73	2.105	73	1.984	69	1.993	69
No. of forecasters	60	1	59	1	59	1	59	1

Source: ECB, Consensus Economics Forecast Poll, Eurostat.

Table 1 shows descriptive statistics of the forecasts analyzed and the ex-post realized GDP and inflation values according to Eurostat. The mean value of CEs inflation forecasts was 1.56 (ECB: 1.56) in the current year and 1.6 (ECB: 1.58) in the following year. The mean of the realized values at 1.57 for the current year was above the ECB's and Consensus' values. For the following year, the realized value at 1.54 was lower than the forecasted value of the considered institutions. The forecast quality of CE, measured as the root mean squared error (RMSE) was slightly worse compared with the ECB for both the current and the following year.

The opposite effect can be observed for the GDP forecasts. There, the mean value for CE was 0.74 (ECB: 0.67) for the current year and 1.47 (ECB: 1.5) for the following year. For the current year, both the Consensus and the ECB values were below the realized value (0.78); for the following year both the private as well as the institutional forecasts overshot. This represents the unexpected exogenous shocks in the economy.

In general, it is noticeable that the mean values of the following year GDP forecasts are considerably higher if compared to the mean value of the current year forecasts for both Consensus and the ECB. It is also noticeable that GDP forecasts are less accurate than inflation forecasts in terms of RMSEs.

4.2. Methodological Procedure and Results

Given the turbulences in the euro area market ever since the outbreak of the financial crisis and therefore, increasing uncertainty about future economic developments, we analyze the performance of the forecasts before the outbreak of the crisis and after. To examine the change of the forecasting quality pre- and post-crisis we split the data set on September 15, 2008, at the peak of the financial crisis with Lehmann Brothers filing for bankruptcy. Hence, the pre-crisis subsample spans from December 2002 to September 2008 and therefore covers 760 (767) private sector forecasts and 24 (24) institutional forecast for the current and following year for inflation (GDP) and the post-crisis subsample spans from December 2008 to December 2020 for the current and December 2019 for the following year. To examine the accuracy of forecasts we apply the RMSE technique. To check the significance of the change in forecasting quality we conduct an one-sided Welch t-test.

Table 2. Forecasting quality pre- and post-crisis

	Inflation		GDP growth	
	CE	ECB	CE	ECB
Current year				
RMSE pre-crisis	0.24	0.17	0.59	0.62
RMSE post-crisis	0.23**	0.25	1.22***	1.23
	(0.01)	(0.39)	(0.00)	(0.17)
No. of forecasts pre-crisis	760	24	767	24
No. of forecasts post-crisis	1336	49	1338	49
Following year				
RMSE pre-crisis	0.92	0.96	2.20	2.33
RMSE post-crisis	0.80	0.75	2.62	2.59
	(0.41)	(0.32)	(0.49)	(0.39)
No. of forecasts pre-crisis	760	24	767	24
No. of forecasts post-crisis	1224	45	1226	45

Note: The p-values of the Welch t-test are given in parentheses. *** (**) indicates significance at a 1% (5%) percent significance level.

Source: ECB, Consensus Economics Forecast Poll, Eurostat.

According to our results the quality of CEs current-year-inflation forecasts improved slightly after the outbreak of the financial crisis, while the quality of ECB forecasts decreased in terms of the RMSE. In the following year CE and ECB inflation forecasts improved noticeably. Interestingly, the improvement of the CE

current-year inflation forecasts is statistically significant. Despite the increased uncertainty in the market after the outbreak of the financial crisis our results indicate an improved accuracy of private sector forecasters in forecasting inflation for the euro area in the short run. One reason for this counterintuitive result might be the change of the ECBs communication strategy (Burden et al., 2021). With the introduction of “Forward Guidance” by the ECB as a monetary policy tool the financial market participants have a clear yardstick to form expectations. This might have added to the significant improvement of the inflation forecasts.

After the outbreak of the financial crisis the quality of the current-year GDP private sector and ECB forecasts deteriorated as the RMSEs more than doubled for both institutions. While the change in accuracy is statistically significant for the private sector forecasts, it is not significant for the institutional forecast. This might be due to the limited amount of observations with respect to ECB forecasts. The forecast error for the following-year GDP forecast also increased for the period after the outbreak of the financial crisis. These results, however, are statistically insignificant. Generally the deterioration in GDP forecast accuracy can be attributed to the increasing uncertainty in the post-crisis time span, i.e. due to the sovereign debt crisis or the COVID-19 pandemic. However, further research is necessary to detect reasons for the lower quality of GDP forecasts after the outbreak of the financial crisis. A more extensive analysis of the forecasting quality would require information about the forecasting models used by forecasters (Hyndman, Koehler, 2006; Lessman, Voß, 2017). With respect to CE forecasts this information is not available for each forecaster.

5. Conclusion

Given the turbulences in the euro area market ever since the outbreak of the financial crisis and the resulting increasing uncertainty about future economic developments, we analyzed the performance of private sector and institutional GDP and inflation forecasts before the outbreak of the crisis and thereafter. We used survey data from the Consensus Economics Forecast Poll to analyze the accuracy of private sector forecasts. With respect to institutional forecasts, we based our analysis on forecasts derived in course of the macroeconomic projection exercise of the ECB. Our results indicate a deterioration of GDP forecasts for the period after the outbreak of the financial crisis irrespectively of the institution under consideration. This result might reflect the increased uncertainty in the market and the high volatility of GDP growth rates. Interestingly, the results of private sector inflation

forecasts indicate an improvement in accuracy in terms of RMSEs for the period after the outbreak of the crisis. This result is statistically significant for the current-year private sector inflation forecasts. One reason for this counterintuitive result might be the change of the ECBs communication strategy. With the introduction of “Forward Guidance” by the ECB as a monetary policy tool the financial market participants have a clear yardstick to form expectations. This might have added to the significant improvement of private sector inflation forecasts.

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SECURITISATION RELOADED: INCREASING TRANSPARENCY IN STRUCTURED PRODUCTS PROMOTES FURTHER DEVELOPMENT OF THE CAPITAL MARKETS (UNION) AFTER BREXIT AND COVID-19

Johannes Alban*, Andreas Igl**

1. Introduction

The complexity and opacity of structured products can be seen as the trigger for the crisis of confidence and liquidity in the securitisation and interbank market, indeed the global financial crisis of 2007/2008. After the securitisation market suffered a severe loss of confidence and collapsed during the crisis, it recovered very hesitantly in Europe compared to the US and the majority of the instruments was retained on the balance sheet by issuers instead of placing them on the market. At the same time, the default rates and losses of European securitisations were considerably lower than in the US. These developments continue until today, exemplified by the stagnation of new European issuances compared to the US (see Figure 1, Appendix).

Therefore, the challenge for regulators has been and continues to be to stimulate securitisation issuances and markets in order to exploit the products' contribution to better credit availability and risk allocation, but also to address their inherent breadth of risks. In the course of this, greater transparency is seen as a central determinant for reviving the securitisation market. In several initiatives,

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the European Commission and the ECB tried to regain investor confidence with stronger disclosure requirements. Particular attention is being paid to the new Securitisation Regulation, which introduced so-called securitisation repositories. These repositories give investors central access to all relevant transaction data, including at the individual loan level, and thus enable a more precise risk analysis. In general, more comprehensive disclosure can promote investor confidence and reduce information asymmetries. However, the quality and presentation format of the data are also important, as investors need to be willing and able to conduct own analyses. At the same time, more disclosure may not only increase transparency, but may also have undesirable side effects.

Against this background, this article analyses to what extent the newly introduced securitisation repositories and the disclosure requirements actually create more transparency in securitisation structures. In addition, the paper assesses which side effects the more detailed disclosure could have on market participants and the information asymmetries inherent in the products. It is organised as follows: First, section 2 explains basic terms and the process of securitisation. Section 3 illustrates the motives, incentive structures, principal-agency conflicts of the transaction parties and outlines possible countermeasures. Section 4 provides an overview of the functioning of securitisation repositories as well as the applicable disclosure requirements for securitisations in the EU. Section 5 focuses on the extent to which the new repositories fulfil their objective of making securitisation structures more transparent and thus reducing agency risks between the transaction parties. For this, it is examined whether the data published in the repositories is sufficient for investors to conduct their own risk analysis. Then, on the basis of capital market theory and practical considerations, the costs, benefits and potential side effects of increased transparency on market participants are analysed. Section 6 concludes.

2. Basic terms and processes of securitisation

Due to the many different forms, a uniform economic definition of securitisations has not been established yet. Securitisation can be defined as a process in which a financial intermediary first acquires debt or equity instruments and restructures their underlying cash flows. It then issues securities that create claims on these restructured payments (Buchanan, 2017, p. 13f). This structured finance technique uses portfolios of interest-bearing, homogeneous assets that are hardly tradable as individual securities on the market. Since a large number of parties is involved, the

transaction structure is often complex and opaque. A single actor can also take on several roles within the transaction (Delivorias, 2016, p. 4).

Basically, one can differentiate between true sale securitisations and synthetic securitisations, which will be explained in the following. In a true sale securitisation (for an overview of the process, see Figure 2, Appendix), a financial institution or a business company (the originator) sells a portfolio of its loans or customer receivables from its balance sheet to a special purpose vehicle (SPV). In some cases, arrangers take over the consolidation and structuring of the receivables from many originators before selling them to the SPV (ECB, 2008, p. 17). The SPV, which is legally independent (and thus not prone to bankruptcy of the originator), holds the loan portfolio as collateral and issues securities (asset-backed securities, ABS) on its basis (Gauthier, 2020, pp. 9–11). The securities are divided into tranches with different seniority, by which the redemptions as well as the losses within the reference portfolio are allocated (waterfall principle) (Hellgardt, 2018, p. 709f.). A transaction manager manages the pool of receivables in the SPV until maturity and adjusts it according to the risk preferences of the investors. As a further party, servicers collect the loan repayments, with the authority to take appropriate actions in case of default or delinquency. Rating agencies assess the risks of the tranches at and after issuance (ECB, 2008, p. 17f). Finally, credit enhancers provide hedging services to improve the credit quality of the tranches (external credit enhancements), such as guarantees or additional cash collateral (Kara, Deku, 2017, p. 16, 18). In a synthetic securitisation, the originator retains the portfolio on the balance sheet and transfers the credit risk to the SPV or directly to investors using credit derivatives. The SPV issues securities backed by the pool of derivatives (Kara, Deku, 2017, p. 32f.). A default of the originator affects the repayment of the securities (Hellgardt, 2018, p. 710).

The legal definition in Art. 2 No. 1 of the STS Regulation takes up the economic perspective and lists the following characteristics of a securitisation: The allocation of the credit risk of the reference assets into tranches, the dependence of payments on the performance of the portfolio and the distribution of losses by seniority of the tranches. In this context, a securitisation may not create special financing exposures pursuant to Art. 147 Para. 8 CRR. In case of asset-backed commercial papers (ABCP), a special form of securitisation, the SPV acquires medium- to long-term assets (usually ABS) as reference assets and refinances itself through the revolving issue of short-term ABCP. Therefore, the SPV additionally enters into maturity transformation and takes on high liquidity risk, given that new securities must be issued in order to redeem the maturing ones. This and other risks are often assumed by a sponsor, e.g., by providing liquidity facilities (Kara, Deku, 2017, p. 36, 38).

3. Opacity and information asymmetries in securitisation structures

The following part analyses which motives, incentives, principal-agent relationships and agency conflicts prevail between the transaction parties. The agency theory by Ross (1973), Jensen, Meckling (1976) and Akerlof (1970) serves as the basis for analysing the behaviour of the transaction parties. It assumes the imperfection of the capital market, since information is unequally distributed between the actors (information asymmetries) (Ross, 1973, p. 134f; Jensen, Meckling, 1976, p. 5; Akerlof, 1970, p. 488f). In a perfect capital market according to Modigliani and Miller (1958), the value of a company and its cost of capital are independent of its capital structure. Since an originator only changes its capital structure by issuing securitisations, it does not achieve any added value. Thus, only deviations from the idea of a perfect capital market can justify the existence of securitisations (Sidki, 2017, p. 221).

According to the agency theory, so-called principal-agent relationships occur when one actor (principal) assigns another actor (agent) a task on its behalf, thereby delegating a certain discretion to the latter (Jensen, Meckling, 1976, p. 5; Ross, 1973, p. 134). Since both want to maximise their own, often incompatible utility, there is a risk that the agent will not perform the task altruistically in the principal's interest (moral hazard). In order to work towards the desired outcome, the principal should create an incentive-compatible environment, for instance by monitoring the agent or requiring a contractual commitment. Ultimately, these measures and the agent's self-interested behaviour create agency costs (Jensen, Meckling, 1976, p. 5 f; ECB, 2008, p. 15). The agent can reduce them by clearly signalling not to exercise its informational advantage (Akerlof, 1970, p. 499, 492). However, all these measures cannot completely offset welfare losses (Sidki, 2017, p. 221).

Akerlof (1970) illustrates the problem with markets in which only the seller (agent) knows about the product quality. Buyers (principals) demand a price discount on the products, being unsure about the quality. Therefore, suppliers of qualitative products cannot achieve the real value of the goods and exit the market. If several quality levels exist, only goods of worst quality will be traded. Consequently, the market can dry up. This systematically suboptimal market outcome is also called adverse selection.

Based on this theoretical foundation, the motives of originators and investors for engaging in securitisation transactions are explained in the following. First, securitisation is a solution to the loan-sales problem: A lender will hardly be able to sell loans without high markdowns because it has significant informational advantages over buyers (Gorton, Pennacchi, 1990, p. 2). In order to prevent fluctuations

of their portfolio value, banks tend to hold back information on their loan portfolio. While a mere sale would reveal this information, the structuring of the credit risk circumvents this. Securitisation thus allows institutions to sell their portfolios in an incentive-compatible way (Sidki, 2017, p. 221). Therefore, illiquid assets can be converted into fungible securities, allowing originators to transfer all risks associated with the portfolio to investors. Selling credit risk can relieve regulatory capital requirements and improve financial ratios, freeing up capital and liquidity from the sale proceeds for new business (Joint Forum, 2011, p. 10 f; Delivorias, 2016, p. 10). With the help of securitisations, originators can diversify their refinancing besides deposits and bonds. Tailor-made securitisations (in terms of risk and return) can address a broader investor base (Joint Forum, 2011, p. 10, 17; Slaughter, May, 2010, p. 4). Securitisations can enable more favourable refinancing conditions than traditional bonds: If the reference portfolio is held by the bankruptcy-remote and legally independent SPV, the rating and risk premia of the tranches do not depend on the creditworthiness of the originator, but only on the credit quality of the underlying portfolio (Joint Forum, 2011, p. 40; Slaughter, May, 2010, p. 2). Moreover, originators can earn high commission income by performing other functions in the transaction process besides the sale of the assets. Especially before the financial crisis, they also attempted to exploit arbitrage opportunities from the different maturities of the securities and the reference assets (Joint Forum, 2011, p. 11; ECB, 2008, p. 11).

On the other hand, especially in pre-crisis years, securitisation products enabled investors to satisfy their demand for well-rated products in the investment grade range that fulfilled their investment restrictions. In doing so, they usually achieved more attractive risk-adjusted returns than with comparable investments (Joint Forum, 2011, p. 12f, 17). In addition, the tranche structure offers investors different, partly tailor-made risk profiles depending on their risk appetite (Sidki, 2017, p. 227; Delivorias, 2016, p. 11). Due to the high number of reference obligors and low correlations to other products, it was argued that counterparty concentration limits were hardly relevant for securitisations and that the products can even increase the diversification of the investor portfolio. However, reference assets in several sectors were highly correlated in the crisis environment (Joint Forum, 2011, p. 13.).¹ In any lending operation, borrowers can exploit their information advantage about the intended use of the money over the originators and ultimately the investors in the ABS, or even provide incorrect information. This classic case of adverse selection occurs especially when credit monitoring is poor

¹ For details on the conflicts of interest, see Ashcraft and Schuermann (2008, pp. 3–12).

(Kara, Deku, 2017, p. 113). In the run-up to the financial crisis, many originators seem to have known about the widespread misreporting by borrowers, accepted it and nevertheless pretended a higher credit quality to investors. Presumably, some (but not all) originators still wanted to securitise these *de facto* unsuitable loans. Subsequently, loans with false information defaulted much more often than correctly reported ones (Griffin, Maturana, 2016, p. 14 f, 28f).

To ensure capacity for new lending in a timely manner and to generate more profits with a higher turnover, originators tend to grant loans with the intention of not retaining them on the balance sheet until maturity, but to sell them to investors via structured transactions as soon as possible after origination (ECB, 2008, p. 16). Agency conflicts play a special role in the context of this “originate-to-distribute” strategy (ECB, 2008, p. 7). In the absence of a long-term remuneration structure, originators have few incentives to conduct diligent (and therefore costly) screening and monitoring of borrowers at and after origination. On the contrary, they may deliberately dispose of the worst performing loans. In this case of adverse selection, the quality and performance of the securitised loans deteriorate; a risk ultimately borne by investors as unknowing principals (ECB, 2008, p. 16; Joint Forum, 2011, p. 14). Securitisations are particularly susceptible to this because of many involved actors and the large distance between risk takers and risk holders (Joint Forum, 2011, p. 45). The majority of empirical studies confirm these relations. Among others, Keys et al. (2010) observe that the share of loans with incomplete documentation increased significantly in the US in the run-up to the financial crisis. If a loan exceeded the applicable credit score to be eligible for securitisation at that time, lenders tended to screen the borrowers less and request less qualitative information. Furthermore, these loans had a significantly higher probability of default than loans that were assigned a lower rating below the threshold (Keys et al., 2010, pp. 309 f, 324–326, 334f). By contrast, analysing securitised European corporate loans over the same period, Kara et al. (2017) conclude that banks did not actively securitise worse loans, but rather retained them (possibly as a signal). Over time, however, securitised loans deteriorated significantly (secured loans less than unsecured loans). The authors attribute this to lower incentives to monitor securitised loans (Kara et al., 2017, pp. 10–12, 17–23). The higher return on ABS compared to other forms of investment can therefore be seen as a risk premium (“lemons” premium) due to uncertainty about the quality of the reference assets (Jobst, 2002, p. 20; Akerlof, 1970, p. 489 f). Due to this lack of knowledge as well as the opacity of the transactions, investors were reluctant to purchase securitisations after the crisis and demanded much more granular information (Joint Forum, 2011, p. 17f; ECB, 2008, p. 13).

Arrangers and transaction managers are often motivated to earn as much commission as possible for their activities. To achieve higher returns and remuneration, they tend to conduct transactions with riskier credit portfolios than desired by investors. Alternatively, they structure the products in a very complex way (and advertise them as innovative) (ECB, 2008, p. 17). Since investors hold tranches with different risk profiles and therefore have unequal interests, they may also come into conflict with each other (the “tranche war”). For example, service providers might favour one group of investors or neglect investor interest altogether because they themselves are invested in the first-loss tranche (ECB, 2008, p. 17f; Joint Forum, 2011, p. 16).

Finally, rating agencies as well as servicers also tend to selfishly increase commission income while neglecting the interest of investors. Since the rating of securitisations was very lucrative for the agencies before the financial crisis, they also applied their rating methodologies to very complex and therefore difficult-to-rate securitisations. In such cases, it is questionable whether the rating correctly reflects all product risks or sends the wrong signals to investors. Moreover, rating agencies hardly communicated that the ratings of a bond and a securitisation are not comparable. Since the issuer pays the rating process, rating agencies might tend to make a tendentially (too) mild judgement. This would also explain the agencies reluctance to downgrade ratings (ECB, 2008, p. 12, 19; Hamerle, Plank, 2010, p. 29).

The servicer could decide what encashment action to take based on its commission if its compensation is not adequately aligned with the required effort. This may affect portfolio value and liquidation proceeds to the detriment of investors (ECB, 2008, p. 19). Overall, however, it should not be forgotten that investors, as ultimate buyers and principles, decide about the demand and thus the conditions of the products and thereby can exert strong market discipline. They can influence the appearance and strength of the explained agency conflicts either by exerting discipline on the actors or by blindly relying on them (ECB, 2008, p. 20). Before the financial crisis, investors’ remuneration was focused on short-term returns, so they barely reviewed the transactions carefully. Rather than requesting detailed information, investors tended to trust the vague representations of originators, the collateralisation or ratings of the tranches (Joint Forum, 2011, p. 14f; ECB, 2008, p. 12). This was especially the case with complexly structured and opaque products. For them, no detailed loan-level information was disclosed. Furthermore, investors did not have sufficient capacity for detailed analysis, which was considered too costly anyway (Joint Forum, 2011, p. 15 f.; Hellgardt, 2018, p. 710).

The following countermeasures might be suitable to mitigate agency conflicts and to revive the market. First, the remuneration of all actors should be aligned with

more sustainable goals than volume or short-term returns. To encourage the originators to adequately screen and monitor the underlying borrowers, they should be required to partly retain the risk of the transaction (ECB, 2008, p. 21f). If investors take this as a signal to refrain from exploiting information advantages, their confidence tends to increase and they demand lower “lemons” premia (Jobst, 2002, p. 20f). However, when participating in the first-loss tranche, the originator may be inclined to favour the self-held tranche, which could lead to the “asset substitution” problem (Sidki, 2017, p. 227; Jensen, Meckling, 1976, p. 43f, 56). Rating agencies should give more consideration to systemic risks as well as the originator’s incentives to adopt an “originate-to-distribute” strategy (Sidki, 2017, p. 224f). Conflicts of interest between players should be clearly documented and addressed. Finally, higher disclosure requirements can make transactions more transparent so that investors can monitor the actors more closely, evaluate products more independently and thus exercise greater market discipline (ECB, 2008, p. 22 f). This aspect will be examined in the course of next chapters.

4. European initiatives for more transparency in securitisation

This chapter presents the European initiatives after the financial crisis to make securitisation transactions more transparent and to reduce the information asymmetries and agency conflicts described above. After explaining the Loan-level Initiative as a pioneer of loan-level disclosure, the transparency and due diligence requirements under the new Securitisation Regulation and the role of securitisation repositories are discussed.

4.1. Loan-level Initiative of the ECB

In the course of the financial crisis, the European securitisation market dried up in many sectors and countries and has only recovered slowly since then. As banks were largely refinanced through Eurosystem open market operations at that time and due to low market demand, they largely retained newly conducted securitisations and deposited them as collateral with the central banks (Kanoni, Schaber, 2013, p. 919; ECB, 2021e). The lack of inaccurate information on transaction risks and structures is seen as the main reason why investors hardly regained confidence and largely avoided the products (Kanoni, Schaber, 2013, p. 919).

Against this background, the ECB announced the Loan-level Initiative at the end of 2010. The primary aim was to establish the disclosure of information at the

individual loan level as an eligibility criterion for securitisations to be used as collateral for Eurosystem refinancing operations. This information is made available to all market participants in a timely manner so that they can more easily assess the risks at the individual loan and transaction level and thus better fulfil their due diligence obligations (ECB, 2021e). Furthermore, the development of individual loans can be tracked based on the history of the reports (Kanoni, Schaber, 2013, p. 922). Overall, this should strengthen confidence in the products, revive the securitisation market and thus stimulate lending. At the same time, the haircuts and rating floors in the Eurosystem collateral framework were lowered for ABS fulfilling the new transparency requirements (ECB, 2021e). Furthermore, the ECB has been purchasing securitisations, for which loan-level data were disclosed, intermittently since the end of 2014 (ECB, 2021a; Decision (EU) 2015/5 of the ECB, Art. 2 para. 2). As the ECB has been heavily exposed to ABS since this time, it is interested in the individual loan data to assess the value and the risk of the products (Mersch, 2017).

Working groups developed highly standardised reporting templates for each asset class, which make the transactions comparable to each other (Kanoni, Schaber, 2013, p. 919f). Between January 2013 and April 2014, the disclosure requirements became mandatory – for both already issued and newly issued ABS (ECB, 2021e). Originators must submit the templates with a fixed number of mandatory and optional fields at least once per quarter, but no later than one month after interest maturity (Annex VIII Guideline (EU) 2015/510 Part 1 No. 3, Part 2; ECB, 2021d).

In order to upload and retrieve the data centrally, a centralised database, European DataWarehouse GmbH, was founded in 2012. Developed and supported by an ECB-driven initiative of the largest market participants, it manages and holds all data. Users have real-time access to the data and can integrate their own analysis and evaluation tools. Automated processing and quality assurance takes place during the upload (ECB, 2021c; Kanoni, Schaber, 2013, p. 920). For example, the reporting party must justify empty reporting fields with a “No data” option according to the “comply-or-explain” procedure, whereby the share of fields with certain “No data” options to the total number of mandatory fields had to fall below certain thresholds in the introductory phase and must now indicate absolute completeness. However, some non-compliance may be tolerated in certain cases (Annex VIII Guideline (EU) 2015/510 Part 1 No. 3, Part 2; ECB, 2021d). In addition to the reconciliation of the reports with the ECB taxonomy, security, timeliness and consistency checks are carried out. Consequently, the warehouse creates more transparency, but credit quality analysis and investment decisions are clearly left to the users (Kanoni, Schaber, 2013, p. 921).

The Loan-level Initiative and the experience gained from it formed an important basis for the transparency regime in the new Securitisation Regulation – especially with regard to the securitisation repositories as well as the precise reporting requirements (Mersch, 2017). These aspects and their motivation will be discussed in the following section.

4.2. Transparency and due diligence requirements of the STS Regulation

Despite all the measures taken, the activity of the European securitisation market remained at a low level, which the European Commission attributed to a continued lack of investor confidence (European Commission, 2015, p. 24). In general, private investment seemed to be moving further and further away from sustainable, growth-enhancing levels. To close this investment gap, the European Commission and the European Investment Bank announced an investment offensive at the end of 2014. The main objective was to work towards a Capital Markets Union (European Commission, 2014, pp. 4–6, 16f). In the action plan announced for this purpose in September 2015, the revival of securitisations in the bank-financed EU was given a central role. With the development of a secure securitisation market as a further financing channel, the Commission hoped for more than €100 billion of additional lending to the real economy and presented the proposal for a Securitisation Regulation on the same day (European Commission, 2015, p. 4, 24 f).

The final version of the regulation (the STS Regulation)² entered into force on 17 January 2018 and became effective on 1 January 2019 (Art. 48 STS Regulation). Taking up the motives explained above, the regulation brings together already regulated aspects into a cross-sectoral, uniform set of rules. In addition, it introduces a new transparency regime and a new class of simple, transparent and standardised (STS) securitisations, in distinction from more complex products (Hellgardt, 2018, p. 710; Art. 1 STS Regulation). The requirements to be fulfilled by them (STS criteria) do not make any statement about the credit quality, but are intended to increase the standardisation and transparency of the products and facilitate independent risk analyses by investors (Cf. Recital 3, 16 STS Regulation; Anschutz, 2020, p. 60). Thus, investors are attributed a greater personal responsibility. In the same way, the obligatory disclosure in the newly introduced securitisation repositories is intended to provide investors with readily accessible information to identify the numerous risks of a securitisation and to fulfil their due diligence obligations (Recital 9, 12 STS Regulation).

² Regulation (EU) 2017/2402, also Securitisation Regulation.

The scope of disclosure depends on whether issuers are required to prepare a prospectus for the transaction under the Prospectus Regulation (Recital 9, 12 STS Regulation) (public securitisation) or not (private securitisation). This takes into account the motives behind private securitisations. In these transactions, issuers disclose the relevant information directly to investors in order to prevent sensitive information from being disclosed to the market (Recital 13 STS Regulation).

