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# Joining up prudential and resolution regulation for systemically important banks

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## Abstract

We set out a stylised framework for the policies enacted to address the risks posed by systemically important institutions (SIIs) and to counter the too-big-to-fail (TBTF) problem, examining conceptually how far supervisory and resolution policies are complementary or substitutable. The Financial Stability Board (FSB) TBTF reforms comprise (1) a higher loss-absorbing capacity in the form of regulatory capital buffers for SIIs, (2) more intensive and effective supervision and (3) a recovery and resolution regime, including sufficient loss-absorbing and recapitalisation capacity in the form of capital and eligible liabilities, to deal with distressed or failing institutions. These reform strands are part of a fundamentally integrated concept, but were largely developed and implemented independently of each other. Therefore, they may fall short of fully taking interdependencies into account, rendering policies less effective and consistent than an integrated approach, which we outline as an alternative. The analysis discusses the regulatory interplay, its implications for policymaking based on the FSB TBTF reforms for banks and its operationalisation in the Basel framework at the global level and in the European Union.

**Keywords** Financial regulation · Financial stability · Going concern · Gone concern · Macroprudential policy · Resolution framework · Systemic risk · Systemically important institutions · Too big to fail

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## Introduction

The global financial crisis (GFC), which peaked in 2008, showed that the failure of financial institutions can pose a threat to the financial system, the real economy and the state. This is the case if normal insolvency proceedings cannot ensure the continuity of the systemically important functions of institutions in distress, in order to safeguard financial stability and protect public funds [66]. Liquidation may be lengthy and may destroy value, possibly prompting fire sales that depress asset prices and magnify contagion, and can be complex, especially in cross-border cases. The impact may not only be felt in the jurisdiction(s) where the failing institution operates but may also affect other jurisdictions, via direct and indirect contagion. In such circumstances, institutions are regarded as SIIs.<sup>1</sup> Absent an alternative in most jurisdictions to normal insolvency proceedings, which may entail the aforementioned risks and costs, governments have often felt compelled to support them in order to limit the negative consequences for the financial system and the real economy.<sup>2</sup> In this case, SIIs are deemed TBTF.<sup>3</sup>

Bailout expectations related to implicit state support could lead to moral hazard, as banks and bank creditors might be encouraged to take on more risk, expecting to be bailed out if things go wrong and thereby socialising losses, which have to be borne by taxpayers. This could also lead to competitive distortions if creditors charge banks perceived as TBTF less. Both bailouts and related funding cost advantages have been observed in the past, including during the GFC [63, 65]. Before and throughout the GFC, risk taking was positively correlated with bank size and mainly increased via higher leverage [23]. In addition, the economies of scale of large banks were affected by cheaper funding due to their perceived TBTF

status [31], meaning that they profited from funding subsidies. To reach a size threshold that could imply TBTF status, banks were willing to pay an added premium for mergers, and stock and bond markets reacted positively to such mergers, allowing for cheaper refinancing [24]. The failure of TBTF institutions could lead to contagion and multiple failures, which may also occur in the case of common exposures and herding behaviour. When the number of bank failures is large, regulators and policy makers may find it optimal ex post to bail out some or all of the failed banks [2], which could effectively be regarded as SIIs, on an aggregate basis or depending on their interconnections. A bailout, or the anticipation of one, may in turn incentivise behaviour that leads to systemic risk. In addition, forbearance on the part of supervisors and financial institutions could aggravate problems because risks are detected too late and no prompt corrective action is taken.<sup>4</sup>

To address the risk from SIIs and to counter the TBTF problem, as well as the resulting moral hazard, the G20 leaders agreed on an FSB framework in 2010 and 2013, to which concrete policy measures were added in 2011 and 2015.<sup>5</sup> This policy framework constitutes a set of minimum standards and is designed to improve the regulation of SIIs, to make them less likely to fail and to provide alternatives to normal insolvency proceedings if they become unviable. The ultimate goal is for SIIs to no longer be TBTF. The FSB TBTF reforms cover three areas in particular: (1) ensuring higher loss-absorbing capacity through regulatory capital buffers, depending on an institution's systemic importance, when the institution is still solvent ("going concern"), (2) more intensive and effective supervision<sup>6</sup> and (3) establishing a resolution regime and sufficient total loss-absorbing and recapitalisation capacity (TLAC) that ensures resolvability<sup>7</sup> when the institution is failing ("gone concern").<sup>8</sup> These measures are implemented via macroprudential policy

<sup>1</sup> In the wake of the global financial crisis, the FSB [56] defined systemically important institutions as "financial institutions whose disorderly failure, because of their size, complexity and systemic interconnectedness, would cause significant disruption to the wider financial system and economic activity". SIIs may be banks, financial market infrastructures such as central counterparties, insurers or other financial institutions. For example, Lehman was a global financial services firm, also commonly called an investment bank, but not a bank holding company under US law. While the focus in this analysis is on banks and banking regulation, financial stability aspects are also part of the regulation of other entities. In addition, better banking regulation helps to lessen the impact of bank failure on the non-banking part of the financial system and on the real economy, but also to reduce any negative impact of spillovers from the non-banking sector into the banking sector.

<sup>2</sup> Before the GFC, there was already a discussion about whether and how to implement a special regime to deal with failing banks, given the experience of past banking crises and cross-border challenges. See, for example, Campbell [26], Hoelscher [73], and Hüpkes [74].

<sup>3</sup> While a bank's size is only one factor, and it would be more appropriate to say "too systemic to fail" [35], the term "TBTF" is commonly used.

<sup>4</sup> Also, emergency liquidity assistance (ELA) may facilitate forbearance when the underlying problem is solvency rather than illiquidity, which may be difficult to disentangle in a crisis situation.

<sup>5</sup> See G20 Leaders' Declarations of 2010 and 2013, FSB [56, 57, 60, 66], and BCBS [15].

<sup>6</sup> FSB [55]. Higher intensity and effectiveness than pre-GFC supervisory practice.

<sup>7</sup> An institution is deemed resolvable if it can be liquidated under insolvency proceedings or resolved using resolution tools without negative systemic effects on the financial system and the real economy. See also "Systemic importance and resolvability assessment" section.

<sup>8</sup> "Going concern" refers to a bank when it is still viable, while "gone concern" refers to a bank when it has become non-viable. Resolution planning may include going concern structural changes to a bank to improve its resolvability.

<sup>9</sup> The strengthening of central financial market infrastructures is a further element of the framework to reduce contagion effects owing to the interconnectedness of financial institutions and the limited transparency of counterparty relationships. See FSB [58]. This element, however, is not examined in this analysis.



and supervision (1 and 2), microprudential supervision (2) and the resolution framework (3). FSB jurisdictions are required to transpose FSB standards into their laws, and compliance is important to avoid regulatory arbitrage and ensure cross-border cooperation across jurisdictions.<sup>10</sup> Parts of the FSB TBTF reforms focussed on global systemically important banks (G-SIBs), such as G-SIB capital buffers and TLAC, but soon a framework for domestically important banks (D-SIBs) was also developed [13], and any financial institution that could be systemically significant or critical if it fails should be subject to a resolution regime [66]. In the European Union (EU), capital buffers for systemic importance apply to all banks designated as SIIs, and an institution-specific Minimum Requirement on own funds and Eligible Liabilities (MREL), based on the TLAC concept and corresponding to an amount higher than minimum capital requirements, applies to all banks for which resolution, rather than liquidation, is envisaged to ensure resolvability.

Focussing on banks, this analysis shows that the TBTF reform strands are inherently interlinked, as they all aim to contain the expected systemic loss to the financial system and the real economy stemming from the failure of SIIs by reducing their probability of default (PD) and loss given default (LGD). However, if regulatory policies are not aligned and coordinated, systemic risk caused by SIIs may be insufficiently reduced, and incentives biased towards excessive risk taking and leverage, leading to socially suboptimal investment and lending decisions, will be retained. This would result in welfare losses, compared with an integrated approach that coordinates policies to sufficiently reduce systemic risk. Building on the linkages that become apparent when taking a bird's eye view and considering current policy practice, we discuss at the conceptual level the regulatory interplay and its implications for policymaking and propose understanding and applying TBTF policies in an integrated, rather than largely independent, way, in order to increase regulatory effectiveness.<sup>11</sup> This would entail cooperation between the authorities responsible for macroprudential, microprudential and resolution policies (see Appendix 1 for the terminology used in this analysis and an overview of the regulatory landscape in the EU).

While we briefly outline how TBTF policies might be empirically evaluated (Appendix 3), estimating quantitative impacts, including of regulatory interactions, which are

especially important for calibrating policy measures, is beyond the scope of this paper. Future research in this area will be important to address operational challenges (see also “[Considerations for implementing an integrated approach](#)” section), while acknowledging that disregarding the regulatory interplay entails the costs to society outlined above. Moreover, the focus of this analysis is on the TBTF problem, although the discussion of the regulatory interplay and an integrated approach is also generally relevant when banks can be regarded as systemic in a “too many to fail scenario”, while specific policy measures may need to be adapted, for example in crisis management.

An integrated approach brings together the different strands of ever-more-specialised regulation, highlighting, inter alia, that an institution's systemic importance is significant for its resolvability assessment, and vice versa. It also shows how capital buffers and going and gone concern minimum requirements interact, particularly if the multiple use of capital is permitted, and that recovery and resolution plans have to be mutually consistent.

The importance of an integrated view on risks and regulations is also emphasised by other studies, both in a broader context of financial regulation and macroprudential policies in general (e.g. [5, 7]) and considering strategic choices by banks that anticipate the response by policymakers [2]. An integrated approach allows the interactions between regulatory tools to be taken into account, to avoid disregarding any complementary or offsetting effects of the various measures [50], and has recently been applied to study the extent and consequences of the multiple use of capital for macroprudential, microprudential and resolution requirements [51].

Focussing on the regulatory interplay of TBTF policies, this analysis also complements the literature on the causes and consequences of financial crises, with experiences from the GFC motivating regulatory reforms, in particular on the TBTF problem. Crises have been frequent throughout history, and common patterns have emerged in terms of their origins, duration and economic fallout (e.g. [25, 86]).<sup>12</sup> However, the GFC stands out, as its negative economic fallout has been massive. The median decrease in potential output in 2014 was estimated as 5.5% in the OECD (Organisation for Economic Cooperation and Development) relative to pre-crisis levels, with losses of more than 10% for several European countries [80]. There were also serious negative implications for the

<sup>10</sup> See, for example, Annex 2 of FSB [64] and more recent FSB annual reports for the implementation status and level of consistency of the reforms.

<sup>11</sup> This paper has been published originally as Ebner and Westhoff [37] and in a shorter version as Ebner and Westhoff [36], available as a SUERF (Société Universitaire Européenne de Recherches Financières, the European Money and Finance Forum) policy note.

<sup>12</sup> We do not elaborate on the fallout of the pandemic since 2020, as it was not originally a financial crisis. The initial impact was severe and heterogeneous across countries. Until 2022, its impact was dampened by massive fiscal and monetary support for the economy and regulatory relief measures for banks. Depending on the scenario, the costs of the pandemic have been estimated as possibly more severe than those of historic financial crises. See, for example, OECD [82].



economic and social well-being of people around the globe. In several countries, poverty and unemployment increased, nutrition and health conditions deteriorated and there was a loss of social cohesion. Public bailouts of financial institutions may have prevented an even more serious financial, economic and social meltdown, but seriously limited countries' fiscal capacity to prevent or counter the above-mentioned negative effects and increased moral hazard [83].

Furthermore, this analysis differs from and complements more recent literature that evaluates regulatory reforms concerning SIIs from an empirical and/or theoretical perspective, but where the focus is not explicitly on the interplay of going and gone concern regulations in general and at the level of specific policies. Ex-ante assessments of initial post-crisis reforms estimate that despite the transitional costs of higher capital requirements [8], the social benefits of reduced crisis probability and crisis costs exceed the cost of regulation resulting from assumed higher lending spreads and lower investment [12]. The reforms are estimated to generate social net benefits, also considering the subsequent introduction of the leverage ratio, the G-SIB buffer and resolution requirements for higher loss-absorbing capacity [54]. In the European Banking Union (EBU), larger capital buffers and resolution requirements for higher loss-absorbing capacity are estimated to have significantly enhanced the banking system's combined going and gone concern capacity to absorb losses, and banks' PDs decreased, on average, from 3.5% in 2007 to 1.1% in 2017, one-third of the pre-crisis value [27]. However, there are also findings based on data for both US and international banks showing that market indicators of risk have not decreased but may even have increased since the GFC [87].

The FSB [63] provides an overview of the evaluation studies of TBTF reforms and conducts comprehensive analyses, observing the progress made in addressing the risks posed by SIIs and in overcoming the TBTF problem, as well as the net benefits of TBTF reforms for society, but also pointing out remaining gaps.<sup>13</sup> Inter alia, the resilience of SIIs has increased from low levels, and the implementation of resolution reforms is progressing, in terms of both the legal implementation of resolution regimes and the development of recovery and resolution planning. However, obstacles to resolvability remain (e.g. TLAC implementation; funding in resolution; valuation; operational continuity; and cross-border coordination), and special challenges may arise in case of multiple failures and system-wide events. Moreover, there is not sufficient public information to assess the degree to which SIIs have become

resolvable, while acknowledging that ensuring resolvability has to be pursued continuously, as the institution and the circumstances in which it operates may change. The relevant information and resolution authorities' assessments are often confidential, and, because there have been very few instances of resolution to date, its practicability can only be observed in those cases. In some cases of banks in distress, state support has continued since the TBTF reforms were agreed (FSB [63], Annex I); public guarantees when Credit Suisse became distressed in 2023).<sup>14</sup> Furthermore, there may be gaps in the information available to public authorities, the FSB and standard setters, including on ownership of the TLAC and other loss-absorbing capacity issued by G-SIBs, which is needed to assess the potential impact of a bail-in on the financial system and the economy.<sup>15</sup> In addition, it is found that the application of the reforms to D-SIBs warrants further monitoring. Despite these gaps, which should be addressed, and state support, which has continued to some extent, funding cost advantages based on implicit state guarantees are found to have fallen since their peak during the financial crisis, but not below pre-crisis levels, while credit rating agencies have removed the assumption of state support in a number of jurisdictions [63].

