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European banking in transformational times: Regulation, crises, and challenges

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European Banking in Transformational Times: Regulation, Crises, and Challenges

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European Banking in Transformational Times: Regulation, Crises, and Challenges

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1 Summary

This paper assesses the progress made towards the creation of the European Banking Union (EBU) and the evolution of the banking industry in the European Union since the financial crisis of 2007. We review major regulatory changes pertaining to the three pillars of the EBU and the effects of new legislation on both banks and the real economy. Whereas far-reaching reforms pertaining to the EBU pillars of supervision and resolution regimes have been implemented, the absence of a European Deposit Scheme remains a crucial deficiency. We discuss how European banks coped with recent challenges, such as the Covid-19 pandemic, a high inflation environment, and digitalization needs, followed by an outlook on selected major challenges lying ahead of this incomplete EBU, notably the transition towards a green economy.¹

Article keywords: European Banking Union, financial crises, regulation, supervision, stability

2 Introduction

Since the inception of the Single Market on January 1st, 1993, the integration of European goods, services, and labor markets unfolded sustained momentum. Today, the Single Market comprises 27 member states of the European Union (EU) and additional European Economic Area (EEA) countries Norway, Iceland, and Liechtenstein. 447 million Europeans generated 18% of global Gross Domestic Product (GDP) in 2021, at par with China and only second to the United States (US).

Considerable efforts were undertaken to harmonize banking markets in the EU to create a level-playing field, such as the single passport to ease entry into foreign EU markets, reciprocity of supervision, and harmonized regulation in amendments of the 1988 Basel I accord and the eventual release of Basel II in June 2004 (Goddard et al., 2019). However, banking markets remained nationally fragmented and cross-border consolidation was the exception rather than the rule. Only few multinational banks provided financial services outside domestic markets and information barriers regarding prudential oversight and resolution strategies prevailed across national borders. This friction became painfully obvious during the Global Financial Crisis (GFC) of 2007/2008. Heterogenous regulation, compartmentalized supervisory regimes across countries, and too lenient risk assessments and associated capital requirements by European financial intermediaries resulted in the need for pervasive ad-hoc bank bailout practices by virtually all national EU governments. Policy makers realized that a fundamental overhaul of the regulatory architecture was essential to detect risks in the European financial system earlier and to contain the burden on taxpayers in case of bank failures. Against the backdrop of the GFC, the European Commission (EC) suggested in June 2009 a Single Rulebook as the basis for an integrated financial framework: the European Banking Union (EBU). It shall eliminate national differences in banking market legislation, harmonize consumer protection, and level the playing field for EU banks.

¹ This study has been prepared for the 4th edition of the Oxford Handbook of Banking. We are most grateful for feedback received from our colleagues Thorsten Beck, Lammertjan Dam, Ralph De Haas, Filippo De Marco, Melina Ludolph, Martin Oehmke, Marcus Opp, Neeltje van Hooren, and the editors.

This paper describes the new regulatory architecture in the EBU regarding its legal basis, the institutional framework in which it operates, and the instruments used to achieve these objectives. We also discuss how recent challenges that EU banks experienced, such as the Covid-19 crisis or geopolitical tensions, affected banks in the EBU. Finally, we present three main challenges that the reformed EBU must tackle soon.

2.1 Why to have a European Banking Union?

2.1.1 Crises background and the structure of EU banking markets

Following the collapse of Lehman Brothers and the manifestation of the GFC, massive equity injections and guarantees helped to halt a full-fledged European banking crisis. Besides the sheer dimension of bank bailouts, which posed a large burden on the public finances of EU member states, further imbalances accumulated in the European financial system. Risks associated with sovereign debt portfolios held by banks were systematically underestimated while uncertainty continued to prevail in capital markets. Elevated credit risk paired with a home-bias for sovereign, zero risk-weighted debt, rendered many banks to be the major lender of their national governments. These positions became problematic as the fiscal situation of some euro area (EA) member states deteriorated severely in 2009. Stressed public finances reflected in part the financial burden imposed on government budgets by bank bailouts, but also continued recessionary tendencies after the GFC that amplified already existing structural deficiencies in EU economies prior to 2008 (Goddard et al., 2010, 2014, 2019).

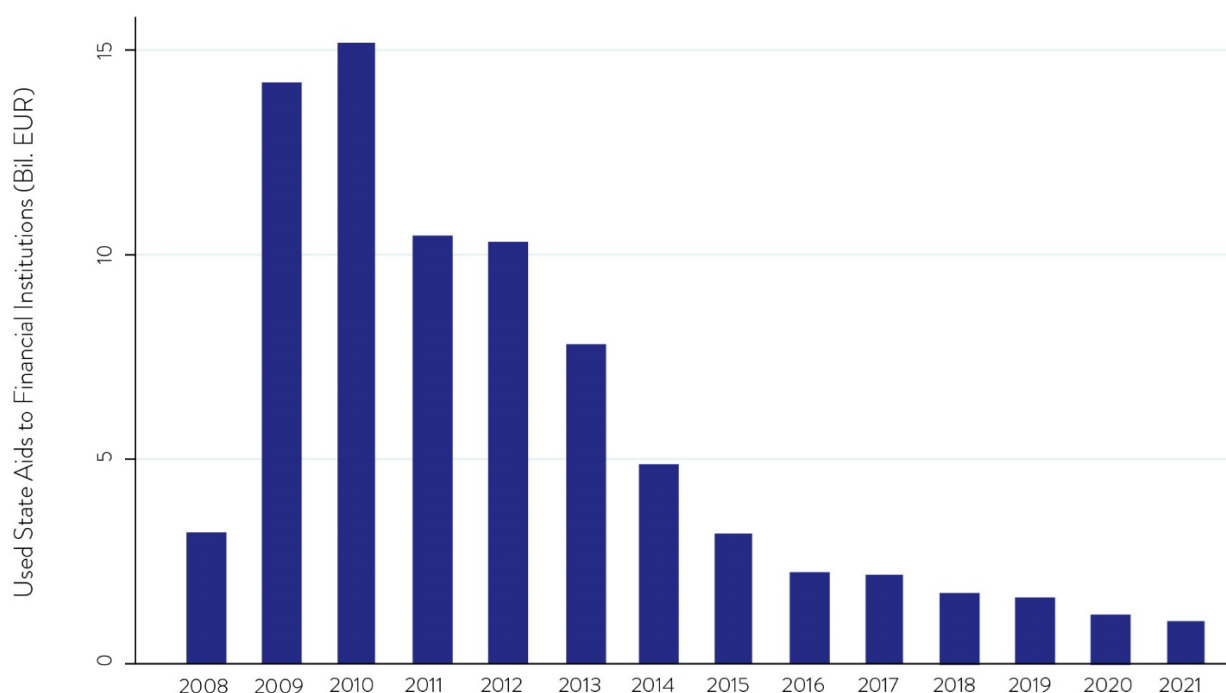
After learning that Greece reported forged data pertaining to its government debt in late 2009, financial markets began to doubt the viability of the Euro as a common currency. Redeeming and refinancing maturing sovereign debt became uncertain for Greece and other EU members: Portugal, Ireland, Spain, and Italy (GIIPS). Lane (2012, 2021) argues that this sovereign debt crisis was an inherent feature of the flawed original design of the EA without a harmonized banking union and a single resolution mechanism at the EU level. The ad-hoc policy response by the EC was to set-up the European Financial Stability Facility (EFSF) as a special purpose vehicle and the European Financial Stabilisation Mechanism (EFSM). Both institutions issued bonds and raised funds in capital markets that were backed by member states and the EU budget, respectively, to provide emergency funding to stressed governments.² The first bailout loan of 20 billion Euros by the IMF and EU members to Greece marked the beginning of the European sovereign debt crisis.

Despite this first rescue package, turmoil in financial markets continued. Credit Default Spreads (CDS) on GIIPS bonds soared, asset values of underlying government bond portfolios plummeted and triggered severe bank stress. These dynamics gave rise to so-called “doomloops”, the self-enforcing relationship between sovereign and bank stress (Acharya et al., 2014). As these risks in the banking system continued to spread, further sovereign support packages and pervasive bank bailouts became necessary in the aftermath of 2008. Figure 1 shows that between 2009 and 2012, EU financial institutions obtained around €14 billion in state aid per year in terms of recapitalization, government guarantees, and impaired assets measures.

² These ad-hoc solutions were replaced by the *European Stability Mechanism (ESM)* on 27 September 2012.

Figure 1

Used state aid to financial institutions over time



The figure illustrates the amount of used state aid to financial institutions in 27 EU countries between 2008 and 2021 in billions of Euros. These data are from the European Commission's State Aid Scoreboard 2022, which is available at https://competition-policy.ec.europa.eu/state-aid/scoreboard_en.

Sources: European Commission's State Aid Scoreboard 2022; IWH illustration.

Importantly, especially fiscally constrained governments “kicked the can down the road” and supported banks by guarantees instead of fully-fledged recapitalizations during the GFC (Acharya et al., 2021). Safety nets caused additional risk-taking, as experienced before in the US and other banking markets (Kane, 1990; Hovakimian and Kane, 2000; Brown and Dinç, 2011; Dam and Koetter 2012). Undercapitalized EU banks shifted their assets from loans to risky sovereign debt and engaged in zombie lending and Acharya and Steffen (2015) show that regulatory arbitrage motives were stronger for large banks with low capital ratios and high risk-weighted assets.

This result is worrying as bank bailouts aggravate “too-big-to-fail” concerns in Europe, which are mounting in a consolidating industry. The Table illustrates the merger wave. In 2022, 5,034 banks operated in the EU 25, which represents a decline by 36 % since 2000. Most banks are located in Germany (28 %), followed by Poland (12 %), Austria, and Italy (both around 9 %). Banking sector assets in the EU amounted to 39,219 billion EUR in 2020, corresponding to 292 % of EU GDP and thereby corroborating the bank-based nature of the European economy. France has the largest banking market (€10 491 billion, 454 % of its GDP), followed by Germany (€8 943 billion, 266 % of its GDP), Italy (€3 847 billion, 232 % of its GDP), and Spain (€2 893 billion, 258 % of its GDP).

The business models of banks in these and other European markets remain very diverse. Large, multi-national, publicly listed universal banks that offer commercial and investment banking services continue to operate side-by-side with small, retail-oriented relationship lenders that focus on maturity transformation funded mostly by covered deposits. The ownership and governance structure of banks also differs vastly within and across countries. Mutually and government-owned banks remain significant players in many countries, for example savings banks in Germany and Spain or large cooperatives

like Credit Agricole and Rabobank in France and the Netherlands. Whereas privately incorporated banks oftentimes specialize on wealth management services for high-net-worth individuals, only relatively few large banks are listed on stock markets. The wide variety of banking types in Europe partly explains the heterogeneity in regulatory requirements, supervisory responsibilities, or deposit insurance schemes that we discuss later in this chapter.