Generally, securitisations as transferable securities are subject to the obligation to publish a prospectus if they are admitted to trading on a regulated market³ or if a public offer⁴ is made to investors. However, if the offer is, for example, only addressed to a few qualified investors or has a certain minimum denomination, no prospectus needs to be prepared.⁵

Public securitisations are also subject to the general disclosure requirements: In addition to a securities prospectus, the issuer is obliged to publish annual financial statements, semi – annual financial reports and, if applicable, consolidated financial statements in accordance with Art. 4 and 5 of the Transparency Directive⁶ if the products are admitted to a regulated market. If the products are authorised to a regulated market, multilateral or organised trading facilities, Art. 17 Market Abuse Regulation (MAR)⁷ specifies the immediate, broad disclosure of inside information. In order to increase transparency, the STS Regulation obliges all, also previously exempt issuers to this disclosure. The requirements under the regulation are specified by Delegated Regulation (EU) 2020/1224 and the format of the reporting templates by Implementing Regulation (EU) 2020/1225 (Hellgardt, 2018, p. 714).

Even before pricing, all documents necessary to understand the transaction, including the prospectus, the final offer or transaction documents, a detailed description of the seniority of payments as well as all contracts between the transaction parties, must be disclosed. The latter shall include, in particular, any servicing, trust, intercreditor and collateral agreements, credit and liquidity facility agreements and, in case of true sale securitisations, asset transfer agreements to the SPV.⁸ For private securitisations, a summary of the transaction or a statement of characteristics shall be prepared, setting out the transaction structure, cash flows, significant trigger events and creditor relationships.⁹

³ An authorised, functioning multilateral trading facility according to Art. 2 letter j Regulation (EU) 2017/1129 and Art. 4 para.1 No. 21 Directive 2014/65/EU.

⁴ Art. 2 letter d Regulation (EU) 2017/1129.

⁵ Art. 1 para. 3–5 Regulation (EU) 2017/1129.

⁶ Directive 2004/109/EC.

⁷ Regulation (EU) 596/2014.

⁸ Art. 7 para. 1 Subpara. 1 letter b, Subpara. 2 STS Regulation.

⁹ Art. 7 para. 1 Subpara. 1 letter c, Subpara. 2 STS Regulation.

The regular publicity is supplemented by loan-level information on the portfolio underlying the securitisation as well as investor reports. The level of detail depends on the type of transaction. In the loan-level report, investors are informed quarterly (or monthly in case of ABCP) about the underlying reference portfolio, including all active, solvent and immediately insolvent positions.¹⁰ While for non-ABCP securitisations information must be provided on each individual underlying exposure, its monthly repayments as well as on its underlying collateral, the issuer of ABCP securitisations only has to report aggregated information. This differentiation is motivated by the shorter maturity and sponsorship of ABCP.¹¹ The exact reporting fields are tailored to the asset classes present in the underlying portfolio, with additional disclosures required for the securitisation of non-performing exposures.¹²

The investor reports are published at exactly the same frequency, showing how the reference portfolio and cash flows have developed since the last reporting date. While every income and expense item of the transaction are disclosed for non-ABCP securitisations, information at the programme level are sufficient for ABCP. In addition, the reports provide information on the occurrence of material trigger events and the risk retention by the originator.¹³ All transaction parties are obliged to provide insider information according to Art. 17 Market Abuse Regulation in the repository. Furthermore, they must report important events without delay. This applies, inter alia, if there is a significant breach of documented contractual obligations, if transaction documents, structure or risks change significantly or if STS requirements are no longer met.¹⁴

Analogous to the Loan-level Initiative, the reporting templates are filled out according to the “comply-or-explain” procedure, so that empty fields are to be declared with a “No data” option. For each field, it is determined whether and which “No data” options are allowed.¹⁵ The reporting templates in XML format resemble those of the Loan-level Initiative and the reports to trade repositories in format and structure.¹⁶ Any disclosure must comply with the applicable data protection regulations, if necessary, by nonymization or aggregation.¹⁷

¹⁰ Art. 7 para. 1 Subpara. 1 letter a, Subpara. 3 STS Regulation; Art. 1 No. 3 and 4, Art. 2 Delegated Regulation (EU) 2020/1224.

¹¹ Recital 7 and Art. 4 para. 1, 2 Delegated Regulation (EU) 2020/1224.

¹² Recital 3, 4, Art. 2 and Annex II–XI Delegated Regulation (EU) 2020/1224.

¹³ Art. 7 para. 1 Subpara. 1 letter e, Subpara. 3 STS Regulation; Art. 4 para. 1, 2 Delegated Regulation (EU) 2020/1224.

¹⁴ Art. 7 para. 1 Subpara. 1 letter f, g, Subpara. 5 STS Regulation.

¹⁵ Art. 9 Delegated Regulation (EU) 2020/1224.

¹⁶ Recital 3, Art. 5 Implementing Regulation (EU) 2020/1225.

¹⁷ Art. 7 para. 1 Subpara. 6–8 STS Regulation.

STS securitisations must comply with additional transparency requirements, which are mainly defined in Art. 22 STS Regulation and explained below. Before pricing, originator and sponsor are obliged to provide information on how defaults and losses of the securitised or similar exposures have developed over the last five years from a static and dynamic perspective.¹⁸ In addition, a liability cash flow model should show the exact contractual relations between the payments generated from the reference assets and the payments made between all parties.¹⁹ If the underlying loans finance residential real estate or motor vehicles, their environmental assessment shall be included.²⁰ In addition, the STS notification must be provided to investors prior to pricing.²¹ With this, the originator and sponsor certify that the transaction meets all STS criteria and explain how they comply with each criterion.²² This self-declaration is not subject to supervisory review, which emphasises the investors' ownership in risk analysis.²³ ESMA publishes all securitisations for which it has received this notification on its website.²⁴ Prior to issuance, an independent party examines a sample of reference assets and verifies the accuracy of the reported data.²⁵ Finally, the publication date is also slightly adjusted: Investors can request the portfolio report on individual positions even before pricing. The final transaction documents or summary must be available before pricing, as explained above, but after 15 days at the latest.²⁶

The other STS criteria specify and expand the requirements for the transaction documents and are presented in detail in the Appendix (Note 1). However, the following aspects should be highlighted: The issuer must clearly state the responsibilities of the transaction parties and outline how the replacement of defaulted service providers, sponsors and counterparties can be ensured. The sponsors of an ABCP must prove that their function does not jeopardise their own solvency and liquidity situation in crisis situations.²⁷ In addition, the lending standards for the underlying risk positions must be disclosed.²⁸

¹⁸ Art. 22 para. 1 STS Regulation.

¹⁹ Art. 22 para. 3 STS Regulation.

²⁰ Art. 22 para. 4 STS Regulation.

²¹ Art. 7 para. 1 Subpara. 1 letter d, Subpara. 2 STS Regulation.

²² Art. 27 para. 1 STS Regulation.

²³ Recital 31, 33 STS Regulation; Anschütz, David, 2020, pp. 141 f.

²⁴ Art. 27 para. 5 STS Regulation.

²⁵ Art. 22 para. 2 STS Regulation.

²⁶ Art. 22 para. 5 STS Regulation.

²⁷ Art. 21 para. 7, Art. 24 para. 20 letter d, Art. 25 para. 2 f. STS Regulation.

²⁸ Art. 20 para. 10 Subpara. 1 STS Regulation.

4.3. Due diligence requirements for institutional investors

Complementary to the disclosed information, institutional investors must fulfil certain due diligence obligations for investing in securitisations. These due diligence obligations are intended to make investors aware of the various risks of a securitisation and to evaluate them adequately (Recital 9 STS Regulation; Hellgardt, 2018, p. 714). Generally, securitisations are only offered to institutional investors and not to retail investors.²⁹

Before buying securitisation instruments, investors must ascertain that effective lending standards have been applied to the reference assets. In addition to retaining part of the transaction risks according to Art. 6 STS Regulation, they must assess whether the originator has fulfilled its transparency obligations. Finally, they should already carry out a thorough risk assessment, which at least includes the risk and structural features of the product and the pool of assets as well as the fulfilment of the STS criteria.³⁰

Until maturity, the investor must continuously monitor the development of numerous parameters as well as the permanent fulfilment of the requirements examined before acquisition. In addition, it shall examine the impact of stress scenarios on the sponsor of ABCP, on the payments and collateralisation of the portfolio and communicate the material risks to the internal governance body. In doing so, the investor must always be able to demonstrate to the authorities its comprehensive knowledge of the transaction, appropriate risk management and due diligence procedures.³¹ These due diligence requirements are initially intended to protect against imprudent investment decisions. Above all, investors serve as a further monitoring instance and check whether the transparency obligations are fulfilled, which increases their binding effect (Hellgardt, 2018, p. 715).

4.4. Role and function of securitisation repositories

For the issuance of public securitisations, one of the main participants (originator, sponsor or SPV) must provide the disclosure via a securitisation register. For private securitisations, only an entity must be designated to provide the information upon request by investors or supervisors (Art. 7 para. 2 STS Regulation; Hellgardt, 2018, p. 714). According to the legal definition in Art. 2 No. 23 STS-Regulation,

²⁹ Art. 3 para. 1, Art. 5, Recital 9 and 15 STS Regulation. For the definition of institutional investors see Art. 2 para. 12 STS Regulation.

³⁰ Art. 5 para. 1–3 STS Regulation.

³¹ Art. 5 para. 4 STS Regulation.

a securitisation repository is a legal entity that centrally collects and stores records on securitisations. As a central, supervised database, it provides investors with all essential information to fulfil their due diligence obligations. In doing so, it aims to increase market transparency and reduce information asymmetries between actors, but also the reporting burden on originators.³²

Securitisation repositories are authorised by ESMA if they fulfil the formal and operational criteria in Art. 10–16 STS-Regulation: First, the repositories must have its registered office within the EU, in which the registration is valid. With regard to corporate governance, operational availability and data protection, reference is made to the regulations for trade repositories in Art. 78–80 European Market Infrastructure Regulation^{33,34}.

The STS Regulation as well as its RTS and ITS specify the exact operational requirements, registration applications, process and fees to be paid, whereas existing trade repositories only have to apply for the extension of their license.³⁵ On its website, ESMA maintains a list of securitisation repositories authorised to date.³⁶ On 23 September 2020, ESMA published the final Level 2 and Level 3 provisions so that first registration applications could be submitted (ESMA, 2020a).

In addition to the sole disclosure of data, the securitisation repositories aggregate the submitted templates and check them for completeness and consistency.³⁷ This takes place automatically and immediately after submission. The procedures to be applied are presented in the Appendix (Note 2 and Table 1). They are intended to ensure high quality and thus comparability of the data between the repositories.³⁸ As a result of this, investors can rely on the information being complete and coherent, but not on its comprehensive accuracy. This is in line with the desired strengthening of their ownership (Anschütz, 2020, p. 87). The securitisation repositories compile a daily end-of-day report from the most recent transactions. In addition to the main participants, this report contains elementary information on the transaction structure, the underlying pool of receivables and the data transmission.³⁹ The repositories must grant direct, free and immediate access to a large number of actors (potential) investors, ESMA, EBA, ECB, the relevant banking supervisors,

³² . Recital 12, 13 STS Regulation.

³³ Regulation (EU) 648/2012, European Market Infrastructure Regulation (EMIR).

³⁴ Art. 10 para. 1–4 STS Regulation.

³⁵ Art. 10 para. 5–8, Art. 11–16 STS Regulation; for further information: Delegated Regulation (EU) 2020/1229; Delegated Regulation (EU) 2020/1230; Implementing Regulation (EU) 2020/1228; Delegated Regulation (EU) 2020/1732.

³⁶ 13 para. 3 STS Regulation.

³⁷ Art. 10 para. 2 STS Regulation.

³⁸ Recital 1 Delegated Regulation (EU) 2020/1229.

³⁹ Art. 2 Delegated Regulation (EU) 2020/1229.

market supervisors and resolution authorities as well as the supervisors pursuant to Art. 29 STS – Regulation to perform their respective tasks, mandates and obligations.⁴⁰ In this context, access to all reported information, the end-of-day report, the results of the completeness and consistency checks and the calculation and aggregation methods must be requested as required. Stakeholders can access their desired information on an ad hoc basis or at regular intervals, depending on the urgency.⁴¹

For the supervision of securitisation repositories, ESMA is granted far-reaching supervisory powers, whereby it also publishes punitive measures taken in the sense of “naming and shaming”.⁴² In contrast and according to Art. 29 STS Regulation, the national competent authorities, depending on the sector, supervise whether investors, originators, sponsors and SPVs comply with their obligations and the STS criteria.

5. Assessment of the transparency-enhancing effect of the new regime

This section assesses whether the newly introduced disclosure obligations and securitisation repositories really make transaction structures more transparent and thus reduce the agency conflicts explained in section 3. First, it is examined whether the data published in the repositories are suitable and sufficient for investors’ independent risk analyses. In a second step, the costs and benefits of increased transparency are weighed on the basis of capital market theories and practical considerations, and possible side effects are critically assessed. An overall assessment summarises the results of the analysis and concludes the chapter.

5.1. Suitability of data in securitisation repositories for risk analyses

In a typical assessment process, the investor first analyses whether the originator has sufficient resources and experience to conduct the transaction, drawing primarily on information about the ’originator’s financial situation, organisational structure and management level (Kara, Deku, 2017, p. 21). The prospectus, the offering documents and the regular financial reports accessible in the repositories only provide indications in case the originator retains the reference assets on its balance sheet and issues the securities itself, because they only show the financial

⁴⁰ Art. 17 para. 1 STS Regulation.

⁴¹ Art. 5 f. Delegated Regulation (EU) 2020/1229.

⁴² Art. 14 STS Regulation; Art. 61–68, 73 f. Regulation (EU) 648/2012.

position of the issuer (usually the SPV). In addition, the prospectus contains the main issuer-specific risks.⁴³ Ultimately, only contracts with other transaction parties can be used. Thus, investors can make rather imprecise statements on the financial, organisational and personnel resources and experience of the originator, whereby the STS criteria at least require its experience.⁴⁴ The transactions themselves are examined from four angles (Kara, Deku, 2017, p. 21f.): For the identification of legal risks arising from the securitisation, it is primarily examined whether the risk positions were transferred to an insolvency-remote SPV in a legally secure manner. In addition to any legal and economic relationships between the SPV and the involved parties, potential tax risks are also investigated. The insolvency remoteness of the SPV and legal risk from the transaction can be derived from the disclosed contracts, e.g., assets transfer agreements to the SPV, collateral and service agreements. Although the tax risks are difficult to evaluate, the documents provide a solid basis for the assessment.

In the second step, the structural characteristics and risks of the transaction are identified, which primarily involves reviewing the transaction documents and modelling the cash flows. Here, the payments generated from the reference portfolio must be sufficient to service the issued securities on time. This basic requirement can be tested by examining the developments of loss variables (such as default rates) in various stress scenarios. Credit enhancements, the subordination structure and potential triggers also have a significant impact on how payments and losses are allocated to the individual tranches. The aforementioned documents contain a description of the subordination and transaction structure as well as credit enhancements and significant trigger events. The offering documents and periodic financial reports inform about the financial resources and ongoing solvency of the SPV (or the originator). In addition, the periodic investor and portfolio reports provide information on each income and expense item of the transaction and the occurrence of triggers. Material changes in this structure and its risk characteristics are disclosed immediately. Particularly informative is the liability cash flow model, which is disclosed for STS securitisations on an ongoing basis and shows the exact contractual relations between the payments generated from the individual exposures and those made between all parties. Overall, investors receive a comprehensive information basis – especially for STS transactions – for understanding the transaction, whereas they must determine the stress resistance of the cash flows themselves on this basis.

⁴³ Art. 6 para. 1, Art. 16 Regulation (EU) 2017/1129; Art. 4 f. Directive 2004/109/EC.

⁴⁴ E.g. Art. 20 para. 10 Subpara. 4 STS Regulation.

The operational risk of the transaction is derived from the reliability and continuity of the transaction parties in performing their functions. Since the failure of critical service providers can significantly disrupt the transaction process, attention should be paid to their creditworthiness as well as their substitutability. Especially in synthetic securitisations, collateralisation arrangements may be concentrated on a few protection providers or instruments, which can jeopardise the repayment of the transaction in case of increased credit defaults (Deutsche Bundesbank, 2006, p. 36).

At first, the originator's resources and experience should be analysed, in particular if the originator takes over further services within the transaction (as explained above). Based on the contractual documents, investors can determine the roles of the other transaction parties, their creditworthiness and remuneration scheme and assess possible concentrations of services, security and external credit enhancements. The documents also give indications on the agency conflicts explained in section 3, which are central to understanding the transaction structure and have a significant impact on its settlement. However, the reliability of the involved parties can hardly be deduced. At the very least, significant contract breaches must be published on an ad hoc basis. Here, the STS criteria go further. They define the obligation to explain how the replacement of defaulted service providers, sponsors and counterparties is ensured. Sponsors of an ABCP must demonstrate their risk-bearing capacity in stress scenarios.

However, the focus of a rating and this consideration is on the credit risk of the products. In a securitisation, credit risks are reallocated according to the seniority of the tranches. The repayments and losses allocated to the tranches are determined by the performance of the reference assets. Thus, the loss distribution of the reference portfolio determines the credit risk of the tranches and builds the fundament of the analysis (Hamerle, Plank, 2010, p. 29f). To determine this, the credit risk of the individual positions is analysed and then aggregated at the level of the reference portfolio using portfolio models (Kara, Deku, 2017, p. 21). The expected loss EL is one metric to quantify the credit risk of the reference assets and defined as follows:

$$EL = EAD * LGD * p.$$

EAD (exposure at default) is the amount of outstanding risk positions and the credit lines drawn, LGD (loss given default) is the loss ratio in case of default. The latter results primarily from the seniority and quality of the collateral (Henking et al., 2006, p. 20, 23; Rudolph et al., 2012, p. 141f). Small p represents the probability of default in a defined period. For illiquid positions (especially loans), p is estimated

using internal credit scoring models, taking into account the risk characteristics of the borrower and exposure. Otherwise, external rating assessments and the probability of default typical for the rating class are used or p is derived from market prices (Henking et al., 2006, p. 17; Rudolph et al., 2012, p. 140).

The starting point for such estimates may be the product offering document, which sets out the key risk factors but does not provide detailed information on the reference portfolio.⁴⁵ In the periodic portfolio reports, the current capital balance, repayments, arrears and defaults as well as the total limit of credit facilities must be disclosed for each underlying risk position. From this, the *EAD* can be derived. The *LGD* can be estimated using data on seniority and any collateral provided (type, valuation amount and method, recourse rights). To determine the probability of default, an individual's region of residence, employment status and income, as well as a company's income, debt and EBITDA can be found in the portfolio reports. In addition, the intended use and account status can be helpful.⁴⁶

The investor reports divide the total outstanding amount of the transaction into intervals according to the estimated probability of default as well as the time of arrears. In addition, they inform about the *LGD* estimated internally for the reference portfolio and the annualised constant default rate.⁴⁷

These three parameters of *EL* fully capture the credit risk of individual positions (Igl, 2011, p. 42). They determine the unexpected loss as the standard deviation of *EL*. When analysing the risk at portfolio level, a mere addition of the individual values is only sufficient if the defaults are stochastically independent (Henking et al., 2006, p. 24). However, this assumption is unrealistic and would underestimate the risks, so it is imperative to include the dependencies between the borrowers. For the exact determination of the bilateral dependencies between m debtors, $\frac{1}{2} * m * (m - 1)$ correlation pairs have to be estimated. Because this is very time-consuming and the necessary data is rarely public, credit portfolio models, which describe the dependency structures in a simplified way, are often used for this purpose (Henking et al., 2006, p. 34; Rudolph et al., 2012, p. 1641).

The one-factor (Merton) model⁴⁸, which is widely used in regulation and practice, is selected as an example for the following explanations. It relates the economic condition of each borrower with its asset value (latent variable R_i). R_i is explained by a systematic factor Y (influencing the solvency of all borrowers) and a borrower-specific idiosyncratic factor ε_i . All dependency structures are modelled on the

⁴⁵ Art. 6 para. 1 f., Art. 16 Regulation (EU) 2017/1129.

⁴⁶ Annex II, III, IV, VI Delegated Regulation (EU) 2020/1224.

⁴⁷ Annex XII and XIII Delegated Regulation (EU) 2020/1224.

⁴⁸ Its original form was developed by Robert C. Merton (1974, pp. 449–470).

basis of the borrowers' sensitivity ϱ_i to the macroeconomic factor Y . First, the idiosyncratic factor ε_i and macroeconomic factor Y are modelled and the unconditional and conditional probabilities of default on a realisation of Y are calculated. With these parameters and the factor sensitivities, the asset correlations between the asset values R_i and the default correlations can be determined (Henking et al., 2006, pp. 162–167; Rudolph et al., 2012, p. 164f).

After determining the dependency structures, the portfolio loss distribution is calculated. This can be done analytically only in simple, rather unrealistic cases (Henking, 2006, p. 168f). Frequently, a Monte Carlo simulation is used, which requires the unconditional probabilities of default, asset correlations, *EAD* and *LGD* of the individual positions. After performing the desired number of simulation runs, all realisations of the portfolio losses as the sum of the simulated individual credit losses form the (empirical) loss distribution (Henking et al., 2006, p. 175 Rudolph et al., 2012, p. 166f). The assumptions and calculation methodology of the one-factor model as well as the procedure of the Monte Carlo simulation are detailed in the Appendix (Notes 3 and 4).

By dividing the portfolio loss distribution into intervals determined by the tranches' attachment and detachment points, the tranche loss distributions and the loss waterfall can be derived. If the cumulative portfolio loss exceeds the attachment point, the tranche bears all losses beyond. If losses exceed the detachment point, the tranche suffers a total loss (Igl, 2011, pp. 73–75; Tillich, 2011, pp. 61–63). Then, the risk measures relevant for the assessment are derived from the tranche loss distribution (Tillich, 2011, pp. 66–69, 71f; Donhauser et al., 2009, pp. 5–7). Overall, the correlations and thus also the systematic sensitivity ϱ_i flow into the calculation of the loss distribution and risk ratios, so that the correct risk assessment hinges upon the borrowers' correlations. However, their determination, which is briefly explained below, is usually ambiguous, so that the parameters were massively underestimated or simplified and assumed to be constant in the past (Rudolph et al., 2012, p. 164).

Since the development of the latent variable R_i is not directly observable, time series of default ratios or corporate figures are used to estimate the asset correlations: Some approaches derive estimates from historical default data of the assets, for instance based on common default events. These estimates tend to be very small and, given that defaults infrequently occur, this can lead to high estimation errors (Düllmann et al., 2008, p. 10 f, 30; Igl, 2011, p. 60). For this method, the static and dynamic development of the default and loss data of the securitised or similar risk positions over the last at least five years could be used. With this history, which is only provided for STS securitisations, a precise estimate would be possible. In

the course of the transaction, default data of the individual risk positions can be derived from the history of the portfolio reports.⁴⁹ However, single position data is only available for STS securitisations before pricing, otherwise only on a quarterly or monthly basis.

Alternative methods are based on the historical development of share prices, turnover or CDS spreads on the borrowers and estimate the asset correlation directly or after modification steps. In general, the derivation from share prices (adjusted for other influencing factors) appears more accurate than from default rates (Düllmann et al., 2008, p. 8f, 30; Igl, 2011, p. 60). However, no share prices exist for most borrowers. For individuals, the income or loan balance developments could serve only as a first orientation, while for corporate loans the developments of turnover, enterprise value and EBITDA can be derived from the history of portfolio reports.⁵⁰ The information on tangible and real estate collateral as well as their valuation help to assess whether there are concentrations in this respect.⁵¹

Since a single-factor model maps all dependency structures via the same systematic factor, it does not take into account whether the portfolio is concentrated in terms of economic sectors and regions. For this purpose, it could be extended by these factors to a multi-factor model:

In order to measure sectoral concentration, borrowers are divided into economic sectors in such a way that the asset correlation within each sector is as high as possible and low to other sectors, and the credit risk of the sector members depends on the same, sector-specific risk factor. The official economic sector classifications are often not suitable for this. The dependency structures can only be determined accurately if each sector can be assigned a common risk factor as well as a sensitivity to it and the correlations between the risk factors are known (Deutsche Bundesbank, 2006, pp. 43–46).

In the portfolio reports, the NACE sector code and the company size is reported for corporate loans.⁵² Since the NACE classification was developed for the uniform statistical classification of economic activities⁵³, its suitability for a risk analysis must be validated beforehand. However, the industry code provides very granular information on the sector or business field.⁵⁴ In contrast, individuals can only be classified by employment status, which does not reveal the employer or its industry.⁵⁵

⁴⁹ See e.g. Annex II, III, IV, VI Delegated Regulation (EU) 2020/1224.

⁵⁰ See e.g. Annex II, IV, VI Delegated Regulation (EU) 2020/1224.

⁵¹ See e.g. Annex II, III, IV, V Delegated Regulation (EU) 2020/1224.

⁵² See e.g. Annex IV Delegated Regulation (EU) 2020/1224.

⁵³ Art. 1, 3 Regulation (EC) 1893/2006.

⁵⁴ Art. 2, Annex I Regulation (EC) 1893/2006.

⁵⁵ Annex II, VI Delegated Regulation (EU) 2020/1224.

While retail loans tend to have lower correlations to each other and to business sectors, regional concentrations on a large employer can also pose significant risks (Deutsche Bundesbank, 2006, p. 49). Overall, securitisation repositories provide sector classifications, but no sector-specific risk factors, correlations and sensitivities. To estimate sectoral concentration, only turnover or market price correlations of representative companies in the underlying portfolio or heuristic measures can be used. The aggregation of similar reference assets to form a benchmark for the assessed transaction must always be carried out by the investor itself.

The quantification of national or regional concentrations requires, analogously, the subdivision of the portfolio into geographical units. The risk drivers, which are hardly quantifiable, are often broken down to a single risk factor and the regional dependencies to asset correlations between regions (Deutsche Bundesbank, 2006, p. 49f). For each borrower, the NUTS-3 region of its residence or corporate domicile must be disclosed in the repositories.⁵⁶ The NUTS-3 level describes member states' administrative areas with between 150 000 and 800 000 inhabitants, which corresponds to the German districts and independent cities.⁵⁷ Overall, the regional concentration risk can only be estimated using heuristic measures, especially in case of individuals.

For the risk assessment of a securitisation, the systematic sensitivities ϱ_i – and thus the asset correlations – play a considerable role: The former can be determined by a bond representation of the tranches, i.e. their treatment as fictitious bonds: The risk profile of the tranches is approximated according to their loss behaviour using the one-factor model, with ϱ_i being obtained via optimisation (Hamerle et al., 2009, pp. 15–17). Hamerle and Plank (2010, p. 31ff) compare the sensitivity of a collateralised debt obligation (CDO) tranche and an equally rated bond using risk profiles that represent the expected tranche loss as a function of the factor Y . The risk profile of a tranche is determined by a one-factor model. In a favourable economic environment (high Y), the tranche's EL is slightly below the bond, but suddenly rises steeply to a multiple of the bond when the economy deteriorates (lower Y). For a bond to adopt such a profile, a significantly higher ϱ_i would have to be assumed. Accordingly, tranching seems to dramatically increase macroeconomic sensitivities and thus also default correlations, which was overlooked or misspecified in the rating and pricing of securitisations before the financial crisis. The underestimation of sensitivities increases the risk and significantly worsens the rating of the senior tranche, whereas the performance of the first loss tranche improves. Small

⁵⁶ See e.g. Annex II, III, IV, VI Delegated Regulation (EU) 2020/1224.

⁵⁷ Regulation (EC) 1059/2003 Art. 1–3; Annex II.

estimation errors can thus lead to massive misstatements about the risk, which shows how important it is to precisely know the dependencies and sensitivities.