Hellwig [71] provides a critical assessment of this evaluation, concluding that the TBTF reforms made the system "safer but not safe". Furthermore, the FSB [63] does not examine the usability of capital buffers, including those of SIIs, which was not explicitly part of its mandate and was analysed in ESRB [51] for banks in the EU. There are also studies in the fields of law and finance on bank resolution and on bail-ins in particular, as one part of the TBTF reforms, also considering their preventive nature, which is important for reinforcing other reforms. Complementing some mixed empirical results on the effect of resolution reforms on funding advantages due to implicit state guarantees [63], these studies conclude that challenges remain in operationalising resolution and fully unleashing its preventive character via market discipline (e.g. [6, 94]).

<sup>13</sup> The terms of reference for FSB [63] did not specifically include the regulatory interplay and recommendations for enhancing the regulatory system. Instead, the evaluation examines empirically the extent to which TBTF reforms for SIIs that have been implemented to date are achieving their intended objective. See the [Summary Terms of Reference](#).

<sup>14</sup> See [press release of the Federal Council](#) in the case of Credit Suisse. In the United States of America, as part of the Federal Reserve Board's [Bank Term Funding Program](#), introduced since the failures of Silicon Valley Bank and Signature Bank in 2023, a public backstop has been made available by the Department of the Treasury. Furthermore, in the cases of these banks, uninsured depositors are also protected by the FDIC (Federal Deposit Insurance Corporation), although any losses to the Deposit Insurance Fund will be recovered by a special assessment on banks ([joint statement by the Department of Treasury, Federal Reserve, and FDIC](#)). FSB [65] identifies preliminary lessons learnt from the bank failures, including areas for further analysis and improvements in the operationalisation and implementation of the resolution framework.

<sup>15</sup> Data availability and data access may differ between jurisdictions. In the EU, combining data from resolution reporting and data on securities holding offers valuable insights, but not all holders can always be identified (e.g. securities held by non-EU banks at central security depositaries in third countries) and data access is restricted.



As the TBTF framework is implemented and its effects evaluated, areas for improvement can be identified.<sup>16</sup> Regulation evolves, particularly as a result of the experience gained during crises. In addition to the evaluation of the effects of reforms already implemented, a better understanding of the conceptual interplay of regulations will help to generate effective policies for SII. The “[Expected systemic loss as a regulatory objective](#)” section introduces the expected systemic loss as one regulatory objective and conceptualises the TBTF problem. “[The current interplay of going and gone concern regulation](#)” section explains the current interplay between going and gone concern regulations and how they affect the expected systemic loss. The “[Implications for going and gone concern regulation](#)” section discusses the implications of an integrated regulatory approach, and the “[Summary and outlook](#)” section summarises the main findings.

### Expected systemic loss as a regulatory objective

The regulatory approaches to tackling the TBTF problem aim to address the risks to the global financial system arising from SII [57]. The methodology to assess whether a financial institution is assessed as systemic should reflect the potential impact of its failure on the financial system and the wider economy rather than the likelihood of its failure. This approach is therefore not based on the probability of default (PD) but on a system-wide loss-given-default (LGD) concept [13, 15]. Dedicated capital buffer are then applied to SII that primarily aim to reduce their PD. Likewise, the resolution framework applies to all banks that could be systemically significant or critical in failure [66], reflecting the system-wide LGD concept.<sup>17</sup> Resolution planning and resolution measures then aim to reduce the impact of a bank’s failure.

The TBTF policies can therefore be conceptualised as identifying institutions that can be systemic in failure by assessing the loss for the financial system and the real economy—the systemic loss given default ( ${}^s\text{LGD}_i$ )—that arises in the event of a default on the part of institution  $i$  via direct and indirect contagion. Measures are then applied to reduce both the systemic probability of default ( ${}^s\text{PD}_i$ ) of institution  $i$  and the  ${}^s\text{LGD}_i$ . This should limit the expected

loss for the financial system and the real economy—the expected systemic loss ( ${}^s\text{EL}_i$ )—as the product of  ${}^s\text{PD}_i$  and  ${}^s\text{LGD}_i$ .

$${}^s\text{EL}_i = {}^s\text{PD}_i \times {}^s\text{LGD}_i \quad (1)$$

Depending on the calibration of the policy measures to reduce  ${}^s\text{PD}_i$  and  ${}^s\text{LGD}_i$ , the  ${}^s\text{EL}_i$  of a SII could be limited to the one of a non-SII, a concept known as equal expected impact approach that informed the capital buffer framework for G-SIBs (“[Calibration of the buffer level for SII and resolvability assessment](#)” section; [15]). However, there are good reasons not to focus on the  ${}^s\text{EL}_i$  only but also to reduce each of its components as discussed later in this section and reflected in the resolution framework.

The  ${}^s\text{PD}_i$  is derived, on the one hand, from its on and off-balance-sheet risk on the asset and liability side and from operational risks, and, on the other hand, from the indirect risks to the institution resulting from, for example, reputational or network effects.<sup>18</sup> These indirect risks are risks that the bank’s management finds it difficult or impossible to assess and therefore to take into account. The  ${}^s\text{LGD}_i$  is the total loss in the financial system and the real economy via multiple-round effects in the event of a default on the part of institution  $i$ . Total loss encompasses the broader impact, including, for example, the effects of any non-substitutability of the functions performed by the failing institution. The systemic loss is not internalised by institution  $i$ , if the institution internalises only the potential losses for its shareholders and also not if it additionally internalises losses for its creditors that exercise market discipline solely in terms of their own potential losses. Thus, negative external systemic effects arise that justify regulation to reduce  ${}^s\text{PD}_i$  and  ${}^s\text{LGD}_i$  (Table 1). In case of a widespread crisis, due to simultaneous defaults or highly negative systemic effects resulting from the default of one SII, confidence effects, fire sales and deleveraging on a broad scale also become important drivers of  ${}^s\text{EL}_i$ .<sup>19</sup>

Heightened loss-absorbing capacity through regulatory capital buffers as well as more intensive supervision are primarily designed to reduce the systemic PD, and a credible recovery and resolution regime is primarily intended to

<sup>16</sup> For example, [the EU is identifying areas for improvement in the functioning of the crisis management framework](#). The [review of the EU’s crisis management and deposit insurance framework is currently ongoing](#). See also FSB [63, 64] and their findings.

<sup>17</sup> The LGD concept in relation to systemic importance and resolvability is further discussed in the “[Systemic importance and resolvability assessment](#)” section.

<sup>18</sup> On and off-balance-sheet risks in terms of assets and liabilities include potential general shocks, such as a pandemic or climate change. Network effects include, for example, credit and funding risks that result not only from the risk arising from direct debtors/creditors, but also, in turn, the creditworthiness of their debtors/creditors, and so on. A bank’s  ${}^s\text{PD}_i$  therefore encompasses more drivers than the bank’s direct decisions and on and off-balance-sheet items.

<sup>19</sup> The  ${}^s\text{EL}$  of simultaneous defaults would be based on the joint  ${}^s\text{PD}$  and  ${}^s\text{LGD}$ .



reduce the systemic LGD.<sup>20</sup> Furthermore, capital buffers reduce the  ${}^s\text{LGD}_i$ , assuming that shareholders are better placed to bear losses than creditors and that contagion is lower. Capital buffers reduce the relevant institution-specific LGD for both the institution in crisis and the creditors directly or indirectly affected by the bank's distress, as some of the losses are absorbed before the default. This reduces the losses of the creditors as well as the resulting potential contagion effects. Lower  ${}^s\text{LGD}_i$ , in turn, may also further reduce the  ${}^s\text{PD}_i$  if it reduces the (implicit) government guarantees and, as a result, the moral hazard leading to higher risk taking.<sup>21</sup> Similarly, an effective recovery and resolution regime can lower the  ${}^s\text{PD}_i$  by reducing moral hazard, and more intensive supervision can contain  ${}^s\text{LGD}_i$  if it ensures that an institution is declared to be failing or likely to fail on time.

Through TBTF policies, the expected systemic loss of a market exit ( ${}^s\text{EL}_i$ ) should be lower than the expected losses or costs of a bailout ( ${}^b\text{EL}_i$ ).<sup>22</sup> The latter include the direct costs of the bailout ( $C_i^B$ ) and the long-term indirect costs of the resulting moral hazard ( $C_i^{\text{MH}}$ ) due to increased bailout expectations.

$${}^s\text{EL}_i < {}^b\text{EL}_i \equiv {}^s\text{PD}_i \times {}^s\text{LGD}_i < {}^s\text{PD}_i \times (C_i^B + C_i^{\text{MH}}) \quad (2)$$

Since  ${}^s\text{PD}_i$  appears on both sides of Inequation 2, it can be reduced to

$${}^s\text{LGD}_i < C_i^B + C_i^{\text{MH}} \quad (3)$$

The TBTF problem can therefore be avoided if a market exit entails lower costs than a bailout. If, at a given point in time the resolution framework is perceived as credible (not credible) and therefore a bailout is unlikely (likely), this is reflected in a lower (higher) level of moral hazard.

<sup>20</sup> BCBS [15]: "Because there is no single solution to the externalities posed by G-SIB, the official community is addressing the issues through a multipronged approach [...]: reduce the probability of failure of G-SIB by increasing their going concern loss absorbency; and reduce the extent or impact of failure of G-SIB, by improving global recovery and resolution frameworks".

<sup>21</sup> Only if state support is expected not only to bail out shareholders and creditors at the point of failure but also to prevent default outright, so that PD can never reach 1, a lower  ${}^s\text{LGD}_i$  could also increase the PD by reducing (implicit) government guarantees. However, in this analysis we define bailout as state support when the bank is failing in economic terms (PD=1) even if this prevents formal default. This definition does not change the outcome and conclusion of the analysis.

<sup>22</sup> We abstract from possible political costs that may be lower in case of bailout even if  ${}^s\text{EL}_i < {}^b\text{EL}_i$ , for example if a considerable number of retail customers were to sustain losses in resolution or liquidation, possibly provoking a backlash during the next elections. This could drive up bailout expectations and moral hazard. It may be conceptualised as a constraint on Inequation 2. However, as this refers to the political economy dimension, it is beyond the scope of this economic analysis.

Furthermore, resolution planning and requirements will affect how the bank is structured and connected to the rest of the financial system. These effects are included in the bank-specific  ${}^s\text{EL}_i$  and  ${}^b\text{EL}_i$  via  ${}^s\text{PD}_i$ ,  ${}^s\text{LGD}_i$  and  $C_i^B$ . The  ${}^s\text{LGD}_i$  comprises the long-term GDP (gross domestic product) effects, including the impact on state finances, which will not only depend on the bank under consideration and the losses to be borne but also on the type of market exit. Depending on the applicable regime, a market exit as an alternative to bailout might be (1) liquidation, in which all the economic activities of the entity cease and its assets are sold to cover losses, expenses and claims, (2) liquidation, allowing for different options, such as the transfer of (part of) the business, or (3) resolution, including different tools such as bail-in and the sale of the business.<sup>23</sup> The costs of bailout ( $C_i^B$ ), from a long-term perspective, are net of any income for the state. Net costs take into account the consequences of growing government debt and even, if applicable, any over-indebtedness resulting from the bailout, the expected income from the sale of public shares or the repayment of other public aid after the restructuring of the institution, as well as the opportunity costs of using public funds for the bailout.<sup>24</sup> The long-term indirect costs resulting from moral hazard ( $C_i^{\text{MH}}$ ) comprise the costs of the TBTF status of the SII and possibly other SIIs persisting or arising due to bailout expectations, which also results in funding cost advantages and high leverage and risk taking in the future.

At the time of the bailout decision, however, there exists only (relative) certainty about its short-term gross costs and about direct and indirect contagion effects in the event of a market exit owing to the shareholding structure and liabilities of the institution in crisis and its creditors. Expected sales proceeds, opportunity costs and moral hazard costs, as well as systemic losses through reputational effects and

<sup>23</sup> "Resolution" is intended to mean the application of powers, if all legal conditions are met, conferred to resolution authorities as part of the new resolution framework, while "liquidation" refers to the process under national insolvency/bankruptcy frameworks. Market exit also refers to situations where a failing bank or bridge institution continues to operate after it is recapitalised via bail-in.

<sup>24</sup> Hertig [72] shows positive (non-risk-adjusted) returns of 2.6–22.5% on government equity stakes acquired in the bailouts of JP Morgan Chase, Wells Fargo, Goldman Sachs, Crédit Agricole, BNP Paribas and Société Générale for the years 2008 and 2009, while Veronesi and Zingales [97] estimate that US government intervention in financial markets in 2008 increased the value of banks' financial claims by \$130 billion at a cost to taxpayers of \$21–\$44 billion, with a net benefit of \$86–\$109 billion. Gomes et al. [68] use a DSGE (dynamic stochastic general equilibrium) model to quantify the distorting effects of public interventions in 2008 and 2009 in the United States of America. Opportunity costs may encompass forgone long-term growth due to reduced investments in education and welfare spending, particularly when governments become over-indebted (see discussion in Ötler-Robe and Podpiera [83]).



loss of confidence in other banks or entire markets, and macroeconomic equilibrium effects, can only be forecast on the basis of assumptions or extrapolated from historical cases with a high level of uncertainty. Moreover, the ratio of the gross to net costs of the bailout varies over time, since different costs are incurred and different income generated at different points in time. Decision-makers are therefore acting not only under conditions of uncertainty and according to their risk preferences. The time horizon underlying their decision-making also influences what costs and earnings are incorporated into the decision. Electoral and appointment cycles may also play a role.