Table

Number of banks in selected countries within the EU

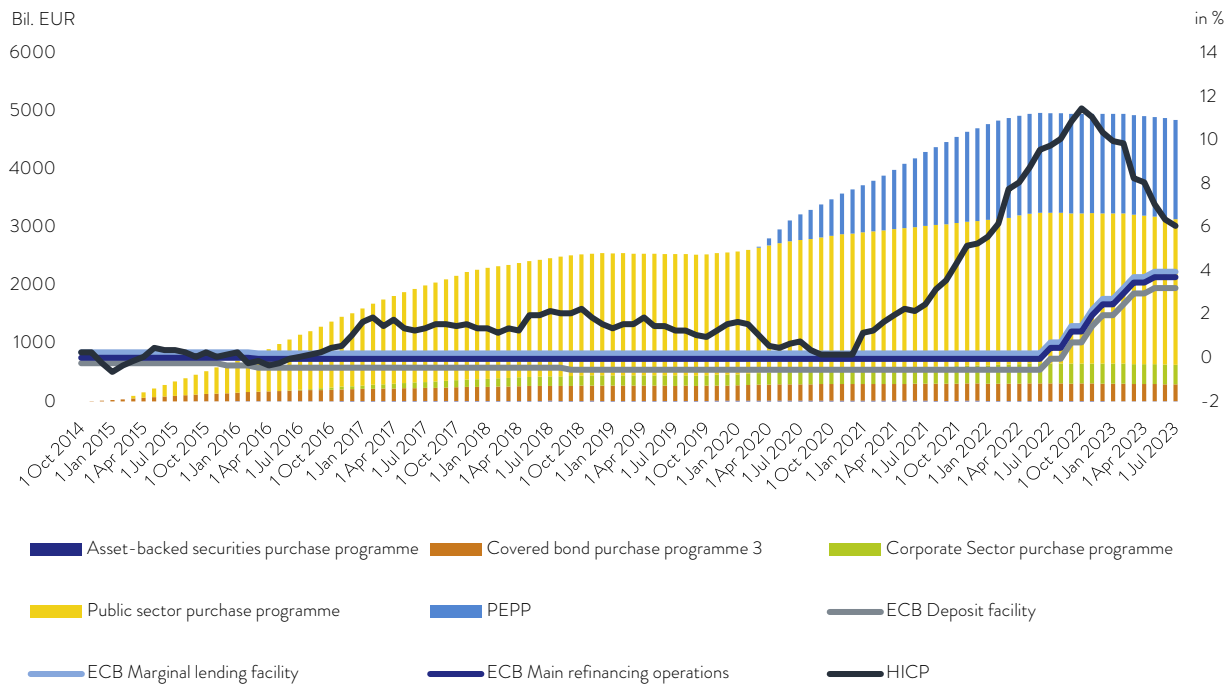
Country/ Year	2000	2005	2010	2015	2020	2021	2022
Austria	848	818	780	678	492	470	444
Belgium	118	100	106	99	83	82	79
Bulgaria	35	34	30	28	24	25	25
Cyprus		391	152	56	29	29	26
Czech		56	55	57	57	53	50
Germany	2,742	2,089	1,929	1,774	1,508	1,445	1,389
Denmark	210	197	161	113	100	94	92
Estonia		11	18	39	39	40	35
Spain	368	348	337	218	192	194	192
Finland	341	363	338	281	228	209	196
France	1,099	854	686	467	408	399	399
Greece	57	62	62	40	35	36	36
Croatia				33	24	24	22
Hungary		214	189	143	42	43	43
Ireland	81	78	489	416	301	288	271
Italy	861	792	778	656	475	457	440
Lithuania		77	87	90	81	81	81
Luxembourg	202	157	146	144	129	125	120
Latvia		25	39	61	50	49	44
Malta		19	26	28	24	22	21
Netherlands	586	401	290	209	87	86	85
Poland		730	706	670	621	604	580
Portugal	218	186	160	147	144	144	139
Romania	44	40	42	38	71	71	68
Sweden	146	200	173	153	154	151	157

Sources: This Table reports number of banks across 25 EU countries between 2000 and 2022. Data is collected from the ECB Statistical Data Warehouse at <https://sdw.ecb.europa.eu/>.

The risk-taking behavior of weakly capitalized banks during the EU sovereign debt crisis also had real economic implications. Firms linked to weak banks exhibited borrowing, investment, employment, and

sales growth contractions (Popov and van Horen, 2015; Acharya et al., 2018; De Marco, 2019). Accordingly monetary policy responded to support EU banks holding stressed assets. The European Central Bank (ECB) reduced policy rates to the zero-lower bound (ZLB) to do “whatever it takes” to preserve the Euro (Draghi, 2012), see Figure 2.

Figure 2
Key ECB Interest Rates, Inflation, and Asset Purchase Programs



This figure illustrates the development of key ECB interest rates in percent, the Harmonised Index of Consumer Prices (HICP), and the holdings of securities by the ECB under key Asset Purchase Programs (APP) and the Pandemic Emergency Purchase Programme (PEPP) between 2014 and 2023. Data on ECB interest rates are obtained from the ECB’s Data Portal on key interest rates as of May 2023 which is available at <https://data.ecb.europa.eu/main-figures/ecb-interest-rates-and-exchange-rates/key-ecb-interest-rates>. Key interest rates include interest rates on the main refinancing operations, the deposit facility, and the marginal lending facility. Data on HICP for 27 EU member states is available at <https://data.oecd.org/price/inflation-cpi.htm>. Data on APP is available at <https://www.ecb.europa.eu/mopo/implement/app/html/index.en.html>. Data on PEPP is available at <https://www.ecb.europa.eu/mopo/implement/pepp/html/index.en.html>.

Sources: ECB, OECD; IWH illustration.

In addition, the ECB acted as a lender of last resort by providing emergency liquidity and by introducing numerous non-conventional monetary policies, most notably asset purchase programs (APP) of stressed sovereign debt instruments (Koetter, 2020), to revitalize policy transmission. Whereas most of these unconventional monetary policy measures succeeded in stimulating lending, increasingly many banks became systematically dependent on liquidity and long-term funding support from the ECB. Moreover, declining policy rates flattened the yield curve, which impairs how banks earn interest income from maturity transformation.

The persistent decline of interest rates together with multiple quantitative easing programs shown in Figure 2 stimulated debates among policy makers and researchers on how banks search for yield may have long-term consequences for risk-taking. Several studies highlight the trade-off between accommodative monetary policies, bank profitability, and bank risk taking. Monetary policy easing reduces net interest margins and profits (Borio et al., 2017; Claessens et al., 2018). Heider et al. (2019) argue that negative policy rates were special because the pass-through to banks’ retail deposit rates is hindered by a

zero lower bound. Thus, banks preserve their profit by lending less and to riskier firms. Laeven et al. (2020) and Acharya et al. (2022) document that central bank liquidity provision and low interest rate environment give advantages to illiquid but viable firms. At the same time, highly indebted firms are not forced from the market either at low-for-long interest rates, which may lead to the zombification of firms in Europe.

Against the backdrop of this turmoil in the European financial system, the EBU was one of four capstone elements in a strategic vision towards a stable and prosperous EMU. On September 12, 2012, the EC detailed a roadmap³ for the creation of the EBU. It should consist of three pillars that would elevate national competencies to the European level based on the fundament of a Single Rulebook: prudential bank supervision, the recovery and resolution of stressed banks, and harmonized deposit insurance to protect consumers from systemic banking crises.

The Single Rulebook constitutes the legal basis for the EBU, specifically three directives and their amendments: the CRD IV / CRR on capital and liquidity regulation that define the basis for prudential supervision, the BRRD on the organization of how to recover or resolve failing banks, and the DGSD on the harmonization of deposit guarantee schemes.

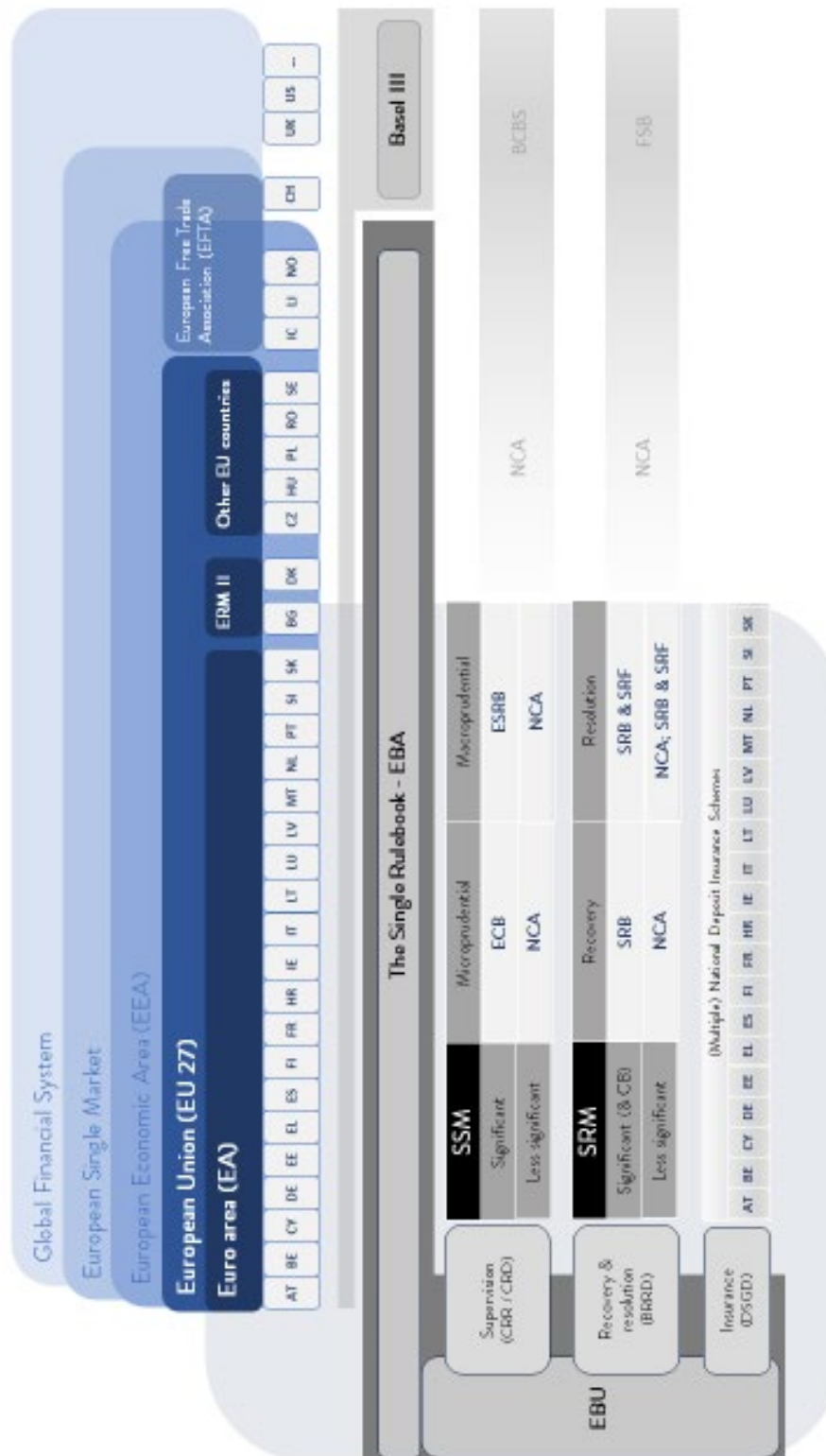
2.1.2 The institutional architecture of the European Banking Union

The challenges faced by EU regulators to resolve failed banks operating across borders of EU nation states sparked more theoretical work on supranational banking supervision. Calzolari et al. (2019) show that national authorities cannot supervise multinational banks (MNB) effectively due to coordination failures whereas a supranational supervisor can. However, MNB can respond to the centralization of prudential supervision by reallocating subsidiary and branch statuses to foreign operations, which can entail welfare reductions (see also Colliard, 2020). Beck et al. (2013) show both theoretically and empirically that the mismatch among bank supervisors of cross-border banks results in biased supervisory intervention decisions. Bolton and Oehmke (2019) show that the sharing of loss-absorbing capital across national jurisdictions is efficient to handle failures of MNB, subject to the caveat that such a policy requires cooperation by resolution authorities. Irrespective of their cross-border activities, Freixas and Rochet (2013) argue that very large banks should be supervised by a central planner different from national competent authorities (NCA). This planner should have a far-reaching mandate, including credible capital and liquidity requirements *ex ante* as well as a pre-funded resolution scheme administered by a powerful, centralized institution with effective instruments at its disposal.

Whereas the EBU should therefore improve the resolution and the supervision of MNB, the European Banking System is not yet fully integrated. Figure 3 visualizes the contemporary institutional setting of the EBU and relates it schematically to adjacent political and financial institutions in Europe. The upper part allocates each European nation state to five different international governmental arrangements, such as the euro area (EA). The bottom part relates the legal bases for banking regulation in- and outside the EBU to the responsible agencies. For each EBU pillar, we indicate the agencies in charge for the type of financial institution (significant vs. less significant) and the conducted task (e.g., micro- vs. macroprudential supervision).