Furthermore, idiosyncratic counterparty concentration risks from a strong exposure to single or multiple connected borrowers can also cause significant losses (Deutsche Bundesbank, 2006, pp. 39–41). In the portfolio reports, all risk positions are given an anonymised borrower identifier, from which the total exposure to each borrower can be derived. However, the internal connections between the borrowers and resulting concentrations are not visible. Similarly, the contractual and business relationships between legally independent debtors can also include concentration risks. Information on this is not public and its modelling is often too complex (Deutsche Bundesbank, 2006, p. 50ff; Kara, Deku, 2017, p. 21). Such dependencies cannot be derived from the information in the securitisation repositories. Finally, stress tests can help to reveal these difficult-to-measure, hidden dependency structures. This involves looking at the deterioration of the portfolio value and loss variables under varying stress scenarios and deriving empirical risk ratios (Deutsche Bundesbank, 2006, p. 52; Kara, Deku, 2017, p. 21). Investors must perform these scenario analyses themselves based on the individual loan information available to them.

Overall, investors can estimate the credit risk of individual exposures from the very granular data accessible in the securitisation repositories. The history of the portfolio reports proves helpful in estimating the dependency structures in the reference portfolio. However, investors require a more appropriate data basis to be able to model these reliably. Therefore, they should at least receive a default history of the risk positions not only for STS, but for all securitisations before pricing. However, the estimation of dependencies and sensitivities always turns out to be complex and hardly feasible, so that more accurate estimates cannot necessarily be achieved with information beyond this. Because these parameters have a significant impact on the risk of structured products, their valuation always remains highly susceptible to uncertainties and misjudgements.

5.2. Impact on information asymmetries and efficiency

After the previous section, the question now arises as to what extent the new transparency regime and the securitisation repositories reduce information asymmetries in securitisation structures, so that the market becomes more functional and ultimately the asset class regains investor confidence (Akerlof, 1970, pp. 488–490; Anschütz, 2020, p. 91f). For this purpose, the Efficient Capital Markets Hypothesis (ECMH) by Fama (1970) offers a good analytical framework, as it shows a theoretical

connection between the degree of transparency and the functioning of the market: According to this, information efficiency prevails if the market always reflects all available information completely in market prices. Information efficiency can be classified into three categories: A weakly information-efficient capital market only internalises all information about historical prices. Semi-strong efficiency prevails if prices reflect all publicly available information (including ad hoc announcements), whereas in the strongly efficient form there are no information asymmetries, since all information, even insider information, are immediately reflected in prices (Fama, 1970, pp. 383, 388 f.; Anschütz, 2020, p. 93f). However, according to the Grossman-Stiglitz paradox, the latter form is hardly feasible in reality: In the case of strongly information-efficient markets, market participants have no incentives to research and evaluate information because they do not have a temporary information advantage and therefore cannot generate arbitrage profits. This would ultimately dry up the markets (Grossman, Stiglitz, 1980, pp. 403–405).

In a before-and-after comparison, it is assessed whether the new regime has increased information efficiency according to the ECMH and reduced asymmetries. In the past, investors relied on the ratings of rating agencies for their risk analysis, since the transactions were overly complex and they lacked reliable, easily accessible information. As a result, current information about the transaction played a minor role in investment decisions and was hardly reflected in prices. Before the introduction of the transparency obligations, the capital market could thus be described as weakly information-efficient. The strong information asymmetries contributed to the drying up of the market in the course of the financial crisis and to the loss of confidence that persisted until today. The Loan-level Initiative and, above all, the new transparency regime under the STS Regulation has established higher, more timely and more differentiated disclosure in order to enable investors independent risk assessments. The newly introduced securitisation repositories centralise all information, which are essential for a thorough risk analysis, in a single point of truth and significantly improve accessibility, including to insider information (Anschütz, 2020, p. 94ff; Recital 12, 13 STS Regulation). The direct, immediate and free access to the data significantly reduces the acquisition costs for obtaining information. In addition, investors have to bear fewer verification costs to validate the information because the securitisation repositories ensure the completeness and consistency (but not the accuracy) of the data. In this respect, the STS criteria do not provide any additional relief as they do not guarantee for the accuracy of the information or lower credit risk⁵⁸. Since the STS Regulation is intended to

⁵⁸ Recital 16, 31 STS Regulation.

encourage independent analyses, it does not relieve investors of the exploitation costs of analysing the data. In short, investors incur significantly lower transaction costs (Anschütz, 2020, pp. 98–100).

All in all, these factors contribute to the fact that public information can be disseminated more quickly in the market, taken into account more comprehensively by market participants in investment decisions and reflected in market prices. In line with the ECMH, this increases information efficiency, which could be rather classified as semi-strong (Anschütz, 2020, p. 96; Fama, 1970, p. 387f). The new regime thus reduces information asymmetries so that the securitisation market is likely to allocate investment capital and opportunities more efficiently. Furthermore, the higher level of transparency promotes the attractiveness and investor confidence in the products, which could strengthen market activity and liquidity (Anschütz, 2020, p. 9 f, 100).

The increased availability of data may also stimulate data exploration and research by academia, allowing to uncover new developments, risks and concentrations alongside supervision (Landier, Thesmar, 2014, p. 39f). In particular, standardised loan-level data allows for more independent, precise risk analyses as well as cross-comparisons of different products. However, investors' information needs considerably depend on their expertise and the complexity of the product. It therefore remains doubtful whether in particular smaller institutional investors have sufficient experience for a comprehensive analysis of the raw data and whether it is worthwhile for them to upgrade their capacities and IT systems for this purpose. Accordingly, it seems that rating agencies will remain important for a quick judgement in time-critical decisions or at least as a second opinion. Ultimately, it is up to the investors whether they analyse the available information base – in line with their due diligence obligations – and thus incorporate it into prices (Kanon, Schaber, 2013, p. 44; Joint Forum, 2011, pp. 21, 24, 26).

Finally, increased disclosure can have a disciplining effect on originators and thus contribute to a higher quality of securitised loans: On the one hand, originators can improve their own screening and monitoring of borrowers with the collected data; on the other hand, investors and supervisors can review transactions and products more intensively and understand the originators' risk appetite and practices.⁵⁹ Overall, the new regime is likely to increase market efficiency and discipline

⁵⁹ See Ertan et al. (2016, pp. 3–5, 31f). The authors point to this relationship by comparing the development of default and delinquency behaviour, LGD and other variables of loans extended under the transparency regime of the Loan Level Initiative with other, “non-transparent” loans in the period from Q1 2013 to Q2 2014 and observe a significantly better performance of the variables of the former group after controlling for many influencing factors. Another study achieved comparable results, also with regard to portfolio diversification. See also Klein et al. (2020, pp. 3–5; 20–31, 35).

and reduce information asymmetries, although presumably not all market participants are able and willing to evaluate the granular data.

5.3. Assessment of the side effects of extended disclosure

The required transparency appears very costly when considering the three parameters of transparency costs (Landier, Thesmar, 2014, p. 37f). The data must be reported at a very high granularity (at individual loan level), at a relatively high frequency (at least quarterly) and with a short delay (before pricing or 1 month after the reference period). Especially industry representatives complain that the disclosure required by the STS Regulation and its very comprehensive regulatory standards is enormously detailed and costly. In comparison, the transparency requirements in other segments of the bond market, especially government bonds, were not worth mentioning, with securitisations also being more strictly regulated in other respects. The clear lack of a level playing field with other capital market products would impede a more stable capital market. Therefore, the transparency and STS regime should be extended to all bonds (Weller, Bechthold, 2020, pp. 45–47). As another representative argues, the bureaucratically overloaded regulation and capital requirements have increased investor confidence, but are not appropriate for European securitisations, which have always been qualitative and crisis-proof. Thus, especially in the COVID-19 crisis, the instruments were far from being able to unfold their potential (Hülbert, 2020, p. 19f).

However, it can be assumed that much of the disclosure is collected for internal purposes anyway and can be taken directly from internal accounting and reporting systems. Furthermore, the specification of standardised reporting templates can standardise the internal reporting and analysis procedures of issuers and investors and thus make them more efficient and effective. Supervision would also benefit from increased comparability (Landier, Thesmar, 2014, p. 33, 41f).

On the one hand, industry representatives emphasise the challenge of operating a securitisation repository economically under the current circumstances. On the other hand, considerable investments would have to be made in the infrastructure and ongoing operations in order to meet the explained formal and operational criteria. Since the accesses must be provided at no charge, the repositories can only charge service fees to the issuer. Based on current market prices for similar services and the current number of new issuances, the revenue prospects would hardly cover the costs (Thun, 2019, p. 27).

As a further side effect, increased transparency may in certain cases increase the instability and volatility of the market and reduce its liquidity. If more informa-

tion is disclosed and investors therefore neglect their private information, this can lead to greater market noise, overreaction of market participants and thus increased volatility (Landier, Thesmar, 2014, p. 34f).

In the case of differences in analytical expertise, the disclosure of complex information in Pagano and Volpin's (2012) model leads to adverse selection because the less sophisticated investors are disadvantaged compared to the more experienced ones – in line with Akerlof's theory on the drying up of the “market of lemons” (Akerlof, 1970, p. 489f). This reduces liquidity in the primary ABS market, with the secondary market reacting in exactly the opposite way. If the secondary market has a high macroeconomic importance and is characterised by strong adverse selection, higher transparency is desirable from a welfare point of view (Pagano, Volpin, 2012, pp. 4–9). Ultimately, investors are also subject to certain conflicts of interest in their internal assessments because they can, for example, reduce their regulatory capital requirements with a good internal rating for exposures. It can therefore be concluded that their analyses do not have to be more accurate than those of the rating agencies (Arntz, 2013, p. 321). Despite their complementarity to internal reporting systems, possible competitive disadvantages arising from transparency requirements for securitisations should be taken seriously. On the other hand, increased instability and reduced liquidity only occur in clearly differentiated constellations and therefore weigh less heavily.

5.4. Final overall assessment

The new transparency regime provides investors with much more granular, regular and centralised information, not only on individual risk exposures, analogous to the Loan – level Initiative, but also on the transaction structure and its risk characteristics. Although there is less information on their experience and resources, the extensive documentation can be used to derive the exact roles of the parties and the agency conflicts between them. This also addresses information asymmetries and the moral hazard of the participants. While investors obtain detailed information to assess individual credit risks, they cannot clearly model correlation structures and concentrations between borrowers. Their determination is always complex, so that the estimation of this component – which strongly influences tranche risk – remains uncertain. Nevertheless, investors can estimate the risks with a certain independence from the rating agencies. Although it remains unclear whether all investors are able and willing to analyse the data comprehensively, securitisations may only be offered to institutional investors subject to comprehensive due diligence obligations and generally not to retail investors.

Overall, securitisation structures have become more transparent to investors, so that they face fewer information asymmetries. At the same time, the securitisation repositories considerably facilitate the procurement of information and its verification by centralising and partially validating the data. Thus, investors can be expected to include the information more in their decisions. This increases information efficiency and at the same time has a disciplining effect on originators. Provided that the market becomes more functional and gains confidence, its revival would be stimulated. On the other hand, fears that the strict transparency regime puts securitisations at a disadvantage compared to other capital market instruments and thus prevents a market revival cannot be completely ruled out. However, the transparency regime should establish a sufficient data basis that enables precise risk analyses of the products – because especially the opacity and complexity of securitisations, in combination with a blind trust in the ratings, have significantly aggravated the financial crisis. Hence, it can be stated that the transparency regime has made securitisation structures more transparent, reduced information asymmetries and mitigated agency conflicts between the participants. However, it remains to be seen whether it will support the recovery of the market. In order to mitigate the remaining information gaps and facilitate the risk analysis, the additional disclosure available for STS securitisations should be made mandatory for all transactions. In combination with the securitisation repositories, which centralise and validate the data, this contributes to lower information asymmetries and higher information efficiency. However, these effects hinge on the investors' capability and willingness to analyse the data. Besides, the transparency regime could impede a level playing field and thus a market revival. Nevertheless, the measures of the European Commission represent a further step towards a capital markets union, which could contribute to an increasing opening and harmonisation of the German and Polish capital markets.

6. Conclusion

The central focus of the paper was to analyze whether the new transparency regime of the STS Regulation, which has been in force since 2019, really improves the transparency of securitisation structures and contributes to reducing agency conflicts and other side-effects. First, it was analysed to what extent investors can independently assess the product risk on basis of the data accessible in securitisation repositories: In addition to the loan-level data already available since the Loan-level Initiative, they receive a well-founded picture of the transaction and

payment structure as well as their structural and legal risks. While the expertise and reliability of the participants is less evident from this, their roles and possible agency conflicts can be well understood. Although investors can derive the credit risks of individual borrowers from the portfolio reports, they cannot clearly model their dependency structures, because default and performance data as an estimation basis are only available for STS securitisations before pricing. However, the risk of structured products depends to a considerable extent on these correlation structures and the systematic sensitivities, the determination of which is always complex or hardly possible. All in all, investors can estimate the structural risks of the transactions precisely and the credit risks at least approximately. Further work should analyse which additional data – which are appropriate for institutional investors and their expertise – can remedy the remaining information deficits and whether the additional information specified for STS securitisations is sufficient for this.

Then, the analysis of the implications on market efficiency and information asymmetries indicated that the data is more accessible to investors as it is centrally disclosed in securitisation repositories. As a result, information is disseminated more quickly in the market and can be more closely analysed and reflected in the prices. This would allow investors to gain confidence and, with increased trading, drive the all-important revitalisation of the market. In this way, the transparency regime seems to contribute to higher information efficiency and thus better market functioning. Besides stimulating academic research, it could have a disciplining effect on originators and the quality of securitised loans.

However, some aspects recommended for further research might weaken the desired effects of the transparency regime. It remains questionable whether all investors have sufficient analytical skills and capacities, whether their internal valuation procedures are really more reliable compared to external ratings, and to what extent these are also characterised by conflicts of interest. However, it should be made clear that not only the regulators, but also the investors exercise market discipline and are thus in a position to influence the explained agency conflicts. They themselves determine the product conditions and to what extent they use the transaction data for an intensive risk analysis or blindly rely on ratings. Although securitisations are only offered to institutional investors, which are obliged to conduct a detailed analysis, it remains questionable whether they do not consider this to be too costly or time-intensive and therefore not worthwhile. At least the securitisation repositories relieve them of the effort of information procurement and verification insofar as they make all data available centrally, completely and check them for plausibility. In further analyses, the effect of other measures such

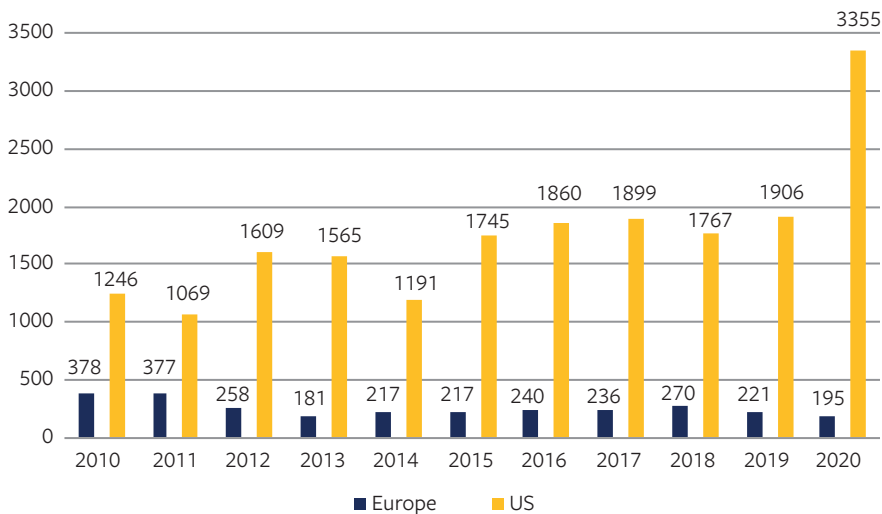
as the adjustment of remuneration structures, rating procedures and the 'originator's obligation to retain risk on the agency conflicts could be examined.

The critical assessment of the side effects could not fully dispel fears that the strict regulation would impede a level playing field with other capital market products and thus prevent a market revival, so that this, too, should be investigated further. However, a comprehensive data basis is absolutely necessary for the valuation of securitisations, which was impressively demonstrated by the fatal consequences of non-transparent transaction design and the sole reliance on ratings in the financial crisis. In addition, the reporting effort is limited, since much of the data to be disclosed should already be available in banks' internal reporting systems.

Overall, the paper indicates that investors receive a considerably more transparent picture of securitisation structures and risks and can thus assess them independently. In this respect, the transparency obligations could reduce information asymmetries as well as agency conflicts between the parties involved. However, it cannot be foreseen from this work how much the regime contributes to the revival of the markets.

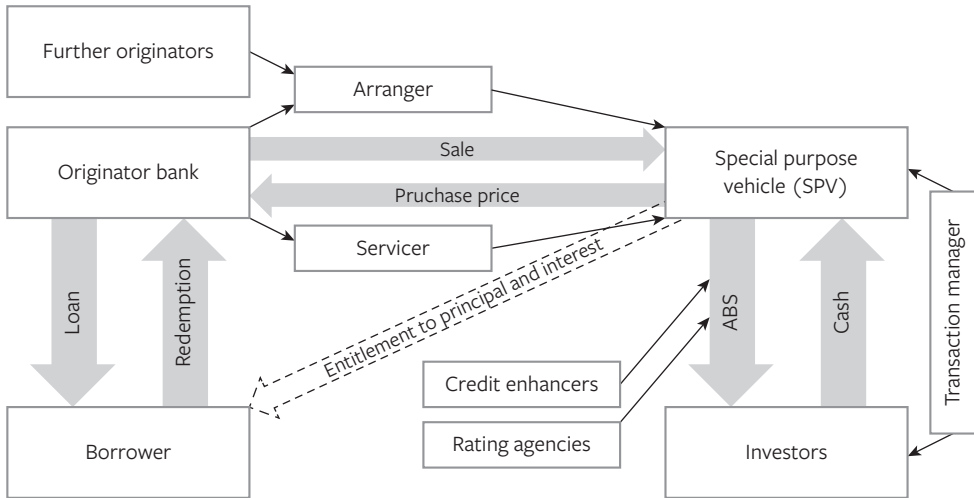
Appendix

Figure 1. New securitisation issuance in Europe and the US from 2010 to 2020 (EUR bn)



Source: Own elaboration following Suarez (2019, p. 2; 2021, Table 2.1).

Figure 2. The securitisation process



Source: Kara and Deku (2017, p. 10); slightly adapted and supplemented.

Note 1. Requirements for transaction documents according to the STS criteria “standardisation” and “simplicity”

The criterion “standardisation” lays down the following requirements for the transaction documents: First, the measures taken to reduce interest rate and currency risks must be listed.⁶⁰ In addition, the issuer must clearly state the contractual responsibilities of the servicers, trustees and other service providers as well as the procedures for ensuring the replacement of service providers, liquidity providers and counterparties in the event of a default.⁶¹ Furthermore, the definitions of events affecting the value of the portfolio (in particular default and delinquency) applicable to the transaction and the countermeasures to be taken should be presented in an understandable manner. The documentation shall also clearly indicate the seniority of payments and the trigger events affecting them, with any material change in the seniority of payments to be disclosed to investors without delay.⁶² This shall include the events triggering early repayment or, in the case of revolving securitisations, an end to revolving.⁶³ Finally, it shall be explained how conflicts between different classes of investors can be resolved and how voting rights are

⁶⁰ Art. 21 para. 2 STS Regulation.

⁶¹ Art. 21 para. 7 STS Regulation.

⁶² Art. 21 para. 9 STS Regulation.

⁶³ Art. 21 para. 5f STS Regulation.

distributed between investors.⁶⁴ Furthermore, in the context of the “simplicity” requirements, the lending standards for the underlying risk exposures and material modifications of these should be provided in an all-inclusive manner.⁶⁵ In the case of restructured loans, their share in the portfolio, their performance and the background to the restructuring are to be listed.⁶⁶

Overall, the requirements apply analogously to ABCP, as Art. 24 and 26 show.⁶⁷ In addition, it must be explained how the sponsor supports the transaction and how it ensures that this function does not have significant consequences for its solvency and liquidity in crisis situations.⁶⁸ In this context, the regulations in the event of default of the sponsor and maturity of the liquidity facility must also be made accessible and the risk positions must be regularly reviewed by an external body.⁶⁹

Note 2. Procedures to verify completeness and consistency by securitisation repositories

The exact procedures to be applied to check the completeness and consistency of the data transmitted are specified in Delegated Regulation (EU) 2020/1229.

First, the transmitted data set is assigned completeness scores comparable to the Loan – level Initiative, calculated according to the formulas below. Here, the data completeness score can be derived from Table 1 after input 1 and 2 have been calculated as follows:

$$\text{Input 1} = \frac{\sum_i^N \text{ND1}}{N}$$

$$\text{Input 2} = \frac{\sum_i^N \text{ND2} + \sum_i^N \text{ND3} + \sum_i^N \text{ND4}}{N}$$

$\sum_i^N \text{ND}x$ denotes the number of fields filled in with the respective “No data” options. N denotes the total number of fields that can be filled with a “No data” option.⁷⁰

In addition, it is also assessed whether the “No data” options were only used in permitted cases and whether they affect representativeness. In addition to the verification of the item codes, designations as well as the time specifications, the

⁶⁴ Art. 21 para. 10 STS Regulation.

⁶⁵ Art. 20 para. 10 Subpara. 1 STS Regulation.

⁶⁶ Art. 20 para. 11 letter a STS Regulation.

⁶⁷ Art. 24 para. 9 letter a, para. 12, 13, 14, 18–20 STS Regulation, Art. 26 para. 1, 6, 7 STS Regulation.

⁶⁸ Art. 24 para. 20 letter d, Art. 25 para. 2f STS Regulation.

⁶⁹ Art. 26 para. 1 Subpara. 3, para. 7 STS Regulation.

⁷⁰ Art. 3 Delegated Regulation (EU) 2020/1229.

reporting parts (including the STS report) are checked against the specified structure of the reporting forms. Comprehensive comparisons between fields, risk positions and data cut-off dates are used to check the extent to which the reporting positions are coherent with past reports, with similar securitisations and between the reporting components.⁷¹ If a report violates the described requirements, the repository rejects it, giving reasons for the error, and communicates all rejected transactions to the information recipients in the form of a weekly report.⁷² Finally, the reporting institution must assure the completeness and accuracy of the (difficult to verify) documentation underlying the securitisation transaction.⁷³

Table 1. Matrix for the assessment of data completeness

		Input 1: Percentage of fields entered as 'ND1'			
		Input 1 = 0%	0% < Input 1 ≤ 10%	10% < Input 1 ≤ 30%	Input 1 > 30%
Input 2: Percentage of fields entered as 'ND2', 'ND3' or 'ND4-YYYY-MM-DD'	Input 2 = 0%	A1	B1	C1	D1
	0% < Input 2 ≤ 20%	A2	B2	C2	D2
	20% < Input 2 ≤ 40%	A3	B3	C3	D3
	Input 2 > 40%	A4	B4	C4	D4

Source: Delegated Regulation (EU) 2020/1229, Annex 1, Table 1.

Note 3. Assumptions and calculation of the one-factor model

In the one-factor model, the economic state of a borrower depends on the realisation of a latent, stochastic process, the asset value process. The latent process is assumed to be log-distributed returns that follow a geometric Brownian motion. By assuming a fixed observation period (here $T = 1$), the latent process is reduced to a normally distributed, latent random variable. The model assumes a portfolio consisting of m loans to the same number of borrowers, with each borrower i being assigned the latent, stochastic variable R_i , which can be interpreted as its asset value or asset value return. If R_i falls below a critical barrier c_i , the borrower and his exposure default. The probability of precisely this event thus corresponds to the unconditional probability of default p_i :

$$p_i = P(R_i < c_i)$$

⁷¹ Art. 4 para. 1, 2, 5 Delegated Regulation (EU) 2020/1229.

⁷² Art. 4 para. 6–9 Delegated Regulation (EU) 2020/1229.

⁷³ Art. 4 para. 3f Delegated Regulation (EU) 2020/1229.

Often the latent variables are explained by a systematic factor Y :

$$R_i = \sqrt{\varrho_i} Y + \sqrt{1 - \varrho_i} \varepsilon_i, \quad (i = 1, \dots, m).$$

ε_i indicate the residual fluctuations of R_i that cannot be explained by Y , ϱ_i reflects how strongly R_i depends on the systematic factor Y . In the explained model framework, Y and ε_i can be assumed to be i.i.d., so that the latent variables and p_i are also normally distributed by default. Thus, the threshold c_i can be calculated as the quantile of the cumulative standard normal distribution of p_i . Maturity-congruent default probabilities of the rating classes assigned to the debtors often serve as the basis for this⁷⁴:

$$c_i = \Phi^{-1}(p_i).$$

For a given realisation of the factor $Y=y$, the latent variables and credit defaults depend only on the idiosyncratic factor ε_i , i.e., they are conditionally independent. The default probability conditional on $Y=y$ is therefore determined as follows:

$$p_i(y) = P(R_i < c_i | Y = y) = P(\sqrt{\varrho_i} Y + \sqrt{1 - \varrho_i} \varepsilon_i < c_i | Y = y) = \Phi\left(\frac{c_i - \sqrt{\varrho_i} Y}{\sqrt{1 - \varrho_i}}\right).$$

Thus, Y can represent a macroeconomic indicator that also influences the condition of borrowers. If the economy deteriorates (low Y), more borrowers will fall short of c_i and thus default (Henking et al., 2006, p. 164f).

Because the defaults of the individual borrowers only depend on the factor Y , the correlation between the latent variables is also determined by the systematic sensitivity ϱ_i :

$$\text{Corr}(R_i, R_j) = \sqrt{\varrho_i} \sqrt{\varrho_j} \quad (i \neq j).$$

Due to the interpretation of the latent variables as asset price or yields, this correlation of the assets of two borrowers is called asset correlation. The asset correlation also determines the probability of a simultaneous default of two borrowers i and j with the binary default indicators 1_{D_i} and 1_{D_j} . The joint default probability is based on the joint distribution of the variables R_i and R_j and can be derived from the following bivariate standard normal distribution function:

⁷⁴ See Henking et al. (2006, p. 162f) and Rudolph et al. (2012, p. 164f).

$$\begin{aligned} P\left(1_{D_i} = 1, 1_{D_j} = 1\right) &= P(R_i < c_i, R_j < c_j) = \Phi_2\left(c_i, c_j; \sqrt{\varrho_i \varrho_j}\right) \\ &= \Phi_2\left(\Phi^{-1}(p_i), \Phi^{-1}(p_j); \sqrt{\varrho_i \varrho_j}\right) \end{aligned}$$

Based on this, the default correlation, i.e., the correlation of the default indicators 1_{D_i} and 1_{D_j} of two borrowers i and j , can be determined:

$$\rho_{ij} = \text{Corr}\left(1_{D_i}, 1_{D_j}\right) = \frac{\Phi_2\left(\Phi^{-1}(p_i), \Phi^{-1}(p_j); \sqrt{\varrho_i \varrho_j}\right) - p_i p_j}{\sqrt{p_i(1-p_i)} \sqrt{p_j(1-p_j)}}$$

Thus, the asset correlation is directly related to the default correlation, the former being commonly higher than the latter (Henking et al., 2006, pp. 164–167; Rudolph et al., 2012, pp. 144, 164f).