The definition of the  ${}^sEL_i$  (Eq. 1) shows that the aforementioned policy measures to reduce the  ${}^sPD_i$  and the  ${}^sLGD_i$  are substitutes in theory, since both affect the  ${}^sEL_i$ . Schematically, this approximates to a continuum in which a maximum tolerated  ${}^sEL_i$  can be achieved via different combinations of  ${}^sPD_i$  and  ${}^sLGD_i$  (Fig. 1).<sup>25</sup> In an extreme case,  ${}^sEL_i=0$  can be achieved either through  ${}^sPD_i=0$  given any  ${}^sLGD_i$  or through  ${}^sLGD_i=0$  given any  ${}^sPD_i$ .

However, measures primarily designed to reduce  ${}^sPD_i$  or  ${}^sLGD_i$  are not perfect substitutes for solving the TBTF problem. This results from practice, since neither a PD nor an LGD of zero are possible,<sup>26</sup> but also from the TBTF problem itself (Inequation 3). Regulatory measures, which take  ${}^sPD_i$  as their starting point, reduce the expected losses of a market exit and of a bailout, which is desirable both from an economic perspective and from the point of view of the taxpayer. However, they cannot change the relative size of the expected losses under market exit and bailout, which influences the decision in favour of or against a bailout, unless they also reduce  ${}^sLGD_i$  (Table 1).

As shown by Inequation 3, a market exit is credible if the  ${}^sLGD_i$  is lower than the sum of direct bailout and moral hazard costs (taking due account of the above-mentioned influence of the time horizon in question). The effects of the decision as to whether to liquidate/resolve or bail out the failing bank based on Inequation 3 will then be reflected in the  ${}^sEL_i$  and  ${}^BEL_i$  of the surviving banks. Since measures for lowering the  ${}^sPD_i$  and the  ${}^sLGD_i$  are not perfect substitutes, both regulatory approaches are justified and therefore also complement each other, even if regulators have risk-neutral preferences. This becomes increasingly important if regulators are risk-averse and try to avoid high-impact events,

<sup>25</sup> This analysis does not address the determination of a  ${}^sEL_i$  that is still acceptable economically. Alongside cost-benefit analyses that also take into account the effects on lending and economic growth, the risk preferences of regulatory policy play a part in this respect. We refer the reader to the literature on the optimal equity ratio.

<sup>26</sup>  ${}^sPD_i=0$  may, where applicable, also suppress economically desirable transactions.  ${}^sLGD_i=0$  is virtually impossible in practice, particularly for SIIIs, given that indirect losses arise from network effects and frictions during resolution.

**Table 1** Intended transmission channels of TBTF regulation and postulated effects

	Systemic PD	Systemic LGD
Capital buffers	↓↓	↓
Recovery and resolution regime	↓	↓↓
More intensive supervision	↓↓	↓

such as those leading to a systemic crisis, even if there is a low probability of these events occurring. In this case,  ${}^sLGD_i$  should be reduced, including if the estimated  ${}^sPD_i$  is already low (resulting in lower  ${}^sEL_i$ ), or the regulator chooses measures that are designed to yield a lower  ${}^sLGD_i$  while accepting a higher  ${}^sPD_i$  that leaves the  ${}^sEL_i$  unchanged.<sup>27</sup>

## The current interplay of going and gone concern regulation

At present, the TBTF regulation generally calibrates the measures to reduce the  ${}^sPD_i$  and the  ${}^sLGD_i$  separately, although some measures ultimately have an impact on both target variables (Table 1). The Basel Committee on Banking Supervision (BCBS) regards the going and gone concern regulations to reduce the  ${}^sEL_i$  of global systemically important banks (G-SIB) as two equivalent and complementary approaches (a multipronged approach).<sup>28</sup>

In principle, however, measures that influence the  ${}^sPD_i$  and  ${}^sLGD_i$  can be calibrated together so as not to exceed an economically still acceptable  ${}^sEL_i$ .<sup>29</sup> Such an approach could take account of interdependencies between going and gone concern regulations, which result from the partial substitutability but also the complementarity of measures that reduce the  ${}^sPD_i$  and those that reduce the  ${}^sLGD_i$ . Difficulties or progress in tackling risk using one regulatory strand, such as impediments to resolvability, could also be considered in another strand. Table 2 gives an overview of the interplay between regulations generally aimed at the TBTF problem. Overall, the interplay with other regulations that may also be relevant under TBTF considerations but are not

<sup>27</sup> Risk-neutral decision-makers only consider the expected value of the alternative and not the associated level of risk. For example, risk-neutral investors are indifferent as to whether they receive €100 with a 100% probability or play a lottery to win €200 or nothing, each with a 50% probability. The expected values of the alternatives are the same, but the lottery is riskier.

<sup>28</sup> See footnote 20. BCBS developed the G-SIB and D-SIB framework and revised its core principles for effective banking supervision based on the FSB TBTF policy strands of (1) higher loss-absorbing capacity in the form of regulatory capital buffers for SIIIs and (2) more intensive and effective supervision.

<sup>29</sup> See footnote 25.



included in our analysis, such as liquidity requirements, is also important.<sup>30</sup>

Systemic importance is conceptually linked to resolvability via the  ${}^s\text{LGD}_i$ . Furthermore, the resolvability assessment not only informs the calibration of gone concern requirements for loss-absorbing and recapitalisation capacity (denoted as TLAC/MREL<sup>31</sup> hereafter) but may also be considered for calibrating capital buffers.<sup>32</sup> Buffers interact, in turn, with TLAC/MREL, but also with the leverage ratio, as different rules govern the use of the same capital unit for both buffer and minimum requirements. An additional interaction exists between recovery and resolution plans, which should be effectively interlinked in order to maximise synergies and ensure a smooth transition from recovery to resolution, but may also, in some areas, not be aligned, for example if both plans envisage the use of the same options that can only be used once (e.g. the sale of a certain business unit). Finally, but importantly, the timing of the positive assessment of a bank's (likely) failure may have major implications for the options available in resolution, which may become restricted if an assessment is late. This, in turn, may be considered in the decision on (likely) failure. The interactions will be discussed in more detail below.

## Systemic importance and resolvability assessment

In the global framework for regulating SIIs, determining systemic importance and assessing resolvability are both based on the concept of the  ${}^s\text{LGD}_i$  of an institution. Although they

are conceptually intertwined, the two assessments are not identical in practice.

An institution is deemed resolvable by the resolution authority if it can be either liquidated under normal insolvency proceedings or resolved using resolution tools without significant adverse systemic effects on the financial system and the real economy, thus minimising its  ${}^s\text{LGD}_i$ .<sup>33</sup> In recovery and resolution planning and the resolvability assessment, both firm-specific and system-wide stress scenarios should be used [66]. An institution can be regarded as resolvable if, for example, it has no critical functions<sup>34</sup> or if these functions can be preserved via resolution or even liquidation, if a transfer tool exists and is deemed sufficient. Inter alia, the interconnectedness and substitutability of the bank, its corporate structure, the identification and separation of critical functions and the performance of its data provision and IT systems are key in determining the resolution strategy and assessing the bank's resolvability. If impediments to resolvability exist, in the EU, the institution is required to remove them: otherwise, the resolution authority can impose measures such as the ring-fencing of certain operations.<sup>35</sup> In addition, the characteristics of the applicable national insolvency proceedings, which are

<sup>30</sup> While most regulations affect both PD and LGD (Table 1), they usually follow a primary objective. For example, the resolution regime is mainly designed to reduce LGD in case of failure, but also exerts a PD-reducing effect in going concern by incentivising more prudent behaviour (e.g. reduced funding cost advantage, leaner corporate structure, possibly greater market discipline). The Basel III liquidity requirements, which are not part of FSB TBTF policies, are designed to ensure that banks hold sufficient high-quality liquid assets (HQLA) to withstand a 30-day liquidity stress scenario in order to reduce spillovers into the real economy (Liquidity Coverage Ratio or LCR) and to maintain stable funding for their on and off-balance sheet activities, to reduce the likelihood that disruptions to a bank's regular sources of funding will increase the risk of its failure and potentially lead to broader systemic stress (Net Stable Funding Ratio or NSFR). As HQLA have to be unencumbered and TLAC/MREL have to be met with capital or uncollateralised eligible liabilities, there is a certain complementarity of requirements in this regard.

<sup>31</sup> Referring to the global Total Loss Absorbing Capacity (TLAC) standard applicable to G-SIBs and to the Minimum Requirement for Own Funds and Eligible Liabilities (MREL) in the EU, which applies to all banks and includes TLAC for G-SIBs.

<sup>32</sup> For the sake of simplicity, we usually use the term "capital buffer" only. However, integrated going and gone concern regulations may also encompass macroprudential liquidity and refinancing requirements, which likewise set a limit on the  ${}^s\text{PD}_i$  and  ${}^s\text{LGD}_i$ . For example, liquid assets reduce the probability of default and contagion effects owing to fire sale externalities, and requirements for the funding structure (e.g. a subordination requirement) may facilitate an orderly resolution.

<sup>33</sup> FSB [66], Section 10 and I-Annex 3: "A SIFI is 'resolvable' if it is feasible and credible for the resolution authorities to resolve it in a way that protects systemically important functions without severe systemic disruption and without exposing taxpayers to loss". For the assessment of resolvability in the EU, see, for example, Articles 15, 16 and Annex: Section C of the Bank Recovery and Resolution Directive (BRRD), World Bank Group [100], p. 80, and Appendix 2 of this article. The resolution objectives are to ensure the continuity of critical functions, avoid significant adverse effects on financial stability and protect public funds, covered deposits, client funds and client assets (Article 31(2) BRRD). In the EU, resolution has to be in the public interest, i.e. necessary and proportionate to achieve one or more resolution objectives that would not be met to the same extent under normal insolvency (Article 32(5) BRRD). Recovery and resolution planning have to consider both idiosyncratic and system-wide stress scenarios (Article 5(6) and Article 15(1) BRRD).

<sup>34</sup> Functions (a bank's activities, services and operations) are critical if discontinuing them is likely to lead to the disruption of services that are essential to the real economy or to disrupt financial stability (see Article 2(1)(35) and Article 15(1) BRRD).

<sup>35</sup> Article 17 and 18 BRRD. If a bank is deemed unresolvable, the Single Resolution Board (SRB), which is the central resolution authority within the banking union, is required to notify the EBA. However, this has not yet occurred, despite the fact that fully fledged resolvability assessments have so far been lacking [33]. In the banking union, the SRB indicated that a fully-fledged resolvability assessment would only be part of resolution planning from the 2020 cycle. The SRB published for the first time a report on resolvability of banking union banks in 2022, noting progress but also need for further work and stating that it expects banks to achieve full resolvability by the end of 2023 [91]. In its report published in 2024 [93], the SRB noted progress but did not state that full resolvability was achieved and observed that additional efforts are needed. The SRB further announced a revised resolvability assessment methodol-



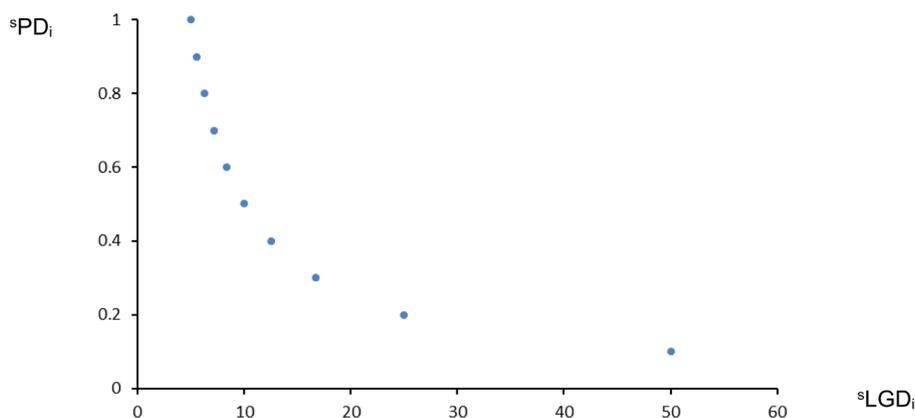


Fig. 1 Isoline for combinations of  $sPD_i$  and  $sLGD_i$  when  $sEL_i=5$

not harmonised in the EU [49], are important in determining whether resolution, rather than liquidation, is necessary.

Similarly, the systemic importance of an institution is based on the effects of its failure on the financial system and the wider economy ( $sLGD_i$ ) and not determined by its probability of default ( $sPD_i$ ). FSB [56] defines institutions as systemically important if their “disorderly failure, because of their size, complexity and systemic interconnectedness, would cause significant disruption to the wider financial system and economic activity”. Following an FSB recommendation, the BCBS developed a methodology for assessing the systemic importance of financial institutions at the global level (G-SIBs).<sup>36</sup> In contrast with the resolvability assessment, the systemic importance score of an SII, according to an indicator-based methodology, serves as a proxy for the (relative)  $sLGD_i$  of an institution. The supervisory authorities base this score solely on size, cross-border activities, substitutability, connectedness and complexity indicators, but adjustments may be possible due to supervisory judgement.<sup>37</sup> The quality of the resolution framework, including resolution challenges, may be implicitly reflected in these indicators but is not explicitly taken into account, including as part of the supervisory judgement. Based on their scores, G-SIBs

are allocated to buckets that are assigned a capital buffer. National authorities may, however, apply higher surcharges beyond that of the G-SIB, for example if there is no credible and effective recovery and resolution plan [15], but have not applied any to date on the basis of such an assessment. By contrast, the BCBS has reviewed the treatment of cross-border exposures within the EBU under the G-SIB methodology [17]. Possible mitigating effects due to the development of the EBU, including the resolution framework, will be considered by calculating a parallel set of G-SIB scores for EBU headquartered banks that treats cross-border intra-EBU exposures partly as domestic exposures. While this calculation does not affect the classification of a bank as a G-SIB, it may reduce its systemic importance score, all other things being equal, and possibly also the allocation to a score bucket that defines the G-SIB capital buffer.<sup>38</sup>

In contrast with the G-SIB framework, the national designated authorities responsible for the assessment of other systemically important institutions (O-SIIs) in the EU may consider the institution’s degree of resolvability in their assessment. The “Guidelines on criteria to assess other systemically important institutions (O-SIIs)” of the European Banking Authority (EBA) also assess systemic importance according to an indicator-based approach. In addition to the mandatory indicators, the guidelines<sup>39</sup> provide optional

Footnote 35 (Continued)

ogy and the systematic testing of banks’ capabilities. In the EU, no harmonised ring fencing has been introduced, as the legislative proposal was withdrawn by the EU Commission in its 2018 working programme. For an overview of bank structural reform (proposals) at the EU level, in the UK, Germany and Switzerland—including references to the US system—see Oppolzer [81].