³ <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0510>.

Figure 3
Institutional architecture of the European Banking System



The figure illustrates the perimeter of the EBU in terms of member states, mandates, and institutions. The areas shaded in blue indicate nested multinational arrangements in which European nation states, indicated by the ISO country codes, participate. The institutions of the EBU are indicated in the grey shaded areas in the lower left part of the figure and comprise horizontally key legal acts and the associated organizations and their tasks in the columns. All abbreviations are defined in Appendix Table.

Sources: IWH illustration.

Only two of the three core institutional pillars are operational as of 2023: the Single Supervisory Mechanism (SSM) and the Single Resolution Mechanism (SRM). The missing part is the European Deposit Insurance Scheme (EDIS).

2.1.3 Who is part of the EBU?

Since the accession of Croatia on January 1, 2023, the regulatory perimeter of the SSM and the SRM are all banks in the 20 EA member states. The EA is a common currency area with two distinct features compared to the EU and the EEA. The first is the use of the euro as single currency and the role of the ECB as sole authority on setting monetary policy and its role as lender of last resort, which proved crucial during the European Sovereign Debt (Garcia-de-Andoain et al., 2016). Second, EA membership implies access to the European Stability Mechanism (ESM), a backstop to EA member states and banks incorporated in these states in case of stress. EU members can opt into the EBU with a close cooperation agreement, which implies that banking supervision is conducted by the ECB, that can be terminated unilaterally. Bulgaria entered an agreement in October 2020 as part of the regular accession procedure for the more recent members of the EU.⁴

2.1.3.1 Single Supervisory Mechanism (SSM)

Figure 1 illustrates the division of *microprudential supervision* tasks in the SSM. In principle the ECB is responsible for safeguarding the idiosyncratic risks of around 8,000 banks residing in its regulatory perimeter. In its capacity to implement the SSM, the ECB interacts with the European System of Financial Supervision (ESFS), comprising three independent microprudential European Supervisory Authorities (ESAs) since its inception in 2011 that are tasked with solvency and market supervision: the European Banking Authority (EBA), the European Insurance and Occupational Pensions Authority (EIOPA), and the European Securities and Markets Authority (ESMA).

The main interaction exists between the SSM and the EBA. Both institutions supervise mainly banks, which may obfuscate responsibilities and duplicate processes according to the European Court of Auditors (2014, 2019). For example, stress tests are conducted by the ECB for significant EBU banks as well as by the EBA for significant EEA banks. Whereas both institutions coordinate on their testing schedules and aim for harmonized input parameters in their stress scenarios, this dual responsibility bears the potential for administrative frictions.

The operational supervision of all EBU banks cannot be executed by the limited resources of SSM staff alone. Therefore, the microprudential supervision of less significant institutions is conducted by NCA. The significance of banks is assessed each year based on four criteria: size (total assets of more than €30 billion), economic importance, cross-border activities (total value exceeds €5 billion and ratio of cross-border assets in another member state above 20 %), and whether the bank obtained direct public financial assistance. In September 2023, 109 institutions were directly supervised by Joint Supervisory Teams (JSTs), including eight globally systemically important institutions (G-SIIs).⁵ Administrative fric-

⁴ Denmark was an EU member before the introduction of the euro and voted in a referendum against joining the EA.

⁵ Supervised banks are listed here: <https://www.bankingsupervision.europa.eu/banking/list/html/index.en.html>.

tions between NCA and the ECB pose a potentially serious hurdle to the efficient cross-border supervision of banks and the minimization of negative externalities due to regulatory arbitrage by banks (see Beck et al., 2022b).

At the EU level, the prevention and surveillance of systemic risk is allocated to the European Systemic Risk Board (ESRB), which has been incepted in 2010 and covers the EBU plus three non-EU EEA countries as observers. The ESRB provides recommendations to the NCA of its members pertaining to a broad range of non-bank financial institutions (e.g. insurances, asset managers, infrastructure providers, etc.). It interacts with the ESFS and NCA, such as national Financial Stability Committees. The ESRB is closely intertwined with the ECB as its decision-making body is chaired ex officio by the President of the ECB. This institutional set-up reduces informational frictions between monetary policy decisions, microprudential supervision, and macroprudential objectives. At the same time, it raises concerns about the autonomy of the ESRB in case of conflicting objectives, for example financial stability and inflation. Moreover, the ESRB, just like most national NCA, has no executive instruments at its disposal, but relies on issuing warnings and recommendations to the industry and other policy making bodies. Hence, biting action is ultimately with microprudential authorities at the EBU or national level. At the international level, the ESRB as well as the ECB and the SSM interact with the Financial Stability Board (FSB), which comprises members from 25 countries, four international financial institutions, and six international standard-setting, regulatory, supervisory, and central bank bodies to promote international financial stability.

2.1.3.2 Single Resolution Mechanism (SRM)

Since August 2014 the SRM seeks to ensure a harmonized approach across EU member states on how to deal with distressed banks. The GFC showed that national bankruptcy codes, largely designed for non-financial firms, were unsuited to tackle systematic bank failures, resulting systemic instability, and the associated negative externalities due to government bailouts. The installation of the SRM shall ensure financial system stability by addressing individual bank stress at an early stage, thereby protecting taxpayers by reducing the risks of costly government bailouts.

The remit of this second pillar of the EBU regarding bank types and tasks is illustrated in Figure 3. Conceptually, the SRM harmonizes two tasks across member states when banks are declared officially as distressed by their responsible supervisor: a common procedure to attempt the recovery of stressed banks and to organize the orderly resolution of banks that cannot recover.

These two tasks are executed by different institutions. Banks that are directly supervised by the ECB are under the remit of the Single Resolution Board (SRB), the first institution that constitutes the SRM. The SRB is a fully independent EU agency, acts as the central resolution authority within the EBU, and manages the second institution of the SRM: the single resolution fund (SRF).

Besides significant banks as defined above, the SRB is responsible for banking groups with relevant cross-border activities across EA and EEA jurisdictions.⁶ As of January 2023, five such groups are iden-

⁶ The SRB reviews cross-border groups annually, see: <https://www.srb.europa.eu/en/content/banks-under-srbs-remit>.

tified, implying that a total of 115 banks and banking groups fall under the remit of the SRB. If the resolution of a stressed bank is necessary, the SRB administers the winding down of the insolvent bank together with the SRF.

Less significant banks are subject to national recovery and resolution authorities. The SRB also issues harmonized resolution standards to minimize the scope for regulatory arbitrage by banks, for example by changing the organizational form of foreign affiliates. Thus, the mandate of the SRM reaches well into the realm of tasks traditionally assigned to sovereign EU member states.

The SRF is funded by pro-rata contributions of each bank in the EBU member states. SRF levies are determined each year by the SRB, collected by NCA, and contribute to so-called national compartments of the SRF during the build-up phase. Small and non-risky institutions are levied a lump-sum if the relevant “tax base”, which are total liabilities less own funds and covered deposits, is less than €300 million. For banks beyond this threshold, the SRB calculates the levy based on the tax base and bank-specific risk factor. The SRB also accounts for banks’ relative importance vis-à-vis the entire system when calculating bank-specific annual contributions to the SRF. Starting in 2016, banks contributed to the build-up of the SRF until it covers at least 1% of covered deposits by 2023. According to a SRF press release on 6.7.2023, the SRF reached €77.6 billion, thereby marking the end of the build phase.

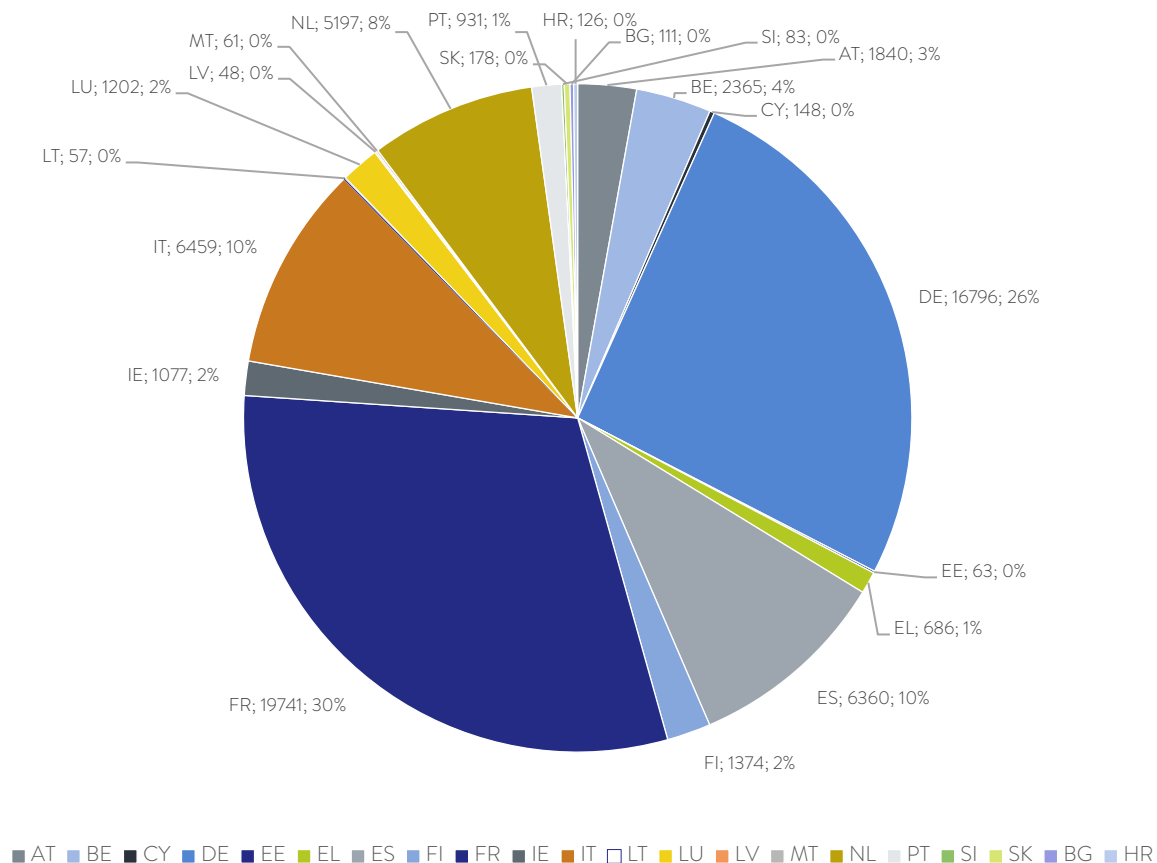
Figure 4 shows the relative contributions by each member state of the SRF as of 2022. France and Germany together contribute more than half of the entire volume of the SRF, followed by Italy, Spain, and the Netherlands. These largest five contributors account for approximately 84% of the SRF, reflecting their banking systems’ relative sizes and their relative riskiness, an important determinant of individual banks’ SRF contributions. As stipulated in the Agreement on the Transfer and Mutualisation of Contributions to the SRF, national compartments will cease to exist by the end of the eight-year phase-in period and thereby the SRB can use all available funds. This mutualization sparked concerns in large parts of SRM member states respective constituencies. In December 2020, member states agreed on a common backstop to the SRF through a €68 billion revolving credit line provided by the ESM. The backstop will become available as soon as the amending agreement on the Treaty establishing the ESM has been ratified by all ESM Members. The mutualization of these national compartments against the backdrop of a skewed distribution of contributions across member states paired with this ultimately tax-funded backstop function of the ESM illustrates the reasons for the political backlash observed in many member states towards the mutualization of any existing insurance schemes, in particular the EDIS, which would augment already nationally funded insurance schemes.