Finally, the variance of the latent variable can also be decomposed into two parts, reflecting the ϱ_i -driven, systematic and idiosyncratic risk of the borrower. Due to the standard normal distribution of R_i and since Y and ε_i are i.i.d., the variances are each normalised to one.

$$\text{Var}(R_i) = \varrho_i \text{Var}(Y) + (1 - \varrho_i) \text{Var}(\varepsilon_i) = \varrho_i + (1 - \varrho_i)$$

Note 4. Process of a Monte Carlo simulation based on the parameters of the one-factor model to determine the portfolio loss distribution

A Monte Carlo simulation can be used to generate a desired number of outcomes according to given input parameters that specify the shape of the distribution. In their entirety, these characteristics form an empirical distribution that can be used for further analyses. In this constellation, the unconditional default probabilities, asset correlations as well as *EAD* and *LGD* of the individual positions serve as input parameters. Each simulation run generally proceeds as follows:

First, a realisation of the systematic factor Y and, for each borrower i , an expression of the idiosyncratic factor ε_i are drawn at random, from which the amount of the latent variable R_i is calculated. If R_i falls below a certain threshold value c_i , borrower i has defaulted. In the event of default, the loss amount from the individual exposures is determined as the product of *EAD* and *LGD* of the respective risk position. All simulated losses are added up to the total portfolio loss. After this process has been repeated depending on the number of simulation runs, all realisations of the portfolio losses form the simulated loss distribution (Henking et al., 2006, p. 175f; Rudolph et al., 2012, p. 167f).

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OWNERSHIP STRUCTURE AND ITS CONSEQUENCES FOR THE BANKING SECTOR IN POLAND

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1. Introduction

The ownership structure of the banking sector in Poland changed significantly after the communist era. In the first years of transformation, under conditions of insufficient supply of domestic capital and reluctance of foreign investors to acquire minority stakes in Polish state banks, privatisation of the banking sector based on strategic foreign investors has played an important role. This has led to a long-lasting dominance of foreign banks in the Polish banking sector. The situation has nevertheless changed in recent years when, under the influence of political decisions, the second largest bank in Poland in terms of assets – Pekao SA – came back under the control of domestic capital. As a result of this transaction, among others, 44.7% of banks operating in Poland were owned by the state in November 2020. However, 43.4% were controlled by foreign companies.¹

The high share of foreign capital in the Polish banking sector is often criticised. This criticism has intensified especially in 2008–2012, when the global financial crisis occurred and the condition of some foreign banks present on the Polish market rapidly deteriorated. At that time, there have been fears that parent banks would focus primarily on improving their own economic situation, even at the expense of the profitability and scale of operations of Polish subsidiaries. The financial crisis in other countries has led to the nationalisation of banks that have become financially distressed.

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¹ Data from the Polish Financial Supervision Authority – monthly data for the banking sector, 30 November 2020.

The increasing role of the state in the financial sector has revived the debate on the desirability and consequences of ownership changes in the banking sector, including in particular their impact on financial stability. Recognising the importance of the financial sector for economic development, many economists have suggested increasing the share of domestic capital in this industry. Since 2015, Poland has started the process of accelerated repolonisation, which has led to an increase in the share of domestic investors. The biggest controversy in this case has not been the participation of domestic capital itself, but the fact that it is capital that is influenced by politicians. After all, experiments with nationalisation of the banking sector have precisely caused economic crises in some countries and gigantic costs for individual economies. Examples are the following countries: Mexico in the years 1982–1990, Spain in the 1980s, Argentina in the 1980s and 1990s, South Korea and Japan in the 1990s. Against this background, the primary objective of this paper is to analyse the impact of ownership structure on the financial stability of the Polish banking system and on systemic risk. These aspects that have so far been largely neglected in the literature, which has focused mainly on the relation between ownership and efficiency. The article analyses at first the current ownership structure of the banking sector in Poland. Then it examines the reasons for changes and the influence of the ownership structure of banks on the stability of the banking sector. In order to identify exactly when the financial system is stable or not, measures for financial system stability are needed. The idea behind this is to provide supervisory authorities with a warning system that enables them to counteract crisis on time.

2. Basic terms

The change in the ownership structure of the banking sector in Poland raises the question of how privatisation can actually be defined. Originally, it was strictly oriented towards (ending) state ownership of the means of production. Examples from the recent past are the sale of Deutsche Telekom or the UMTS mobile phone licences in Germany. The privatisation of the savings banks and state banks would be regarded as a sale of state productive assets, which are included in the group of “produced assets”. The transfer of public assets to private control is referred to as “material privatisation” or “privatisation in the narrower sense” or “task privatisation”. Its opposite is the complete or partial transfer of private assets into common ownership (socialisation, nationalisation). If a nationalisation is reversed, then one speaks of reprivatisation (Loesch, 1987).

In a broader sense, the change of the legal form into a private legal entity (e.g. institution into a joint-stock company or a limited liability company) is also considered privatisation even though the state still retains all shares. This form is called formal or organisational privatisation. A prominent example is the transformation of Germany's railway company "Deutsche Bundesbahn" into "Deutsche Bahn AG" with the federal government as the sole shareholder (Federal Ministry of Finance, 2002). It may, however, be a preparatory step to real privatisation.

The form of privatisation used in each case depends on the objectives of the privatisation. Usually, the focus is less on a basic regulatory conviction and more on relieving the burden on public budgets through extraordinary state revenues. The latter can be achieved through material privatisation. But formal privatisation can also relieve the budget, because the state no longer needs to employ the workers in the formally privatised companies according to the rather employee-friendly rules that apply in the public sector (e.g. low wage flexibility, permanency). However, due to grandfathering rules, these savings effects usually only come to bear in the long term. The expenditure savings through "contracting-out models" consist in the state being relieved of the obligation to pay for the provision of capacities (Monopolkommission, 1992).

Even if all forms of privatisation create more freedom for private action, the intensity of deregulation is of course greatest in the case of task privatisation, since this is where the state withdraws as far as possible from economic activity. Its regulatory implications are greater than those of "contracting-out" and even more so than those of formal privatisation. Whereas in the case of spin-offs there is still a partial denationalisation, formal privatisation can no longer be accepted as privatization, because the state's performance of tasks remains practically unchanged (Loesch, 1987).

3. The importance of privatisation in the banking sector – conclusions from theoretical considerations

Privatisation of state-owned banks is generally recognised as a desirable economic policy objective both by the authors of numerous academic publications and by policy makers (Levine, Scott, 1993; Thorne, 1992). Privatisation is expected to promote competition in the banking sector and efficiency via a better use of financial and human capital. Privatised banks have a greater incentive to sort out good from bad borrowers and hence not to lend to unsound companies. In particular, the management is interested in positive outcomes, seeking better remuneration

and retaining attractive jobs. Moreover, “privately held banks should be less prone to political manipulation than publicly held banks” (Levine, Scott, 1993).

The restructuring of non-performing loans and the associated capital increase of state-owned banks are seen as prerequisites for bank privatisation (Begg, Porters, 1992; Levine, Scott, 1993). The privatisation of banks, without first solving the problem of non-performing loans, can significantly hold up the privatisation process by discouraging potential investors from participating due to the high level of uncertainty regarding bank assets.

Notwithstanding the undisputed benefits of early privatisation of the banking sector² and the financial discipline it is expected to impose on the corporate sector (*hard budget constraints*; Kornai, 1980), it poses significant problems for decision-makers³. Given the importance of the financial system for the course of enterprise restructuring and privatisation as well as for the functioning of the entire economic system, a successful transfer of state-owned banks to the private sector is of paramount importance for the success of the transformation process.⁴

In view of the low capitalisation and lack of expertise, the participation of Western credit institutions in the banks to be privatised is recommended (Begg, Porters, 1992). The participation of renowned Western banks would not only provide an influx of urgently needed expertise, but would also have the self-disciplining effect of reputation (Calvo, Kumar, 1994). A similar view was held by the Polish Ministry of Privatisation, as has already become clear in the privatisation of the first major banks Wielkopolski Bank Kredytowy (Poznan) and Bank Slaski (Katowice) (Fabrycki, Zalewski, 1995).

As far as the transfer of knowledge to banks is concerned, it is particularly relevant today. Its importance in the financial sector is growing. This is influenced by such factors as the rapidly increasing amount of knowledge and radical changes in technological knowledge, progressive globalization driven by the expansion of the Internet as well as information and communication technologies (Kuchciak, Wiktorowicz, 2020). Today’s world is also dealing with new technological trends and multidimensional competition in the financial services market. They are driving financial institutions to seek effective and innovative methods to achieve competi-

² Thorne (1992, p. 98f) cites a number of arguments for a rapid privatisation of the banks: more efficient allocation of capital, more efficient restructuring of the companies and more efficient risk management. At the same time, he points to the problem of lacking buyers.

³ Rapid bank privatisation requires efficient supervision and regulation of banks (Wijnbergen, 1994, p. 21; Schwartz et al., 1994, p. 301). Borish et al. (1995 p. 38ff) provide an overview of the experiences of transition countries with bank privatisation

⁴ An example of failed ad hoc bank privatisation is the case of Chile. Most of the banks privatised in 1975 were nationalised again by 1983 (Marshall, Montt, 1988, p. 291).

tive advantage. As for the impact of technological know-how on the efficiency of banks, this issue is highlighted by many researchers. One of them is Zhang who outlines that technology-based products provide significant benefits to banks (Zhang et al., 2018). For example, there may be cost advantages for the bank, profitability may be increased, and risks may be minimized compared to traditional banking products (Tunay et al., 2015; Zengin, Yüksel, 2016). Findings from applied research in various countries reveal that e-banking services increase the efficiency of banks (Long et al., 2017; Yüksel et al., 2017; Tunay et al., 2018). However, important in the banking business area are not only technological, but also human resources. Indeed, due to the particular nature of financial institutions' operations it has become necessary to provide adequate non-financial resources. This is understood as the knowledge of employees and relationships with customers.

The final theme of employees' bargaining power is alluded to by Gradoń and Szustak (2016). They point out in their article that the success of a bank ultimately depends on the people working for it, their knowledge, competence and connections, while intellectual capital is capital that is practically invisible in a bank's balance sheet. Also the financial markets, valuing the value of a bank, do not give it the attention it deserves. Given the fact that the ratio of intellectual capital to financial capital has increased significantly in recent years and is now as high as 80:20%, the weighting point in estimating the value of a bank should be modified without delay (Gradoń, Szustak, 2016).

In the area of the materiality of the transfer of know-how by foreign banks to certain country, Marcinkowska (2013) also takes a position. She points out that in the banking sector, intellectual capital does not constitute "added value" (as it does in many other sectors), but is a factor conditioning the ability to compete in the market. Without building strong intellectual capital and effectively managing it, a bank is unable to achieve a strong competitive position and, consequently, to build sustainable value (Marcinkowska, 2013).

Intellectual capital also appears in the deliberations of Wladyslaw Jaworski (1998). He states that that the competitive capacity of the of the entire sector is determined mainly by internal factors, such as capital potential, modernity of technology, personnel qualifications, innovation and quality of banking services and the profitability of the network (Jaworski, 1998).

Klimontowicz (2011) also has his own interpretation of intellectual capital. She emphasizes that the components of intellectual capital affect the creation of the bank's value. In this context, intellectual assets derived from the skills, commitment and quality of employees' work (including management, communication,

leadership, etc.) and customer assets, including, among others, bank-owned customer knowledge bases should be regarded as the most important.

Considering the impact of know-how transfer by foreign banks on the efficiency and stability of banking systems, Kulawik's publication (2007) should be recalled. In it, he refers to International Monetary Fund report from April 2007 which confirms that where the penetration of foreign banks is higher, the level of security is higher. This report also shows that globalization in world banking has improved the stability of global finance. In addition to the stabilizing effect in the host countries, there has also been a diversification effect across almost all of European banking, strengthening the stability of banks on our continent. The author also points out that we should view the presence of foreign banks in Poland and in the Central and Eastern Europe as a whole as a per-balance beneficial factor. These banks have modernized the domestic system, increased efficiency and stability in it (Kulawik, 2007).

However, the interest of Western credit institutions in acquiring stakes in the privatised (state-owned) banks in the transition countries should not be overestimated. First, they were only allowed to acquire minority stakes for the time being, which means that the danger of political influence in the future cannot be ruled out. Second, the banks to be taken over were still in a restructuring process. Third, neither political nor economic stability existed in most countries. Fourth, there was scepticism among the owners of Western banks about the profitability of such investments and fifth, it might have been more attractive for Western banks to open a branch or enter into a joint venture with a smaller private bank instead of participating in privatised banks (Hogg, 1994).

The privatised banks can play a significant role in the economic development of the transition countries after financial restructuring has taken place, which means, on the one hand, the rehabilitation of the non-performing loans and, on the other hand, the increase of the capital of the banks concerned (Mayer, Vives, 1993).⁵ Whether they will actually enable an efficient allocation of resources and effective control of the corporate sector depends on a number of other factors. First and foremost, there is the question of the control mechanism of the banks themselves, which raises serious doubts about its effectiveness in view of low capacities in the supervisory authority. Although the incentive-compatible deposit contract

⁵ Sachs (1992, p. 47) pointed to the urgency of privatising the banks: "It might bethought, erroneously, that the banks could be among the last enterprises to be privatized, but the experience of Eastern Europe teaches otherwise. (...) When the commercial banks are themselves bureaucratic organs of the state, the incentive to carry out these functions is naturally dulled, as has been seen in Poland during 1990-1991."

reduces the need for depositors to control banks⁶, the recurring crises of individual banks nevertheless make regulatory intervention by the supervisory authority necessary. In the following, therefore, the question of the future shape of the regulation of banking activities and the role of competition in the banking sector will be explained (Majewski, 1996).

Competition can be strengthened not only by foreign banks acquiring shares in domestic banks, but also by establishing branches in the countries concerned. Arguments for competition between banks are the avoidance of market power and efficiency gains in the financial sector. Lack of competition leads to market power of credit institutions in both lending and deposit business and results in allocative distortions. Competition, on the other hand, generally increases the functional efficiency of the financial sector, i.e. besides allocative efficiency, the cost efficiency of credit institutions, the dynamic efficiency of the financial system as well as the availability and quality of intermediary products (Bröker, 1989).

However, some publications refer to the negative effects of too much competition on the composition of banks' portfolios (Besanko, Thakor, 1993). According to this view, intense competition would reduce the information advantages from repeated lending relationships and thus induce a higher portfolio risk. Increased competition can also have a negative impact on the quality of the selection of investment projects to be financed, as the large number of potential lenders reduces the probability of award and at the same time worsens the repayment conditions from the lender's perspective.⁷

With regard to the intensity of competition in the banking Majewski (1996) holds: "Competition in banking is not like competition in sausage production. (...) It is quite conceivable that competition in banking needs to be moderated more than that in other markets." From the point of view of risk diversification, competition is seen as disadvantageous, because the diversification possibilities of the individual bank are restricted (Mayer, 1994; Damme, 1994). However, the fact that the marginal returns to scale of diversification are always positive, but approach zero as the size of the bank increases, speaks against this consideration (Dowd, 1992).

Another argument against bank competition is that competition leads to an inefficient allocation of capital in the case of information asymmetry between banks and borrowers, since in the competitive equilibrium of the credit market

⁶ "By offering debt contracts, the need to monitor banks is avoided" (Corbett, Mayer, 1991).

⁷ Because of the limited possibility to internalise information costs, information collection is limited due to rational considerations. "The effort devoted to screening loans can be expected to depend positively on the probability of winning a loan and on the return from a successful loan. Competition is discouraging in both respects" (Riordan, 1993, p. 340).

too many bad risks receive a loan. Considerations of this kind assume Bertrand competition between banks, i.e. the amount of the individual loan is taken as given and banks compete with each other for good credit risks via the level of the lending rate (Schwiete, 1998).

In Poland⁸, increasing competition in the banking sector has been observed since 1992. For example, from 1994 to 1995 the market share of state-owned institutions in the lending business fell from 80% to 60%. However, competition exists mainly in the deposit business, as many commercial banks are trying to strengthen their deposit base due to the high and highly fluctuating interest rates on the interbank market. Despite a very restrictive licensing of foreign banks, there is obviously a strong influence of existing institutions on pricing in all market segments. For good credit risks, this competition is already making itself felt in falling funding costs. Moreover, according to the OECD, an explicit competitive strategy of many banks is to establish themselves as universal banks, to support companies in their restructuring and thus to build long-term relationships with their customers (OECD, 1994). Nevertheless, even in Poland, bank competition cannot yet be described as sufficient. The market share of state-owned banks remains considerable at about 50% (as of 30 November 2020), especially since there is only weak competition between the individual state-owned banks. Strengthening competition would be achieved by reducing market entry barriers for foreign credit institutions. The creation of equal market access conditions for domestic and foreigners therefore remains the most important reform recommendation for Poland (Schwiete, 1998). Gelos and Roldós (2002) show that despite the consolidation process of the banking system occurring in recent years and the accompanying increase in concentration, no significant deterioration of the competitive situation had occurred. To a considerable extent, the increased foreign bank participation that accompanied the wave of consolidation “ [...] attenuated any reductions in competition intensity resulting from consolidation” (Hommel, 2008).

The privatisation processes that became necessary in the banking sector of Central and Eastern European countries, including Poland, were carried out using a variety of privatisation strategies. One of the preferred strategies was voucher privatisation, which was carried out by means of an intended broad distribution of shares among the population via the capital market. Although capital market privatisation has the effect of disciplining management and largely eliminating political influence in functioning capital markets, a functioning and liquid stock market had yet to be established, especially in the transition countries. Poland limited privati-

⁸ The following remarks are based on: OECD (1994) and Schröder, Pieper (1996).

sation in the first phase only to domestic investors (Bonin et al, 2003). Since this did not lead to an improvement in both the reduction of bad debts and allocative efficiency in the capital allocation process, the banking sector was subsequently opened up to foreign investors. Consequently, the banking sector in Poland has been characterised by the entry of foreign investors and the takeover of national banks. In the context of the privatisation and liberalisation processes in the transformation economies, the question of opening up to foreign strategic investors was controversially discussed. While Hungary liberalised its market against international takeovers as early as 1989, scepticism about the “sell-out” of national banks prevailed in the remaining countries. Until the mid/end of the 1990s, this resulted in an increasingly restrictive behaviour of the national authorities towards foreign banks when taking over national banks or establishing their own branches. Due to the meanwhile very significant role of national banks in foreign ownership, the current extent in the respective financial systems will be presented below and assessed on the basis of efficiency and stability effects (Hommel, 2008).

4. The influence of foreign direct investment on the efficiency and stability of the banking system – practical conclusion

With the involvement of foreign banks in the transition countries, including Poland, their influence on the stability of the financial sector and the efficiency of individual banks is very great due to the existing considerable differences in development.⁹

Efficiency effects can be distinguished in terms of improvements in allocative efficiency and increased technological efficiency (Brissimis et al., 2006). Allocative efficiency gains result from the entry of mature banks with an efficient cost and risk structure into a partly monopolistic banking market. Due to the emerging competition, national banks can no longer pass on the interest rate premiums resulting from technology gaps or monopolistic structures to the consumer. Thus, on the one hand, there is the implementation of efficient competition on the basis of products and cost structures, and on the other hand, an increase in technological efficiency through technology spillover and imitation behaviour, which is recognised as necessary. An increase in technological efficiency results from the human and physical capital imported by foreign banks, especially in countries without

⁹ For more detail see Haiss et al. (2005); Baudino et al. (2004); Claessens et al. (2001); Engerer, Schrooten (2004); Green et al. (2004).

experience of a market economy. Particularly in transition countries with a history of planned economies, both lending and deposit-taking usually did not take place under economically efficient, market-based aspects, so that experience does not exist, especially in lending and the associated assessment of risks. With the takeover of a national bank by a foreign banking company, specific skills are developed through further training of the staff, which results in a higher qualification of the staff (Müller, 1999). In addition, the adoption of internal banking group standards, especially at the operational level, ensures more efficient lending and better monitoring of borrowers (Hommel, 2008). In other words, the improvements in efficiency and stability resulting from increased foreign ownership mainly relate to advances in risk management techniques and liquidity management. This contributed to an improvement in the risk structure of bank portfolios and, to a large extent, to a broadening of the borrower base and a corresponding increase in lending. In particular, the increased supply of liquidity to the subsidiary banks by the parent companies, as well as economically efficient capital management, increased the possibilities for lending, which also reduced the financing costs of national companies (De Haas, Van Lelyveld, 2002).

Claessens et al. (2001) show, based on a study of 80 emerging markets (including Poland), that foreign banks are more efficient than the respective national credit institutions. However, these results should rather be interpreted as a relative efficiency advantage, as both economic and legal/institutional development of foreign markets are not comparable (Soussa, 2004). Moreover, the authors were able to demonstrate that after foreign banks appeared, the profitability of national credit institutions decreased, but as time went on, an increase in efficiency of national banks was observed (Claessens et al., 2001). With regard to the Central and Eastern European transition countries, a study by Green et al. (2004) on the efficiency effects of the nationality of bank owners in the sense of economies of scale and scope did not show any clear differences between domestic and foreign banks. Moreover, the working paper by Naaborg (et al., 2003) confirms a downward trend in the development of current business costs¹⁰ for both groups, which means that the theoretical argument of possible spillover effects and their enforcement at the cost level can be described as largely applicable. However, the distinction between efficiency gains resulting from changes in the market structure and possible improvements through knowledge and technology transfer is problematic in all the studies shown. A study by Goldberg (1992) further shows that in particular the level of the respective national savings rate is an essential entry factor. As

¹⁰ Current business costs refer to costs incurred that cannot be directly attributed to a product.

foreign banks usually come from home countries with a high savings rate and thus a good refinancing base and enter countries with a much lower savings rate, they can thus deploy capital more profitably in the market. Due to the prevailing liquidity shortage in target countries, higher interest margins can be profitably exploited, especially in the area of mostly high-risk loans.¹¹

When considering the effects of foreign investment on the stability of the financial systems in the transition countries, it is generally possible to identify stability-improving effects. The positive aspects of foreign direct investment include, on the one hand, the import of rules and technology, e.g. accounting and disclosure regulations as well as risk assessment and management techniques. On the other hand, there are aspects of potential mitigation of capital shortages through the use of the parent company's resources as well as the know-how of implementing economies-of-scale and -scope techniques, which contribute to a further spread and deepening of credit markets.

When a national bank is taken over by a foreign investor (bank), it becomes part of a mostly internationally active financial group. This primarily results in a short-term inflow of capital due to the takeover of capital shares by the foreign company.¹² The implementation of risk management techniques and a related more aggressive strategy to avoid qualitative portfolio deterioration can help prevent the problem of bad debts. In addition, the introduction of new products, such as swaps or other derivatives, improves risk diversification and market development. In this context, foreign banks prefer to limit risks in the respective national markets, since the knowledge about local contents of the products offered is also available there. The expansion of the product range is also associated with further developments in supervisory law, so that learning processes on the part of the supervisory authorities are set in motion by the pressure of changing market conditions (BIS, 2004; Goldberg, 1992).

The development of market infrastructure is related to this, as foreign banks can partly set up necessary structures themselves or exert pressure on the authorities in the case of larger networks, such as a transaction processing system (clearing and settlement system). Subsidiary banks of international groups are subject to national disclosure and accounting requirements as well as internal group reporting standards. Since the parent company usually comes from industrialised countries with complex regulations and usually stricter regulation and supervision, the

¹¹ Goldberg (1992) describes this using the example of the US, where Japanese banks in particular sought investment opportunities in the United States in the 1980s due to higher yields.

¹² In this context, the transition countries are increasingly taking tax measures to prevent a repatriation of profits and thus support an increase in the domestic capital base (BIS, 2004; Bundesbank, 2003).

requirements of information preparation within the framework of the consolidated financial statements are also transferred to the subsidiary banks in the transition countries. The improved information policy in this way is, on the one hand, essential for the monitoring activities of the depositors and the subsequent development of a stable relationship with the refinancing base. On the other hand, it can also generate an improved database for supervisory authorities and central banks, which makes it easier to analyse reactions and/or problems of the banks. A characteristic of the establishment of subsidiary banks is the transfer of ownership and management control to the foreign investors. With the transfer of control, strategic decision-making power is also transferred to the parent group, which usually passes on consistent guidelines to the respective subsidiary banks within the framework of an international strategy. Therefore, an internal stability is also created in the strategic orientation of the institution, which enables operational decisions to be made efficiently on a daily basis within the framework of a strategic goal. Since foreign direct investors, in contrast to short-term return-oriented portfolio investors, tend to aim for long-term growth, they are also interested in long-term stable development (Haiss et al., 2005).

Another key point for a positive stability effect is access to resources of the parent company, especially in the context of possible liquidity shortages (BIS, 2004; Haiss et al., 2005; Uiboupin, 2005). This is usually associated with a steepening of credit growth. The parent company's diversification strategy can achieve independence from national economic cycles, since in the event of a crisis it can fall back on the parent company's capital resources (BIS, 2004; European Central Bank, 2004). However, such secured lending is difficult to prove empirically for transition countries, as foreign banks were only permitted in this overwhelming number after the first severe banking crisis in these countries in the mid-1990 s. Thus, the remaining study period is too short to be able to reproduce credit or economic cycles and generate reliable information (European Central Bank, 2005). Moreover, this correlation does not have to be the case, since the decision of the parent bank to discontinue or continue to support the lending activities of the subsidiary bank has to be seen in the context of the strategic group objective. In this context, an individual subsidiary has only a small volume and weight in the overall group. The reputation of an international banking company also makes a not insignificant contribution to the stability of a subsidiary. As already shown, this can effectively reduce the asymmetrical distribution of information for the benefit of depositors, which can generate greater trust in the financial relationship between depositor (headmaster) and bank (agent). Investors are therefore also more inclined to stick to relationships with their previous bank (Müller, 1999). A medium- to long-term banking

relationship established in this way can represent a barrier to market entry for new competitors entering the market. However, due to the numerous bank insolvencies of domestic credit institutions in the past, trust is generally low, especially in the transition countries. Thus, it is above all foreign banks in more developed economies that bring with them a reputation import that has an impact on stability.¹³

When a domestic bank is taken over by an international banking group, the respective national institution is often renamed, which also creates a transfer of ownership that is clearly visible to the outside world. The advantages resulting from this are based on the further and better risk diversification of an internationally active financial company anticipated by the depositor and a presumed lower risk of insolvency.¹⁴ However, in the event of liquidity or solvency problems in the parent country, such a reputation import can have a negative impact on the subsidiary banks in other countries.¹⁵ This effect is also referred to as the risk transmission channel. In the case of economically good data in the transition countries, this can lead to the possibility of a bank run implied by the foreign country, which, depending on the market power and size of the emerging subsidiary banks, can have stability-threatening effects on the national banking market. Due to the considerable market shares of foreign, almost exclusively Western European banks in most of the Central and Eastern European countries, such an effect cannot be completely ruled out there. Therefore, a negative shock from the EU-15 countries can have a significant impact on the systemic stability of these countries. Overall, however, the positive effects of European banking exposure in the transition countries outweigh the negative effects. In particular, the development of risk management as well as information production and monitoring techniques contribute to a considerable stability assurance of the financial systems in these countries in the medium term. As Caprio et al. (2003) confirm in a general study from 2003: “[f]ortunately, there appears to be one tool that authorities can use to improve both short-term and long-term stability, and that is greater reliance on foreign ownership.”

Overall, the entry of foreign banks has a stabilising effect on the entire financial system. This happens through the improvement of existing or implementation

¹³ “The presence of foreign banks helps in the improvement in the domestic market by importing financial institutions with a strong reputation from abroad and increasing trust in the banking sector” (Engerer, Schrooten, 2004).

¹⁴ In this context, theoretical essays usually refer to the parent company’s function as lender of last resort. See for more on this Müller (1999) and Engerer, Schrooten (2004).