<sup>36</sup> FSB [56], paragraph 48; BCBS [15].

<sup>37</sup> BCBS [15]. According to the G-SIB methodology of the BCBS, the systemic importance of a bank is measured relative to the global banking sector, using a large sample of banks as its proxy. Banks whose systemic importance score (the indicator value of the bank relative to the value of the entire sector) is above a minimum cut-off level set by the BCBS (currently 130 basis points) are classified as G-SIBs. See also BIS [9], “The G-SIB framework - Executive Summary”.

<sup>38</sup> In the EU, Article 131 CRD establishes a complementary G-SII identification methodology that excludes a group’s intra-EBU activity from the cross-border activity category. According to BCBS [17], supervisory discretion on cross-border intra-EBU exposures can be exercised using an [Adjustment for SStructural Regional Arrangements \(ASTRA\)](#), see ECB [46]. The complementary methodology is meant to reflect progress in the EBU. However, the resolution framework has barely been tested in the EBU, and gaps in resolvability remain, according to the SRB [91–93].

<sup>39</sup> EBA [38]. The O-SII Guidelines of the EBA define a minimum score of 350 basis points (which, if justification is provided, may be increased to 425 basis points or lowered to 275 basis points) for institutions to be identified as systemically important at an EU Member State level, i.e. the reference sector is the entire national bank-



**Table 2** Interplay between regulations

Regulation	Interplay	Regulation
Systemic importance	Both based on ${}^sLGD_i$	Resolvability
Regulatory capital buffers and TLAC/MREL	Additional loss absorbency if impediments to resolvability and to shoulder losses due to another bank's failure Capital buffers not only tend to reduce ${}^sPD_i$ but also ${}^sLGD_i$ and can therefore improve resolvability, similar to TLAC / MREL	Resolvability
Regulatory capital buffers	Capital buffers inform MREL calibration Using buffer capital to meet minimum requirements reduces buffer usability	TLAC/MREL/leverage ratio
Recovery plans	May reinforce each other or be partly non-aligned	Resolution plans
Assessment of bank failure	Timing of assessment affects resolution options, which may inform the timing	Resolution options

resolvability indicators: (1) the degree of resolvability according to the institution's resolvability assessment, (2) importance for an institutional protection scheme (IPS) of which the entity is a member, (3) interbank claims and/or liabilities (with limitation on bail-inable interbank liabilities, an indicator for potential impediments to resolvability due to contagion effects), and (4) deposits guaranteed under a deposit guarantee system (due to the possible impact on the guarantee fund and required ex-post contributions in case of failure).<sup>40</sup>

Until now, however, these optional indicators have been used by only a few national designated authorities of EU Member States and without an explicit relation to resolvability, with one exception.<sup>41</sup> The Netherlands used the degree of resolvability but only in 2016, because it proved not to be a relevant criterion for additionally designating an institution as an O-SII. In Poland, two affiliating banks to which cooperative banks are affiliated have been identified as O-SIIs due to their importance for the IPS of which they are members. Romania and the United Kingdom, as a former EU Member State, use activity on the interbank market as an optional indicator without explicitly including aspects of resolution.<sup>42</sup> The closest example in the EU of an integrated macroprudential and resolution approach to tackle the TBTF problem currently seems to be Austria, which integrates the O-SII and systemic risk

buffer, the Deposit Guarantee Scheme (DGS) and the assessment of whether resolution is in the public interest (PIA) if the institution is failing or likely to fail. Banks above a certain threshold of covered deposits are required to hold an O-SII buffer that is designed to reduce the probability that a bank will fail and the risks of severe repercussions throughout the system, including for the DGS.<sup>43</sup> In addition, the Austrian national central bank and the FMA (Financial Market Authority), which is the national designated and resolution authority, collaborate so that the list of banks assessed as O-SIIs and the list of banks that may pose a risk to financial stability and therefore fall under the resolution regime are consistent (while allowing for some divergences, as the PIA is based on all the resolution objectives and is not restricted to financial stability). Furthermore, Austria applies a systemic risk buffer that should enable banks to absorb potential losses stemming from the market exit of other banks (e.g. due to the resolution of an O-SII or the insolvency of smaller banks), strengthening the credibility of the resolution framework and complementing the O-SII buffer to tackle the TBTF problem.<sup>44</sup>

Given the different types of indicators used by resolution and supervisory authorities and possible differences in risk preferences regarding the level of  ${}^sLGD_i$ , which defines systemic importance and resolvability, the two concepts differ in practice. This may raise questions of consistency, especially if there is a strong dichotomy between resolution and insolvency regimes (Fig. 2).

For example, a bank may be assessed as systemically important, but at the same time liquidation under insolvency procedures is deemed sufficient, even if it only allows for a "piecemeal" liquidation involving a generally more value-destroying gradual sale of individual assets. The Latvian bank ABLV is one case of an O-SII for which, when it failed in 2018, the relevant resolution authority decided that resolution in the public interest was not necessary. Instead, it considered national insolvency proceedings adequate, as

Footnote 39 (Continued)

ing system. With respect to resolvability, no minimum level exists, as the resolution authority will assess each institution individually. In the European Union, G-SIBs are referred to as G-SIIs and designated according to the Basel G-SIB methodology. G-SIIs are in general also O-SIIs: however, systemic importance is measured against the global banking sector for G-SII designation and against the national banking sector for O-SII designation.

<sup>40</sup> See Appendix 2 for an overview of the interaction between resolvability and systemic importance in the EU.

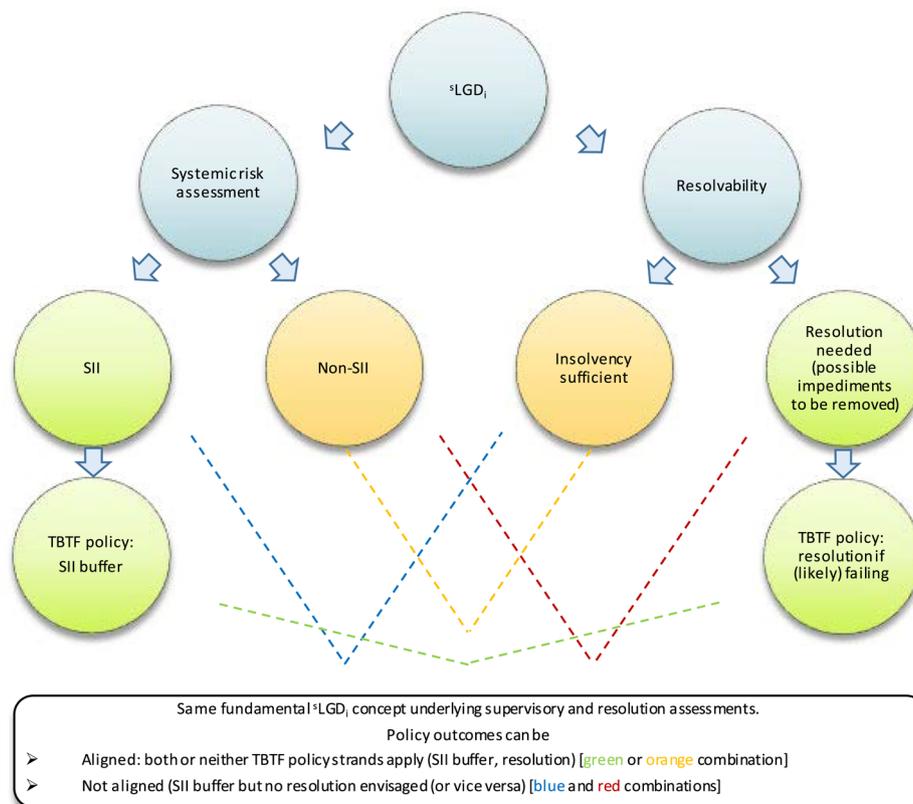
<sup>41</sup> Based on public information in national notifications of O-SIIs to the European Systemic Risk Board (ESRB).

<sup>42</sup> For the country approaches mentioned, we refer to the national notifications of O-SIIs to the ESRB (Netherlands, Poland, Romania and United Kingdom).

<sup>43</sup> FMSG (2019), "Recommendation FMSG/4/2019: guidance on applying the O-SII buffer", 21st meeting, 9 September.

<sup>44</sup> Posch et al. [85].





**Fig. 2** Policy combinations in the light of <sup>S</sup>LGD<sub>i</sub>

financial stability was not seen as being at risk.<sup>45</sup> Other examples are the smaller Danish banks, Andelskassen JAK Slagelse in January 2016 and København Andelskasse in 2018, Polish banks BS w Przemkowie (2020), PBS w Sanoku (2020), Idea Bank S.A. (2020) and Getin Noble Bank S.A. (2022), Croatian bank Sberbank d.d. (2022) and Slovenian bank Sberbank banka d.d. (2022). These banks had not been designated as O-SIIs and their degree of resolvability was not seen as an indicator; nevertheless, resolution was applied because it was regarded as necessary to avoid negative systemic effects on the financial system and the real economy.<sup>46</sup> The cases of the Italian banks, Veneto Banca and Banca Popolare di Vicenza, in 2017, were somewhat different. Neither bank had been designated as systemically important, and the resolution authority did not determine any public interest in resolution when they were failing or

likely to fail, as the grounds on which they had been earmarked for resolution in their 2016 resolution plans no longer applied.<sup>47</sup> However, to avoid economic disturbance in the Veneto region, the Italian government included, in its decree law on the application of compulsory administrative liquidation to banks, public support measures to facilitate the sale of assets and liabilities to a purchaser (liquidation aid).<sup>48</sup>

Conceptually, one could argue that systemic importance and resolvability are two sides of the same coin of <sup>S</sup>LGD<sub>i</sub>. An institution that is not deemed resolvable, either through insolvency proceedings or under the new resolution regime, is also systemically important, as the consequences of its disorderly failure would be severe. Similarly, with increasing <sup>S</sup>LGD<sub>i</sub> under normal insolvency proceedings that envisage piecemeal liquidation an institution's systemic importance

<sup>45</sup> See SRB (2018), “The Single Resolution Board does not take resolution action in relation to ABLV Bank, AS and its subsidiary ABLV Bank Luxembourg S.A.”, 24 February. For the designation of ABLV as an O-SII, see the [notification template](#).

<sup>46</sup> See European Commission [49], p. 54, the Polish national resolution authority (the BFG (Bank Guarantee Fund—*Bankowy Fundusz Gwarancyjny*)) and the EBA. The Danish approach generally also applies resolution tools to smaller banks, as the public interest assessment, which is a precondition of resolution, is interpreted differently than in other EU Member States.

<sup>47</sup> The SRB justified this deviation from the resolution plans by referring to the significant developments since the respective 2016 and 2020 plans of Veneto Banca and Banca Popolare di Vicenza. Also, when Sberbank Europe AG, established in Austria, was failing in 2022, it was not designated as an O-SII, nor was resolution deemed to be in the public interest (SRB/EES/2022/19), although it had been earmarked for resolution in the 2020 resolution plan. However, in this case the Austrian government did not use liquidation aid.

<sup>48</sup> European Commission [49], Annex 2, Country Report Italy, pp. 31–34. See also the EU Commission [press release](#).



also increases, and resolvability becomes a concern. When  ${}^s\text{LGD}_i$  is high, TBTF policies have to be applied.

TBTF policies are higher capital buffers and more intensive and effective supervision, as well as resolution planning and the setting of TLAC/MREL requirements.<sup>49</sup> Mutual consideration of the respective assessments by the resolution authority and the supervisory authority could allow for an integrated, and therefore more holistic, assessment of the bank and its importance. A joint assessment that a bank's  ${}^s\text{LGD}_i$  is too high could imply that the bank as a going concern is both earmarked for resolution and designated as an SII, with the respective requirements. This could also apply if the reference for the systemic impact is not national, but regional or sectoral, without necessary spillovers to the national level, as TBTF measures should be consistently applied. In the event of a crisis, the time between, on the one hand, the SII assessment and the most recent resolution plan, and on the other hand the (likely) failure, may allow for changes in the bank structure and an interconnection that lead to a change in  ${}^s\text{LGD}_i$  and possibly the need to apply resolution tools. Furthermore, depending on the resolution objectives in the legal framework of a jurisdiction, not all objectives may be strictly related to reducing  ${}^s\text{LGD}_i$ , which may hinder a full alignment between SII designation and earmarking for resolution in all cases.

Importantly, a consistent assessment does not mean that a bank deemed to be resolvable based on resolution planning could not be designated as systemically important, as heightened supervision and going concern loss-absorbing capacity may contribute to resolvability and serve as an additional safety net. By contrast, if the need for TBTF policies is assessed differently by the authorities,  ${}^s\text{LGD}_i$  and  ${}^s\text{EL}_i$  may not be sufficiently reduced to effectively contain systemic risk.

### Calibration of the buffer level for SIIs and resolvability assessment

The BCBS framework uses the equal expected impact approach (EEI) as a basis for determining the size of the G-SIB capital buffer.<sup>50</sup> In the EEI approach, the  ${}^s\text{EL}_i$  of an SII should correspond to the  ${}^s\text{EL}_i$  of a non-SII, which is still tolerable for the macroprudential authority and, as it is accountable to political decision-makers, for society as a whole.