The SRF levy represents a significant burden on banks’ profits, which might have several unintended adverse effects. Tonzer et al. (2017) report, for example, that German banks contributed €1.58 billion in the first year when the new SRM rules applied, which amounts to 4.3% of aggregate after tax profits. Based on contributions to the national resolution scheme in Germany that preceded the SRM, Buch et al. (2016) show also that more heavily taxed banks reduced their lending and raised deposit rates, possibly to attract non-taxed covered deposits. Similarly, Devereux et al. (2019) demonstrate for a sample of EU banks that those exposed to the SRF levy increased their capitalization by 90 basis points, implying a significant reduction in bank risk. They also document that more affected banks reallocate their asset mix towards more risky assets, almost entirely neutralizing the risk-reducing effect of raising eq-

uity. Overall, causal evidence on the net effects of building-up the SRF remains scarce and further research on the effects on idiosyncratic risk-taking, financial stability, and lending choices affecting the real economy seem warranted.

Figure 4

National compartments of the SRF



The figure shows cumulative contributions to the SRF in millions of Euros and their respective shares in percent as of August 2022. The data are obtained from the SRF and are available at https://www.srb.europa.eu/system/files/media/document/2023-03-17_National-Compartment.pdf.

Sources: SRF; IWH illustration.

3 Legal bedrock of the EBU: The Single Rulebook

The Single Rulebook comprises legal acts that reflect three main aspects how to enhance financial system resilience in the vision of 2009: the supervision, resolution, and insurance of EBU banks.

3.1 Capital and liquidity regulation

The capstone element underlying prudential supervision in the EBU is the implementation of the Basel III rules, published by the BCBS in December 2010. The two major legal acts that define capital and liquidity requirements of credit institutions and investment firms in Europe are the Capital Regulation Directive 2013/36/EU (CRD IV) and the Capital Requirements Regulation (EU) No. 575/2013 (CRR) which became effective as of January 1, 2014. The transposition of these legal acts to national

laws implies that the Basel III requirements apply to all banks in the EU, not only large ones or those incorporated in EA states. In addition, the European Free Trade Association (EFTA) members, except Switzerland, also transposed the CRD IV and the CRR. Initial regulations were amended in 2019 and 2021 by banking packages. The former regulation was published in the Official Journal of the EU on June 7, 2019, and amended the Single Rulebook (CRR II, CRD V, BRRD II). It accounted more explicitly for market risk in the calculation of capital requirements, introduced a binding leverage ratio, and stipulated the Net Stable Funding Ratio (NSFR) to monitor liquidity risk. Furthermore, rules to hold sufficient equity to buffer losses in resolution and recovery cases were put into place. Regarding the latter regulation, the EC proposed further amendments to the Single Rulebook on October 27, 2021. Main changes concerned the calculation of capital requirements and added a few aspects to banking regulation, notably rules on measuring, reporting, and managing carbon risks, the adequacy of financial institutions' management, the valuation of residential property lending, and risks related to crypto assets. Observers expect that the European Council, Commission, and Parliament converge to a legal text on this CRD VI / CRR III package by the end of 2023, leaving banks with approximately one year for implementation until the transposition deadline of January 1, 2025.

The main objectives of the CRD/CRR packages are to enhance banks' capital adequacy and provide harmonized liquidity requirements. The directives also contain governance aspects, such as bonus payments, transparency, and reporting standard (see, e.g., Colonnello et al., 2023). The package establishes a uniform legislative framework for banking supervisory practices in the European Single Market, thereby mitigating the scope for regulatory arbitrage across EU members and EEA countries. We focus on capital and liquidity regulation.

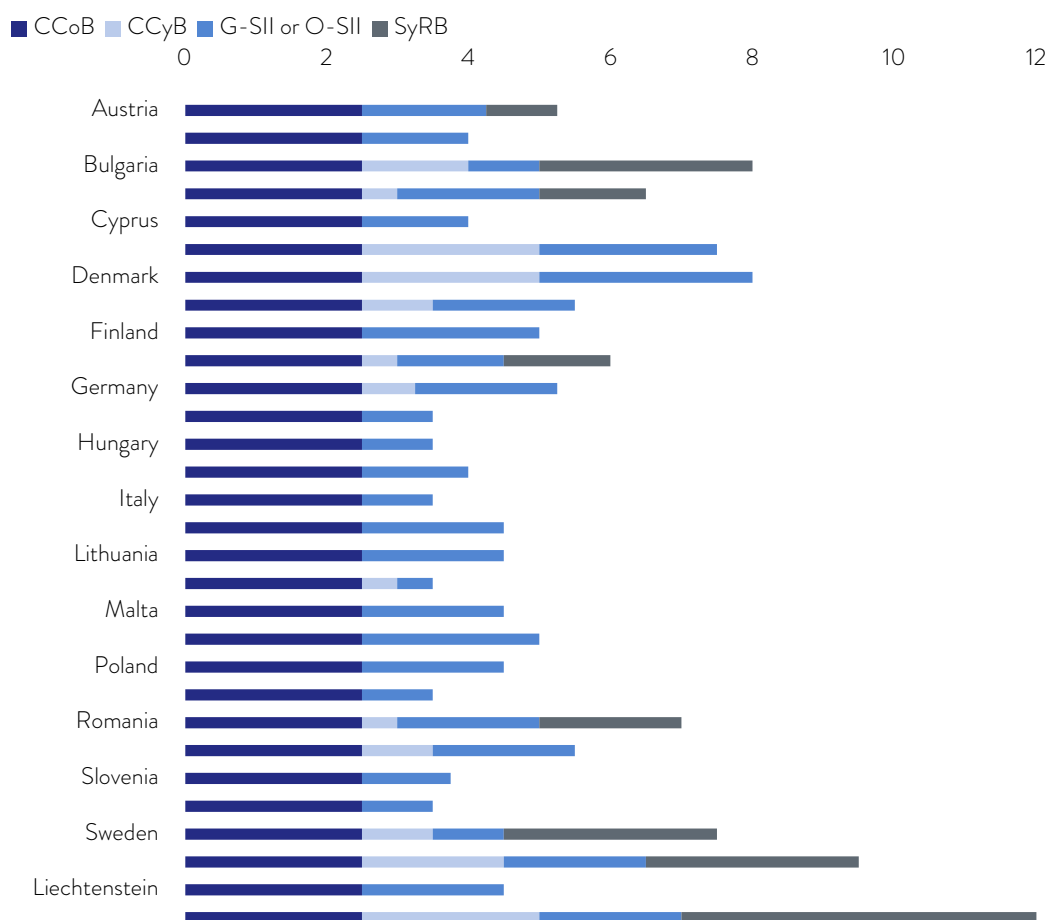
3.1.1 Capital requirements

Own funds requirements pertain to three types of equity capital: common equity tier 1 capital (CET 1), additional tier 1 capital (AT 1), and tier 2 capital. The sum of the former two types constitutes Tier 1 capital. The sum of all three types equals total capital. The CRR regulates that banks must hold 4.5% of risk-weighted assets (RWA) as CET 1, 6% as Tier 1 capital, and 8% as total capital. Breaching these minimum capital requirements can lead to revoking the banks' charter. The requirements apply to banks at both the individual and the consolidated group level.

Besides microprudential total capital requirements, Basel III introduced additional capital buffers, which serve macroprudential purposes. These buffers are set by NCA based on principles laid out by the EBA and are reviewed monthly. They can apply to sub-sets of banks, such as G-SII versus other systemically important institutions (O-SII), or different asset types, such as loans collateralized by real estate. Figure 5 illustrates the resulting considerable heterogeneity of total capital requirements per bank across, and within jurisdictions.

Figure 5

Combined capital buffers in EEA member states



These data are obtained from the ESRB https://www.esrb.europa.eu/national_policy as of April 14, 2023. Buffers are shown in percent of RWA and are based on 202 supervised banks in 30 countries. CCoB denotes the capital conservation buffer, CCyB denotes the counter-cyclical conservation buffer, G-SII and O-SII are the highest buffers imposed on globally and other systemically important institutions per country, and SyRB denotes the systemic risk buffer. Sectoral SyRBs are not depicted.

Sources: ESRB; IWH illustration.

Since its full phase-in in 2019, the capital conservation buffer (CCoB) equals 2.5 % of risk-weighted assets and must be held in CET 1 capital. As soon as the CET 1 ratio of the bank falls below 7%, increasingly tight limitations on dividend payments, bonus payments to management, and share buybacks are imposed. Whereas the violation of the Tier 1 capital requirement can invoke the retraction of the banking charter, the objective of the CCoB is to conserve a bank's capital under adverse business circumstances while permitting it to continue as a going concern.

The countercyclical capital buffer (CCyB) ranges between 0 and 2 % of RWA. The key notion is to require banks to build additional capital reserves in times of booms that can be released during adverse economic conditions like the aggregate demand shock following the Covid-19 pandemic and the energy crisis in the wake of the Russian aggression towards Ukraine. Thereby, it seeks to mitigate adverse effects of the business cycle on banks' lending activities. This allows NCA to respond in a more targeted fashion to the possible emergence of credit-driven asset price bubbles or crunches. NCAs must give

notice until when banks have to hold any CCyB buffer, thereby providing banks with some lead time to adjust. The option to tailor capital buffers to differences across national asset markets and business cycles is an important advancement of the EBU. NCA can account for regional differences in business and credit cycles, which are likely to persist in various important sectors of EU economies. The CcyB was phased in in lockstep with the CcoB and must be held in CET 1, too. It is, however, subject to reciprocity because banks must calculate CcyB requirement as a weighted average of their exposures to markets where NCAs activated the CcyB. Banks are obliged to publish their buffer requirement as often as their microprudential minimum capital requirement together with the geographic breakdown of exposures. This procedure vividly illustrates the increased regulatory costs imposed on banks that are associated with EBU.

The buffers for systemically Important institutions depend on whether NCA assign a bank a G-SII or an O-SII status. This classification is conducted by NCAs and follows binding technical standards (BTS) issued by the EBA (2014, 2020), which concerns five criteria: size, interconnectedness with the financial system, substitutability, complexity, and cross-border activity. The G-SII criteria mimic those used by the BCBS (2018) that were applied to identify 30 global systematically important banks (G-SIB) for the first time in 2022, of which 8 are EBU banks.⁷ In 2020, the EBA reported 171 O-SII that NCAs flagged to them. Both G-SII and O-SII buffers must be held in CET 1 and can range up to 3.5 % and 3% of RWA, respectively.

Finally, the systemic risk buffer can vary across types of banks as well as exposures. There is no explicit numerical range stipulated for this buffer, but it may be subject to approval by the EC depending on its height and potential impact on other EU member states.

3.1.2 Leverage ratio

Besides risk-based prudential capital requirements, the CRR also formulates a minimum, unweighted leverage ratio. The ratio of Tier 1 capital to the total unweighted exposure of the bank must be at least 3%. Initially planned as a Pillar 2 instrument to be activated at the discretion of national regulators, the BCBS decided in 2017 that this ratio is a binding Pillar 1 requirement as of 2018. In addition, G-SIBs would have to hold half of their systemic institution capital buffer, corresponding to the G-SII buffer, on top of this minimum requirement as of 2023. The unweighted leverage ratio addresses the deficiency of risk models to yield adequate valuations during times of extreme stress in 2007/2008, serving as a backstop especially for very large banks.

3.1.3 Liquidity requirements

The relationship between bank capitalization and risk-taking is central in both the Single Rulebook as well as the economic literature. At the same time, an equally important function of financial intermediaries is to provide liquidity (Allen and Gale, 2004; Berger et al., 2016). The CRR together with the Commission Delegated Regulation (EU) 2015/61 of October 2014 and its amendment CRR II in Regulation (EU) 2019/876 stipulate two liquidity regulation metrics. The first is the Liquidity Coverage Ratio (LCR)

⁷ The 30 G-SIBs and capital buffers are published by the FSB: <https://www.fsb.org/wp-content/uploads/P211122.pdf>. Note that G-SIIs as identified by their NCA are only a subset of the 30 G-SIB identified by the BCBS.

and entails that high-quality liquid assets shall match the expected cash outflows during a stress scenario over a period of 30 days. This LCR of 100% is in effect as of January 1, 2018. The second metric is the net stable funding ratio (NSFR), which complements the short-term view of the LCR with a medium time horizon of one year, during which banks are required to hold sufficient stable funding sources that are detailed in the CRR II vis-à-vis expected outflows under a stress scenario over said time horizon.