¹⁵ This became particularly clear in the case of the withdrawal of liquidity by Japanese banks from the US market in the 1990 s. In the course of the deterioration of the domestic economic situation of the parent companies, Japanese subsidiary banks had sharply reduced their lending, especially in the real estate sector, which had noticeable effects on the American market (Haiss et al., 2005; Clarke et al., 2001).

of new risk management techniques, which thus increase the capacity to absorb shocks in the system. This means that by monitoring the quality of asset positions more closely, massive deteriorations within a given group can be partly anticipated, thus preventing the build-up of bad debts (BIS, 2004). Furthermore, the stabilisation of the credit supply through the possible recourse to resources of the parent bank leads to a reduced dependence on national economic conditions (business cycles). Furthermore, these recourse options are also seen as system-stabilising mechanisms in the event of a liquidity crisis, as already described for the individual case, but this still needs to be verified.

The actual degree of integration of national banks into the international or global network of the foreign parent company and thus the effects on the efficiency and stability of the national financial system depends to a large extent on the legal structure of the business relationship and the intended business model of the parent bank (Hommel, 2008). In terms of effectiveness, however, the impact on the profitability of a domestic bank after a foreign takeover is not so clear-cut. In other words, the extent to which takeovers improve the cost efficiency of a company remains controversial.

5. The state of banking in Poland – practical dimension of systemic transformation in Polish banking sector

At the beginning of the banking reform process in Poland, a pronounced monopoly position of state-owned banks was typical for the country's banking system. Therefore, the newly established commercial banking system had to create the possibility to break up these monostructures. Only in this way was it possible to improve the quality of credit relations and create incentives inherent in the system for an efficient allocation of capital (Schmieding, Buch, 1992). In the context of the existing structures within the transition countries, including Poland, and the prevailing framework conditions, a universal banking system is advantageous from the point of view of information procurement and processing.

The banking sector in Poland is in the middle of a profound process of change. On the one hand, the causes can be seen in the well-known market changes affecting the Polish financial sector as a whole: technical progress, globalisation and internationalisation of the financial markets and the competitive environment, tightening of regulatory conditions through Basel II (Hofmann, 2006). However, the current changes were already preceded by fundamental changes in the sector in the 1980s. The transformation of the Polish banking sector began as early as the beginning

of 1982 (Ugolini, 1996), when credit institutions were given more autonomy, the possibility to establish new banks and a bankruptcy law was created. On 31 January 1989, the National Bank of Poland Act came into force and a two-tier banking system was created. Hence, the monobank was then split into nine commercial banks by spinning off regional branches.¹⁶ In order to strengthen competition, each bank was additionally allocated some branches in other regions (Husemann, 1995). The explicit aim of the reform steps was that each bank should strive to be represented throughout Poland as a universal bank (Schwiete, 1998).

A start was made in the privatisation of the large state-owned banks that emerged from the National Bank with the bank privatisation programme for the regional banks. The aim was to achieve an ownership structure in which the state retains about 30% of the equity. The remaining 70% was to be divided as follows: Polish investors (companies and private households) 40–50%, bank employees 10% and foreign investors 10–20% (Parfiniewicz, Żebrowski, 1993). Although the foreign investors are thus only to receive a minority share in the privatised bank, they nevertheless have a strategic role in that they are to ensure more efficient operation than before and bring expertise into the bank. This has already been achieved at WBK S.A., BŚ S.A. and BRE.

The privatisation was to take place in two steps. First, all nine regional banks were converted into joint-stock companies in October 1991 in 100% state ownership. Gradually, candidates for privatisation were to be selected according to a fixed catalogue of criteria, including above all the business results of the respective credit institution and the quality of the bank management. Once the value of the bank has been estimated and a list of strategic investors has been drawn up, the bank is to be privatised by selling shares (Hein, 1995).

The state-owned commercial banks that emerged were burdened with bad debts and made little progress in efficiency without profitable business lines. With the creation of open markets through the lifting of price restrictions and the dissolution of contracting constraints, private start-ups of new banks were made possible. The resulting increased competition forced “old” banks to restructure (Babl, 2005). In the initial phase, there was a strong political focus on increasing the number of banks, disregarding qualitative and quantitative requirements. However, regulation of market entry is necessary for stability reasons, which should take the form of general regulatory standards such as a minimum equity capitalisation for new start-ups (Hommel, 2008). Therefore, from the mid-1990s onwards, the

¹⁶ As part of the ongoing structural transformation of the National Bank of Poland, the Polish Investment Bank became the tenth bank to be spun off from the NBP in 1993 (N.U., 1993; Repetzki, 1993b).

licensing requirements were tightened and then included above all higher equity capital requirements, but also a considerably more discretionary granting of bank licences on the part of the central banks.¹⁷

The liberal licensing in the early 1990s led to the establishment of a large number of new banks, including state-owned banks (Brüggeman et al., 2000). Licences were granted to domestic and foreign banks (Ugolini, 1996). Yet, there was no adequate regulation and supervision of banks. A large number of small banks emerged with a small share of the assets of the entire banking sector (Chopra, 1994). These banks were mostly undercapitalised. Minimum capital requirements were too low and eroded with high inflation. Newly established private banks were also at a competitive disadvantage vis-à-vis state-owned banks, as the state guaranteed the deposits of state-owned banks, and a bank run was more likely. Disincentives existed in the banking sector. A high proportion of classified loans and insolvency problems arose. In order not to endanger the stability of the entire banking sector and to avoid a bank run, the National Bank of Poland supported some banks directly with capital and bought bills issued by the banks. The monetary base increased. The deficits of the banking sector were monetised.

As early as 1992, licensing was made more restrictive (International Monetary Fund, 1997). Capital requirements were successively increased, the regulations for new business start-ups were raised and the permitted banking activities were restricted (Brüggeman et al., 2000). In some cases, licensing was suspended altogether. The number of banks did not increase further. All banks established before 1993 were exempted from the new regulations. These exempted banks, especially the large banks and cooperative banks spun off from the National Bank, had low capitalisation. In 1993 there were 87 banks, 29 of which were majority state-owned. The state-owned banks constituted 86.2% of the total assets of the banking sector. Ten banks were majority foreign-owned.

Privatisation of state-owned banks progressed very slowly. In 1996, there were still 24 majority state-owned banks out of a total of 81 banks. Thus, 69.8% of the banking sector's assets were state-owned. In 1998, 13 banks were still majority state-owned accounting for 48% of all banking assets. In 1999, substantial progress was made in bank privatisation under the privatisation programme. The number of state-owned banks dropped to seven, resp. to 24.9% of banking assets. Foreign banks acquired the majority of shares in state-owned banks, and the problem of inadequate capitalisation was thus solved (Brüggeman et al., 2000) after in early 1998 and 1999 all legal and political restrictions on foreign players in the bank-

¹⁷ Criteria such as “macroeconomic advantageousness” were also evaluated (Babl, 2005).

ing sector had been lifted (Wagner, Iakova, 2001). The number of foreign banks increased sharply from 10 in 1993 to 46 in 2003 and their share of overall banking assets to 71.5% in 2003 (Kurth, 2010). It should also be mentioned that in 1998 a new Banking Supervision Act was passed in Poland, which strengthened the financial soundness of the financial sector. The legal adaptation to EU standards was thus completed before accession. High foreign involvement (share of about 60 per cent) has significantly improved the quality of bank management and financial services as well as competition in the banking sector.¹⁸

After 2000, the following events took place, which contributed to further changes in the ownership structure of the banking sector in Poland. In 2004, the privatisation of PKO BP began with the sale of 30% of its shares in a public offering. In the following years, the Treasury's share in PKO BP's share capital decreased to 29.43%, but it retained control of the bank and kept The state retained control of the bank, but stipulated that no other shareholder could hold more than 10% of the votes in the general meeting. Also in 2004, the privatisation of BGŻ SA began when Rabobank International of the Netherlands acquired 13.76% and the EBRD 15% of the shares. By 2012. Rabobank increased its share in BGŻ SA's capital to 99.26%, and in 2014 the French group BNP Paribas took control of BGŻ SA (Kurkliński, Lepczyński, 2019).

The banking sector now plays a dominant role in the financial system, accounting for around 70% of financial sector assets. The sector is mostly privately owned, with the state controlling about 40% of the banking sector and the largest insurance company. According to KNF data, there were 30 locally incorporated commercial banks in Poland at the end of August 2020. Poland's 533 cooperative banks play a minor role in the financial system, but are widespread. Eight banks are owned by the state. In recent years, rising capital requirements, lower profit prospects and uncertainty about legislation on foreign currency mortgages have driven banks into mergers and acquisitions. The KNF welcomes this consolidation process and considers it a "natural" way to create an efficient banking sector.¹⁹

¹⁸ See: <https://www.bpb.de/internationales/europa/polen/40724/strukturwandel?p=1> (accessed: 15.03.2021).

¹⁹ See: <https://www.state.gov/reports/2021-investment-climate-statements/poland/> (accessed: 14.01.2022).

6. Conclusion

The vast majority of banking experts believe that without the inflow of foreign capital and a radical reduction in state participation, the systemic transformation of the banking sector in Poland towards market-based solutions is difficult to implement, or at best very slow. This is because the direct impact of foreign investors on the banking services sector in Poland was through the acquisition of know-how and new technologies in the field of marketing strategy, modern risk management methods and distribution channels. Moreover, this also improved the safety, stability and transparency of the banking sector.

However, an important aspect of foreign banks' activities in Poland was also increasing competitiveness. This is because in the long term such a situation leads to increase in efficiency of state-owned banks which without this peculiar pressure from foreign competitors could record lower safety indicators. The liberalization of licensing of foreign banks has also contributed, as indicated in the text, to improving credit relations. Unfortunately, the gradual reduction in the share of state-owned banks during the transition period has been met in recent years with the opposite trend, i.e. the so-called "repolonization of banks".

The negative effects of retaining state control in the banking sector are not only reflected in the development of the financial sector, but also in the impact on economic growth. Such a situation is not only synonymous with stagnation, but also with regression. The lack of access to new capital leads to domestic state-owned banks being marginalised, lagging behind technologically and losing customers, so that the situation of many of them is usually much worse than that of institutions that have found a strategic investor.

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Part III

DIGITALIZATION

DIGITAL ECONOMY AND DIGITAL TRANSFORMATION: DEFINITION, EFFECTS, ESTIMATION AND POLICY

Olga Domakur*, Bakhtiyor Mamurov**

1. Introduction

Digital technologies such as artificial intelligence, high-performance computing, advanced robotics, virtual and augmented reality, show a great impact on the economy, labor market, and wider society. According to macroeconomic simulations, by 2030 the cumulative additional GDP contribution of new digital technologies could amount to €2.2 trillion in the EU, a 14.1% increase from 2017 while the average employment effect of technology and demographic decline by 2030 is -2.9%. This necessitates increases in labor productivity which digitalization can provide (European Commission DGCN, 2020).

Digital technologies are already available to all segments of the population. They offer new models of interaction between consumers and business entities, citizens and states without intermediaries, new rules for doing business outside borders, distances and time zones, new forms of behaviour for manufacturers, sellers and consumers. The transition from the use of information in paper and analog form to digital format has also led to an exponential growth in the volume of data flows, media content, financial settlements, virtual goods and services, all which contain a high potential for economic growth.

Yet, the digital transformation is developing unevenly. Factors such as legal norms, traditions and culture, the level of the technological base, ways of financing, education and stimulating economic growth play a significant role for the scope and of digitalization. Therefore, it is important to study the experience of advanced

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countries to identify trends, patterns of digitalization as well as policies that support and accompany this process.

The paper is organized as follows. After a literature review, it outlines the concept of the digital economy and main aspects of digital transformation. It then develops a list of new indicators to measure the spread of digitalization, identifies trends and patterns of the digital transformation and finally examines support policies. This study applies a comparative analysis based on a combination of normative and positive approaches, as well as a systemic analysis and synthesis of previous research. It draws on data from the statistical collections “Information Society in the Republic of Belarus”, “Key Indicators of the Development of the Information Society in Uzbekistan”, “Indicators of the Digital Economy: 2020” in the Russian Federation, and on the methodology of indices, such as Digital Economy Rankings, Digital Economy and Society Index, Index of Digitalization of the Economy (e-Intensity).

2. Literature review

This new and interesting topic has been studied by many scientists. One strand of research is devoted to the definition and delineation of the digital economy (Tapscott, 1996; Lane, 1999; Mesenbourg, 2001; Unold, 2003; Bukht, Heeks, 2017; Rodionov et al., 2017; Veduta, 2018; Gestrin, Staudt 2018; Golovenchik, 2019) while others develop methodologies for assessing its development (Sidorov, Senchenko, 2020) and analyze its drivers (Heidi, 2019; Morandini et al., 2020). A further topic discussed in the literature is the role of government in digital transformation. For example Heidi (2019) and Plotnikov et al. (2020) conclude that state support is needed to boost and steer digitalization of the economy to lessen the negative impact of digital transformation on the vulnerable groups inside the country. Similarly, the Report of the European Commission explored the role of the state in increasing the efficiency of investments and strengthening the even distribution of digital transformation effects, and how digital transformation can be guided by objectives of strategy Shaping Europe’s Digital Future for a human-centric path for Europe (European Commission DGCN, 2020).

Heidi (2019) also analyzed the impact of digitalization on economic performance and found a positive relationship between digital transformation and economic development, labor productivity and employment. Morandini et al. (2020) explored the relation between productivity and the average skills levels of workers. They concluded that a well-qualified labor force is more resilient to digi-

tal transformation shocks so that high-quality education and training systems are seen key to cope with digitalization in a positive way).

Many publications study the features of digital transformation different countries or regions. For example, Turgel et al. (2021) analyzed factors that determine the readiness of regions for digital transformation. They assert that the digital ecosystems in a region need support due to the low profitability of small and medium-sized businesses, which turned out to be especially vulnerable in the COVID-19 pandemic. Isaksen et al. (2019) developed a conceptual framework for understanding digital transformation processes in regional industries, which include institutional environments, assets like firm capabilities, skills and technological knowledge. They found that digital activities require both reusing existing assets and the creation of new assets, such as new or modified knowledge and skills, but also new organizations (e.g. a prototype lab), new norms (e.g. about teaching methods), new policy priorities and new education programs. Therefore, it is held necessary to lay the foundation for various forms of recombination of scientific knowledge, experience, new competence and digital technology in products, services and work processes.

Similraly, Naumova et al. (2020) proposed strategy to advance digitalization which involves creating non-digital foundations (regional legislation, state policy applied in the region, the level of R&D and innovation development, the region's institutional environment, etc.), as well as digital foundations (development of digital infrastructure, ICT penetration level) and regional economic actors such as information and communication companies. The impact of digitalization is measured by regional economic growth indices, the level of regional employment as well as the quality of services and the quality of life of the population. Dolbnya et al. (2021) found a positive relationship between the level of innovative development and digitization processes in the regions. Raimjanova et al. (2021) analyzed the relation between the investment dynamics in information and communication technologies and e-government and e-commerce development in Uzbekistan. Kadyrov et al. (2021) estimated the impact of investments in ICT fix assets, number of Internet users and number of mobile subscribers on volume of ICT services in Uzbekistan and had shown the number of Internet users is the strongest factor of volume of ICT services.

3. Definition of the digital economy

Early definitions (Tapscott, 1996; Lane, 1999; Mesenbourg, 2001) focus specifically on the Internet, reflecting its emergence during the 1990s as a mainstream technology, at least in the global North. Later definitions add new technologies such

as mobile and sensor networks (DBCDE, 2009), and cloud computing and big data (G20 DETF, 2016). Sometimes they apply the more general and simple notion “digital technologies”. One can also see historical specificities reflected in the definitions. Early definitions sought to delineate themselves from earlier developments such as the information economy and society. Tapscott (1996), for example, argued that the digital economy encompasses two generations of economic activity: first, informational activities that consisted of basic tasks such as putting up information on websites and interactional activities enabled by the Internet.

Later, a large number of definitions refer to the fuzzy boundaries of the digital economy. Tapscott (1996), for example, described the digital economy as the relationship between the new economy, new business and new technology, and how they enable one another. Lane (1999) focused on e-commerce and the wider ramifications of the digital economy around issues such as privacy, innovation, standards, and the digital divide. Margherio et al. (1998) emphasized the foundations of the digital economy and made first clear differentiations within the digital economy. Brynjolfsson and Kahin (2000) regard the digital economy from various angles – macroeconomics, competition, labor, organizational change – while Mesenbourg (2001) focused on how to measure e-business and e-commerce.

According to Unold (2003) the digital economy is based on digital technologies, including digital communications networks, computers, software, e-commerce applications, Web-based applications and other related information technologies and so has created a revolution in the drivers of economic growth, business models and competition. In a similar vein, identified the Expert Group of the European Commission typical characteristics of digital economy, such as innovation through new sources of finance (venture capital), the importance of intangible assets, new business models based on network effects and cross-border e-commerce (European Commission, 2013). For the Expert Group of OECD, the most important trends in the digital economy are mobility, cloud computing, social networking, sensor-nets and big data analytics, which make “smart everything”, i.e. grids, homes, business processes, energy, healthcare, transport and government, as well as empowering businesses, consumers and society at large (OECD, 2014). The Expert Group of the European Parliament focused on competition and regulation of the digital economy (European Parliament, 2015), while specialists from Deloitte point out such areas as the future of work, customer experience, digital supply networks, and Internet of things (Deloitte, 2016).

Dahlman et al. (2016) highlight the potential of digitalization to provide inclusive and sustainable growth. For Bukht and Heeks (2017) the digital economy encompasses any economic output derived solely or primarily from digital technologies

with a business model based on digital goods or services. The authors revealed three elements of digital economy where the digital technologies change interaction models with consumers and producers (platform economy) and transform business models all other sectors (digitalised economy). The core of digital economy engages ICT manufacturing like hardware, software, telecommunication, IT consulting, information services. The digital economy covers some parts of emergent phenomena – the platform economy, the gig economy, the sharing economy – where those could be seen to be new economic activities that did not pre-exist digital technology. Transformed by digital technologies economic activities like e-Business, e-Commerce, Industry 4.0, precision agriculture, algorithmic economy and also sharing and gig economies, was named the digitalised economy.

The Expert Group of UNCTAD (2017) speaks of the New Digital Economy which emerges from a combination of technologies, mainly from the ICT space, that are becoming pervasive across mechanical systems, communications, infrastructure and environment. Thus, they play an increasingly important role, not only in social and political life, but in research, manufacturing, services, transportation, and even agriculture (UNCTAD, 2017).

Rodionov et al. (2017) view the digital economy as a form of the economic activity organization and social and economic relations in a society, which appeared as a result of scientific and technological progress aimed at creating more value through the use of technologies of the sixth technological phase, and ensuring its long-term sustainable development. Veduta (2018) draws attention to the digital economy as an economic cyber system that simulates the mechanism of harmonization of internal economic scheduled “input-output” calculations at the macro, meso and micro levels. This will make it possible to overcome disparities in sectors development. Thus, the balance can be achieved in the context of effective distribution of “social resource of labor according to social needs”.

A much wider understanding is advocated by Gestrin and Staudt (2018). They define the digital economy as the broader economy as it undergoes the process of becoming increasingly digital. The expression ‘digital firms’ or ‘digital sectors’ is used in reference to firms or sectors whose main business segments relate to digital data, platforms, or technologies. Golovenchik (2019) defined the digital economy as a system of social, economic and technological relations between the state, business, community and citizens, functioning in the global information space, through the widespread use of network digital technologies, generating digital types and forms of production and promotion of products to the consumer, products and services that lead to continuous innovative changes in management methods and technologies in order to improve the efficiency of socio-economic processes.

What all definitions of the digital economy have in common is the fundamental importance of digital technologies, the creation of which will become the most profitable business, and which change the forms and methods of production of goods and services, communications and management. English-speaking researchers focus more on how digital technologies are changing economic activity and business or income-generating models, while Russian-speaking scholars concentrate on changing socio-economic relations. Most scientists agree that digital technologies are the driver of business and social innovation, opening up new opportunities to create value added and profit, and changing the structure of input and output markets. It shall be underscored that the digital economy is still being formed, so that all economic entities and relations undergo a constant change.

4. Digital transformation of the economy

Digital transformation is usually defined as the integration of digital technology into business that results in changes in business operation and delivery of value to customers (Mičić, 2017). This leads to changes in current business practices in the field of decision-making, which are either made by a person based on data analysis, or are left to the mercy of systems, excluding a person from the process. Algorithms make it possible not only to speed up and improve processes in current business models (for example, the decision to issue a loan can now be made in a split second, which previously took up to several weeks), but also to create new business models, such as ecosystem or platform businesses. Striving to reap the full benefits of digital transformation, many companies use digital platforms, which are intended not only for customers and internal use but also for other interested parties: shareholders, counterparties, partners. The platform digitizes production, sales, and customer service, communication, payments, logistics, accounting, personnel management, inventory management and others. New models based on the use of data analytics allow us to offer a huge selection of products and services, personalization, speed, economies of scale not available to traditional companies. An important part of digital transformation is following the customer as they digitize their lifestyle.

Digitalization has an impact on all components of the economic order and structure. Therefore, the digital transformation in industrial production was called “Industry 4.0” and includes such trends as robotization of production, “Internet of Things”, cloud computing, big data, cyber security, etc. Automation and robotization, is based on the use of artificial intelligence and cognitive computing leading

to rise of productivity and reduction of working hours. A significant effect from the introduction of Industry 4.0 tools can be expected in production operations management. In capital-intensive industries, such as the extraction of gas, oil, heavy metallurgy, new technologies will not entail a radical transformation of the business model. Still, they will only provide unique opportunities to improve the efficiency of the enterprise.

There are three stages of digital business transformation:

- digitization of individual management processes, within which the introduction of digital technologies is carried out to improve the efficiency of data management;
- e-commerce, which involves the introduction of digital technologies using the Internet to improve sales and interaction with customers;
- digital production, in which digital technologies of the latest generation make it possible to take into account the preferences of individual users when forming the composition of the services provided and the range of products (Volkova, 2019).

To carry out effective digital transformation, companies should use not only one technology or digitize not one business process. An integrated approach to the use of information technology in all company processes is needed, not only internally, but also when interacting with the outside world, customers, partners and the state. Automated workflow systems digitize business processes, for example, automated document management systems (ECM – Enterprise Content Management, which support a single lifecycle of unstructured information of various types and formats), production planning software (ERP – Enterprise Resource Planning, which integrate of production and operations, asset management, human resources and financial management, focused on resource optimization), software for personnel management (HR Software), customer relationship management (CRM) systems.

For labor-intensive industries, the potential for digital transformation lies in improving the efficiency of the manufacturing process through the Internet of Things, in-depth analytics of big data, and maximum automation and robotization. The most significant effect can be obtained in production due to high productivity at all stages of creating added value, from the development and launch of new products to the market, synchronization of the supply of raw materials and products, and quality control. It is important to develop the infrastructure of traditional production systems, renew capital assets, and create high-tech assets (Plotnikov, 2020).

Since 2015 the highest rates of digitalization are observed in services such as ICT, media, professional services, finance and insurance, wholesale trade, and

only in sixth place is advanced manufacturing (Manyika, 2016). Therefore, it can be argued that the digital economy is the economy of a post-industrial society in which the largest share of GDP production is provided by services. The creation of methods for the production and transmission of electricity contributed to industrialization in the late 19th and early 20th centuries, so the newest ways of using information and knowledge will transform people's lives into new forms of business, work, public activity, creativity, and leisure. Digitalization, as mechanization with steam and electric motors, will lead not only to great opportunities, but also to social problems, such as structural unemployment.

A lot of citizens will not be able to find new professions and will have to receive a universal basic income. Such initiatives and tentative ideas have already been successfully tested in several European countries. Other governments should prepare similar institutional rules. Some of the released workers will want to acquire new competencies to adapt to the digital economy. It is essential to ensure a sufficient volume of qualified personnel for new professions needed in automated production. The acceleration of innovation requires from the state the same active and flexible regulatory policy. The state should also stimulate the population to more actively join the digital transformation process, ensuring the availability of infrastructure and increasing the digital literacy of citizens (Plotnikov, 2020). Moreover, public funding is needed to leverage the capital required for the digital transformation. Without public intervention, both economic and labor effects are likely to impact countries and regions unevenly, favouring the economies that are already most advanced, and hence risking to exacerbating existing inequalities. On the other hand, measures that effectively promote the development, adoption, and diffusion of new technologies can help capture digital's potential to the benefit of all citizens, in an inclusive and sustainable manner (European Commission DGCN, 2020).

Digital transformation is a change in current business practices in the field of production, delivery, operation management, decision-making management. Due to high productivity at all stages of creating added value and reduction of transformational and transaction costs. Reducing transformation costs is achieved through the optimal choice of the structure of the product range and stocks of resources, reducing the time for the development and implementation of new products, optimal pricing policy, reducing the number of intermediaries, storage costs, advertising, delivery, and sales. The reduction of transaction costs is associated with the establishment and maintenance of interaction between a company, its customers and suppliers, information retrieval and transaction support. The high efficiency of the communicative properties of the internet makes it possible to reduce the time spent searching for partners, making decisions, and executing transactions. A high

flexibility in the presentation of information allows you to maintain its relevance without time delay and distribution costs.

The increase in income from digital transformation is due to improved service quality, personalization of the production of goods and services, and the use of network effects. The network effect occurs after a certain number of users of a product or service is reached, called the critical mass, then the value of the product or service increases. After reaching a critical mass, attracting customers becomes a much easier task, since new users perceive the value of a service or product more than its price due to positive network externalities.

The digital economy is the economy of a post-industrial society in which the largest share of GDP production is provided by services, and services have undergone the most rapid digital transformation, especially those services which are not related to the sale of goods. And just as mechanization has freed labor from agriculture, industrial automation has pushed workers into the service sector, so digitalization is pushing workers out of routine services into intellectual and creative professions or leaving them unemployed, so it is very important to change income policy in countries with better digital transformation.

5. Assessing the digital economy

In order to assess the progress and success of different countries in digitization different indices are used, where the values for the sub-indicators (components) are calculated based on data from official statistics or sample surveys. Common sub-indicators used measure connectivity and technology infrastructure, the business, legal, social and cultural environment, government policy as well as consumer and business adoption. These are, for example, used in the Digital Economy Rankings (Digital Economy Rankings, 2010). Other indices, such as the Digital Evolution Index (DEI) (Digital Planet, 2017), include the supply level and consumer demand for digital technologies, the institutional environment and innovation climate. The Digital Economy and Society Index (European Commission DESI, 2020) refers to infrastructure, skills, internet users, business and public digitalization, and the Index of Digitalization of the Economy (e-Intensity, 2017) ICT infrastructure, online spending, activity users (companies, consumers, state institutions).

The use of indices to assess the level of digitization in an economy has advantages and disadvantages. The advantages include objectivity and comparability across a large number of countries, including for individual sub-indicators that characterize

major directions of change. The disadvantages are the irrelevance of data, irregularity and out-of-time estimates. The existing information system and technological level of statistical accounting and data presentation is not sufficiently adapted for assessing the digital economy. This manifests itself in incomplete data on all evaluated objects, periodically revised evaluation criteria, and the lack of reliable initial information. Moreover, the calculations of the indices, as a rule, are lagged by one year, since it is necessary to collect statistical data for all indicators from all the countries being assessed. This significantly decreases the relevance of the data and makes that the ratings appear out of time. In order to uphold the significance of the indices, the assessment methods are adjusted, which in turn reduced the comparability of the indices.