<sup>49</sup> The EU MREL regime allows for the setting of MREL > own funds requirements for every bank if needed for resolvability. For example, Denmark requires MREL > own funds not only for O-SIIs but for most small and medium-sized banks, as they are regarded as performing critical functions, and resolution is generally deemed to be in the public interest to achieve the resolution objectives (see, for example, [Danmarks Nationalbank \[30\]](#)).

<sup>50</sup> BCBS [15].

$${}^s\text{EL}_{\text{SII}} = {}^s\text{EL}_{\text{non-SII}} = {}^s\text{PD}_{\text{SII}} \times {}^s\text{LGD}_{\text{SII}} = {}^s\text{PD}_{\text{non-SII}} \times {}^s\text{LGD}_{\text{non-SII}} \quad (4)$$

Equation 4 includes the  ${}^s\text{LGD}_i$ , which explains systemic importance and, by definition, is higher for SIIs than for non-SIIs. The capital buffer rate can be set so that  ${}^s\text{PD}_{\text{SII}}$  and  ${}^s\text{LGD}_{\text{SII}}$  assume a value through which the equation is satisfied. The methodology used by the BCBS calibrates the G-SIB capital buffer under the following assumptions: (1) a default occurs if the capital ratio falls below the minimum requirement; (2) the PD is determinable on the basis of the historical distribution of the return on risk-weighted assets (RORWA) or through a Merton model based on share prices; and (3) the score of the indicator-based methodology for determining systemic importance serves as a proxy for the  ${}^s\text{LGD}_i$  in relative terms (“[Systemic importance and resolvability assessment](#)” section). The EEI is also based on risk-neutral preferences by focussing on the EL only, not emphasising high-impact, low-probability events that would put financial stability at risk.

However, a capital buffer calibrated in this way cannot fully offset the higher  ${}^s\text{LGD}_i$  of an SII in relation to a non-SII. As the historical distribution of the RORWA is based on a sample and is used in the same way for all banks, an underestimation of losses and the  ${}^s\text{PD}_i$  might occur in specific cases.<sup>51</sup> Furthermore, differences between SIIs and non-SIIs in the regulatory bank-specific Pillar 2 capital requirements are not taken into consideration, and  ${}^s\text{LGD}_i$  may be underestimated by the systemic importance score. While in the BCBS G-SIB framework supervisory judgement may support the results of the indicator-based measurement approach, for example to avoid buffers that are too low, it is, however, only meant to override those results in exceptional cases and is subject to international peer review [15]. Passmore and von Hafften [84] as well as Jiron et al. [77] discuss further points and propose revised EEI approaches using explicit PD and LGD functions, which indicate higher than current Basel G-SII buffers, at least for the most systemically important banks. The PD function is modelled based on extreme value theory, while the LGD is based on an exponential function or on the market-based  $\Delta\text{CoVar}$  approach,<sup>52</sup> measuring spillover effects in the financial system when an institution is under stress. Nevertheless, both the current BCBS approach and the proposed alternatives do not explicitly include in the  ${}^s\text{LGD}_i$  calculation whether an institution

<sup>51</sup> In specific cases, an overestimation of the buffer is also possible, but this is less relevant from a financial stability perspective. The BCBS [15] also states that buffers would be higher if a Merton model, rather than RORWA, were used to determine the relationship between regulatory capital ratios and the probability of a bank default.

<sup>52</sup> Adrian and Brunnermeier [3].



is regarded as resolvable under the resolution framework, implying that systemic losses may be underestimated in case of impediments. However, national authorities may demand higher capital surcharges, for example if there is no credible recovery and/or resolution plan.<sup>53</sup> In addition, if preferences are not risk-neutral but risk-averse, as expected,  ${}^s\text{LGD}_i$ -reducing measures would need to be employed even if  ${}^s\text{EL}_{\text{SII}}$  equals  ${}^s\text{EL}_{\text{non-SII}}$  but  ${}^s\text{LGD}_{\text{SII}} > {}^s\text{LGD}_{\text{non-SII}}$  (“Expected systemic loss as a regulatory objective” section).<sup>54</sup>

Based on the economic reasoning of the EEI approach, the buffer for SIIs aims to reduce  ${}^s\text{EL}_{\text{SII}}$  to  ${}^s\text{EL}_{\text{non-SII}}$  (Fig. 3), offsetting only part of the higher  ${}^s\text{LGD}_i$ , while the resolution framework also aims to avoid losses that are further along in the tail, reducing  ${}^s\text{LGD}_i$  to a level where the financial stability and real economy effects are contained.

Capital buffers not only lower  ${}^s\text{PD}_{\text{SII}}$ , thereby reducing the probability that resolution measures will have to be applied, but also provide an escalation ladder when they are used, and lower  ${}^s\text{LGD}_{\text{SII}}$  to some extent if more of the losses ultimately leading to a bank’s resolution or liquidation are absorbed while the bank is still a going concern. A reduced  ${}^s\text{LGD}_{\text{SII}}$  would facilitate effective and credible resolution.<sup>55</sup>

Regulatory capital buffers can only have the envisaged effect, however, if they do not also count towards a bank’s minimum requirements (“Interplay between capital buffers and minimum requirements” section), as the overlapping part cannot be used without breaching a minimum requirement, and also does not add loss-absorbing capacity. Even if the use of a buffer would not trigger an assessment of (likely) failure and thus a possible resolution, an overlap with non-risk-weighted TLAC/MREL requirements would reduce the minimum loss absorption and recapitalisation capacity below the level deemed necessary by resolution authorities and regulators to aid resolvability.<sup>56</sup> By contrast, if there is no overlap between regulatory capital buffers and TLAC/MREL, the effect of the SII buffer in reducing the TBTF problem can be reinforced. In the EU, the market confidence charge (MCC), which is part of the risk-weighted MREL requirement, is calibrated by considering an amount equal to the bank’s risk-weighted regulatory buffers, excluding

the countercyclical buffer. Since in the EU risk-weighted regulatory capital buffers do not count towards risk-weighted TLAC/MREL, the effect of the SII buffer is complemented by a higher MCC, if the risk-weighted requirements are the constraining ones for the financial institution.<sup>57</sup>

Within the EU’s O-SII framework, the calibration of capital buffers is the responsibility of the national designated authorities. However, under its macroprudential powers, the ECB (European Central Bank) can increase any regulatory buffer requirement set within the EBU by national designated authorities, if it does not consider it to be risk-adequate.<sup>58</sup> Resolution aspects may be included in the calibration, but neither the Member States nor the ECB have done this to date. In the United Kingdom, however, the resolution regime was considered when assessing the appropriate level of the equity requirement for the banking system as a whole, including the calibration of the systemic risk buffer (SyRB) used instead of the O-SII buffer until December 2020.<sup>59</sup>

### Interplay between capital buffers and minimum requirements

Capital buffers are part of the going concern regulation to tackle financial stability risks in general and the risks emanating from SIIs in particular. They serve as an “airbag” by absorbing losses while maintaining the status of the bank as a going concern, thereby cushioning the impact on the wider financial system and the real economy. To function as intended, buffers have to be usable, meaning that their loss absorption does not simultaneously breach minimum requirements. In relation to risk-weighted buffers, it means that banks should not rely on buffer capital to meet their TLAC/MREL requirement in leverage ratio exposure terms and their minimum leverage ratio to keep buffers usable.

According to the TLAC standard of the FSB, capital buffers should be usable without entering resolution, and capital used for TLAC must not also be used for capital buffers.<sup>60</sup>

<sup>53</sup> “For example, national supervisors could impose higher capital surcharges beyond the higher loss absorbency requirements for G-SIB that do not have an effective and credible recovery and resolution plan.” See BCBS [15], footnote 13, p. 8.

<sup>54</sup> Also, PD could be further reduced so that  ${}^s\text{EL}_{\text{SII}} < {}^s\text{EL}_{\text{non-SII}}$ , but this might be challenging, if PD is already low, or insufficient, depending on the risk preferences.

<sup>55</sup> However,  ${}^s\text{LGD}_{\text{SII}}$  might still be high due to other aspects, such as impediments to resolution, for example due to insufficient liquidity in resolution. As capital buffers help to reduce  ${}^s\text{PD}_i$ , they reduce the likelihood that resolution tools will have to be applied.

<sup>56</sup> Article 45c(1) BRRD.

<sup>57</sup> See Article 45c(3) BRRD and “Interplay between capital buffers and minimum requirements” section for the market confidence charge as part of risk-weighted MREL.

<sup>58</sup> The top-up power has not yet been used at the time of writing. In line with its macroprudential mandate and in collaboration with the national authorities, the ECB has developed a methodology that determines floors for the capital buffers for nine buckets defined by the O-SII score [47]. The EBA [42] gives an overview of the calibration methods of O-SII buffers in the EU and proposes the introduction of an EU-wide floor for these buffers to avoid unwarranted heterogeneity.

<sup>59</sup> Bank of England [10]. The results of the possible mitigating effects of the resolution framework are, however, highly sensitive to assumptions. Fender and Lewrick [54] assume lower effects and find higher capital requirements are welfare enhancing.

<sup>60</sup> See FSB TLAC standard, Principle (ix) and No 6a in the term sheet. Principle (x) states that a breach or likely breach of TLAC



However, in practice, different jurisdictions, as well as the EU regulatory framework, take the approach that risk-weighted buffers only need to stack above the risk-weighted minimum requirements for capital and TLAC/MREL. This means that not only capital for meeting risk-weighted minimum requirements but also capital used to meet risk-weighted capital buffers can fully count towards the minimum leverage ratio or towards TLAC/MREL in terms of the leverage exposure measure.<sup>61</sup> The ESRB [51] finds that, for more than 50% of banks in a large EU sample, the ability to use capital buffers is significantly restricted or even non-existent, due to the multiple use of capital for buffers and minimum requirements. Buffer usability is lower for G-SIIs and other systemically important banks, as well as banks using internal ratings-based approaches to calculate risk weights, than for other banks. On average, over all banks, only 70% of the combined regulatory risk-weighted capital buffers (combined capital buffer requirement) is usable as of end-2019 when taking into account the interaction with the leverage ratio, and usability could drop to less than 30% once final MREL targets apply, even assuming that all shortfalls are eliminated. The Basel III output floor would improve buffer usability only slightly, on average, for banks using the internal ratings-based approach to calculate risk weights.<sup>62</sup> Buffer capital used to meet minimum requirements does not add or preserve loss absorbency beyond the minimum requirements and does not internalise the negative externalities for which the buffers are set, and is hence

Footnote 60 (continued)

should be treated as severely as a breach or likely breach of minimum capital requirements. No 4 in the term sheet states that the leverage ratio exposure-based TLAC requirement does not limit the authorities' powers to set a requirement above the common minimum or put in place buffers in addition to the leverage ratio exposure-based TLAC minimum.

<sup>61</sup> For the EU, see Article 45b(6) BRRD. According to the EU Commission's non legally binding interpretation, even the double counting of capital for meeting risk-weighted capital buffers and TLAC in terms of the leverage exposure measure is allowed as well as the double counting of capital for meeting the G-SII leverage ratio buffer and TLAC/MREL both in risk-weighted and leverage exposure measure terms (2020/C 321/01 (OJ C 321, 29.9.2020, pp. 1–35, margin number 4)), which would represent a regulatory inconsistency. See also ESRB [51], Table 3. In the UK, buffer capital should not count towards MREL [11].

<sup>62</sup> Also under the complementary approach, considering that the combined buffer requirement (CBR) does not count towards risk-weighted MREL, as described in ESRB ([51], box 2), buffer usability remains limited, depending on the relative size of the requirements, the composition of banks' funding and their risk-weight density; for Italy, Cornacchia and Guerra [28] find that around 25% of banks have limited buffer usability, and average usability across all Italian banks, including those without limitation, is around 74%. Limited buffer usability is also found for resolution groups under the SRB's remit using end-2022 data [32] and, considering only the interaction between risk-weighted buffers and the minimum leverage ratio, for banks in the Americas, Europe and other parts of the world analysed as part of a global sample [18].

ineffective in achieving the goals of buffers. Limited usability therefore also makes the TBTF problem harder to overcome.

According to the ESRB [51], buffer usability can be ensured through legal change by disallowing the double-counting of capital for buffer and minimum requirements. In addition, leverage buffers that mirror all risk-weighted buffers could be implemented to strengthen the backstop function of the leverage ratio as a supplementary and complementary safeguard.<sup>63</sup> If implemented on their own, leverage buffers being on top of leverage-based minimum requirements, like risk-weighted buffers being on top of risk-weighted minimum requirements, would improve but not always ensure buffer usability.<sup>64</sup> Moreover, banks could be required to meet a certain fraction of TLAC/MREL, for example the recapitalisation amount, with eligible liabilities rather than capital, to ensure loss absorption and recapitalisation capacity in gone concern, when most capital will be eroded, and to reduce any overlap with capital buffers.<sup>65</sup> Also increasing the required capital quality for meeting regulatory minimum capital requirements and the leverage buffer could improve buffer usability.<sup>66</sup> To continue to ensure a certain level of buffer usability when such double-counting

<sup>63</sup> The minimum leverage ratio is a backstop to minimum risk-weighted capital requirements but cannot be a backstop to risk-weighted buffers, as this would undermine the buffer function. This can also be seen from the implementation of a Basel G-SII leverage ratio buffer and its conversion factor (50% = 3% Tier 1 minimum leverage ratio / 6% Tier 1 minimum risk-weighted capital requirements).

<sup>64</sup> At EU level, only a G-SII leverage buffer has been introduced since Basel III implementation. The United Kingdom mirrors the risk-weighted G-SII, the O-SII, the systemic risk and the countercyclical buffers in the leverage ratio framework.