3.1.4 Effects on bank behavior and real activity

Microprudential total capital requirements together with the various capital buffers as well as liquidity requirements introduced as part of the EBU represent a multitude of defense lines to prevent severe bank stress. How did these regulations introduced as part of completing the EBU affect banks behavior and subsequently the real economy?

One strand of literature focuses on the effects of requiring more capital, which enables banks to cope better with adverse economic conditions and idiosyncratic shocks. Higher capital buffers reduce banks failure probability with favorable effects on banks' funding costs, but also reduce excess reserves, thereby limiting banks' abilities to lend. Increased borrowing frictions for firms and households, in turn, may have adverse effects on real economic activity.

Angelini et al. (2011) shed light on the trade-off's between enhanced financial stability due to higher capital buffers, lending, and real economic activity. Using counterfactual experiments based on dynamic stochastic general equilibrium (DSGE) models, they simulate that higher capital standards imply a mild reduction of equilibrium GDP levels, but also reduce output volatility. Empirical evidence from a meta-analysis of 47 studies that use various macroeconomic models confirms a mild contraction of equilibrium output due to tighter capital regulation (Fidrmuc and Lind, 2020). But the advantage of macroeconomic models to compare counterfactual policy exercises in a consistent way often neglects micro-founded dynamics, notably the reduced social cost due to lower bank failure probabilities, to ensure tractability (Angelini et al., 2011).

On exactly that issue, Bahaj and Malherbe (2020) pursue a micro-founded theoretical approach to show that the reduction of implicit government subsidies embodied in higher capital requirements makes banks safer. As a result, banks holding more capital also originate loans that would have not been made in states of the world in which they failed previously. The lower loan supply in the latter case with less capital results from the fact, that bank owners know ex ante that any proceeds from that marginal loan would have to be passed to the government guarantor in the state of failure. In a calibration exercise, they show that this forced safety effect on lending is likely present and sizeable. Using a dynamic general equilibrium model, Begenau (2020) arrives at similar results. The mechanism how higher capital requirements spark lending is here a reduction in banks' cost of capital as fewer deposits are supplied. Since households are willing to incur a liquidity premium, the overall lower cost of capital spur bank lending. In addition, higher equity stakes enhance the monitoring incentives of banks and thus their efficiency.

Regarding empirical evidence whether and how higher capital requirements affect bank behavior, the direct regulatory cost seem to be small. Kisin and Manela (2016) exploit a costly loophole in the regulation of 18 very large US banks that allowed them to reduce their capital requirement to estimate that an increase of the minimum capital requirement by 1% cost banks on average 40 basis points of their annual profits. Related to the question, how banks comply with new capital regulation, Gropp et al (2019) document that banks subject to higher capital requirements under Basel III did not increase

their (core) capital, but reduced RWA. Firms borrowing more from banks that are exposed to a capital regulation shocks, the first Asset Quality Review (AQR) preceding the inception of the SSM, obtained less credit and invested less. This result echoes concerns by some policy makers about banks' willingness and abilities to continue lending under tighter capital regulation. Using individual firm-level data from Denmark, Jensen (2015) also estimates a contraction of borrowing on the order of three percent if the primary bank is subject to increased minimum capital requirements. Contrary to Gropp et al. (2019), he finds no evidence that affected firms grow significantly slower because the reduction in credit is substituted for by equity. An exception are small, young firms with negative earnings, which indicates that higher capital requirements increase credit frictions for certain parts of the economy.

Another strand of literature focuses on the different types of capital because the various components address shortcomings of prior regulation under Basel I and II, such as procyclical effects of risk-based capital regulation (Repullo, 2013; Repullo and Suarez, 2013; Gehrsbach and Rochet, 2017; Malherbe, 2020). If credit risk soars during a recession, risk-based capital requirements would increase, thus limiting credit supply. Such a regulation-induced loan contraction would amplify the business cycle, which is why the CCyB was introduced. Behn et al. (2016) compare lending patterns by banks that are subject to procyclical capital regulation to those that are not during the transition of credit risk systems from Basel I to Basel II. Using the Lehman collapse as an unexpected shock to credit risk in Germany during the fragmented transition from standard to internal ratings-based (IRB) approaches to calculate risk-weighted assets (RWA), they show that corporate borrowers connected to IRB banks, which are subject to procyclical regulation, receive less credit. A counter-cyclical capital requirement like the CCyB is thus important, possibly compensating the additional cost due to a more complex regulatory framework.

3.2 Bank recovery and resolution

A crucial aspect of the proposal towards establishing an integrated financial system was to replace bail-out policies with a reliable mechanism to impose the burden of bank failures on shareholders and debtholders instead of taxpayers, i.e., a bail-in regime.

The conventional narrative to motivate a bail-in regime is that bailouts are costly to taxpayers ex post and undermine market discipline due to moral hazard behavior of banks ex ante (see, e.g. Avgouleas and Goodhart, 2015; Philippon and Audet, 2017). Yet, a strict no-bailout policy is no panacea. Revoking the implicit assumption that banks will be rescued by a fiscal transfer in case of (a rare) crisis can induce depositors to withdraw funds earlier compared to an economy with a positive bailout probability. In an economy with frequent crisis, Keister (2016) shows that a credible no-bailout policy is welfare enhancing but a tax on short-term funding is optimal.

The limitations of a pure no-bailout policy notwithstanding, especially the failure of cross-border banks during the crisis of 2008 highlighted the coordination frictions between national resolution authorities, consistent with Bolton and Oehmke (2019). The second pillar of the EBU therefore harmonizes recovery and resolution procedures of stressed EBU banks. The legal basis is the EU Bank Recovery and Resolution Directive 2014/59/EU (BRRD), scheduled for transposition by December 2014, reviewed by the EC (2019), and amended by 2019/879/EU Directive in 2019 (BRRD II). We summarize the main fields of action before discussing the empirical evidence about the effects of the BRRD on banks and the real economy.

3.2.1 Main fields of BRRD action

The BRRD applies in principle to all banks in the EU, delegates resolution authority to the SRM and comprises three main fields of action to enhance financial stability and avoid costly bailouts: preparation and prevention, early intervention, and resolution.

Regarding the first aspect, BRRD requires banks to draft and annually review recovery plans. These plans must adhere to an explicit structure determined by the NCA in accordance with the BTS developed by the EBA. Banks need to make explicit how they identify potential financial stress, their decision-making processes under such adverse scenarios, and a range of measures to take in case of stress to ensure its going concern without external financial assistance. These plans must be reviewed annually by the responsible NCA and the BRRD requires NCA to draft resolution plans. The aim is to identify potential obstacles to liquidation and to define adequate resolution tools *before* the worst-case scenario occurs that a bank must be wound down. Regarding early intervention, the BRRD assigns far-reaching tools to supervisory authorities. If the bank is considered stressed by the supervisor, but not yet moved to the resolution procedure, supervisory authorities may instruct management to implement measures articulated in recovery and resolution plans. If they consider management unfit, they can also assume responsibilities or remove individual and groups of executives. These examples reflect the power to interfere with banks' management assigned to resolution authorities by the BRRD.

The third and probably most important change concerns the resolution of EU banks. In Title IV, the BRRD defines resolution cases and four resolution tools: the sale of business, bridge institutions, asset separation, and bail-ins. Resolution authorities can also issue moratoria, as happened in the case of Sberbank Europe AG in February 2022. The most notable change is the bail-in tool, which had to be implemented by EU members as of January 1st, 2016. If a bank fails, shareholders and debtholders bear losses and ought to recapitalize the bank in resolution sufficiently to comply with capital requirements, thereby allowing the continuation of operations. Upholding the going concern of a bank in resolution is the main difference from conventional insolvency procedures that seek to maximize the liquidation value of insolvent firms but require to cease operations. The negative effects of these sudden stops on the activities of connected banks shall be prevented by the BRRD while minimizing moral hazard behavior due to the expectation of bailouts. If a bank cannot be recapitalized and continue to exist, it is wound down by local authorities according to harmonized standards unless it is systemically relevant. In the latter case, the resolution is orchestrated by the SRM.

Importantly, shareholders and debtholders must bear the burden of losses according to a clearly defined bail-in hierarchy of banks' total funds that we will discuss shortly. Bail-in is a necessary requirement to benefit from the mutualized contributions of the SRF. If and only if shareholders and relevant debtholders absorbed losses of at least 8% of total liabilities, including own funds, a bank in resolution or recovery can take recourse to this facility, which is capped at 5% of total liabilities including own funds of a bank in resolution.

3.2.2 Bail-in hierarchy

If resolution authorities activate the bail-in tool, Article 34 of the BRRD defines the hierarchy of own funds and liabilities to compensate for losses. A guiding principle is that shareholders should bear losses first and that no creditor should incur higher losses compared to a regular insolvency scheme.

Consequently, obligations should be reduced in the order of CET 1, AT 1, and Tier 2 capital first. Next, junior liabilities must cover losses and the resolution authority can enforce their conversion into equity. Considering persistent national differences regarding creditor hierarchies under insolvencies across EU member states (Deutsche Bundesbank 2016), Directive (EU) 2017/2399 further clarified the creditor hierarchy in case of a bail-in (see also Deutsche Bundesbank, 2019). The 5th level of the bail-in cascade is senior non-preferred debt, which includes outstanding unstructured senior unsecured bank bonds under a grandfathering scheme as well as new issues of such bonds with contractual subordination and a maturity of more than one year. The 6th level of preferred debt includes derivatives, corporate deposits of more than €100,000, structured senior unsecured bonds, and those unstructured senior unsecured bank bonds that do not fall into the 5th-level category. The last level of debt subject to a bail-in are then deposits from households and SME of more than €100,000. Covered deposits, i.e., those of less than €100,000, are exempted from a bail-in to achieve the objective of the BRRD to protect retail consumers.

3.2.3 Minimum Requirement for Own Funds and Eligible Liabilities (MREL)

One concern regarding the possible effectiveness of the bail-in tool concerns the availability of eligible liabilities. Therefore, the FSB defined already in 2015 the so-called Total Absorbing Loss Capacity (TLAC) standards that G-SIBs had to meet with CET 1 capital. With the passage of the Banking Package in June 2019 that amended the Single Rulebook, G-SIBs had to comply with TLAC requirements phased-in between 2019 and 2022. The notion that banks must hold at any time sufficient liabilities that are eligible for conversion into equity in case of resolution was also part of the BRRD in the form of Minimum Requirement for Own Funds and Eligible Liabilities (MREL) requirements. These applied in contrast to TLAC rules to all EU banks and were communicated by resolution authorities only as guidance. The banking package aligned the global TLAC rules with those for EU banking, emphasizing that because of proportionality most of the many small banks are subject to MREL requirements set by NCA with considerable discretion (Deutsche Bundesbank, 2019; Single Resolution Board, 2021).

For G-SII and so-called “Top Tier” banks, defined as those with more than €100 billion in assets, different rules applied as of 2022. The MREL requirement for G-SII amounts to 18% of RWA and 6.75% of leverage ratio exposure (LRE), plus an additional MREL requirement on the order of 8% of total own funds and liabilities (TOFL) as of 2024. This last requirement deviates from international TLAC requirements to align with accessability of the SRF. Top Tier banks face the same TOFL requirement as of 2024, a MREL requirement of 13.5% of RWA, and 5% of LRE since 2022. In addition, the responsible resolution authority can set institution-specific requirements at their discretion.