In Belarus, Russia and Uzbekistan the level of the digital economy is evaluated by statistical institutions on a regular basis. The corresponding data are issued in the statistical publications “Information Society in the Republic of Belarus”, “Key Indicators of the Development of the Information Society in Uzbekistan” and “Indicators of the Digital Economy: 2020 in the Russian Federation”. There is no open electronic database in these countries. Statistical data are collected according to lists of indicators that more reflect the established traditions of statistical accounting, rather than indicators that are included in international indices. As a result, the data are not sufficiently comparable. In addition, usually relative indicators are published, although absolute indicators are more useful to carry in-depth economic analyses. The statistical compilations available in Belarus, Russia and Uzbekistan allow an assessment of digitization in these countries only on the basis of macroeconomic indicators, infrastructure development, internet accessibility, internet use by the citizens, business, public institutions (except Uzbekistan). Russia also publishes information on the use of cloud services, RFID technologies, software for doing business, ERP-, CRM-, SCM-systems, information security tools in organizations, which is missing in Belarus (Domakur, 2021).

The historical experience of developed countries has shown that technological innovations contribute to the growth of incomes and hence to an improvement of the quality of life of people. Therefore, the governments of many countries try to accelerate the introduction of new technologies into the business world. For this, strategic documents are developed, which outline support measures and desired results. In Belarus targets are set in the State Program “Digital Development of Belarus” for 2021–2025, in Russia in the Program “Digital Economy of the Russian Federation and in Uzbekistan in strategy “Digital Uzbekistan – 2030” and in the EU in the program “European Digital Decade: Digital Goals for 2030”. The results on to what degree to targets set have been achieved are also regularly published

(Digital Development of Belarus, 2020; Digital Economy of the Russian Federation, Digital Uzbekistan, 2030; Europe's Digital Decade, 2030).

Russia has developed the largest list of target indicators. These include the development of skills of the population, the availability of the necessary professionals and infrastructure, the use of digital products in public and private management, the application of information security standards, innovative development, the effectiveness of the use of digital products in the form of reducing electricity losses. In addition, Russia takes into account reduction of commercial losses of electrical energy and the number of patent applications (published) for digital technologies, which have no analogues in Belarus and Uzbekistan, such as. Uzbekistan's target indicators are the most generalized, but they includes measures for assessing the digital skills in the regions and the use of digital products for digitalization of production, delivery and management. The Belarusian target indicators are focused more on assessing the digital transformation of public administration, the development of digital infrastructure and the skills of the population. Belarusian and Uzbek lists have no indicators for assessing the effectiveness of digital innovations and the digital transformation of business, cities and regions.

The EU's Strategy for the digital transformation "European digital decade: digital goals for 2030" set targets for indicators in four areas. These are in the group "Skills" 20 million ICT specialists and minimum 80% of population having basic digital skills (0,7% in Belarus for 2025, 34% in Russia for 2025, 1,7% in Uzbekistan for 2022); in the group "Secure and sustainable digital infrastructures" connectivity by 5G everywhere, double EU share in global production cutting edge semiconductors, 10,000 climate neutral highly secure edge nodes for Bigdata clouding, first computer with quantum acceleration; in the group "Digital transformation of businesses" 75% of EU companies using Cloud/AI/Big Data, grow scale ups & finance to double EU Unicorns, more than 90% of SMEs reach at least a basic level of digital intensity; and finally in the group "Digitalization of public services" 100% online key public services (80% in Russia for 2025), 100% of citizens having access to medical records, 80% citizens using digital ID.

In the strategies of Belarus, only one such indicator has been identified, Russia and Uzbekistan – two. On the whole, European digital goals are more focused on assessing the effectiveness of the digital transformation of business and public administration, the production of equipment and services for the digital economy, and the innovative development of entrepreneurship (Domakur, Mamurov, 2021).

Further insights on the scope of the digital economy could be gained by collecting the following information in electronic form:

- volume of GDP generated by economic activity using the Internet (across all sectors and activities),
- volume of GDP of the platform economy,
- volume of online trade turnover,
- volume of investment in digitalization, security, privacy and consumer protection,
- number of companies using Cloud/AI/Big Data,
- number of SMEs reach a basic level of digital intensity,
- number of innovation infrastructure entities,
- number high-tech firms,
- number of new digital start-ups,
- number of provided and received electronic government services,
- number of provided and received electronic medical services,
- number of provided and received electronic social projects,
- number of people employed in IT outsourcing,
- number of vacancies occupied by new digital professions,
- number of people retrained in digital skills,
- increasing business profitability after digital transformation,
- reduction of time and costs for purchases,
- number of citizens using digital ID,
- number of schools, colleges, universities, which use e-learning systems constantly throughout the academic year, number of national commercialized patents.

6. Policies to promote digital transformation

The influence of technological progress on changes in the structure of production and employment was studied in the theories of industrial society (O. Conte, R. Aron, A. Saint-Simon, M. Weber, J. Galbraith), the concepts of structuring production sectors (Clarke K., Fischer A.G.B., Fourastier J.) and stages of economic growth (W. Rostow, F. List, B. Guildenbrand, K. Bucher, W. Sombart, T. Veblen) (Domakur, 2015). Clarke K., Fischer A.G.B. and Fourastier J. viewed the implications of machines on displacing human labor and considered these processes to be long-term (Domakur, 2015), while John Maynard Keynes viewed “technological unemployment” as an “only a temporary phase of maladjustment”. Schumpeter explained that innovation is the major source of disequilibrium in the economic system and a most likely weapon leading to its destruction. Schumpeter justified this with two elements: (1) Technical advances that take place are not similar or the same across the whole economy; rather they tend to concentrate in specific sec-

tors, leading to structural adjustments between them; (2) Innovations lead to economic cycles with uneven growth periods (Freddi, 2018).

The destructive effect of artificial intelligence on employment tend to take many forms that could be viewed as different phases of evolution: changes in the way of work, i.e. changes in the tools used during the work process; negative impact on labor demand due to AI replace of human decisions; changes in management staffing and decision-making process to improve management efficiency; new technology creating new jobs since old sectors and industries will gradually be replaced by the new industries and departments (Ping, Ying, 2018). Not only does digital evolution affect the total number of job creation or losses, it also greatly affects the composition of the available jobs. There is a high risk that digital transformation would lead workers to either switch occupations or even to lose employment entirely. As shown in a survey among German firms, cutting-edge digital technologies have little effect on total employment rate, but lead to large movements of workers between occupations and industries (Arntz et al., 2019). Therefore, the main challenge of the digital transformation is not only the number of jobs, but also the structure of employment and the equivalent need for supply side adjustments to meet the shift in demand both within and between occupations and sectors (Heidi, 2019). Due to the increasingly widespread use of digital technologies, not only ICT-specialists but most jobs these days require some level of digital skills. Survey evidence suggests that in 2014, about 85% of jobs in the EU required at least a basic level of digital skills – and this number is expected to increase (Cedefop, 2018). Yet, more than 40% of Europeans still lack “basic digital” skills, according to the Digital Economy and Society Index (DESI) (European Commission DESI, 2019).

At the individual level, digital skills gaps act as a barrier to societal participation and exacerbate existing socio-economic inequalities. At the aggregate level, they can hinder further expansion of e-commerce and e-government and the adoption of new technology in the business sector. The share of enterprises with hard-to-fill vacancies for ICT specialists rose from 3% in 2012 to 5% in 2019 in EU28, the share of large companies reporting such hard-to-fill vacancies rose from 18% in 2012 to 30% in 2019. Their incidence is (unsurprisingly) highest in the ICT sector (42%), and higher in professional services (9%) than in business support services (5%) and in the manufacturing sector (4%). Only 1% of companies with more than 10 employees report hard-to-fill vacancies for ICT specialists in the construction and in the accommodation and food service sectors.

Effective education and training policies first and foremost require sufficient financial resources. Public money accounts for the bulk of spending on education and training, but it is important to attract co-financing from the private sector to

provide inclusive education and training of foundational skills, opportunities to upskill and reskill for low-skilled and older workers. To make education and training systems more labor market relevant, links with the world of work be strengthened. Successful strategies include the expansion of work-based learning schemes, better career guidance (drawing on graduate tracking surveys and reports on expected skills needs by growing sectors), the involvement of social partners in the development and update of education and training curricula, and the use of effective tools for workforce planning in specific sectors (such as healthcare and education).

Labor market regulations should facilitate the mobility of EU citizens, attracting talent from abroad and making better use of migrants' skills. In the area of education and training policy EU states must exchange best practices and learn from each other for supporting the development of Europe's human capital base. Highly skilled workers are most productive if they are matched with jobs that fully utilize their skills.

The link between skills and productivity can also be strengthened by structural policies, such as a business environment that promotes investment, and regulations that foster efficient resource allocation (Morandini, 2020). With regard to digital transformation policy measure should aim at the following fields:

1. Developing and scaling ecosystems by the collaboration between super universities, public authorities, established industries and vibrant start-ups, creating regulatory sandboxes, adapting taxation (e.g., on stock options for start-ups to attract founders).
2. Creating a digital leadership instrument for procurement of digital technologies of strategic importance by combining innovation funding and public procurement.
3. Building data platforms for strategic B2B sectors, enabling sharing of data to improve production and services outcomes, research and fuel innovation while respecting privacy and citizen trust.
4. Leading the way towards trustworthy AI worldwide by both promoting AI based innovation to fuel economic growth and social innovations while ensuring transparency and a positive social impact, which can include social measures to counter potential adverse effects.
5. Empowering cities and communities across Europe by promoting and enabling development and equal access to citizen-centric smart city technologies for better public and private services across transport, health, energy, social and community services for the municipalities (European Commission DGCN, 2020).

Since 2015, the main reason for all data leaks in the world has been the mistakes of its own staff, the users themselves, and not malware per se. The human factor,

according to research, is responsible for 52% of all hacks of information systems, 63% of data leaks are due to theft or brute-force password to the security system. Since more than half of such incidents happen through the fault of the users themselves, it is necessary to minimize the influence of the human factor by introducing biometric identification technologies as a mechanism for ensuring cybersecurity (Golovenchik, 2019). Therefore, it is important to a policy for protecting against cyberattacks, which should focus on the following aspects:

- continuous work to improve the cybersecurity system, implementation of quantum cryptography, installation of information security update systems, regular scanning of website and application vulnerabilities, constant protection against malware, the use of antivirus tools, personal firewalls and intrusion detection systems;
- formation of an effective system aimed at preventing cybercrimes, including the improvement of criminal legislation, law enforcement practice;
- development of the cyber risk insurance market;
- development of standards, regulations for the use of information systems, methodologies for countering hacker attacks (Golovenchik, 2019);
- constantly informing citizens and businesses about the methods of safe behavior in working with information systems and methods of social engineering for the purpose of hacking;
- increasing strategic autonomy for key technologies, building on the General Data Protection Regulation, to improve understanding, user-centricity, control and effective enforcement of citizens' data rights and enable innovation and new business models based on data portability (European Commission DG CN, 2020).

Moreover, competition policies are needed that preserve the level playing field and reduce entry barriers for smaller firms and more vulnerable workers target in-market drivers of inequalities aimed at supporting sustainable and equitable growth (Morandini, 2020). Some competition authorities have raised concerns about the market power that some digital firms have developed, as well as the scope for using certain digital technologies to support anti-competitive practices (OECD, 2017). Generally accepted principles for an effective competition policy in markets are transparency and accountability, perfect information, no barriers to entry in the market. Effective measures of antimonopoly policy are monitoring for overstating market prices or collusion, conducting proceedings and enforcing court decisions. But as practice has shown, the requirements of state bodies of antitrust regulation to digital giants, such as Facebook, Google, Amazon, represented a small punishment

for them (Choudhury, 2021). Therefore, traditional measures of antimonopoly policy in the context of globalization of markets are ineffective.

Finally, support for start-ups, private and public financing of innovation infrastructure, staff training can have a better impact on the quality of services and goods of national small producers so that they can successfully compete with large companies. More and more often, developed countries are discussing and experimenting new ways of social support for people who find themselves outside the sphere of labor relations. For example, the idea of an unconditional basic income, sufficient for a comfortable living of a person, was originally intended to reduce poverty, and in the context of digital transformation it will help solve the problems of people who have not adapted to the new professional requirements. The results of experiments in Germany, Spain and other counties have shown that the basic income boosted life satisfaction and mental health while making participants neither more likely nor less likely to find employment (Samuel, 2020).

The obvious positive results of the policy of social and educational support for individuals, investment and organizational support for start-up entrepreneurs, support for competition and cyber security will create conditions for trust and easier adoption of digital transformation innovations.

7. Conclusion

Digitization is one of the most relevant topic in economics. However, this analysis has shown that it is necessary to define and assess the digital economy properly with solid indicators in order to identify patterns of its deployment and draft policy measure to support digital transformation. Measuring the digital economy is necessary to understand the speed of change, positive and negative processes of economic transformation. Many indexes evaluating the digital economy have been created; however, they have the disadvantages, such as the irrelevance of data, irregularity and out-of-time estimates. Therefore, the article suggested further indicators for assessing the effectiveness of digital innovations and the digital transformation of business, cities, and regions.

The digital economy is the economy of a post-industrial society in which the largest share of GDP production is provided by services, and it is services that have undergone the most rapid digital transformation, especially those services which are not related to the sale of goods. And just as mechanization has freed labor from agriculture, industrial automation has pushed workers into the service sector, so digitalization is pushing workers out of routine services into intellectual and creative

professions or leaving them unemployed, so it is very important to change income policy in countries with better digital transformation. For better digital transformation, the policy of social and educational support for individuals, investment and organizational support for start-up entrepreneurs, support for competition and cyber security will create conditions for trust and easier adoption of digital transformation innovations.

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DIGITIZATION IN THE POST-COVID WORLD

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1. Introduction

Many people are worried about the future of many of the adjustments companies have created concerning the epidemic as the world expects an end to the pandemic. Many of these alterations are very surely enduring. Companies will feel encouraged to operate virtually now that the pandemic has driven companies to eliminate many of the hurdles to digitization that happened previously, including such data security, so that employees may gain access from anywhere. Corporations have already taken substantial steps to protect their online privacy while establishing a technological stack that allows employees to work remotely (Almeida et al., 2020).

Many of these innovations, such as scheduling flexibility that allows staff to work from home when required, are likely to stick about. Digitization is beginning to be recognized for its tremendous potential by corporations. Growth and accomplishment, popular in business development, are mostly about trying to save money; they're also about gaining an edge over rivals and seizing new opportunities in the sector. Businesses will be more prepared to leverage embracing innovation and realizing the rewards it has to provide when they become more conscious of these advantages.

Teachers have become progressively successful at constructing virtual lesson plans in institutes, where pupils have opted for distant courses in many seminary schemes and colleges. The educational potential of this, which includes opening accesses for individuals who might have historically been unable to join certain schools due to remoteness, is unlikely to be overlooked (Barnes, 2020).

Organizations in a range of industries have incredible opportunities to communicate with individuals all around the entire world because of technology. Before the epidemic, many firms were only beginning to realize the possibilities that most

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of these skills offered. They quickly saw how strong technology can be when they were compelled to reduce in-person discussions and activities as a consequence of COVID-19. The outbreak has accelerated digitization and established a climate that will remain to foster future development and creativity uptake. Corporations will gain a better knowledge of the opportunities that arise in the future once the pandemic is over, as they obtain a better awareness of the potential of various aspects of modern technology.

2. The world after COVID-19 is digitized

With actual interactions at a minimal, many businesses rely on digital communication to stay afloat. Consumer brands and retailers who have adopted digital have seen an increase in online purchases and have been able to run their businesses from home during the pandemic (Björkdahl, 2020). COVID-19 brings to light what it entails to be digital. This is not just about getting interesting applications; this is about having a whole supply chain that spans operations, people, and technologies. It's a significant shift in the way people operate, live, and conduct business. As government actions led to a straightening of the coronavirus curve, humans would enter a phase that may seem like business as normal. However, it has already been considered that in the post-pandemic era, demand will change as fresh outbreak periods and government interventions become more likely in a subsequent wave. As a result, the approaching phase will be more than just about recuperating and matching needs with capacity. Businesses should have already planned for a potentially unpredictable era ahead, as well as the post-COVID-19 future.

Throughout the epidemic, purchasers have moved intensely closer to online networks, and agencies and industries have replied in turn. The survey outcomes verify the speedy shift closer to interrelating with clients over virtual channels. They additionally display that costs of the application are years in advance of wherein they have been while preceding surveys have been shown, or even extra in advanced Asia than in different regions. The COVID-19 disaster has delivered approximately years of alternate inside the manner businesses in all segments and areas do business. Rendering to a brand new McKinsey Global Survey of executives, their businesses have extended the digitization in their consumer and supply-chain connections and their inner operations through 3 to 4 years. And the proportion of virtual or digitally permitted merchandise in their portfolios has extended through a stunning seven years. Businesses have stood up as minimum transient answers to satisfy the various new needs on them, and plenty greater fast than that they'd

notion viable earlier than the disaster. What's greater, respondents assume a maximum of those modifications to be durable and are already manufacturing the forms of investments that each one, however, makes sure they may stick. In detail, while we requested executives approximately the effect of the disaster on several methods, they are saying that investment for virtual projects has multiplied greater than something else, greater than will increase in costs, the number of humans in era roles, and the number of clients.

Digital transformation is affecting how we work, meet people, and make monetary value. Digital structures consisting of Twitter, Facebook, and Instagram; search engines like google and yahoo consisting of Yahoo!, Google and Baidu; and video sharing and song streaming structures consisting of YouTube and Spotify create digital areas wherein groups have interaction and alternate information, goods, and offerings in a virtual place. With the COVID-19 pandemic, the usage of virtual structures thru online shopping, Zoom meetings, virtual payment, EdTech, and telehealth have strengthened; effectively permitting society to keep important monetary interactions without the hazard of contagion. The accelerated position of virtual structures in our monetary lives is predicted to persevere even past the epidemic, as an increasing number of businesses, communications, and interactions flow to the virtual compass.

COVID-19 prompted changes in society all over the world when it was released. Essentially instantly, authorities issued orders prohibiting big crowds, reducing in-person operational processes, and pushing staff to participate from home all the time. As a consequence of the World Wide Web, companies and institutions both started to seek for things to implement virtually. They employed a variety of web conferencing and teleconferencing features to keep in touch regularly with their colleagues, consumers, and students while performing tasks.

Before the outbreak, automation had become a more important part of the job. Corporations recognized the internet as a useful resource for communicating with consumers, allowing for some flexibility in timetables, and streamlining and accelerating processes. These procurements have been accelerated significantly by the spreading of the viral disease and the stoppage of in-person conferences for non-important enterprises. It compelled enterprises to look into cutting-edge digitalization to maintain operating abroad and serving their consumers (Faraj et al., 2021).

Many businesses approached digital processes from both a customer-facing and a back-end perspective. Many industry associations and institutions have had to come up with new ways for individuals to connect, collaborate, and complete job or educational tasks while working from home due to their incapacity to convene in groups. Consumers, on either hand, have expressed a desire for systems that

provides almost no human involvement, advocating for distant or, or at the very minimum, direct communication processes from a consumer standpoint.

Collectively, these factors have contributed to the digitalization of businesses in a variety of industries. Recognizing how these transformations have affected businesses can make people realize how businesses will adopt digitization and which features will probably last.

COVID-19 has posed the most severe challenges to authorities, businesses, and communities in recent years. It is commonly considered the 21st century's final turning point. The outbreak reminds people to organizations that to preserve the continuity of operations, they should have a strategy to deal with disruptions. It's also a turning point, indicating the beginning of a dramatic expansion of digitization throughout society.

3. Increased technology investment and prioritization

Corporations have had to realize that perfecting the integration of technology into their processes isn't necessary. Companies across a wide range of industries have been enabled to keep up with the times far more swiftly than expected. According to the report, participants answered their firms were ready to enact digital advances 20–25 times higher than they anticipated. These participants stated their firms were willing to embrace working remotely alternatives 40 times stronger than they planned before the outbreak. Workers were allowed to continue working from home because of a satisfactory alternative devised by companies (Bai et al., 2021).

It is most usually related to businesses realizing that processes didn't have to be perfect before they could be applied. Having a suitable solution allows enterprises to continue operating while conforming to municipal restrictions that traditionally held children back home. Businesses were compelled to make the adoption of technology a primary focus. More than half of firms stated that a shortage of attention was a significant reason for the delayed implementation of online technologies and capabilities before the outbreak. Institutions were capable of achieving these positive changes promptly after COVID-19 compelled them to prioritize them.

Because workers were expected to effort almost completely home-based for the period of their national closure, businesses were forced to seriously reconsider staff morale when deploying digital infrastructure. They couldn't imagine their workers just "made do with what they had." Workers may have before been thankful for any benefits that allowed them to work more freely as a result of

technological advancements. Workers' online experiences have a big impact on their satisfaction with their profession now that firms across fields have adjusted to cloud computing.

With numerous companies attempting to navigate the problematic environment caused by the widespread, no one desires to manage the high attrition that can result from low employee approval and the expenditures related to employing new personnel daily. Rather, administrations would profit really from concentrating on the necessity of offering a nice digital involvement for people (Tasnim, 2020).

Consequently, businesses have been forced to think about how convenient it is for consumers to communicate with them digitally. Consumers undertake a big percentage of their interactions with online stores, therefore companies must ensure that consumers can buy and engage on your website without difficulty.

4. Encouraging a technology 'spring cleaning' to optimize investments

As a consequence of the drive toward digitization, many businesses are attempting to organize their digital strategies in a 'spring cleaning' procedure. Before the covid era, when firms may have only used their digital capabilities on occasion, it was easy for employees and corporate executives to overlook duplicates or deficiencies in operations. The pandemic's dependence on technology, on either hand, has caused people to rethink their investments in technology and how they connect with what they want to successfully control a digitally focused business.

Companies still must evaluate which technologies and expertise they have engaged in. Assess for duplication of spending and expenditures, and also capability duplication. Analyze why the organization invests in many technologies to see if different offerings are necessary. Search for cheaper options while still meeting the needs of various sectors (Srinivasan, Eden, 2021).

Search for network interruptions at the very same time. Analyze how businesses organize their digital services and the difficulties they face. Start to understand how technology might probably fill in these deficiencies so that the business can properly run online and provide a nice experience for both employees and clients.

The objective is to construct simplified services throughout the company. Videoconferencing software, project storage platforms, customer interaction tracking solution, and other critical software should be chosen for their capacity to provide a consistent involvement so that the trademark can function with as little misunderstanding and disruption as probable.

5. Seeing technology as a tool for growth and innovation

Before even the pandemic, most companies regarded technology as a way of saving money and eliminating unnecessary spending. For example, when analysis of data can be done and mail being sent mechanically when requested, the marketing staff can focus on tasks that digitization and automation can't handle. (Hodder, 2020). A digital transformation, on the other side, allows businesses to develop and advance to the frontline of their industry.

Earlier in the epidemic, over half of the companies according to one of the top-most three digital preferences were to use technologies to remove business expenses. Nevertheless, as the outbreak progressed and companies instigated to recognize the numerous advantages of technology, just 10% of participants mentioned this as a chief cause for the lockdowns afterward they activated (Chen et al., 2021). Yet, considerations about cost lessening became overshadowed by considerations about modernizing capabilities, founding a viable edge, and establishing a corporate structure oriented towards digital technology.

When technology is being used properly, it permits brands to improve and grow in their dimensions to interrelate with consumers, answer to their needs, and move onward toward new techniques.

6. Increased automation uses to enhance the customer experience and develop contactless offerings

Consumers have expected more seamless services, thus brands have witnessed a significant push toward mechanization, which has boosted their ability to give this service. The fewer activities that must be performed directly by employees, the simpler it is for businesses' purpose of providing excellent, secure customer service.

Technology, which can assist brands to manage it all from supplies to email subscription databases, may be quite beneficial to them. Whereas many businesses have started to understand the benefits of robotics in their operations, the epidemic has prompted an increasing variety of entrepreneurs to reconsider their positions and embrace the tech's capabilities.

The program's advantages in lowering employees working in small quarters while also lowering the number of staff required to manufacture a certain item have been considerable, and this trend has been especially prevalent in industrial organizations.

7. Seeing technology as a tool for growth and innovation

Even before the outbreak, many businesses saw technology as a way to save money and eliminate unnecessary spending. When analysis can be performed and messages can be sent instantly when requested, for instance, advertising & distribution personnel can focus on tasks that robots and automation can't do. A digital transformation, on the other hand, allows businesses to develop and advance to the head of their industry.

Before the pandemic, more than half of the companies claimed that using tools to reduce expenses was among their top 3 technological goals. Only 10% of respondents listed this as a primary reason for the closures after they started as the outbreak spread and enhance the business to appreciate the different benefits of technology. Instead, worries about cost reduction were outweighed by concerns about updating capabilities, establishing a competitive advantage, and establishing a business culture centered on digital technology (Olatunde-Aiyedun et al., 2021).

Brands can expand and expand in their capacity to interact with consumers, react to their expectations, and push forward in innovative ways when innovation is handled effectively. As companies have started to appreciate the opportunities increasing technological, they have started to realize and welcome this strategy.

8. Greater investment in cybersecurity

As a consequence of the rising focus on digital abilities, cybersecurity has now become a vital part of the digital revolution. Maintaining information private has become a top priority for companies that rely on knowledge and software that supports them propose vital solutions to customers and pupils while also communicating with coworkers about essential initiatives.

A cybersecurity intrusion takes a minimum of 280 days to uncover and manage, allowing hackers more than enough time to wreak havoc on corporate computer networks. It also charges firms an equivalent of \$3.86 million.

As a consequence of the epidemic, organizational cybersecurity goals have changed. They've moved their concentration from tedious task support and corporate network management to allowing remote employees. Those in the responsibility of cybersecurity have had to adjust their attention and goals, depending on know-how such as virtual private networks and instruction and protecting workers from cheats and attacks that attack independent contractors (Zahra et al., 2021).

The crucial nature of cyber security is becoming an essential feature of digital alteration as a consequence of the amplified focus on digital competencies. Preserving information safe has now become the main concern for administrations across firms that depend on digitalization and software that helps them deliver significant services to the consumers and learners while also linking with their coworkers about critical projects. Organizational objectives for cyber security have grown as an outcome of the pandemic (Collier et al., 2020). They have moved their attention from giving help with ordinary actions and sustaining internal systems to allowing remote workforces. Those in custody of cyber security have suddenly changed their effort and precedence, using expertise including such virtual private networks (VPN) and frustrating to instruct and protect staff in contradiction of cheats and attacks that harm software developers (Lallie et al., 2021). However, in the post-COVID world, many businesses have recognized the importance of raising their cyber security expenditure as the number of remote employees has grown. Regardless of the point that this is a task for the businesses which have been smashing into the most by the pandemic, with condensed incomes necessitating budget cuts, cyber security has now turned into a main concern for industries all across the world.

As the amount of remote employees has increased, many businesses have recognized the importance of increasing their cybersecurity expenditures. Even though it was difficult for the industries hardest hit by the epidemic, with lower earnings necessitating budget cuts, security has become a major issue for enterprises across the line. Even though this is a difficulty for the industries hardest hit by the epidemic, with lower earnings necessitating funding cuts, cybersecurity became a major issue for enterprises across the range.

9. Shift towards digitalization

Many businesses approached digital activities from both a customer-facing and a back-end perspective. Several professional organizations and establishments have had to think of new ways for individuals to interact, collaborate, and complete work or educational responsibilities when working at home because of their incapacity to assemble in groups. Customers, but on the other side, have expressed a desire for operations that require no or minimal human collaboration, pushing for digital or, in the very slightest, contact-limited processes from a customer-facing standpoint. This, collectively, has assisted in the digital renovation of companies throughout all businesses. Understanding how these changes have affected organizations can

make individuals realize how companies might accept their digitalization and which features of it will probably exist (Bai, Quayson, Sarkis, 2021).

Improving the network of digital and invention is vital for corporate continuousness and the upcoming prosperity of our community, but this can be accomplished by one corporation or organization acting alone; it demands worldwide public-private enterprises.

Many innovation-based businesses are already captivating steps to actively sustain the healthcare industry, sustain jobs, and protect their workers and regions as we fight together to combat COVID-19.