<sup>65</sup> This is also supported by FSB [60]: "Regulatory capital buffers must be usable without entry into resolution. Firms must be allowed to utilise Basel III buffers without entering resolution. The setting of Minimum TLAC requirements should not interfere with that" (Principle (ix)). "In addition, to help ensure that a failed G-SIB has sufficient outstanding long-term debt for absorbing losses and/or effecting a recapitalisation in resolution, there is an expectation that the sum of a G-SIB's resolution entity or entities (1) Tier 1 and Tier 2 regulatory capital instruments in the form of debt liabilities plus (2) other TLAC-eligible instruments that are not also eligible as regulatory capital, is equal to or greater than 33% of their Minimum TLAC requirements" (term sheet, No 6). This expectation of a minimum amount of eligible liabilities aims to ensure that resources necessary for resolution are still available when a bank is failing, as equity will be largely eroded.

<sup>66</sup> For example, phasing out instruments such as Tier 2 from the regulatory capital and instead requiring Common Equity Tier 1 (CET1) increases the CET1 minimum risk-weighted capital requirements, so that any overlap is now more between the CET1 used to meet minimum risk-weighted and minimum leverage ratio capital requirements, and less between CET1 capital buffers and minimum leverage ratio requirements. Phasing out AT1 could also increase the ability to use total buffers (usable part of CBR plus any leverage ratio buffer exceeding CBR). See ESRB [51], Table 11 and p. 56. CET1 used to meet minimum capital requirements counts towards TLAC/MREL, except for any part that may need to be met with eligible liabilities only.



of capital is allowed, macroprudential authorities could also calibrate buffers higher. In this way, a greater share of buffer capital would be usable and not relied upon to meet minimum requirements. The options typically lead to higher capitalisation or adjustment of liability structures, which might entail private costs for banks. The social benefits of higher buffer usability have to be balanced against the social costs of the options concerned, but, at the same time, against the social costs of inaction, i.e. in terms of limited buffer usability and hence resilience.

In the EU, the size of the O-SII buffer also affects the institution-specific MREL requirement. MREL expressed in terms of risk-weighted assets includes an MCC designed to ensure that the institution is sufficiently recapitalised in resolution to regain market access post-resolution. The default value of the confidence charge corresponds to an amount equal to the institution's combined buffer requirement (of which the O-SII buffer is part) less the countercyclical buffer.<sup>67</sup> Going concern capital buffers and gone concern TLAC/MREL therefore depend to some extent on each other, which influences their ability to reduce an institution's  ${}^sEL_i$ .

To safeguard resilience in going concern, it is important that banks breaching their buffer requirements restrict their distributions, such as dividends. While such restrictions are automatic when risk-weighted (leverage) regulatory capital buffers are breached on top of risk-weighted (leverage) minimum capital requirements, in the EU they are at the discretion of resolution authorities when risk-weighted regulatory capital buffers are breached on top of risk-weighted TLAC/MREL.<sup>68</sup> In this case, macroprudential authorities are not involved and have no instrument to safeguard resilience, necessary to mitigate systemic risk if at the same time the aforementioned conditions for automatic distribution restrictions are not met.<sup>69</sup> Banks may operate below buffers for some time without distribution restrictions, rendering them more vulnerable when losses hit and undermining the macroprudential objective of those buffers. Automatic distribution restrictions, for example when buffers are breached on top of minimum capital requirements, would simplify processes and help ensure resilience; at least, decisions on restrictions should be taken in consensus with

macroprudential authorities. Macroprudential authorities are also not involved in assessing the capital conservation plans that are mandatory for banks that breach their buffers.<sup>70</sup> Such involvement would be particularly beneficial in systemic crisis and/or if systemically important banks are affected, in order to assess the impact on financial stability.

In the EU, there is also no obligation for microprudential authorities to inform macroprudential authorities when buffers are breached<sup>71</sup> or supervisory or early intervention measures are taken, although this information is valuable for the prompt assessment of the impact of the stressed institution on financial stability. Similarly, there is no obligation for resolution authorities to share information, including MREL requirements and resources, with macroprudential authorities, possibly making the calculation of regulatory buffer usability challenging, as discussed above.<sup>72</sup> Information sharing among authorities is a precondition for an integrated regulatory approach and could be ensured by being mandatory.

### Interplay between recovery and resolution plans

Recovery and resolution plans (RRPs) are part of the FSB Key Attributes of Effective Resolution Regimes for Financial Institutions and are defined by them.<sup>73</sup> Like other regulatory instruments, they are designed to reduce  ${}^sPD_i$  and  ${}^sLGD_i$ . While the recovery plan identifies options to restore financial strength and viability when the firm comes under stress (going concern), the resolution plan aims to facilitate the effective use of resolution powers to achieve the resolution objectives when resolution has been triggered (gone concern). In the EU, financial institutions write recovery plans that are assessed by microprudential authorities, whereas resolution authorities write resolution plans. Despite these different competencies, RRP should be seen as one integrated planning process with recovery and

<sup>67</sup> Article 45c(3) BRRD. Resolution authorities retain the discretion to adjust the confidence charge.

<sup>68</sup> Article 16a BRRD.

<sup>69</sup> While financial stability concerns justify automatic distribution restrictions in the capital framework, a serious disturbance to financial markets, as determined solely by the resolution authority, may prevent the application of distribution restrictions if the CBR is breached on top of risk-weighted TLAC/MREL (Article 16a BRRD). This treatment of disturbances in Article 16a BRRD should be removed, as it may undermine the effectiveness of macroprudential buffers.

<sup>70</sup> Article 142 CRD. While Article 56 CRD does not preclude the exchange of information between authorities, the involvement of macroprudential authorities is not ensured.

<sup>71</sup> For example, Article 141(2) and 141b(2) CRD determine that banks are required to notify the competent (i.e. microprudential) authority. Recommendation ESRB/2019/18 on exchange and collection of information for macroprudential purposes on branches of credit institutions having their head office in another Member State or in a third country may mitigate information gaps with respect to those branches. Disclosure of MREL requirements and capacity by banks applies from 2024.

<sup>72</sup> Article 90 and Article 84(4) BRRD could be strengthened to explicitly ensure information sharing for financial stability purposes. Information may have to be shared with macroprudential authorities if they are part of supervisory or resolution colleges of cross-border banks.

<sup>73</sup> FSB [66]. For EU legislation, see Article 5(ff) BRRD (recovery planning) and Article 10(ff) BRRD, as well as Article 8(ff) SRMR (resolution planning).



resolution options aligned to enable a smooth transition from recovery to resolution when needed. If there is no alignment, one option (e.g. the sale of business unit X) may be part of both plans, while the option may only be executed once (unit X can only be sold once), leading to double-counting for both recovery and resolution capacity, meant as available options and means that can be generated. Furthermore, some recovery options may jeopardise the resolution plan, for example if certain business units or services deemed to be critical are reorganised or dismantled or if asset encumbrance increases such that funding in resolution is jeopardised.

The FSB recognises that the extent to which recovery measures support or are consistent with resolution strategy has to be assessed.<sup>74</sup> In the EU, microprudential and resolution authorities are required to consult each other on the respective RRP: therefore, coordination and willingness to cooperate are essential. The EBA [40] stresses that effective interlinkages between RRPs can maximise synergies and ensure consistency in their potential implementation. While showing that some interlinkages between RRPs already exist, the analysis concludes that more progress is needed in assessing some key aspects of interlinkages, such as the implications of recovery options on resolvability and the impact of resolution plans on recovery plans and ongoing supervision, to which end the EBA developed a framework to aid resolution and supervisory authorities. Furthermore, the identification of a bank's critical functions should be fully aligned across plans, and a sequential link between the availability of central bank funding in recovery and resolution has to be ensured. It would also be beneficial to analyse the implications of resolution plans and measures to remove impediments to resolvability on recovery options, for example if an institution is required to alter its funding profile or reduce its operational interconnectedness within the group. Despite the recognition of a need for coordination and cooperation among authorities, this is currently mainly confined to microprudential and resolution authorities, while macroprudential authorities are not required to be consulted by law, and there is no obligation to share RRPs with them.<sup>75</sup> This also applies to RRPs under systemic stress scenarios or when assessing the feasibility of RRP options at the macro level. However, an integrated approach to tackling the TBTF problem would require all relevant authorities, including macroprudential ones, to have access to plans, and would require assessments to be shared. Information from the plans and assessments would help financial stability

<sup>74</sup> FSB [59], p. 11.

<sup>75</sup> Except that resolution authorities are required to consult, if appropriate, the designated national macroprudential authority on the impact of measures to remove substantive impediments to resolvability on the institution, the internal market and financial stability in other Member States and in the Union as a whole: see Article 17(7) BRRD. Central banks, designated national macroprudential authori-

analyses of (1) the effects of recovery and resolution on the financial system and the real economy, including under system-wide stress, (2) the feasibility of recovery and resolution options if applied simultaneously to several banks, for example whether envisaged capital raising would be feasible at the macro level, and (3) the systemic importance analysis, given the relevance of critical functions and the degree of resolvability (“[Systemic importance and resolvability assessment](#)” section). As the contents and details of RRPs should take into account the effect of an institution's failure on the financial system and the wider economy, sharing plans and analyses and bringing in macroprudential expertise would be beneficial.<sup>76</sup>

Furthermore, in the EU, for recovery and resolution planning the use of simplified obligations is allowed, provided an institution meets the eligibility criteria. These criteria are based on a two-step approach, where institutions are assessed against quantitative and qualitative criteria. The quantitative criteria are based on measures related to systemic importance and are identical with the criteria for identifying O-SIIs.<sup>77</sup> Hence, RRP planning combines systemic importance and resolvability (see also Appendix 2).

### Importance of a prompt assessment of failure for the available options in resolution

In the EU, when a bank is assessed as failing or likely to fail, and there is no reasonable prospect that any alternative private sector measures would prevent the failure, the resolution authority determines whether resolution is in the public interest. This is the case if the application of resolution tools is deemed necessary to meet the resolution objectives, including safeguarding financial stability and limiting negative effects on the real economy. Alternatively, in case of a negative public interest assessment, the bank is liquidated under normal insolvency proceedings. The competent authorities responsible for going concern supervision usually carry out the assessment of (likely) failure, while resolution authorities may also carry out this assessment themselves, if Member States have exercised the national option provided in the EU Directive (in the EBU, the respective EU regulation confers this power on the Single Resolution Board). The timing of the declaration of (likely)

Footnote 75 (continued)

ties and the ESRB have to be informed if an institution is declared to be failing or likely to fail (Article 81(3) BRRD) and when resolution action is taken (Article 83(2) BRRD).

<sup>76</sup> See Article 4(1) BRRD for the considerations for the content and details of RRPs. Article 4(2) states that competent authorities and, where relevant, resolution authorities shall make their assessments after consulting, where appropriate, the national macroprudential authority.

<sup>77</sup> European Commission [48].



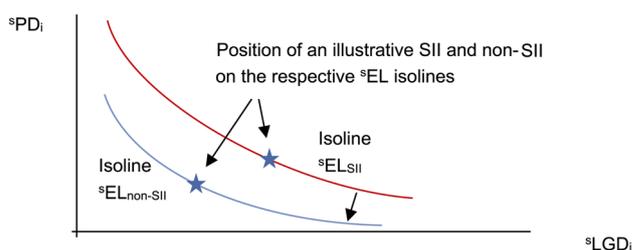
failure can have major implications for the options available to resolution authorities when the bank enters resolution.

A late assessment of (likely) failure may mean that liabilities already substantially exceed assets, exhausting a bank's loss-absorbing and recapitalisation capacity via bail-in. It could also mean that funding in resolution, one of the remaining challenges for orderly resolution, becomes an even bigger problem when the bank's assets are highly encumbered. Forbearance would increase the likelihood that bail-in also affects derivatives and deposits. This may increase systemic loss and therefore the relative attractiveness of bailout. The FSB TLAC standard recognises that a sufficient amount of own funds and subordinated (i.e. easily bail-inable) liabilities is needed to reduce systemic loss and thus the probability of bailout. To ensure that sufficient resources are available in resolution, any (likely) breach of TLAC should be treated as a (likely) breach of minimum capital requirements and addressed swiftly (TLAC Principle (x)). There is also an expectation that at least 33% of TLAC will be met with long-term debt (TLAC term sheet, No 6). By contrast, EU law does not implement this expectation and does not explicitly allow the resources needed in resolution to be taken into account when assessing the (likely) failure of an institution.<sup>78</sup> However, some authorities recognise the importance of the timing of such a decision for resolvability, especially if the institution is mainly funded with own funds, secured financing and deposits, making bail-in, as a resolution tool, difficult or impracticable.<sup>79</sup>

Safeguarding sufficient resources in resolution also extends to liquidity. In the United States, institutions should provide for the adequate sizing and positioning of liquid assets for anticipated net liquidity outflows for a period of at least 30 days before bankruptcy (Resolution Liquidity Adequacy and Positioning (RLAP)). They also have to estimate the liquidity needed after the U.S. Intermediate Holding Company bankruptcy filing to stabilise the surviving material entities and to allow those entities to operate post-filing (Resolution Liquidity Execution Need (RLEN)).<sup>80</sup> In the EU, the SRB

<sup>78</sup> In the EU, falling short of the necessary resources to ensure resolvability is not listed as one of the circumstances for declaring an institution failing or likely to fail (see Article 32 BRRD). However, the exact timing of such a decision involves a certain degree of discretion, and the relevant authority has to assess all relevant information. Furthermore, various measures are available to address breaches of MREL (see Article 45(k) BRRD), including an assessment of whether the institution is failing or likely to fail. Banks breaching the CBR on top of risk-weighted MREL or breaching TLAC or MREL requirements also need to propose measures and timelines to comply with the requirements within two weeks of receipt of the determination by the resolution authority that there are substantive impediments to resolvability (Article 17(3) BRRD).

<sup>79</sup> Danish Financial Supervisory Authority [29]. This may, in particular, be an issue for smaller and medium-sized banks, which, however, might also be systemic individually or when considered together (too-many-to-fail).