Since 2020, the SRB reports a MREL dashboard for the banks under its remit, which provides a breakdown of MREL funds per country and banking group.⁸ Overall, banks under the remit of the SRM closed the gap between accumulated MREL funds relative to their targets expressed as a percentage of the Total Risk Exposure Amount (TREA) in the MREL dashboard of Q4:2022.

The average MREL target upon completed phase-in in 2024 stood at 23.5% of TREA, corresponding to a cumulative volume of €1.8 trillion. Actual MREL holdings by the end of 2022 were a mere 0.1% below

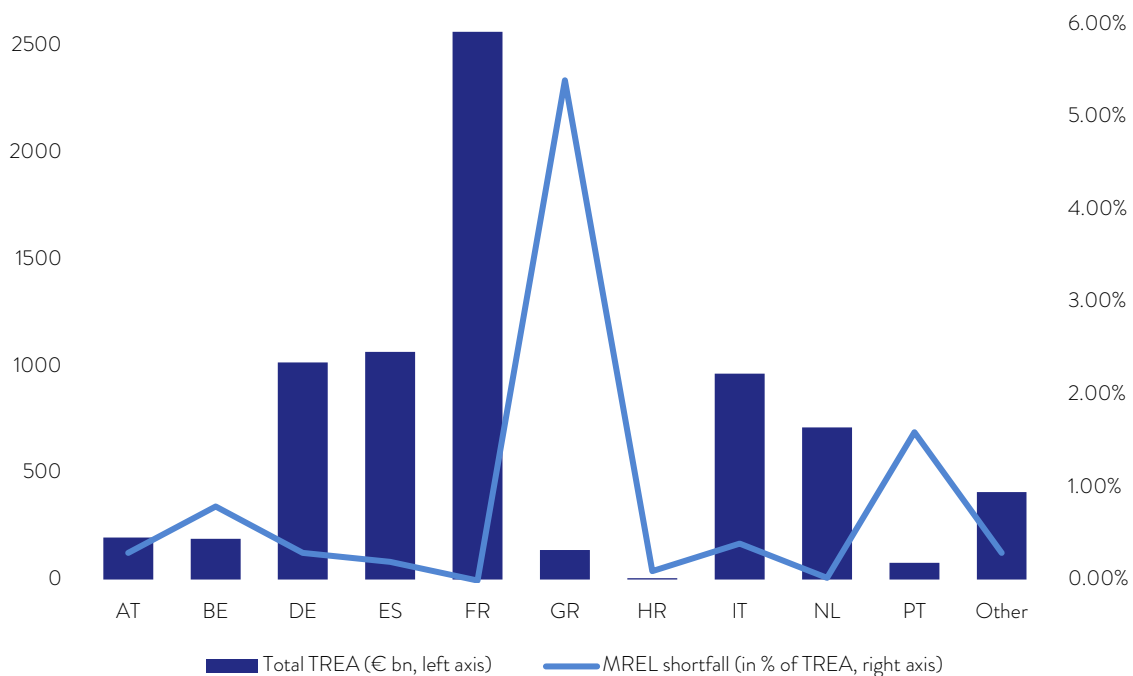
⁸ <https://www.srb.europa.eu/en/content/mrel-dashboard-0>.

this target without combined buffer requirements (CBR) and 0.3% including CBR. Thus, the build-up of funds to cope with potential resolution and recovery threats can be regarded overall as being on track, despite a few notable cross-country differences.

First, MREL shortfalls are the largest for two economies that were also amongst the most stressed ones during the European Sovereign Debt Crisis, Greece and Portugal. Second, despite being the largest economy in continental Europe, the TREA of German SRB banks is only €1,000 billion, which is comparable to the risk exposures of banks from the considerably smaller Spanish and Italian banking sectors and substantially lower than the €2,500 billion TREA pertaining to French banks. Thus, it is not necessarily the largest banking systems in the EBU that are considered most exposed by the SRB to prepare for resolution and recovery.

Figure 6

Total risk exposure amounts and MREL target shortfalls by country



These data are obtained from Table 2 of the Single Resolution Board's (SRB) MREL Dashboard Q4:2022, which is available at https://www.srb.europa.eu/system/files/media/document/SRB_2023-05-15_MREL_Dashboard_Q4-2022.pdf. The Figure shows on the left axis total risk exposure amounts (TREA) in billions of Euros aggregated per country. The sample pertains to 80 resolution entities under the remit of the SRB in Q4:2022. On the right axis the shortfall from MREL targets including combined buffer requirements (CBR) as of 2024 is shown in percent of TREA. Data for countries with too few banks are aggregated in the category "Other" to ensure confidentiality.

Sources: SRB MREL Dashboard; IWH illustration.

3.2.4 Credibility of the BRRD and its effect on banks and firms

The key motive to introduce the BRRD was to create a credible resolution mechanism that should contain moral hazard especially by very large banks in anticipation of government bailouts, thereby ameliorating the lack of fiscal integration warned about by Berger et al. (2019). The ex-ante commitment of banks and resolution authorities to specific rules how to hold bank owners but also increasingly many creditors liable for losses should enhance monitoring of bank managers ex ante, thereby curbing excessive risk-taking.

This pillar of EBU crucially hinges on whether market participants consider the recovery and resolution regime of the BRRD credible (Bernard et al., 2022). Several studies explicitly investigate this aspect by studying differences in the pricing of bonds that are or are not eligible for bail-ins under resolution. Lewrick et al. (2019) find a positive bail-in risk premium, which is higher for riskier issuers and changes pro-cyclically. This evidence suggests that bond investors exert market discipline on banks after the BRRD. Cutura (2021) reports that bonds eligible for a bail-in under the BRRD exhibit a yield spread to non-treated bonds of 13 basis points. He also demonstrates that this yield correlates positively with a weaker bank capitalization and responds favorably to management efforts to reduce the riskiness of the bank. Schäfer et al. (2016) analyze market responses in CDS and stock markets around bail-in events and the introduction of legislation. Their results confirm an overall belief by market participants in a regime switch, but they also note that actual bail-ins generate substantially larger responses compared to the mere introduction of legislation. Hence, these studies indicate that financial markets adjusted their risk-premia charged on banks due to the BRRD. Yet, Pancotto et al. (2019) caution that BRRD did not break the nexus between sovereign and bank risk (Acharya et al., 2014), which motivated the EBU in the first place. They study the spread of CDS spreads of banks and non-banks vis-à-vis government CDS around the introduction of the BRRD and find only in the Italian case some evidence of breaking the doomloop.

Koetter et al. (2022) consider in a similar vein the funding cost responses of EU banks in 15 member states to the launch of the BRRD. Their identification approach exploits the staggered transposition of the directive into national legislation at different times across members states documented in Koetter et al. (2019). They investigate banks' weighted average cost of capital (WACC) to account for potential changes to the equity premium of banks, which should benefit from enhanced expectations on overall financial system resilience in a less incomplete EBU. They report a mild average, yet heterogenous increase in WACC across EU member states, which suggest credibility of the resolution scheme in financial markets. Funding cost hikes of banks are only passed on to less profitable and more risky firms.

Related, Beck et al. (2022a) mobilize loan-level data to analyze the real implications of the unexpected bail-in of junior debtholders after the failure of Banco Espírito Santo in August 2014. They do not identify effects of the BRRD itself, but their set-up provides causal evidence on financial and real effects of bank bail-ins. First, they find a credit supply contraction to firms that were more dependent on a bailed-in bank. Second, they also report worse overall credit conditions and resulting reductions in investment and employment, which indicates that the activation of the BRRD bail-in tool will likely also entail real economic cost.⁹

⁹ The failure of Credit Suisse in 2023 is only an indirect test of the BRRD as Switzerland is not part of the SRM. The failure of this large, interconnected bank is largely due to a series of idiosyncratic scandals, such as money laundering, corruption, and tax evasion by employees. In March 2023, Credit Suisse notified the public of 'material weaknesses' in its financial reporting for 2021 and 2022. As a result, its share price collapsed, and the Swiss National Bank administrated the acquisition of Credit Suisse by UBS. The merged entity accounts for 200% of Swiss GDP, raising concerns if UBS is now a too-big-to-save institution. In sum, Swiss authorities have not opted for actions in the spirit of the BRRD to resolve the national champion Credit Suisse. It remains to be seen how SRM member states would react if a national champion in their banking systems failed.

Overall, the available empirical evidence suggests that markets considered the BRRD credible. Yet, it remains an open question whether the resolution scheme could withstand a systemic shock of larger magnitudes without an economically sizeable fiscal backstop under a fixed exchange rate regime like the EA (Berger et al., 2019). Avgouleas and Goodheart (2015) point furthermore to firmly engraved differences regarding both the goals and scope of bailout regimes in the US and the BRRD in Europe and given the long history of regulatory forbearance, Philippon and Salor (2017) call for further integration of the EBU.

3.3 Deposit insurance

Policy makers argued that a truly integrated financial architecture also required a uniform European deposit insurance scheme (EDIS) which is still missing in the implementation of the EBU (see, EC 2015, 2016; Gros, 2015; Schoenmaker, 2018; Carmasi et al., 2020).

Theoretically, if bank runs occur because of “sunspots” or panics, a credible insurance scheme avoids the inefficient withdrawal of funds by depositors (Diamond and Dybvig, 1983; Allen and Gale, 2004). However, deposit insurance is costly to society in case of informed bank runs because deposit guarantee schemes (DGS) will be tapped *ex post* (Allen et al., 2011), possibly leading to disbursements across jurisdictions. Informed runs due to structural weakness can further induce moral hazard behavior *ex ante* due to the existence of deposit insurance (Lambert et al., 2017). Insured depositors monitor banks poorly, which take excessive risks in anticipation of expected government bailouts by insurance schemes. Anginer and Demirguç-Kunt (2023) review the reasons for having and the effectiveness of various DGS across the globe. Whereas the undesirable moral hazard effect dominates during normal times of the financial cycle, DGS have a stabilizing effect during crisis (Anginer et al., 2014, Demirguç-Kunt et al., 2015, Ji et al., 2018).

Aside from moral hazard reservations, another frequently voiced concern by national policy makers is that existing, well-funded national DGS would be transferred to a single European one and thereby used to mutualize potential losses. In 2015, the EC published the initial EDIS proposal, which did not receive a majority amongst EU member states because of this fear for losses in “weaker” national financial systems by existing national DGS. The EC proposed in 2018 a “hybrid model”, which retained national DGSs but complemented them with a supranational reinsurance fund that would act as a reinsurance to national DGS, provide co-insurance, and only potentially provide full insurance in a final stage. This proposal was also rejected by the EU Ministers of Finance. This political opposition towards EDIS appears costly considering a study by Carmassi et al. (2020) on the potential benefits and the effectiveness of a fully integrated DGS at the European level. Based on a large and unique sample of supervisory data on covered deposits they investigate the resilience and cost of a fully mutualized European deposit insurance scheme (EDIS). Their analysis yields that a single European DGS covering 0.8% of covered deposits suffices to withstand even larger financial shocks than the financial crisis 2008.

So far, however, the third legislative act of the first banking package, the DGS directive (2014/49/EU), only harmonizes and simplifies national procedures to protect deposits, ensure a faster pay-out and improved financing of existing national DGS schemes. It obliges member states to set-up at least one DGS in which all banks of a member state participate. Generally, deposits up to €100,000 are insured and considered super preferential. Thereby, insured depositors should be amongst the first ones to be

compensated out of the assets of a failed bank, thereby exerting as little pressure as possible on national DGS and hence public funds. By 2024, member states shall have collected funding from participating banks to cover 0.8% of covered deposits. Since 2016, the EBA publishes data for national DGS regarding the volume of covered deposits and the collected contributions from banks.¹⁰ According to the latest communication by the EC, deposit guarantee schemes are pre-financed in a sufficient manner and it is expected that €63 bn in the EU, and €55 bn in the EBU, should have been collected by 2024 as planned.