While businesses must plan how to custom expertise to stay fluid and adaptive, they must also work directly with countries and public groups like the Society Economic Forum to build a customary of international standards and wide-ranging regulations to help the process to a 4.0 world. To promote further public-private collaboration in this sector, we will keep raising consciousness through our current collaborations, including the United Nations Global Compact and the Global Compact Network Thailand.

By utilizing the excellent options in cross-sector participants engaging with each other, there is a realistic prospect to dramatically restructure the supply chain, assuring that a digitized, linked globe will ease community as we “build back better” from the present situation.

10. Upskilling, reskilling, and teaching the labor force

The digital revolution is about authorizing individuals to exertion in innovative conduct as much as it is about reforming business procedures. As a result, preparing our personnel for the coming and enabling them to familiarize themselves with the different authenticities of the globe and the sectors in which we function is a top concern for us at C.P. Group. This includes offering our staff training and skills training opportunities, as well as full force and affect all parts of the business to guarantee that our organization is driven by technology and creative improvements from top to bottom.

This is especially true in Southeast Asia, which is currently experiencing an excellent moment for technology start-up development as the public’s living standards rise. As shown in a joint statement made by Google, Temasek Holdings, and Bain Ventures, the Southeast Asian internet economy would surpass US\$100 bn this year and increase to US\$300 bn by 2025. During 2015 and 2019, the country’s

online population grew from 260 million to 360 million individuals, with about 90% of them utilizing cellular data (Teodorov et al., 2021).

To stimulate greater private enterprise and invention in the area, creating a conducive environment for start-ups is critical. This entails offering incubation programs as well as financial assistance, talent expansion, and revelation to corporate systems to entrepreneurs. This is what inspired us to create Southeast Asia's main initiative ecology, True Digital Park, which focuses on fostering connectivity and knowledge sharing.

Technological developments and inventions can help us imagine how different industries, such as medical, communications, and farming, can use technology to have a significant impact on people.

Outbreaks will continue to be a hazard to healthcare professionals and public health organizations, but they can be mitigated by using huge data and AI to anticipate and anticipate outbreaks, and also the basis of medicinal provisions. There are auspicious illustrations of huge data and the visions it provides for enhancing epidemic preparedness and tracking.

C.P. Group and True Corporation are cooperating with other associates of the Digital Council of Thailand in Thailand to establish digital boards and submissions to support obtaining medical supplies contributions and also way, touch, and restrict the extent of COVID-19. We've also been collaborating with HG Robotics on the deployment of robotic elucidations at 41 health cares around the country to improve communication between medical staff and quarantined patients. Each robot can assist in the reduction of up to 70 occurrences of actual physical contact every day.

Sustaining capacity for citizens and merchants is a critical component of business steadiness and financial flexibility during this crisis. The use of technology to connect individuals during lockdowns has immense promise, and the transition to distant employed and online learning will very certainly continue beyond the COVID-19 outbreak. To construct the correct internet infrastructure to help society, cooperation with authorities, monetary firms, and supervisory agencies will be required (Bigot, German, 2021).

Integrating innovative technology into agriculture, rural, and online commerce will support take more visibility and accountability into the entire value chain in the global food supply and retail sector, allowing customers and society to be served more responsibly and sustainably.

We've shown how communications satellites may increase yields find good fertile land for agriculture, how the Internet of Things can help agricultural plants greater control usage of water, and how blockchain improves supply chain visibility by allowing market participants to track farm products throughout the process of production.

Constant Research and Development in satellite broadcasting expertise, biotechnology, nanotechnology, and automation have also demonstrated that innovation, when correctly applied, may assist in understanding animal viruses and the life phase of supplies, ensuring that farmhouses are more profitable and ecological.

Maintaining a focus on customer comprehension and trying to stay relevant in the post-COVID-19 world will provide numerous problems. It's all about being able to generate consumer connection in a systematic and long-term manner. That means businesses will have to identify true consumer demands, put them into action, and align their organization to achieve meaningful engagement with customers (Hodder, 2020).

Turning consumer data into actionable information: In today's information era, pieces of information are the force that binds a profitable organization intact. Data is important, but actions reign supreme. The lack of reliable customer information is the largest difficulty that Chief marketing officers are now experiencing. Customer insights cannot be realized without sources of data linked from within and outside the company, as well as data quality controls in place. This has an impact on marketing and decision-making. On the upper edge of that, there are issues like non-compliance with privacy laws like the General Data Protection Regulation and digital morals.

Creating meaningful user engagement: A brand's primary goal is to assist individuals. They want to interact with people and provide them with the situations that they enjoy. This necessitates a careful balancing of information and technology with human values and characteristics. As a result, long-term customer participation is tough to achieve. It takes end-to-end skills to transform client information into meaningful and relevant activities. Because everything business does is for an individual, the resulting experience ought to be genuine and reflect universal ideals. With digital becoming the new reality, companies which can enhance the human experience would be capable of building a long-lasting emotive connection with their customers, which would be revolutionary.

Creating a delivery-oriented company: Advanced technologies aren't a magic spell that will solve all business problems. To assist in the execution of these client experiences, organizations must have the necessary competencies, talents, and customer-centric company. From data collection and analysis to practical insights and technology integration, a customer-centric culture attempts to develop, understand, and preserve these connections with people.

These three Core challenges are inextricably linked. Businesses can embrace digital and jump ahead of their competition in the new baseline by combining data, technology, and management.

11. Role of a pandemic in enhancing digitization

When COVID-19 hit, it ignited variations in civilization all across the biosphere. Governments endorsed instructions limiting large masses of persons, restricting in-person business processes, and inspiring individuals to work from home all the time almost overnight (Chen et al., 2021). As a result, companies and institutions alike started in search of methods to work virtually, owing to the technology (Amankwah-Amoah et al., 2021). When functioning at home workplaces, they used many teamwork platforms and computer-generated meeting abilities to stay in contact with their coworkers, customers, and followers.

Technology had developed an enormously significant feature of the business even earlier than the outbreak. Industries viewed technology as a beneficial instrument for interacting with clients, allowing for flexible schedules and mechanizing and fast-moving procedures. The expansion of the new coronavirus, in addition to the interruption of in-person conferences for unneeded businesses, has accelerated these implementations vividly. It enforced industries to search for advanced digital technologies thus that they could endure operating distantly and satisfy their clients (Skrhak, 2021).

12. Inspiring a technology 'spring 'cleaning' to optimize investments

As a consequence of the drive toward digital transformation, several businesses are attempting to organize their investments in technology in a spring 'cleanup' process. It seems to be simple for workers and corporation managers to disregard inconsistencies or inadequacies in operations in the pre-covid era, when establishments may have merely used their digital competencies on occasions. The pandemic's dependence on technology, on the other side, has enforced individuals to reconsider their investments in technology and also in what way they line up with whatever they require to manage a digitally-focused company efficiently (Björkdahl, 2021).

In the post-COVID-19 era, brands will need to evaluate which technology and abilities they have capitalized in. Businesses have to check for coinciding expenses and investments, as well as redundancy in competencies. It will be needed to inspect why the business invested in numerous technologies to determine if the many amenities may be vindicated and also look for ways to cut costs while guaranteeing that the requirements of the various departments are satisfied.

At the same moment, businesses in the digitization era have to retain an eye out for facility interruptions and observe how industries accomplish their digital contributions and the trials they face (Skrhak, 2021). Companies may try to understand by what means technology may support to fill in all these shortcomings so the business can run efficiently virtually, giving customers and staff a pleasurable practice. The objective is to construct streamlined operations throughout the company. Conferencing technology, project hosting systems, user experience tracking solution, and other critical software must be chosen for their capacity to provide a consistent experience so that the business can function with very little ambiguity and disruption as feasible.

As consumers have demanded more contactless offerings, businesses have seen a vast thrust towards automation, which now has upgraded their capability to deliver this experience to the customer. The fewer processes which must be managed in a straight line by personnel, the simpler it is for businesses to offer great, safe client engrossment. In post covid era, Brands may benefit greatly from automation, which can help them accomplish anything from portfolios to email subscriber lists. Although many businesses have started to identify the worth of mechanization in their operations, the pandemic has provoked a cumulative number of corporations to review their positions and recognize the potential of technology (Amankwah-Amoah et al., 2021). The assistances of automation in lessening persons working in conjunction quarters while simultaneously dropping the number of people required to make a certain item have been huge, and this tendency has become mainly common in industrial organizations.

Companies should concentrate their next-generation digital strategies on four key areas:

1. **Customer experience:** While not entirely new territory, customer experience in the digital world is growing more emotional and personal than it is in the past. Whether that's an online clothing platform utilizing machine learning and artificial intelligence to select attire based on individual preferences or a brick-and-mortar retail outlet using a smartphone application to give consumers curbside pickup and debit cards payment, companies are utilizing data to provide superior customer experience (EuroScientist, 2021).
2. **Employee experience:** Automation and advanced analytics can make ordinary activities more efficient, whereas other technologies like virtual reality can help workers in ways that weren't previously conceivable (Horgan et al., 2020). There are some project that uses augmented reality to overlay digital instructions onto the workstation, such as showing technicians how and where to arrange their lines or indicating if a piece of machinery is too big to move alone.

3. Operations: Innovations like digital twins and advanced analytics, driven by the Internet of Things and Industries 4.0, allow firms better exploit real-time information to optimize operating performance and launch new products.
4. To assist their clients, contract manufacturers, for example, make better electrical goods, by using data to evaluate which parts perform effectively together and which suppliers are most trustworthy. Simulation is used by defense industries to improve design quality and reduce the number of unsuccessful prototypes (Björkdahl, 2021). Other businesses have been able to launch new product-as-a-service offerings as a result of data-driven processes.

Transformation of the business model: Smaller prospects for digital upgrading and information-based extensions might be sought out by organizations. For instance, insurance providers are watching and assessing consumers while they ride to improve policy pricing, and fleet businesses are using real-time data analytics to provide predictive and preventive maintenance services.

13. Concentrate on developing a workforce that is ready for the machine age

New positions (including such search engine marketing managers and social media page managers), new kinds of businesses (cloud technology suppliers and social media organizations), and sometimes even new economic sectors have emerged as a result of digitalization (digital security and data science). Digitalization's influence has also functioned as a spur for jobs created in the broader economy (Matarazzo et al., 2020). For instance, it is projected that the work process outsourced and IT-enabled service industry generates 3 to 4 jobs for every job generated.

Most governments ranked short-time period responses to the epidemic, however, a few have additionally all started to deal with longer-time period strategic necessities for recovery. Several governments in growing international locations have intervened to defend organizations and character incomes. In the Caribbean and Latin America for instance, Costa Rica's authorities started a platform for organizations without an internet presence, and a telephone app and texting carrier to facilitate change amongst manufacturers of agricultural, meat, and fish products. In Africa, Senegal ran info, schooling, and recognition marketing campaign on the advantages of e-trade throughout all segments of the population. In Asia, Indonesia released a capacity-constructing program to accelerate digitization and digitalization amongst micro, minor, and medium enterprises.

Numerous governments had reinforced their planned method for the virtual transformation previous to the COVID-19 epidemic. In particular, within the OECD Digital Economy Outlook 2020, 34 OECD nations had put in location a countrywide virtual method corresponding at the best degree of the presidency as of mid-2020, with a further 5 OECD nations reportage co-ordination at the top minister/chancellery degree. Governments also are devoting extra interest to rising virtual technology which includes AI, blockchain, and 5G organization, the latter of that's important to aid more suitable cellular broadband, Internet of Things gadgets, and AI applications. By mid-2020, 60 nations had a countrywide AI method, and in the closing 3 years numerous OECD nations – along with France, Australia, Spain, Austria, Colombia, Germany, Korea, the UK, and the United States – have issued a countrywide 5G strategies. Blockchain and important computing are enticing growing coverage interest, as well. Several nations have delivered a blockchain method (Australia, People's Republic of China, Germany, India, Switzerland), even though others (France, Italy) are growing.

The virtuous circle between virtual innovation and virtual alteration is an essential motive force of new commercial enterprise fashions and marketplaces, and virtual technology maintains the ability to reinforce the science and studies structures that can be showing so important to nations' COVID-19 reaction and retrieval. Yet nations also are identifying that the manner wherein those technologies are used can posture dangers to human-targeted values, in addition to privacy, safety, and customer protection. This offers brought motivation to their hard work to set planned directions, along with the global degree, wherein the OECD AI Philosophies is simply one instance of like-minded nations participating in the direction of sincere technology.

14. The Benefits of Digitalization

Organizations adopting digital capabilities have more durability in the face of adversity – and a unique perspective on the competition, allowing them to recover quicker and transition from defense to growth.

Improved data set: Digital transformation provides a method for collecting the right information and properly integrating it for higher-level business analytics. It establishes a method for various organizational functional units to convert raw data to insights through multiple touchpoints. It creates a single perspective of the customer lifecycle, operations, manufacturing, finances, and investment opportunities

as a result of this. As part of a process, it's critical to examine how customer information is recorded, stored, processed, and distributed.

- **Efficiency advantage:** They use digital technology to optimize operations and automate manual procedures, leading to increased speed, reduced waste, and much more time spent on revenue-generating tasks.
- **Productivity advantage:** Their staff had already been set up for a job remotely, so their concentration is on maximizing workforce efficiency and maintaining business culture by leveraging collaborative tools and applications (Katz et al., 2020).
- **More effective resource management:** Resources and services are consolidated into a set of business tools through digital transformation. It centralizes company resources and minimizes vendor duplication rather than using disparate software or databases. In 2020, enterprises will use an average of 900 apps. Digital transformation can bring together programs, databases, or technology into a single corporate intelligence source. Every aspect of a firm can benefit from digital transformation, which can contribute to operational innovation and productivity across departments. Every department uses sensitive data, from marketing and advertising to finances and the C-suite.
- **Security advantage:** They are properly positioned for and more adaptable to the current atmosphere's explosion of cyber threats (EuroScientist, 2021).
- **Agility advantage:** They have an agile edge because they use data-driven insight to make and act on choices more quickly. They have cultural flexibility built in, allowing them to adjust or shift direction at any time.

15. Recommendations

- Utilizing technology to enhance authorities' answerability, social comprehensiveness, and partnerships. Generating a data-pushed lifestyle withinside the public subdivision;
- Guaranteeing comprehensible use of virtual technology throughout coverage regions and ranges of authorities;
- Strengthen the binds among virtual authorities and broader public ascendancy programs;
- Shiny a hazard control method to cope with virtual protection and privateers issues;
- Developing clean commercial enterprise instances to preserve the investment and fulfillment of virtual technology schemes;

- Strengthening institutional sizes to manipulate and screen task applications;
- Measuring present belongings to manual obtaining of virtual technology. Reviewing prison and controlling frameworks to permit virtual possibilities to be detained.

16. Conclusion

When the COVID-19 pandemic broke out in advance this year, an awful lot of the sector moved online, accelerating a virtual alteration that has been happening for decades. Teenagers with at-home Internet access started out attending elegance in the least; many personnel began out running from domestic, and several firms followed virtual enterprise fashions to keep operations and hold a few sales flows. In the meantime, cellular programs have evolved to help “song and trace” the improvement of the pandemic; and investigators hired synthetic intelligence to study greater approximately the virus and boost up the search for vaccinations. Internet site visitors in a few international locations extended by as much as 60% rapidly after the pandemic, underscoring the virtual quickening that the epidemic sparked. While those sports reveal the remarkable ability of the virtual transformation, the pandemic has additionally emphasized the holes that continue. Even though a few virtual divides have pointed speedy in the latest years, others have now no longer accompanied the equal pace, leaving a few in the back inside the COVID-induced virtual acceleration. Furthermore, the extended dependence on virtual answers has brought new insistence to issues around privateers and virtual security.

COVID-19 has elevated the procedures of virtual transformation now no longer most effective in groups but additionally in people and public objects. Digitization of groups will grow the significance given to the virtual stations of advertising and the income of groups. It will even foster telecommuting and intake of technological merchandise as extra human beings will engage in the use of mixture conversation mechanisms available from wherever, and now no longer completely inside the bodily surroundings of groups and their households (Horgan et al., 2020).

To answer for the beginning question given in this paper we might say that the COVID-19 pandemic has been replaced as a breaking test and has uncovered numerous essential caveats and cursed troubles associated with digitalization. The epidemic breach has uncovered taken-for-granted expectations approximately vast get right of entry to virtual infrastructure, the volume to which administrative procedures are sincerely digitalized, the pliability of digitalized procedures to surprising events, and the societal norms approximately what establishes surveillance

and the boundary among paintings and personal spaces. Further, then digitalized paintings and organizational procedures, the COVID-19 epidemic has additionally uncovered the improved dependence on quantification of human performance, bearing in mind a remarkable extension of administrative center investigation into the home, paralleled with improved surveillance with inside the public sphere. Academics of digitalization can advantage substantially from entering into the breach unlocked through the COVID-19 pandemic for they have got frequently extolled the intense opportunities related to the digitalized upcoming.

Besides the paper indicates that fruitful streets of studies may be determined through that specialize in information the developing project of a widespread a part of the populace having constrained get right of entry to virtual assets and substructure. Digitalization researchers may advantage of spotting the endurance of the analog in digitalization. Employing is plain inside the evaluation above and inside the memories rising from the epidemic, a good deal of human and administrative lifestyles calls for an important analog size that cannot surely be enthused to the virtual realm. Digitalization has aided society to address the disturbance because of COVID-19. Yet the effect of the epidemic has been to breach vast assumptions and to show cracks in a formerly taken-for-granted digitalized future.

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THE STATUS QUO OF ARTIFICIAL INTELLIGENCE IN GERMANY*

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1. Introduction

Artificial Intelligence (AI) has made it to the focus of policy makers in the European Union and in Germany. In 2009 the European Commission, the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions published its communication regarding Key Enabling Technologies (KET, European Commission, 2009). This communication defined six technologies that are essential for the competitiveness of the European Union in the world and that should be fostered. Nanotechnology, advanced materials and photonics were examples. Furthermore, these technologies are seen to be indispensable for “welfare, prosperity and security” (KET, European Commission, 2009). Artificial Intelligence (AI), however, did not belong to the initial KETs but it was proposed to it by the “High Level Group on Industrial Technologies” in 2018 (European Commission, 2018).

After the proposal, the European Commission started and outlined an EU Initiative on AI including a plan in order to coordinate policies of the member states (European Commission, 2018b). In 2020 the Commission published its White Paper on AI (European Commission, 2020) and presented “policy options to enable a trustworthy and secure development of AI” (European Commission, 2020). In 2021, the European Commission published an updated Coordinated Plan on AI to coordinate policies within the Union and published a proposal for a regulation of AI (European Commission, 2021). The European Commission aims at making the European Union the dominant player in the field of trustworthy AI and therefore

* This article is based on the studies KI-Monitor 2020 (Demary et al., 2020) and KI-Monitor 2021 (Büchel et al., 2021b) on behalf of the German Association for the Digital Economy (BVDW).

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published a proposal to set the right framework conditions for AI and coordinated the implementation (European Commission, 2021).

But Germany also published its own strategy on AI in 2018 (Bundesregierung, 2018) and updated it in 2020 (Bundesregierung, 2020). Furthermore, in order to overcome the economic downturn due the corona pandemic, the German Government also increased its funding on AI (BMBF, 2020). As a member state of the European Union, the initiatives of the European Union and the German Government together determine the development of AI in Germany. To track the development of AI and the effects of the policy measures, the German Economic Institute developed an index for the German Association for the Digital Economy (BVDW). The AI Index allows for identifying the effects of the measures and helps to give advice for improvements in Germany. This paper briefly lays down the basic definitions used for the Index and the Index itself in section 2. The results of the analysis are presented in section 3 and section 4 concludes.

2. Definition and structure of the AI Index

The increasing interest in AI by politics since 2018 seems to be delayed when it is recalled that AI research already started in 1956 (Norvig, Russel, 2010). In 1997, the IBM-computer Deep Blue defeated the chess world champion Garri Kasparow (Eberl, 2018) and in 2016 AlphaGo Zero defeated world champion Lee Sedol in the more demanding and intuitive game Go (Eberl, 2017). However, even until today no general definition of AI has been established (Norvig, Russel, 2010, p. 2). To lay the ground for a common understanding of AI, the following section proposes a definition and basic principles for indicators that shed a light about AI.

2.1. Definition

When it comes to defining AI, scholars argue about whether AI encompasses artificial systems acting or thinking like humans, or acting or thinking rationally (Norvig, Russel, 2010, p. 2). Accordingly, proposed definitions exist that reflect each of these four ways AI can be understood. Furthermore, since AI encompasses very different applications from different fields of the whole society, for example autonomous driving vehicles, automated booking systems or chat bots, translation programs, medical outcomes or playing games, finding a general definition is also aggravated. For the Index at hand, "AI is understood as the creation of (virtually) intelligent programs and machines that can make decisions independently,

and can execute actions based on these decisions.” Independently in this respect means, that humans may only act as supervisors but are not involved in the decision-making process.

Computer programs like AlphaGo Zero or the computer Deep Blue collect data on successful moves from games in their database and react accordingly to moves of their opponent. These applications are representatives of the so-called weak AI (Norvig, Russel, 2010) because they are only optimizing their move based on past games and do not think by themselves. Strong AI, on the other hand, would entail such a kind of thinking: The computer only knows the rules and chooses without a database with results the best move. Almost every AI application today falls under weak AI. Accordingly, the creation of applications and technological improvements that can have severe effects on the whole economy and society are yet to come (European Commission, 2021).

To make use of the opportunities of AI and setting rules for the future development of AI, the above-mentioned initiatives have been started by politicians. Against this backdrop, this article monitors the effects of the measures taken and the development of AI as a whole in Germany since 2018.

In the literature, there are studies that also concentrate on AI and try to track the development. The Stanford University annually publishes its Artificial Intelligence Index Report (Perrault et al., 2021). In the latest edition the report encompasses indicators and analysis for different countries from the categories Research and Development, Technical Performance, Economy, AI Education, Ethical Challenges, Diversity and AI Policy and National Strategies. The Stanford University (2022) also provides a tool where readers can access the data and create an Index individually using indicators from the categories *Research*, *Economy* and *Inclusion*. The report, however, does not combine all the indicators to create and interpret an index. Instead, the different indicators are only listed and described.

Groth and Straube (2019a) use the Cambrian AI Index to compare 13 countries with respect to AI. However, the publication only gives the final result and only describes the situation at a point in time. With respect to Germany, there also exist national studies that try to evaluate the status quo and the likely effects on the German economy, for example PAiCE (2018). The study at hand adds value to the literature by combining an in-depth analysis on indicator level with a combination to a single index number. The index is created on an annual basis and therefore allows for a quick overview of the status quo and development of AI in Germany. To this end, 14 indicators (Table 1) have been chosen that shed some light on the situation and evolution of AI in Germany. These indicators are supposed to fulfill the following preconditions:

- For every indicator a hypothesis is formed as to how it is facing the development of AI. Accordingly, the indicators are intended to explain the status quo of AI and do so from a theoretical point of view.
- The indicators are supposed to be current, precise, reliable and updated annually.
- The indicators should overlap as little as possible (although there are necessarily and logically dependencies).
- Where possible, both supply-side and demand-side indicators are used to avoid a one-sided presentation.
- An attempt is made to depict the degree of penetration and utilization of the AI in the indicators, because the mere presence of the corresponding technologies does not make a statement about the actual intensity of use, too.

The indicators are grouped into the three categories *General Framework*, *Economy* and *Society*. These categories were chosen based on the deliberation that AI and AI-applications need a market for being implemented. Accordingly, a demand side and a supply side are needed. Furthermore, a market comprises of settings and rules that determine the way transactions are made and how many transactions take place. The General Framework describes the rules for AI and the prerequisites suppliers and users of AI applications can make use of. The category Society evaluates how prone and curious the individuals in the society are about AI. The enterprises play a dual role concerning AI. On the one hand, enterprises can demand for and use AI applications. But on the other hand, enterprises are also central for developing and upgrading applications. The category Economy, therefore, represents the supply side and also parts of the demand. The indicators and their specific value added for describing the situation of AI are explained further in the next subsection.

2.2. Categories and indicators

Table 1 shows the indicators used, their categories, their units, and the raw values in the three years the AI Index was calculated. By category, the respective indicators and their value for describing AI are analyzed.

2.2.1. General Framework

The category General Framework comprises of the digital infrastructure and the legal framework. Furthermore, the prerequisites for enterprises to develop and implement AI applications are included in this category. The human capital available on the labor market is included in these prerequisites. Available insights provided by public research institutions and the likelihood that these results find their

way to enterprises that create marketable products using them or use these results for internal purposes are also important factors.

The availability of a suitable digital infrastructure for enterprises and households is a key factor for the implementation of AI. This infrastructure enhances both supply and demand for AI because this provides a platform that facilitates transactions, and the exchange of data which is crucial for the implementation and improvement of AI (Norvig, Russel, 2010; Perrault et al., 2021). For example, only if a suitable infrastructure exists, also digital services like cloud computing or platform-as-a-service and predictive maintenance can be used. The digital infrastructure is approximated for the index by the share of households with a broadband connection of at least 100 Mbit/s. In Germany, most areas are mixed areas, where households and enterprises reside in one area (Büchel et al., 2020, p. 7). That means the share of broadband connections for households also includes the availability for most of the firms. The share of households is annually published on behalf of the Federal Ministry of Transport and Digital Infrastructure (BMVI).

In the mid of 2018 66.3% of households had access to a broadband connection of at least 100 Mbit/s (BMVI, 2018). This share was used for the AI Index 2019. In 2019 to share rose to 81.8% (BMVI, 2019) and in the last year the share was 85.7% (special analysis for the German Economic Institute).

Table 1. Name, unit of Indicators used and values for the years 2019–2021

Indicator name	Indicator unit	Indicator 2019	Indicator 2020	Indicator 2021
General Framework				
Digital Infrastructure	Share of households with broadband connection of at least 100 Mbit/s	66.3	81.8	85.7
AI in speeches in the Bundestag	AI-words per 1000 word in speeches at the German parliament (Bundestag)	0.17	0.13	0.09
computer science graduates	Absolut number of graduates	26 394 (2017)	27 104 (2018)	28 909 (2019)
Scientific AI-publications	Share of German scientific AI-publication on all scientific publications in Germany	3.8	4.2	3.6
Cooperation between enterprises and scientific institutions	Share of AI-publications with an enterprise and a scientific institution cooperating on all AI-publications in Germany	3.7	3.1	4.0
Economy				
Importance of AI for enterprises	Share of enterprises that predominantly saw more opportunities due to AI	63.0 (2019)	61.8 (2020)	65.7 (2021)

cont. Table 1

Indicator name	Indicator unit	Indicator 2019	Indicator 2020	Indicator 2021
Use of AI	Share of enterprises that use AI	10.1 (2019)	12.9 (2020)	21.1 (2021)
AI in annual reports	AI-words per 1000 words in annual reports of DAX30 enterprises	1.6	1.5	2.9
AI standards (patents)	Share of AI standards on all patent applications in Germany	0.74 (2016)	1.02 (2017)	1.46 (2018)
AI in employment ads	Share of employment ads which demand for AI skills on all employment ads in Germany	0.58 (2019)	0.72 (2020)	0.88 (2021)
Society				
Knowledge about AI	Share of people that can explain what AI means	52	61	65
AI on twitter	Average tonality of tweets on twitter (from 0 (negative) to 100 (positive))	53.23	53.42	52.78
AI in print media articles	Average tonality of articles in newspapers (from 0 (negative) to 1 (positive))	50.69	50.66	50.97
Interest in AI	Added up and normalized values of Google Trends numbers for 10 AI-words	16.7	17.6	15.0

Note: The date of elicitation of the values of the indicators are 2018–2020, otherwise the year of the elicitation is given in brackets.