**Fig. 3** The effect of TBTF policies on banks'  ${}^sEL_i$ . Notes: Stylised graph for illustrative purposes. According to the EEI approach, the SII buffer is calibrated in order to reduce  ${}^sEL_{SII}$  to  ${}^sEL_{non-SII}$  ( ${}^sEL_{SII}$  shifts from the red to the blue isoline). The resolution regime primarily aims to reduce  ${}^sLGD_i$  but also affects  ${}^sPD_i$  (Table 1), shifting the position of the  ${}^sEL_{SII}$  to a lower isoline

(Single Resolution Board) has published expectations for banks and guidance on liquidity and funding in resolution.<sup>81</sup>

The crisis management and deposit insurance framework in the EU should be reviewed to explicitly allow for the resources necessary for resolution to be taken into account when determining whether a bank is failing or likely to fail. Such a determination has to be made when the bank is still deemed to be resolvable, i.e. when it still has sufficient own funds and easily bail-inable liabilities, as well as unencumbered assets.<sup>82</sup> Any decision of likely failure would retain a certain discretion but allow for a more holistic assessment, explicitly considering the implications for resolvability.

## Implications for going and gone concern regulation

This analysis shows that both regulatory strands can be seen as part of a fundamentally integrated framework to reduce the systemic risk stemming from SIIs. Although implemented independently of each other, they nevertheless interact to some degree. Whether policies have been effective in reducing  ${}^sPD_i$  and  ${}^sLGD_i$ , and therefore  ${}^sEL_i$ , as well as, ultimately, the TBTF problem (Inequation 3) continues to be evaluated.  ${}^sPD_i$  and  ${}^sLGD_i$  are hard to measure, and establishing a causal

<sup>80</sup> See Board of Governors of the Federal Reserve System, "Resolution Plan FAQs, Foreign Banking Organisations".

<sup>81</sup> See SRB [89, 90].

<sup>82</sup> For this, Article 32 BRRD should be amended to require developments in MREL, (central bank eligible) unencumbered assets and counterbalancing capacity to be considered when assessing whether an institution meets the conditions for (likely) failure. Article 32 BRRD could be further amended so that a (likely) breach of MREL can also be grounds for declaring an institution as (likely) to fail if it is under severe stress. The vague concept of "in the near future" (Article 32(4) BRRD) should be operationalised to cover a 12-month period or, in case of liquidity problems leading to (likely) failure, at least five working days.



link between a variation in those two variables and TBTF reforms represents an additional challenge. The FSB [63] carried out a comprehensive evaluation of TBTF reforms, trying to assess their effects and how market participants, credit ratings agencies, authorities and academia perceive them. Various studies have also attempted to assess systemic importance, resilience, market discipline (particularly in terms of funding cost advantages) and resolution and bailout costs.<sup>83</sup> These findings may help to approximate the  ${}^sEL_i$  of banks (see Appendix 3 for a brief outline). However, any such estimate, including the causal effects of reforms, would come with uncertainty. It would also be important to know bank-specific minimum and buffer requirements to infer how binding TBTF measures are for individual banks. However, these are currently not always available in a consistent and comprehensive way at the international level, either for all the authorities involved or for market participants that would rely on it to price risk adequately.<sup>84</sup> Against this background, and to complement the evidence on the effectiveness of reforms, the conceptual analysis of the regulatory interplay can be useful for policymakers to assess whether the current framework works as intended and is effective.

### Why an integrated approach?

The current approach of largely independent implementation of policies implies that the authorities responsible for microprudential and macroprudential policies (going concern) and those responsible for resolution (gone concern) have more or less clearly delineated policy areas, instruments and responsibilities. Cooperation between authorities is confined to specific aspects: for example, microprudential supervisors

and resolution authorities consult each other on RRP in the EU. They also exchange some bank-specific information on a regular basis and more in crisis situations.

However, the current approach may fall short of fully seeing and taking into account the different interdependencies that stem from the integrated framework on which the regulatory strands are based. For instance,  ${}^sLGD_i$ , and thus systemic importance and resolvability, are assessed by macroprudential and resolution authorities, which may have different implications for the use of policy measures to reduce  ${}^sPD_i$  and  ${}^sLGD_i$  that are not necessarily consulted on and aligned between authorities. In addition, the interplay between regulatory instruments is not yet fully understood and taken into account by policymakers, regulators and banks. For example, overall regulation and the calibration of capital buffers currently do not consider whether buffers are effectively usable or whether their absorption of losses would simultaneously breach minimum requirements, such as the leverage ratio or TLAC/MREL, due to the multiple use of capital. Buffers that are not usable do not add loss-absorbing capacity and consequently do not reduce  ${}^sPD_i$  and  ${}^sLGD_i$ . Another example are options in a bank's recovery plan that may negatively affect resolution options. This necessitates close coordination and cooperation by the authorities involved, and it remains to be seen whether the current consultation requirement in the EU can achieve this. Moreover, resolution and recovery planning under systemic stress, while required by law, is only in the development stage, and macroprudential authorities are generally not involved when assessments and plans are made ("[Interplay between recovery and resolution plans](#)" section).<sup>85</sup>

### What would an integrated approach entail?

Realising that instruments from both the going and the gone concern regulation may help to achieve the regulatory objective, by limiting  ${}^sPD_i$  and/or  ${}^sLGD_i$ , and therefore  ${}^sEL_i$ , has several implications. First, the various authorities (or departments if competences are bundled into one authority) in charge of regulatory policies should have a common understanding of whether  ${}^sPD_i$  and/or  ${}^sLGD_i$  are deemed excessive and instruments should be employed to limit them. Second, authorities need a clear understanding of all instruments and how their interplay affects  ${}^sPD_i$  and/or  ${}^sLGD_i$ , including in order to improve regulation. Third, the most effective instrument (or combination of instruments) from the different regulatory strands should be calibrated accordingly.

What would this mean in practice? Closer cooperation between authorities would help to form a common understanding of the potential risks to financial stability and the means necessary to address them. For example, both when assessing

<sup>83</sup> FSB [63] provides a literature review covering various aspects of the risks posed by SIIs and the TBTF problem. On the impact of the post-crisis TBTF reforms on banks' behaviour and structure, see, for example, Violon et al. [98] and BCBS [16]. VanHoose [96] and Behr et al. [21] provide an overview of studies on the link between capital requirements and risk taking. Market discipline may be measured using information on funding cost advantages, see, for example: Gudmundsson [69], IMF [75], Schich and Toader [88], and Ueda and Weder di Mauro [95]. The effect of regulatory and resolution reform announcements and policy actions on risk premia of bank debt is studied by e.g. Bellia et al. [22]. Resolution and bailout costs are studied by, for example: Acharya et al. [1], Beck et al. [20], Halaj et al. [70], Keister [78], Navaretti et al. [79], and White and Yorulmazzer [99]. On funding in resolution and sources of liquidity provision see FSB [61–63, 65, 66].

<sup>84</sup> For example, in the EU, MREL disclosure requirements apply only since 1 January 2024, while MREL regulatory reporting according to new definitions under the revised BRRD started on 28 June 2021; see EBA [41] (official text OJ L 168 12.5.2021, p. 1). If the supervisory consolidation perimeter differs from the resolution consolidation perimeter, the capital buffer requirement on top of MREL needs to be estimated by the resolution authority; however, for this no reporting and disclosure requirements currently exist. See also FSB [63] p. 7 on data gaps.

<sup>85</sup> See Articles 5(6) and 10(3) BRRD and Article 8(6) SRMR.



whether an institution is systemically important and when deciding on the measures needed to overcome any TBTF problem, authorities should take all relevant aspects into account. This could mean that all banks earmarked for resolution, for example due to their critical functions or impact on financial stability in case of failure, are also designated as systemically important and vice versa, reflecting their high  ${}^s\text{LGD}_i$  and thus the need to apply TBTF policies. Furthermore, resolution and macroprudential authorities could work together, for example via formal consultations, to develop and apply systemic stress scenarios for recovery and resolution planning and to assess the feasibility of the recovery and resolution actions envisaged in the respective plans at the macro-level. This would take into account whether actions at the bank level, such as the sale of business units or capital raising, are feasible if multiple banks intend to implement similar options at the same time under systemic stress. While microprudential and resolution authorities can already take this into account, macroprudential authorities are generally not yet involved, and information does not have to be shared with them. In case of differing views in formal consultations between authorities, the consulting authority could nevertheless decide, assuming responsibility and after all views had been documented, or a dispute settlement mechanism could be defined.

In addition, interactions between requirements that may limit their effectiveness have to be taken into account. Macroprudential authorities (national designated authorities, in the EU, see Appendix 1) should generally set buffers so that a sufficient amount is not constrained by parallel minimum requirements, including TLAC/MREL, as long as the multiple use of capital for buffers and minimum requirements is still allowed by law. They could also regularly communicate their expectation that banks should maintain a certain level of buffer usability. This would give banks the discretion to decide how this is achieved, for example by issuing specific instruments to improve buffer usability or by adjusting their risk-weighted assets or the leverage exposure measure, depending on the drivers of the buffer usability constraint [51]. To implement such an integrated approach, authorities need to share all information relevant for the respective tasks. Buffer setting could also take into account impediments to resolvability, which mean that a bank's  ${}^s\text{LGD}_i$ , and probably  ${}^s\text{EL}_i$ , is too high. Mitigating options should therefore be employed until the impediments are removed.<sup>86</sup> These could be higher TLAC/MREL requirements, but these might not be able to increase market discipline if resolution is not deemed credible or reduce

contagion risk if resolution occurs.<sup>87</sup> Moreover, TLAC/MREL cannot address all impediments, for example those stemming from a lack of liquidity in resolution. In this case, authorities might find it appropriate to reduce the bank's  ${}^s\text{PD}_i$  and  ${}^s\text{EL}_i$  by increasing going concern resilience, for example via higher capital buffers,<sup>88</sup> which are not constrained by parallel minimum requirements, and/or via liquidity requirements and/or by setting requirements for the maturity profile of the bank's liabilities.<sup>89</sup>

Authorities may also ensure that financial institutions have higher loss-absorbing capacity, in order to mitigate any contagion effects caused by other banks exiting the market, as is the case in Austria, with the aforementioned SyRB. This could also be released in the event of a larger bank failure if any stigmatising effects of using it for loss absorption are deemed material. Special attention could be given to increasing the resilience of institutions that are directly and indirectly connected to institutions that have impediments to resolvability. Capital buffers could limit contagion, supplementing the deduction regime for TLAC holdings, which could be strengthened by requiring all institutions earmarked for resolution to deduct TLAC holdings and holdings of financial instruments used to meet similar jurisdictional requirements (MREL in the EU).<sup>90</sup>

<sup>87</sup> In the EU, only G-SIIs have to deduct TLAC holdings (the TLAC requirement is incorporated as statutory MREL minimum requirement for G-SIIs in EU law) from their own TLAC and only for compliance with the statutory, but not the overall, MREL requirement. This falls short of the BCBS TLAC holdings standard [14], according to which all banks should deduct TLAC holdings from their own Tier 2 capital.

<sup>88</sup> Capital buffers reduce  ${}^s\text{PD}_i$  and therefore the probability that liquidity in resolution will become a problem. Buffer levels could be informed, for example by remaining gaps in resolvability, implicit government guarantees and estimates of contagion effects via bail-inable liabilities.

<sup>89</sup> Going-concern liquidity requirements, such as the LCR and NSFR, may be insufficient, as the LCR is a buffer that may be used in going concern and might not be available in gone concern, and the NSFR may also be met with stable retail deposits that might be problematic in a bail-in, or may be met with secured financing that would also not be subject to bail-in, and encumbered assets would not be available for liquidity generation. The distress of Credit Suisse in 2023 suggests that LCR and NSFR in their current form might also not always be able to cover liquidity risk sufficiently.

<sup>90</sup> See also the EBA [44] and the ESRB [52], the latter stating that measures such as higher risk weights for MREL eligible liabilities, the introduction of specific limits or a full deduction regime could be envisaged. While on average, direct contagion via MREL eligible liabilities seems contained in the EU, there are outliers with above-average holdings of eligible liabilities and significant issuer or country concentration. Furthermore, the EBA [44] does not take into account contagion via MREL held by institutions not earmarked for resolution that may be relevant and material, including under a too-many-to-fail perspective (e.g. in banking networks), or held by banks that are earmarked for resolution but are not in the sample. See also Deutsche Bundesbank [34], p. 73.

<sup>86</sup> For an aggregate resolvability assessment in the EBU, see SRB [91–93]. Assessments, including bank-specific ones, are published in Switzerland, the United Kingdom and the United States (regarding living wills, under Title I Dodd-Frank Act).



Moreover, it is essential that the determination of a bank in distress as failing or likely to fail occurs promptly and ensures that the bank still has sufficient own funds, easily bail-inable liabilities and unencumbered assets to make it resolvable, while acknowledging that other factors also impinge on resolvability.

In such an integrated approach, the boundaries between going and gone concern requirements may become blurred: for example, the use of primarily going concern instruments is motivated by gone concern considerations. While not current practice, this would arise naturally from the perspective of an integrated framework that attempts to limit  ${}^sPD_i$ ,  ${}^sLGD_i$  and  ${}^sEL_i$ . This framework could also be expanded to encompass further policies to limit systemic risk, in order to understand and design regulatory policies at a systemic, rather than mainly individual, level [2].