In sum, the system of national DGS remains fragmented, some member states operating one scheme, yet others maintain up to six national DGS. This fragmentation is problematic as documented in Fecht et al. (2019) who use detailed data on German deposit supply show how heterogeneous DGS coverage causes an inefficient reallocation of deposits. The latest initiative by the EC to revitalize the legislative process dates from April 2023. It adjusts the EU's existing bank crisis management and deposit insurance (CMDI) framework by harmonizing the bail-in hierarchy of depositors into essentially just two categories, uninsured and those insured by national DGS. Thereby, the scope of insured entities grows and includes now also public entities, such as hospitals or schools. The proposal also addresses the fact that existing MREL levels, especially among smaller and medium sized banks, might not suffice to achieve the required losses covered by owners and creditors up and until 8% of total liabilities and own funds. In that case DGS might be a source of bridge funding. Whereas these measures represent further steps to strengthening the resilience of the EBU, they do not address the main issue: the absence of an EDIS, the most important open flank of the EBU.

4 Crises dynamics

Banks in this (incomplete) EBU had to face a series of challenges after the first banking package was put into action, such as the exit of the UK from the EU, the Covid-19 pandemic, or the invasion of Ukraine by Russia, which implied a series of socioeconomic shocks. We discuss how the EBU coped with these challenges.

4.1 Brexit and the implication for EU banks

The 2016 Brexit referendum has fundamentally changed the relationship between the EU and the United Kingdom (UK) and sharply transformed the banking landscape within the EU. As of December 2019, 80% of EA clearing members' OTC derivatives positions were cleared through UK central counterparties. At the end of 2020, to continue serving customers in the EU, UK financial institutions needed to adapt to Brexit, facing three options for business relocation: (i) setting up new subsidiaries; (ii) setting up new branches; (iii) expanding existing affiliates. To relocate, a bank needs to conform on average to 25 Brexit-related formal procedures (ECB, 2020).

At the end of 2019, 31 UK banks indicated that they would move part of their businesses to the EU where Germany and Ireland were the most popular locations. These incoming banks are usually large and complex financial institutions with a plan to operate with a total of €837 billion in capital market assets in the EA (ECB, 2020).

¹⁰ <https://www.eba.europa.eu/regulation-and-policy/recovery-and-resolution/deposit-guarantee-schemes-data>.

Some of the Global Banks relocating from the UK to the EU will meet the criteria to be supervised by the SSM. In anticipation of these new tasks, the ECB evaluated if business activities and risk management practices of third-country subsidiaries conform with the EU standards in 2020. These practices are important to avoid that global banks operate empty shells in the EU only to obtain a passport to serve EU customers.

Regarding the effect of Brexit on the real economy and banks, Born et al. (2019) estimate that the Brexit vote has caused a UK output loss of 1.7% to 2.5% by the end of 2018. Berg et al. (2021) document a 24% contraction in the UK syndicated loan market after the Brexit vote relative to a set of comparable loan markets attributable to a reduction in demand by UK firms. They also show that changes in GDP forecast around the Brexit vote explain approximately 61% of the decline in lending. They do not find evidence, however, that the UK lost its attractiveness as a financial center for cross-border lending. The results indicate that most UK banks have neither moved their senior staff nor their main operations to the EU. EBU banks, in turn, did not exhibit operational instability because of London no longer being an EU member. Market structures in the UK and the EBU seem to have adjusted in an orderly fashion to regulatory differences.

4.2 Covid-19 and EU banks under the less stringent regulatory environment

Between spring 2020 and summer 2022, the Covid-19 pandemic disrupted socioeconomic activities across the globe and negatively affected economic growth until today. EBU banks entered the pandemic well-capitalized (Enria, 2021), mostly due to prudential regulatory buffers.

To compensate for the adverse economic conditions due to the Covid-19 outbreak and to flank national fiscal stimulus programs, the ECB launched the €1,850 billion pandemic emergency purchase programme (PEPP) to reduce borrowing costs and increase lending in the EA. Figure 2 illustrates the size of the PEPP, which is comparable to all major APP conducted after the EU sovereign debt crisis together, and its use mostly during the height of the pandemic in early 2020. Until April 2022 the PEPP purchased bonds from Germany (€398 billion), France (€297 billion), and Italy (€290 billion), adding to the already substantial APP in place.

Besides unconventional monetary policy, the ECB also conducted targeted longer-term refinancing operations (TLTRO) with an uptake of more than €2.2 billion at the end of 2021 by EBU banks. Banks could borrow from the ECB 25 basis points below the main refinancing rates with a maturity of around four years. Outstanding eligible loans grew significantly more for TLTROs participants compared to non-participating banks (Schnabel, 2021). Regarding prudential policies, banks were also temporarily allowed to ignore required capital conservation buffers as well as the recommended LCR. Furthermore, the EBA postponed the stress test scheduled for 2020 by one year and banks were granted more flexibility to implement IFRS 9 when reporting non-performing loans (NPL) and Loan Provisioning (Carletti et al., 2020).

A nascent literature investigates whether this plethora of pandemic policies succeeded to stimulate bank lending or whether they de-stabilized the EU banking system. Couaillier et al. (2022) show that EU banks during the pandemic were not willing to use capital buffers above the regulatory requirements to meet credit demand and absorb losses during the pandemic. Instead, banks engaged in procyclical behavior to preserve capital ratios, especially those with capital ratios closer to regulatory requirements. Using bank-loan-level exposure data, Acharya et al. (2021b) study bank stock prices during

the Covid-19 pandemic. Stock prices of banks with large *ex ante* exposures to undrawn credit lines as well as large *ex post* gross drawdowns decline more. The effect is attenuated for banks with higher capital buffers. These banks reduce term loan lending, even after policy measures were implemented. Demirguç-Kunt et al. (2021) investigate the bank stock market response to the Covid-19 pandemic and policy responses globally. They highlight that the effectiveness of policy measures depended on bank capitalization and fiscal space in the respective country. Using loan level data from Italy, Core and De Marco (2023) highlight that banks' information technology (IT) can substitute for local branch presence in the provision of small business credit and that digitalization helps banks facilitate more Covid-19 guaranteed loans to firms at a faster speed and lower lending rates.

Overall, short-term responses of banks to these policies therefore yield a mixed picture. More importantly, whether these loose regulatory environments undermined banks' long-term resilience to withstand credit risk shocks and recessions since the end of 2022 remains an open question.

4.3 The Russian aggression against Ukraine and its economic fallout

Russia's invasion of Ukraine in February 2022 affected the EU through multiple channels, such as migration, energy supply frictions, supply chain disruptions, and financial flow limitations. Already after the 2014 Russia-Ukraine conflict, the EU sanctioned Russia's access to the EU's capital and financial markets and services. In 2022, the EU expanded the list of sanctioned Russian banks and disconnected 10 Russian banks from Society for Worldwide Interbank Financial Telecommunication (SWIFT) payment services (Drott et al., 2022).

The Russia-Ukraine war also created an unprecedented energy crisis in Europe. As of 2020, 29% of crude oil and 43% of natural gas imports into the EU originated from Russia, with Germany, Italy, and Central and Eastern EU countries being the largest importers. In May 2022, the EC banned almost 90% of Russian oil imports by year-end. European gas and electricity wholesale prices hiked by 115% and 237% (Ferriani and Gazzani, 2023). A survey by the Association of German Chambers of Commerce and Industry (DIHK) revealed that 82% of 24,000 businesses considered energy and raw material prices as material business risks, which also elevated credit risk faced by EU banks. In response, many EU countries conducted significant fiscal stimulus policies to mitigate energy shortages, accounting for 1.9% of GDP in the EA in 2022, 1.8% in 2023 and 0.5% in 2024, which also benefited banks. With high levels of loan provisions after the pandemic and state bailouts of energy companies, EU banks managed to avoid the worst of the energy crisis (Bloomberg, 2022).

5 New challenges and banks' responses

In hindsight, the reformed banking system of Europe proved strikingly resilient to cope with the described polycrisis. The transformations leading up to the EBU might not have been completed but sufficed to withstand a series of diverse shocks over the last decade. Looking ahead, we consider three challenges most important for the incomplete EBU. The first is persistently high inflation, after years at the zero lower bound, since autumn 2022. Second, financial technologies and competition from non-banks challenge the traditional business model of EU banks (Berg et al., 2022, Carletti et al., 2020). Third, banks will have to cope with the risks borne out by climate change (Deryugina et al., 2017), policies, and regulation alike.

5.1 From life below zero to high inflation

Figure 2 shows that average inflation rose steeply to 8% across 27 EU countries since the end of 2022, mostly driven by food and energy prices. After more than a decade of very loose monetary policy, the ECB and central banks around the globe tightened monetary policy in early 2023. Banks that maintained large maturity mismatches and relied heavily on short-term funding during the low-interest rate environment until then are negatively affected by rate hikes. The changing stance of monetary policy may stress EU banks with large duration gaps in a similar way they did elsewhere. For example, the failure of the US bank SVB partly reflected losses on government bond holdings after interest rate hikes, followed by a run on their uninsured deposits from technology start-ups.

So far, EU banks remained resilient, which may reflect improved capital and liquidity positions because of gradually completing the EBU. Volk et al. (2023) cautions, however, that monetary policies have not transmitted as quick as regulators hoped for because of two reasons. First, many retail deposits at EU banks are inelastic demandable deposits. Second, banks hold high levels of fixed rate bonds and liquid assets as the result of long accommodative monetary policies before 2023 and do not adjust lending rates accordingly just yet. With most of outstanding positions from APP ending at the end of 2024, potential cliff effects in terms of refunding challenges may lie ahead of EU banks in the next two years should the monetary stance has to remain hawkish.

Despite the encouraging resilience of EU banks in 2023, the cloud of recession is not over yet. While NPLs have been at record lows in 2021 for EU banks, default rates on banks' corporate credit exposures started to increase in the second half of 2022 and early warning signals of future asset quality deterioration have become more pronounced (Guindos, 2023).

5.2 Digitalization, cyber risks, and competition from Fintechs

Compared to their US and Chinese counterparts, a major weakness of EU banks is the low pace to adopt digitalization. A survey on digital transformation and the use of fintech conducted by the SSM in 2021 reveals that only 46% of significant EBU banks pre-decide on lending choices digitally. Most of SSM supervised banks have more than half of their customer base as digital. Slow digitalization in banking is problematic as studies show that this technology helped to serve customers better during the pandemic (Core and De Marco, 2023) and strengthens financial stability during a crisis (Pierri and Timmer, 2022).

Whereas almost all significant EBU institutions have a digital transformation strategy, many banks still face challenges in developing Key Performance Indicators (KPIs) to monitor digital progress, quantify the impact of digital transformation on their profitability, and track the effectiveness of implementation. The SSM (2023) reports that supervised banks spend on average 2.8% of their operating income investing in digital transformation.

As banks rely more on technology, at least two main new risks emerge. First, banks must incorporate cyber fraud, cyberattacks, and dependency on third party technology providers into their risk management frameworks. Gogolin et al. (2021) show that cyberattacks targeting small banks caused deposit outflows from these banks to neighboring larger banks. Using a multi-day cyberattack on a technology service provider, Kotidis and Schreft (2022) document how cyber risk can threaten financial stability.

Given mounting cyber risks in the wake of the Russian invasion of Ukraine, the ECB announced the first cyberattack stress tests for directly supervised banks in 2023.

Second, digital banks challenge the traditional business model to transform liquid short-term deposits into illiquid long-term lending. Koont et al. (2023) show that mobile banking allows depositors to move funds quickly, possibly spurring bank runs and challenging financial stability.

A review of nascent literature on digitalization in banking also highlight that technology may create competitive advantages for fintech companies. Banks tend to be more product-centric and less consumer-focused compared to their non-bank competitors (Carletti et al., 2020). Therefore, it is harder for them to adopt consumer-friendly interfaces that rely mainly on technology. Meanwhile, Fintech and Bigtech companies provide traditional banking products to consumers and investors such as payment services, loans, and investment products. These services usually rely on AI technology, big data analytics, and other nontraditional information. Berg et al. (2022) highlight that the US and China are the largest markets for Fintech lenders, but that other markets trend upward in recent years, too. Buchak et al. (2018) and Frost et al. (2019) show that Fintech and Bigtech firms lend more when banking markets are more competitive with less stringent regulations. Berg et al. (2020) illustrate that a German E-commerce firm extends credit to its customers requiring only the name, address, and email address of the customers to make a credit decision.