Source: Own elaboration.

As mentioned in Section 1, AI is an important topic for politics. Because the framework for AI is defined by the legal context, the importance of AI in legislative procedures is also included in the Index. In fact, the relative frequency of AI words in speeches in the Bundestag, the German parliament, is used to analyze the effort invested by politicians in determining the framework for AI. The speeches are published on the website of the Bundestag (2022). In these speeches, AI words were automatically searched for. The list of words is provided in the Appendix and is based on the AI-skill-cluster (Burning Glass, 2020). For the index the average number of AI words per 1000 words is used to adjust for different numbers of speeches and the lengths of speeches in the different years. In 2018 0.17 AI words per 1000 words were counted. In 2020 there were on average 0.13 and in 2021 0.09 AI-related words per 1000 words in a speech.

Human capital is also an important factor for the implementation of AI. An analysis of employment ads showed that especially graduates of computer science are demanded for in AI related employment ads (Büchel, Mertens, 2021). Accordingly, the absolute number of passed final examinations in computer science in Germany are used in the AI Index as an approximation for the availability of AI related skills on the labor market. For the AI Index 2019 the latest available number published by the German Statistisches Bundesamt gave the passed examinations for 2017

and was used as an indicator. In 2017, there were 26394 passed final examinations (Statistisches Bundesamt, 2018), while in 2018 there were 27104 (Statistisches Bundesamt, 2019) and 28909 in 2019 (Statistisches Bundesamt, 2020).

Scientific publications are also important for the development of AI, because these provide the public with the latest results in the field and encourage further research and implementation of the ideas. Accordingly, also the significance of AI in the scientific literature in Germany is included into the index. To this end, publications in the category Artificial Intelligence of the database Microsoft Academic (2020) were analyzed whether a German institution was involved or not. If at least one author from a German institution (university, think tank etc.) was involved, this publication was counted as an AI publication. This is used in order to approximate the capabilities to create new knowledge in Germany in a first place. The resulting number was divided by the number of all scientific publications where a German institution was involved. In 2018 3.8% of all German publications were AI related. In 2019 the share was 4.2 and 3.6% in 2020.

Scientific publications and results must also be transformed into new products or processes in order to make use of the research. Accordingly, new publications are only one step. Another step is to make use of these results in enterprises. To include an indicator that approximates how scientific research is transferred into the economy, *cooperation* between enterprises and scientific institutions were included into the index. To this end, the German AI publications from the indicator scientific AI-publications were analyzed again. The number of AI publications where an enterprise and a research institution cooperated was divided by the number of all German AI publications. In 2018, in 3.7% of all German AI publications there was a cooperation between an enterprise and a research institution. In 2019, this share was 3.1% and 2020 4.0%.

2.2.2. Economy

Groth and Straube (2019b) find that especially in China, Japan, South Korea and the USA enterprises play a key role for the progress of AI. On the one hand, enterprises develop AI applications and products. On the other hand, they are also an important factor on the demand side of a market for AI products and related services. A high market potential encourages investment in AI and, therefore, enhances AI research and development. Both, the active role of an enterprise by investing in AI and the passive role as a potential buyer, encourage the developments in AI (Lundborg, Märkel, 2019). Accordingly, the category “Economy” is also an important module for describing AI in Germany. In this category, the demand

and supply of enterprises for AI is highlighted. In particular, AI patent applications and the importance of AI related skills in employment ads are included as well as the share of enterprises already using AI and the share that ascribes high opportunities to AI.

For the Index, a survey of enterprises in the industrial sector and industry related services for each year of the AI Index is conducted. The industrial sector is an important part of the German economy and also plays a significant role in the digital transformation (Büchel et al., 2021a). The survey asked how many enterprises already use AI and whether the firms ascribe more risks or more opportunities to AI. The enterprises could assign a value between 0 (max. risk) and 100 (max. opportunity). For the index the mean of all answers is used. Accordingly, a value of more than 50 can be interpreted as opportunities outweighing risks. In the spring of 2019, 577 enterprises answered this question, in 2020 776 and in 2021 850 firms. The mean values were 63.0 in 2019, 61.8 in 2020 and 65.7 in 2021. Accordingly, the enterprises constantly see more opportunities to AI than risks. Nevertheless, these values also indicate that there are some risks in the opinion of the enterprises.

As to the question, whether enterprises *use AI* or not, there were recorded 681 answers in the spring of 2019, 893 in the spring of 2020 and 983 in the spring of 2021. 10.1% used AI in 2019, 12.9% in 2020 and 21.1% in 2021. Accordingly, the use of AI constantly increased in the enterprises and until 2021 the use of AI more than doubled from a relatively low starting point.

Besides the survey in the industrial sector, the 30 enterprises in the biggest German stock index DAX-30 were analyzed. Because of their size, these enterprises represent a large share of the German economy and thus can act as a role model for other enterprises (Kilian, Hennings, 2011, p. 250). The advantage of these enterprises is that they annually publish a report where they address opportunities and risks for their business. The annual reports are analyzed analogous to the speeches in the Bundestag (see section 2.2.1). In the Appendix, the used list of AI words is presented. The number of results is then divided by the total number of words in the report. Note that AI is discussed in the reports both as an opportunity and a risk. But already the role of AI in the reports reveals the importance of this technology. In the reports for the fiscal year 2018 there were 1.6 AI words per 1000 words in the report. For 2019 there were on average 1.5 and 2020 2.9 AI words per 1000 words per annual report.

The output of effort invested by enterprises is considered as an additional indicator for the AI Index. To this end, the relative importance of “AI patents” on all patent applications is considered. Although patent applications in die European

Union cannot only be based on Software (Dreier and Meyer-van Raay, 2011), not all inventions lead to an application. Since there is a time lag of 18 months, the change in the relative importance of AI compared to other technologies can still add value to the analysis of AI. All patent applications by German enterprises that were submitted to the Deutsches Patent- und Markenamt (DPMA), the European Patent Office (EPO) or the World Intellectual Property Organisation were considered for the analysis. In EPO (2017) 401 CPC (Cooperative Patent Classification) technology categories were identified that potentially contain AI-related patents. The full texts of the applications in these CPC categories were downloaded and then checked whether the AI words listed in the Appendix could be found. This double-staged procedure ensures that only patents that are related to AI are counted. Because of the time lag of up to 18 months between application and publication, data from 2016 to 2018 were used for the index. It was found, that in 2016 there were 367 AI-related patent applications by German enterprises, 508 in 2017 and 738 in 2018. These numbers were then divided by the number of all applications by German enterprises in the respective years for the final indicator. As a result, in 2016 0.74% of all applications were AI related. In 2017, the share was 1.02% and in 2018 1.46%.

A final aspect considered was the demand for skilled labor is introduced. The hypothesis behind this is, that the more employees with AI related skills are searched for by the enterprises, the more advanced is the (intended) use of AI. Textkernel (2021) provides a database with employment ads published on different online job platforms. For the AI Index, the employment ads of Textkernel from the first quarter of the index year were extracted and duplicates deleted. That means, for example, that for the AI Index 2021 the employment ads of the first quarter of 2021 were analyzed. According to the Textkernel database, there were 3.6 million ads in 2021, 3.0 million in 2020 and 3.3 million in 2019.

In order to create a list of search items (see also Büchel, Mertens, 2021; Demary et al., 2021), common job titles from the literature for AI jobs were used in a first step to find corresponding *employment ads* in the database. The search results were then analyzed in a second step to find new job titles and AI skills demanded for. These new search items were then used to find more employment ads in the database. This procedure was repeated. The result of skills that were AI related is shown in the Appendix and used in all three years covered by the index to identify employment ads. As an indicator, the share of AI employment ads on all employment ads in the database of Textkernel (without duplicates) was used. In fact, in 2019 0.58% of all employment ads were intended to find employees with AI skills. In 2020 the share was 0.72% and 0.88% in 2021.

2.2.3. Society

Finally, the acceptance of AI in the society plays an important role for the implementation of AI. Only if individuals are interested in AI and want to use AI-based applications, can AI be successfully applied, and applications and related services can be offered. Vice versa, if there are prejudices against AI, implementing technologies and applications using AI is difficult. Therefore, in the index the knowledge and the interest in AI in the society were included. Also, how AI is discussed in the society was approximated for the Index.

Knowledge about AI allows for a knowledge-based choice on whether to use AI and buy AI-related products or services. This also tendentially provides individuals with the opportunities offered to them by AI and, therefore, enhances the use of AI. Furthermore, knowledge forestalls prejudices against AI. Therefore, knowledge about AI is included into the index as an indicator. Knowledge is approximated by the share of people that know the term AI and can explain the term or can roughly describe what is meant. The shares for the years 2018 to 2020 were extracted from studies from Initiative D21 (2019, 2020) and the Federal Association for Information Technology, Telecommunications and New Media (Bitkom, 2018, 2020a, 2020b).¹ In fact, the shares of individuals that could roughly explain what AI is are 52% for 2018, 61% for 2019 and 65% in 2020.

Besides the knowledge itself, the curiosity of individuals in Germany about AI was included as another indicator. It is called *interest in AI* and based on data from Google Trends. Google Trends allows for comparing different search items according to when there were the most search queries for this term on the Google search engine. Accordingly, the 14 AI-related search items in the Appendix were compared using data from Google Trends on weekly indexed searched results. Google Trends ascribes the search item with absolutely the most search queries in a week the value of 100. The number of search queries for the compared search items in the weeks in the analyzed period was then calculated in relation to the 100. For the index, the weekly values of every search item are summed up and the mean for each year is calculated. The corresponding mean for all 14 search items was 248 in 2018, 257 in 2019 and 225 in 2020. This analysis was repeated 10 times and the mean for all 10 repetitions was calculated. The corresponding values are 234 (2018), 248 (2019) and 211 (2020). These values were then min-max normalized to values between 0 and 100 and used as an indicator.² The values of the indicator are 16.72 for 2018,

¹ For more details see Büchel et al. (2021b, pp. 27–28).

² For more details see Büchel et al. (2021b, pp. 31–33).

17.63 for 2019 and 14.95 for 2020. A value of 100 indicates that there were on average the same number of search queries, independently of the absolute number, for every item in every week. This, however, is rather unrealistic. A value close to zero or even zero indicates that there were almost no search queries at all, or only one search query for one item in one specific week occurred. This also seems quite unlikely. More realistic is that the different fields of AI covered by the used words experience different numbers of search queries at a time. The indicator, therefore, adds value to the analysis because it covers different trends in user interest and ascribes one number to it. The higher the number, the more homogenous and generally the higher are the absolute numbers of the search queries. A low number indicates that the number of search queries varies greatly in size. This also points to a low number of search queries on average because of the pronounced trends for one or a few number of words.

The last two indicators in the category “Society” try to approximate how AI is discussed in the public. To this end, “print media articles and twitter tweets” were analyzed. Print media articles are used by large parts of the society to inform themselves (van der Wurff et al., 2018.). Twitter tweets are used, because individuals can actively discuss a topic there. Online articles of three of the five print media newspapers with the highest circulation were analyzed to identify articles dealing with AI. On twitter, tweets were identified that actively dealt with AI in German. Subsequently, a sentiment analysis was conducted (Remus et al., 2010) on the media articles and the tweets, respectively. Based on the words used, a value was calculated that describes whether AI is discussed positively, neutral, or negatively. The mean was calculated for each, the articles and the tweets, for 2018, 2019 and 2020. A value of 100 describes a situation where every article or tweet had a completely positive attitude. A value of zero suggests a completely negative depiction while a value of 50 describes a neutral attitude on average. For twitter, the resulting values are 53.23 for 2018, 53.42 for 2019 and 52.78 for 2020. The values for the print media are 50.69 (2018), 50.66 (2019) and 50.97 (2020).

3. Calculation of the AI Index

The aim of the AI Index is to track the development of AI in Germany and to represent this movement with a meaningful index value. Note that the development can also be analyzed in detail by a deeper look at the indicators.

To combine the different values of the indicators with their different units the percentage change is used. The AI Index uses 2019 as a base year to this end.

The 14 indicators are denoted by I and the percentage change to the base year is denoted by Δ_i .

The sum of the percentage changes of the indicators is then calculated for each of the three categories (Δ_K), where K stands for the General Framework, the Economy or Society respectively. The sum of each category Δ_K is then divided by the number of indicators in the category (n_K):

$$\Delta_K = \frac{1}{n_K} \sum_{i=1}^{n_K} \Delta_{I_i}$$

Δ_K gives the mean of the changes for each category. Note that this is based on the assumption that each indicator has the same weight in the category. For the AI Index this assumption does not hold because every category is ascribed an equal weight. This, however, means that the weight of the indicators in the category Society is slightly larger (weight of 1/12 for the index) compared to the indicators in the other categories (1/15).

Nevertheless, each of the three categories have an equal weight for the overall Index. Accordingly, Δ_K of each category is summed up and divided by three. In the year t of the analysis the change compared to the base year 2019 is given by

$$\Delta_{Index}^t = \frac{1}{3} \sum_K \Delta_K$$

where $K = \{\text{General Framework, Economy, Society}\}$.

For 2019 the value of the Index is defined as $I_{2019} = 100$. Generally, the value of the index in year t is denoted by I_t and is given by the value I_{t-1} and the change of the index in that year (Δ_{Index}^t). For 2021 (I_{2021}) it results that

$$I_{2021} = I_{2020} + \Delta_{Index}^{2021} = 100 + \Delta_{Index}^{2020} + \Delta_{Index}^{2021}.$$

Accordingly, the development of AI compared to the base year 2019 can be decomposed in the specific changes of each passed year. This allows to identify driving forces on the level of categories and the level of indicators. The detailed results for each category are analyzed in the following subsection before the result for the general AI Index is depicted in section 3.2.

3.1. Results by category

Table 2 shows the percentage change of the indicators in the category *General Framework* since 2019. In addition, it displays the weighted changes for the indicators. It reveals that especially the digital infrastructure has a positive trend. In fact, since 2019 the share of households with a broadband connection of at least 100 Mbit/s increased by more than 29%. Likewise, the number of computer science graduates (+9.5%) and the share of cooperation between enterprises and scientific institutions in the literature (+7.3%) increased. A negative trend was noted for the share of AI publications on all scientific publications. Since 2019, this share decreases by roughly 5.5%. A more pronounced negative trend was found regarding the role of AI in speeches in the German Parliament. Since 2019, AI words per 1000 words decreased by more than 51%. This development, however, might also be related to the pandemic. Section 1 showed that there were parliamentary initiatives focusing on AI in Germany. However, during the pandemic, more speeches dealt with COVID 19 than with.

Table 2. Change and weighted change of indicators in the category “General Framework” and the contribution of the category to the AI Index

Indicator name	Change of each indicator 2019 to 2021 in percent (Δ_i)	$\frac{1}{n_{General\ Framework}}$	Weighted change of indicator in category
Digital Infrastructure	+29.26	1/5	+5.85
AI in Bundestags-protokollen	-51.15	1/5	-0.23
computer science graduates	+9.53	1/5	+1.91
Scientific AI-publications	-5.53	1/5	-1.11
Cooperations between enterprises and scientific institutions	+7.28	1/5	+1.46
	$\Delta_{General\ Framework}$:		-2.12
Contribution of the category General Framework to the AI index ($\frac{\Delta_{General\ Framework}}{3}$):			-0.71

Source: Own elaboration.

Nevertheless, the pronounced negative trend in speeches made the overall contribution of this category to the AI Index negative. The sum of percentage changes ($\Delta_{General\ Framework}$) is -2.12. Since the category General Framework is of equal value as the other two categories, the contribution to the AI Index is -0.71. Still, the indicators with a positive trend indicate that the existing know-how has increased and

the transmission of knowledge from research to business improved. Yet, there is still much scope for improvement in the framework conditions.

Table 3 depicts the results in the category *Economy* are given in. All five indicators of this category increased since 2019. The use of AI in enterprises more than doubled since 2019 and the role of AI in patent applications nearly doubled. Furthermore, the increase of more than 80% in the use of AI words in annual reports of DAX-30 enterprises is remarkable. The role of AI in employment ads increased by more than 50%. Already in the 2020 AI Index (Demary et al., 2020), the majority of enterprises perceived more opportunities than risks with AI. However, the assessment of AI slightly decreased compared to the previous year. The increase in 2021 compared to 2019, therefore, indicates that the downturn is reversed and overcompensated.

Table 3. Change and weighted change of indicators in the category Economy and the contribution of the category to the AI Index

Indicator name	Change of each indicator 2019 to 2021 in percent (Δ_i)	$\frac{1}{n_{Economy}}$	Weighted change of indicator in category
Importance of AI for enterprises	+4.29	1/5	+0.86
Use of AI	+108.91	1/5	+21.78
AI in annual reports	+80.43	1/5	+16.09
AI standards (patents)	+95.94	1/5	+19.19
AI in employment ads	+51.72	1/5	+10.34
	$\Delta_{Economy}$		+68.26
Contribution of the category Economy to the AI index ($\frac{\Delta_{Economy}}{3}$):			+22.75

Source: Own elaboration.

Similarly as in the AI Index 2020 (Figure 1; Demary et al., 2020)³, the German economy is again the major driving force of AI in the AI Index 2021. All indicators make a positive contribution. In fact, the category Economy contributes +22.75 index points to the AI Index 2021. But still, as with the indicators considered, in some cases there is still considerable potential for improvement. Accordingly, it can be expected that the importance of AI continues to grow.

³ Note that the values in the indices 2020 and 2021 for the index year 2020 slightly differ according to necessary changes in the methodology. For more details see Büchel et al. (2021b).

As table 4 shows, two indicators of the category “Society” reveal a positive and the other two a negative trend. The knowledge about AI increased by 25 percentage points since 2019. The sentiment of articles in print media increased, too, but only slightly with 0.5%. This is in line with table 1 where the sentiment of AI in print media articles was found to be neutral. The small increase does not change this finding. The same holds for the sentiment analysis of twitter tweets. Although the indicator shows a negative trend (– 0.85 percent compared to the base year), the discussion is still neutral. A pronounced negative trend is indicated by Google Trends data. In fact, the search queries decreased by more than 10%. However, this could again be caused by the pandemic which may have attracted more attention by the users of general search engines than AI issues.

Table 4. Change and weighted change of indicators in the category Society and the contribution of the category to the AI Index

Indicator name	Change of each indicator 2019 to 2021 in percent (Δ_i)	$\frac{1}{n_{\text{Society}}}$	Weighted change of indicator in category
Knowledge about AI	+25.00	1/4	+6.25
AI on twitter	–0.85	1/4	–0.21
AI in print media	+0.54	1/4	+0.14
Interest in AI	–10.57	1/4	–2.64
	Δ_{Society}		+3.54
Contribution of the category Society to the AI index ($\frac{\Delta_{\text{Society}}}{3}$):			+1.18

Source: own elaboration.

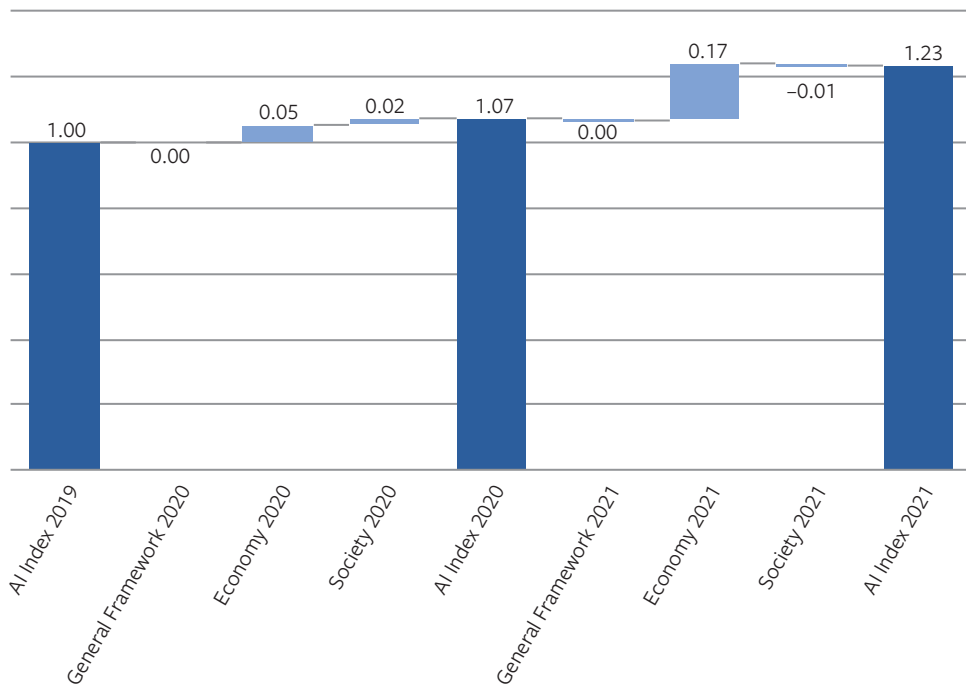
In the AI Index 2020 (Figure 1; Demary et al., 2020)⁴ the category Society positively contributed to the AI Index. In the AI Index 2021 this contribution is still positive compared to 2019. However, compared to 2020, the contribution of the category in the AI Index 2021 declined. In fact, in the AI Index 2020 the contribution was +1.91 (Figure 1), while in the AI Index it is +1.18 (Table 4; Section 3.2). Accordingly, the society still facilitates the promotion of AI compared to 2019. However, also due to the pandemic, the movement is slowed down. But still objective discussion and knowledge about AI in society is growing. However, the increased knowledge about AI might also be caused by a decrease in search queries. Whether this is indeed the case, can be analyzed in the AI Index 2022.

⁴ Note that the values in the indices 2020 and 2021 for the index year 2020 slightly differ according to necessary changes in the methodology. For more details see Büchel et al. (2021b).

3.2. Result for the AI Index 2021

Based on the trends of the indicators and the results of the individual categories the AI Index can be calculated. The values of the AI Indices 2019 to 2021 and the respective contribution of the categories are depicted in figure 1. Since the index year 2019 is the base year, the AI Index for this year is normalized to 100. The AI Index increased from 2019 to 2020 by almost seven index points. While the category economy contributed more than five points and the category society almost two points, only the General Framework had a negative effect and lessened the value by around 0.4 points.

Figure 1. AI Index for Germany 2019 to 2021 and contribution of categories for index year 2020 and 2021



Source: Own elaboration based on Büchel et al. (2021b).

In the year 2020, that was shaped by the corona pandemic, AI experienced a boost in its development in Germany. In fact, the AI Index 2021 increased compared to 2020 by more than 16 points to an AI Index value of 123.22. The category economy contributed more than 17 points and, therefore, overcompensates the negative effects of the categories General Framework (-0.32) and Society (-0.74).

These negative effects may be caused by the pandemic, because in both categories one indicator is influenced negatively due to less attention on AI. But the efforts invested by regulatory bodies and the increased knowledge about AI in the society indicate that AI is still an important topic. The economy is the driving force in the index and this indicates that AI is of high importance for the enterprises.

4. Conclusion

AI is one of the key technologies for the economy and a crucial factor in the competition between enterprises and across different economies. AI can boost enormous efficiency gains, technological advances, and new products and services. But at the same time, AI is also highly relevant to society. This necessitates adequate framework conditions for an effective use of AI. In order to evaluate the effects of political initiatives as well as the social acceptance of the new technology and observe and recognize negative developments in Germany as early as possible, the AI Index has been developed. Germany can only become one of the leading AI markets, if the success of AI in the triad of general framework, transfer to the economy and social acceptance is understood and handled accordingly. Similar to the first survey of the AI Index (Demary et al., 2020), the AI Index 2021 shows again the General Framework as a brake on the holistic positive development of AI in Germany. Above all, there is a trend towards less emphasis on AI-relevant topics in Bundestag debates which diminishes the progress made in the digital infrastructure and in human capital development. Nevertheless, the application of AI in the economy increases the innovative strength measured by AI-related patent applications and the demand for AI specialists. The echo of AI in society is also positive which is indicated by a neutral sentiment in discussions and an increased knowledge about AI. Yet, there are also challenges such as the lack of skilled labor or the removal of barriers to the use of AI in business and society. What is needed is more trust and the ability to convey the potential of AI. At the political level, the recent proposals of the European Commission and the updated AI strategy of the Federal Government of Germany are two important pillars. These should be seen as a starting point and further developed in such a way that the balance between freedom for innovations and requirements for legal security is preserved. Because only then can the desired confidence-building effect be fully developed so that Germany and the entire European Union can become the key player for trustworthy AI as it is intended by the European Commission (2021).

Appendix

Table 5. Words related to artificial Intelligence (AI) used for the indicators of the AI Index

AI words in general except AI standards and employment ads	AI words in AI patents (standards)	AI words in employment ads
<ul style="list-style-type: none"> ▪ artificial intelligence ▪ autonomous driving ▪ machine learning ▪ natural language processing ▪ neural net ▪ robotics ▪ image recognition ▪ künstliche intelligenz ▪ autonomes fahren ▪ maschinelles lernen ▪ neuronales netz ▪ natürliche sprachverarbeitung ▪ robotic ▪ Bildererkennung 	<ul style="list-style-type: none"> ▪ artificial intelligence ▪ autonomous driving ▪ machine learning ▪ neural net ▪ natural language processing ▪ computer vision ▪ machine vision ▪ language understanding ▪ reinforcement learning ▪ robotic(s) robot ▪ face/image/character/speech/video/text & recognition/generation ▪ direction recognition ▪ gesichts/bild/zeichen/sprach/video/text/richtungs & erkennung/generierung ▪ object & detection/localization/classification ▪ objekt & erkennung/lokalisierung/klassifizierung ▪ machine translation ▪ maschinelle übersetzung ▪ künstliche intelligenz ▪ autonome fahr ▪ maschinelle lern ▪ neuronale netz ▪ natürliche sprachverarbeitung ▪ autonome roboter ▪ deep learning ▪ fuzzy logik ▪ trainingsdaten ▪ trainier daten ▪ ki nlp ▪ ml ▪ cnn ▪ lstm ▪ fourier transformation ▪ algorithm ▪ maximum likelihood ▪ navigation & system/einrichtung/vorrichtung ▪ bilderfassung ▪ fahrerassistenzsystem ▪ routen berechnung 	<ul style="list-style-type: none"> ▪ big data engineer/scientist/science ▪ research scientist ▪ business intelligence ▪ artificial intelligence ▪ künstliche intelligenz ▪ machine learning ▪ maschinelles lernen ▪ deep learning ▪ autonomous driving ▪ neural net ▪ neuronales netz ▪ computer vision ▪ machine vision ▪ natural language processing ▪ language understanding ▪ reinforcement learning ▪ robotics ▪ robotic ▪ face/image/character/speech/video/text/direction recognition ▪ face/image/character/speech/video/text/direction generation ▪ gesichts/bild/zeichen/sprach/video/text/richtungserkennung ▪ object detection/localization/classification ▪ objekterkennung/lokalisierung/klassifizierung ▪ machine translation ▪ maschinelle übersetzung ▪ autonomes fahren ▪ natürliche sprachverarbeitung ▪ bot developer ▪ chatbot ▪ roboter programmierer ▪ robot learning ▪ bayesian optimization ▪ AI ▪ KI ▪ NLP ▪ SLAM ▪ LIDAR ▪ ML ▪ CNN

AI words in general except AI standards and employment ads	AI words in AI patents (standards)	AI words in employment ads
	<ul style="list-style-type: none"> ▪ virtual reality ▪ datenverarbeitung ▪ ambient assisted living ▪ vollautomatisiert ▪ assistenz system ▪ früh erkennung ▪ programmcode ▪ detection/erfassen von objekten 	<ul style="list-style-type: none"> ▪ LSTM ▪ ADAS

Source: own elaboration.

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