New entrants from Fintech and Bigtech companies into financial markets also raise regulatory concerns how to ensure adequate consumer and investor protection. In principle, identical risks should be regulated in the same way across financial services irrespective of the provider, banks or non-banks. However, Fintech companies benefit from a more lenient regulatory treatment for two reasons (Berg et al., 2022). First, Fintech companies are usually non-depository institutions, thereby falling outside the scope traditional banking regulation and supervision frameworks. Second, some Fintech lenders offer structured products with features outside conventional lending laws. For example, many payment companies, such as Klarna in Europe, offer “buy-now-pay-later” options that serve as consumer loans but are legally considered deferred payment products.

5.3 Climate change and EU banks

Climate change may pose the single-most important threat not only to financial, but to overall socioeconomic stability. Between 1980 and 2021, climatic events in Europe caused economic losses estimated at €560 billion, reaching more than 1% of GDP in the EA per year.

Banks, as well as other market participants, face two major climate-related risks. The first is physical risk due to extreme weather events, such as natural disasters, and permanent climate changes, such regular heat waves. The second is transition risk, reflecting the uncertainty about climate policies, preferences, and technological disruptions created by the global shifts towards a more sustainable and carbon-neutral economy. These two types of risk are distinct in nature, but closely intertwined. In the absence of adequate climate policies, market participants may face much higher costs from more frequent climatic events and natural disasters in future. Thus, taking transition risk in the short and medium terms is a must to achieve long-term goals of limiting the adverse impact of climate change. After the

Paris Agreement of 2015, the EU committed to a 55% reduction in carbon emissions by 2030 (Fit for 55 package) and a carbon-neutral economy by 2050.

Regarding physical risk and EU banks, the ECB (2021b) reports that around 30% of EA banking system credit exposures are to borrowers located in areas with high risk of natural disasters. Half of these credit exposures are secured by physical collateral that can be damaged if extreme weather events occur. A striking fact is that over 70% of high physical risk credit exposures belong to only 25 large banks in Europe. In adverse scenarios, the concentration of physical risk may lead to financial stress of these banks and potentially spill over to the financial system due to interconnectedness across large EBU banks. Previous studies also highlight that adverse effects may also propagate through lending networks and affect access to credit beyond disaster-impacted regions (Rehbein et al., 2020, Ivanov et al., 2022).

A growing literature shows that banks incorporate physical risks in their lending decision. Koetter et al. (2020) show that banks in unaffected areas can meet credit demand of firms and household in directly affected regions without excessive risk-taking or rent-seeking behaviors in the short-term. In the long-term, banks may also consider the risk of sea level rise and price the risk accordingly in loan contracts (Nguyen et al., 2020; Jiang et al., 2020).

One of the main challenges for banks in managing climate physical risks is the uncertainty regarding when and which climate risks will materialize. Central banks could step in and provide guidance on regulators' expectations and best practices in managing climate risks. In 2021, the ECB conducted the first EU-wide bank climate stress tests that covers about 1,600 consolidated banks. In 2022, the ECB required 112 G-SIBs in the EU to run climate stress tests with various climate scenarios using different extreme weather events for climate physical risk: a large flood, a severe drought, and a heatwave. While climate risk has material effects on banks' portfolios, EU banks are still at an early stage to factor in climate risk into their credit risk models. In many cases, credit risk parameters used by internal risk management models of banks were found to be insensitive to the climate risk shocks depicted in the stress test scenarios.

Regarding transition risks, the ECB climate stress tests of 2022 reveal that EU banks generate more than 65 percent of their interest income from carbon-intensive industries. Hence, EU banks are exposed to climate transition risk should regulators implement hard-nosed climate policies to mitigate the effect of climate change. Roncoroni et al. (2021) estimate that climate policies could strand 3% of banks' and investment funds' total value at risk.

Carbon prices increased by about 60% under the EU Emission Trading System since 2019. A growing literature documents that banks consider transition risks in their lending decisions, for instance in terms of higher interest rates on carbon-intensive loans (Chava, 2014, Delis et al., 2021). However, if banks can securitize carbon-intensive loans in secondary markets, they do not price carbon transition risk as much (Mueller et al., 2022). The effect on loan supply is inconclusive. Kacperczyk et al. (2021) shows that carbon-intensive firms may receive less credit from banks if their banks committed in carbon reduction initiatives whereas firms that disclose environmental performance voluntarily obtain better credit terms (Degryse et al., 2023). In contrast, lending relationships with carbon-intensive firms may hinder the green transition as banks discriminate lending decisions to firms that are exposed to green technology disruptions (Degryse et al., 2022). At the same time, banks may provide more credit to firms that might benefit

from the introduction of environmental regulations, particularly if these firms located in countries with more stringent regulations on climate change (Mueller and Sfrappini, 2022).

Banks limiting their credit exposures to carbon-intensive industries may not be the optimal responses to facilitate the transition to a low-carbon economy. The EC estimates that reaching the 2030 “Fit for 55” package requires additional annual investments of €360 billion within the EU. This is equivalent to a 50% increase in annual investment in the EU. Funding for these investments would require banks to allocate credit to green champion companies and carbon-intensive companies that have concrete plans and technologies to transit to a more sustainable business model. While banks may be in a unique position to influence the green transition, de Haas and Popov (2023) show that banks are generally less suited to reduce emissions in carbon intensive industries compared to stock markets. They document that emissions per output decline faster in economies with deeper stock markets and conclude that market-based systems are better suited to spur sustainable innovations in emission intensive sectors compared to bank-based systems.

A central question is whether central banks can influence lending decisions of banks and facilitate a smoother transition. Under the EU taxonomy, financial institutions need to report their green asset ratios as of 2024. Absent a harmonized and universal carbon tax, it remains debatable if carbon capital requirements for banks can limit the negative externalities of carbon emissions. Oehmke and Opp (2022) find that such requirements allow banks to manage transition risk better, but that carbon capital requirements are inferior to carbon taxes in reducing carbon emissions.

Few studies find evidence of how banks increase lending to carbon-intensive firms for green transition purposes. Using the French climate stress tests of 2020 as an exogenous shock to bank climate policies, Fuchs et al. (2023) document that stress tested banks provide more credit to borrowers that are highly exposed to transition risk. At the same time, stress tested banks charge carbon premia in their loan contracts. Upon receiving credit from climate stress tested banks, borrowers are more likely to set carbon reduction targets and to consider the environmental impact of investment projects. However, there has not been clear evidence of the reduction of direct carbon emissions from borrowers' production chains. Ongoing research is crucial to shed light on whether regulatory intervention can support banks' climate risk management and promote a sustainable transition.

6 Conclusion

The European Banking Union (EBU) is one of the main policy responses to the Global Financial Crisis of 2007/2008, which resulted in costly bank bailouts, fiscal pressure on many EU member states, and resulting sovereign stress that threatened the integrity of the common currency area. The EBU represents the strategic vision of a banking system with harmonized capital and liquidity requirements to enhance the resilience of the European banking system, clear procedures to manage bank stress and failure across national borders, and effective consumer protection.

Two pillars of the EBU are completed and the available evidence indicates that financial market participants considered the new institutions of the EBU, such as the Single Supervisory and the Single Resolution Mechanisms, as credible and effective. European banks proved resilient during three major disruptions that hit the reformed EBU: the shock to financial architecture due to Brexit in 2016, the

aggregate demand and supply contraction due to the Covid-19 pandemic starting in 2020, and the geopolitical uncertainty and its economic fallout following the Russian aggression towards Ukraine. EBU banks entered the polycrisis generally well-capitalized, which helped them to provide the EU economy continuously with credit and liquidity.

Regarding the first pillar of EBU, both the macro- and microprudential supervision of banks by the various European and national agencies functioned smoothly, defying concerns about excessive procedural complexity. Responsibilities and tasks of the different institutions remain at times redundant and intricate, but overall, the interaction between agencies worked well. Regarding the second pillar of EBU, the institutional insurance schemes to cope with stressed and failed banks have been successfully prefunded despite the adverse economic conditions, too. The Single Resolution Fund will achieve the target volume by the end of 2023 and funds available for conversion into equity in case of failure, MREL, are expected to be on target by 2024.

The most important deficiency in the design of the EBU remains the absence of a single European Deposit Insurance Scheme, which would be necessary to protect consumers credibly and effectively during bank failures and to prevent inefficient runs. Efforts undertaken so far harmonized national procedures to some extent, but further progress is needed to integrate the existing fragmented deposit guarantees landscape in the EBU and the EU.

Whereas the (incomplete) EBU fared well so far to cope with recent crises, we consider several challenges as relevant drivers of further integration efforts. In the short run, the resurgence of rising inflation after a long period of very loose monetary policy might pose risks to financial stability as banks have to close their duration gaps and cope with mounting credit risk during recessionary times. From a more structural perspective, the traditional bank business model is generally contested by non-bank intermediaries, which face fewer regulatory constraints and benefit from an increasingly fast digitalization of financial products and services demanded by consumers and firms alike. So far, the EBU offers only limited perspectives as how to regulate the new risks arising with progressing digitalization within and adjacent to EU banking. Finally, the transition to an ecologically more sustainable economic system is probably one of the largest challenges to socioeconomic systems, not only in the long run. The continued design of the EBU will therefore require policies on how to manage and regulate climate risks, both physical and transitional ones.

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Appendix

Appendix Table 1: List of abbreviations

Abbreviation	Definition
AQR	Asset Quality Review
AT1	Additional Tier 1
BCBS	Basel Committee for Banking Supervision
BRRD	Banking Resolution and Recovery Directive
BTS	Binding Technical Standards
CBR	Combined buffer requirements
CDS	Credit Default Swaps
CET1	Common Equity Tier 1
CMDI	Crisis management and deposit insurance
DGS	Deposit Guarantee Schemes
DSGE	Dynamic stochastic general equilibrium
EA	Euro area
EBA	European Banking Authority
EBU	European Banking Union
EC	European Commission
ECB	European Central Bank
EDIS	European Deposit Insurance Scheme
EEA	European Economic Area
EFTA	European Free Trade Association
EIOPA	European Insurance and Occupational Pensions Authority
EMU	European Monetary Union
ERM II	Exchange Rate Mechanism II
ESA	European Supervisory Authority
ESFS	European System of Financial Supervision
ESM	European Stability Mechanism
ESMA	European Securities and Markets Authority
ESRB	European Systemic Risk Board
EU	European Union
FSB	Financial Stability Board
G-SIB	Global systemically important banks
G-SII	Globally systemically important institutions
GDP	Gross Domestic Product
HHI	Hirschman-Herfindahl Index
IRB	Internal ratings-based
JST	Joint Supervisory Teams
LCR	Liquidity Coverage Ratio
LRE	Leverage ratio exposure
MNB	Multinational bank
MREL	Minimum Requirement for Own Funds and Eligible Liabilities
NCA	National competent authority
NPL	Non-performing loans
NSFR	Net Stable Funding Ratio
O-SII	Other systemically important institution
OTC	Over the counter
PEPP	Pandemic emergency purchase programme
RWA	Risk-weighted assets
SRB	Single Resolution Board
SRF	Single Resolution Fund
SRM	Single Resolution Mechanism
SSM	Single Supervisory Mechanism
SWIFT	Society for Worldwide Interbank Financial Telecommunication
TLAC	Total Absorbing Loss Capacity
TLTRO	Targeted longer-term refinancing operations
TOFL	Total own funds and liabilities
TREA	Total Risk Exposure Amount
UK	United Kingdom
US	United States
WACC	Weighted average cost of capital



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