### Have there been attempts to implement an integrated approach in practice?

To date, few countries have tried to apply such an approach, and these have limited it to specific aspects, as outlined in the “[Systemic importance and resolvability assessment](#)” section on the identification of SIIs and in the “[Calibration of the buffer level for SIIs and resolvability assessment](#)” section on the SII buffer calibration. Austria integrates macroprudential buffers, DGS and resolution aspects in its policies to some extent (“[Systemic importance and resolvability assessment](#)” section). Furthermore, the EBA [43] asks supervisors to consider information from RRP, including the resolvability assessment, when analysing the business models of institutions and in carrying out supervisory or early intervention measures to ensure consistency. The EBA [45] also published resolvability testing guidelines to ensure that the arrangements put in place to support the execution of the resolution strategy are adequate and ready to use. These include a self-assessment that asks banks to consider the interaction between their resolvability capabilities and recovery, a multiannual testing programme and a master playbook that also provides a tool for banks to link their recovery plans to their readiness to support the execution of the resolution strategy. In Switzerland, progress in resolvability could have led to a rebate of requirements for additional loss-absorbing capacity (own funds or bail-inable liabilities). Impediments to resolvability can lead to higher loss-absorbing and/or liquidity requirements.<sup>91</sup> The rebate aimed to incentivise banks to improve their resolvability and the resolution

<sup>91</sup> While being part of the resolution framework, it can be seen as taking an integrated view, taking regulatory interactions into account. See Articles 65, 65a, 65b and 66 of the [Banking Ordinance](#). Discounts were only possible for internationally active systemically important banks and their subsidiaries in Switzerland under the scope of Title 5 of the [Capital Adequacy Ordinance](#).

authority to regularly review and assess it, although a rebate may not be desirable, as resolvability can only be assessed with certainty when it occurs.<sup>92</sup> Moreover, Belgium has authorised its macroprudential authority to impose requirements on the level and maturity profile of a bank’s loss-absorbing capacity, including liabilities, to improve its resolvability.<sup>93</sup> From a resolution and financial stability perspective, the authorities responsible for deciding whether a bank is failing or likely to fail should also consider the impact of the timing of the decision on the available resources in resolution or liquidation. If resources are already largely eroded when a bank is (likely) failing, resolvability may be jeopardised, increasing the  ${}^sEL_i$  via a rise in the  ${}^sLGD_i$ .<sup>94</sup>

### Considerations for implementing an integrated approach

There may be a number of reasons why an integrated approach has generally not been implemented to date, or only to a limited extent. Regulation has historically grown and various policies have only been introduced as a response to the 2008 financial crisis. Often, different authorities (microprudential, macroprudential and resolution) and institutional layers (e.g. national and European in the EBU; state and federal in the United States) are responsible for different policies, potentially making an integrated view more challenging.<sup>95</sup> In addition, experience with capital buffers, and particularly with resolution frameworks and gone concern requirements, is still limited, or policies are still being implemented or are under development. Furthermore, as in many

<sup>92</sup> The incentive effect may, however, be limited for internationally active Swiss SIIs, as they are also subject to requirements in the foreign jurisdictions in which they operate.

<sup>93</sup> See Article 36/34(1)(10) of the law of 22 February 1998 establishing the [organic statute](#) of the NBB (Nationale Bank van België/Banque Nationale de Belgique). This provision was repealed by the [law of 20 July 2022](#) as, inter alia, the risk that specified the provision is now covered by the BRRD, according to the Belgian authorities. NBB is both a designated and national macroprudential authority (see [Appendix 1](#) for definitions).

<sup>94</sup> This is, for example, recognised by the Danish Financial Supervisory Authority: see the [Memo on Reaction pattern following breach of MREL](#) [67]. However, the resources necessary to ensure resolvability are not listed by the EBA as an indicator to consider when deciding on the (likely) failure of a bank, which may render the inclusion of this aspect more challenging.

<sup>95</sup> In the EBU, macroprudential policy is mainly a national competence, with the ECB having some top-up power (unused to date), while for significant institutions resolution competence lies with the SRB and microprudential supervision with the ECB. In the United States of America, there are several regulatory authorities at the state and federal level. The Financial Stability Oversight Council (FSOC) is composed of voting members from ten different authorities (see the [report of the Task Force on Financial Stability](#), The Brookings Institutions). For an overview of the institutional arrangements for bank resolution, see Baudino et al. [19].



fields, regulation and policies tend to specialise, with the side effect that their interactions do not always receive the attention they deserve. Lastly, but importantly, an integrated approach raises operational questions, some of which also apply to the current system.

These questions encompass the institutional system and agreements to ensure the necessary coordination and cooperation between authorities. Operationalisation also needs to take into account the uncertainty surrounding  ${}^s\text{PD}_i$  and  ${}^s\text{LGD}_i$  and the impact on them of regulatory policies and interplay. In particular, the effectiveness of resolution planning and crisis management can, *ex ante*, be related to high levels of uncertainty, although the testing of capabilities, including via dry runs, may reduce uncertainty to some extent. Forward-looking quantification of the benefits and costs of policy measures and their interactions, as well as the related uncertainty, is challenging and will remain approximate. Further research is warranted to help operationalise the integrated framework that has been outlined, in which the optimal combination of macroprudential, microprudential and resolution policies can be conceptualised. In this regard, it is also worth exploring whether simpler rules, rather than complex models, might be useful in a financial system characterised by uncertainty [4]. However, the current regulatory approach, in which policies are largely calibrated independently of each other, is also subject to the aforementioned quantification challenges. Disregarding certain regulatory interactions may facilitate policy operationalisation, but compromises the ability of such an approach to mitigate the TBTF problem. This applies, in particular, to regulatory interactions that are evident and even quantified, such as the multiple use of capital for regulatory buffers and minimum requirements.

Operationalisation also relates to the type of approach to be followed, which could be symmetric or asymmetric. A symmetric approach, for instance, would try to offset impediments to resolvability with going and/or gone concern requirements but conversely reduce those requirements when certain bank-specific resolvability targets are met.<sup>96</sup> Such an approach might make banks more incentivised to increase their resolvability and cooperate fully with authorities. By contrast, an asymmetric approach would also increase requirements in case of impediments to resolvability, but the absence of impediments would not result in a lowering of requirements. This would reflect higher risk aversion on the part of authorities, acknowledging that any failure would entail costs. In addition, resolvability can only be assessed

with certainty when resolution occurs, the current assessments indicate remaining gaps [91–93], implicit government guarantees are not yet below pre-GFC levels [63] and a reduction of requirements, such as capital buffers, might, in turn, have a negative effect on resolvability.<sup>97</sup> Although studies on optimal capital levels for banks differ in their assumptions and findings, some analyses suggest that even with a credible resolution regime, higher buffers may still increase welfare [54].

## Summary and outlook

The TBTF regulation attempts to reduce the systemic PD of institutions, as well as their systemic LGD. An institution's systemic EL, the product of PD and LGD, can thus be limited. Prudential policies that increase resilience in going concern and resolution policies designed to ensure the orderly market exit of an institution in gone concern affect both PD and LGD. These policies can therefore be considered as substitutes to some extent, but also mutually complementary, as shown in this analysis.

The various strands of the FSB's regulatory approach to addressing the risk posed by SIIs have been instrumental in tackling the TBTF problem. To date, however, they have largely been implemented separately, and so fall short of taking all of the different interdependencies into account. An integrated approach could increase the effectiveness and consistency of these policies. Because regulations interact, a better understanding of the regulatory interplay will result in more effective policies. Examples of such interplay include the significance of an institution's systemic importance for its resolvability assessment and vice versa, the coordination of RRP and the interaction of capital buffers and going and gone concern minimum requirements, including buffer calibration that takes into account impediments to resolvability. If, for example, the resolution authority determines that a bank's systemic LGD is so high that resolution should be envisaged, but its supervisors do not also designate it as an SII (or vice versa), the bank will not be subject to the full set of TBTF policies put in place to reduce its systemic impact. This could lead to an insufficient reduction of PD and LGD from a social point of view, and therefore to a welfare loss. The same applies if buffers are calibrated without taking into account that all or part of the buffer may be not usable if the capital is also used for minimum requirements. An integrated approach would encompass the regulatory interplay and the impact of bank failures in both idiosyncratic cases

<sup>96</sup> Article 17(5) BRRD states that in case of substantive impediments to resolvability, the resolution authority may require institutions to issue eligible liabilities to meet the requirements for external and internal MREL, which in turn have to be calibrated to ensure resolvability (Article 45c(1a) BRRD).

<sup>97</sup> In the EU, lower buffers may also decrease the risk-weighted MREL requirement by lowering the market confidence charge that is part of the recapitalisation amount ("Calibration of the buffer level for SIIs and resolvability assessment" section).



and during system-wide events, and help to set the right incentives for banks' behaviour.

An integrated regulatory approach covering going and gone concern requirements would not be without challenges in practice, but the same is true of the current regulatory system. An institution's systemic PD and LGD can only be estimated with a considerable degree of uncertainty, which policymakers should take into account when devising their measures. In addition, close exchange between microprudential, macroprudential and resolution authorities would be required, for example regarding information on resolvability, prompt assessment of bank failure, possible contagion effects of bank failure, alignment of RRP and the calibration of buffers to reduce the systemic EL. In some areas, such as the multiple use of capital for buffers and minimum requirements, regulatory changes are also necessary. These should be pursued both at the global level, by the FSB and BCBS, and in the EU, where the current reviews of the macroprudential and crisis management and deposit insurance frameworks should be used to better consider the interplay between policies.<sup>98</sup> The only constant in regulation is that it is always evolving. This analysis aims to contribute to this process by taking a bird's eyes view of the origins and interplay of the regulations put in place to address the risks posed by SIIs and to tackle the TBTF problem.

## Appendix 1: EU regulatory landscape and terminology

In this analysis, when speaking in general, we refer to macroprudential, microprudential and resolution authorities as authorities in charge of respective policies and instruments. These terms do not necessarily reflect the institutional framework and legal terms of a particular jurisdiction.

Within the EU, macroprudential, microprudential and resolution tasks are entrusted to different authorities. In EU law, those authorities are defined as follows.

- a. Authorities responsible for microprudential banking supervision are referred to as "competent authorities", as defined in point (40) of Article 4(1) of Regulation (EU) No 575/2013, including the ECB with regard to specific tasks conferred on it by Council Regulation (EU) No 1024/2013. For national competent authorities, the abbreviation "NCA" is commonly used.

- b. Authorities responsible for resolution are referred to as "resolution authorities", defined as authorities designated by a Member State in accordance with Article 3 Bank Recovery and Resolution Directive (BRRD)<sup>99</sup> or established according to Article 42 Regulation (EU) No 806/2014 (Single Resolution Board). For national resolution authorities, the abbreviation "NRA" is commonly used.
- c. With respect to authorities entrusted with macroprudential tasks, multiple definitions exist in EU law. These are, for example, "authorities charged with responsibility for maintaining the stability of the financial system in Member States through the use of macroprudential rules", as referred to in point (b) of Article 56 of Directive 2013/36/EU and "authorities aiming at protecting the stability of the financial system", as referred to in point (c) of Article 56 of Directive 2013/36/EU. These definitions are understood to include but are not limited to:
  - (1) designated authorities pursuant to Chapter 4 of Title VII of Directive 2013/36/EU or Article 458(1) of Regulation (EU) No 575/2013, including those designated according to Article 131 (G-SII and O-SII buffer), 133 (SyRB), 136 (countercyclical buffer). For national designated authorities the abbreviation "NDA" is commonly used;
  - (2) the ECB and the national central banks regarding their task to safeguard the stability of the financial system;
  - (3) national macroprudential authorities entrusted with the conduct of macroprudential policy referred to in Recommendation B1 of the Recommendation of the ESRB of 22 December 2011 on the macroprudential mandate of national authorities (ESRB/2011/3).

In this analysis, when focussing on the EU context we use the following terminology with respect to authorities entrusted with macroprudential tasks, unless otherwise indicated.

"National designated authorities", when referring to authorities pursuant to point a), especially those responsible for identifying G-SIIs and O-SIIs and setting the respective buffers.

"National macroprudential authorities", when referring to authorities pursuant to point c)—for example when information needs to be shared by the resolution authorities based on provisions in the BRRD and the SRMR (Single

<sup>98</sup> See the BCBS [work programme](#) and the EU [macroprudential framework and crisis management and deposit insurance framework](#). The ESRB [concept note](#) [52] and [response to the Commission's call for advice regarding the macroprudential review](#) [53] also stress the importance of better information sharing and collaboration among authorities.

<sup>99</sup> Directive 2014/59/EU of the European Parliament and of the Council of 15 May 2014 establishing a framework for the recovery and resolution of credit institutions and investment firms (OJ L 173, 12.6.2014, p. 190).



Resolution Mechanism Regulation)<sup>100</sup> at the time of writing of this analysis.

If an authority incorporates several of the functions described, we are referring to the departments in charge of those functions and the collaboration and information exchange between them, as well as with any other relevant authorities.

## Appendix 2: Assessing an institution's systemic importance and resolvability in the EU

In the EU, assessments of systemic importance and resolvability, as well as their regulatory implications in the form of going and gone concern requirements, follow a set of prescribed steps (Fig. 4). While being largely independent of each other, there are different touching points between the two frameworks.

Initially, the national designated authority assesses the systemic relevance and the resolution authority the resolvability (step 1 in Fig. 5). For systemic relevance, indicators prescribed by the EBA are calculated for each institution and aggregated into an overall score per institution (the higher the score, the higher the systemic relevance). An EU Member State may also take additional indicators into account, which are included in the respective EBA guideline. These might be, for example, information on an institution's resolvability. At the same time, the resolution authority considers in the resolution planning negative systemic effects stemming from the failure of an institution and when assessing whether it is deemed resolvable. An institution is resolvable if it can be liquidated under normal insolvency proceedings or resolved using resolution tools so that resolution objectives are met, such as avoiding negative systemic effects on the financial system and the real economy. The decision as to whether resolution is deemed necessary or whether insolvency proceedings are sufficient to meet resolution objectives is formalised in the public interest assessment (Fig. 4 and 5).

On the basis of the resolvability assessment and resolution planning, impediments to resolvability are identified and their materiality is assessed (step 2; see also World Bank Group [100], p. 80). Formally independently of this, the national designated authority classifies an institution based on its scores into different categories that define the degree of supervisory obligations. According to EBA [38],

institutions are defined as O-SIIs if their score equals or exceeds the threshold of 350 basis points (bp) ( $\pm 75$  bp). Higher supervisory obligations apply if the score equals or exceeds a threshold of 25 bp, below which simplified obligations may apply [48].<sup>101</sup>

Next (step 3), the authorities apply measures according to their assessment of the institution in step 2. On the one hand, the national designated authorities determine the size of the O-SII capital buffer, while the competent authority (as the microprudential authority) examines whether an institution is complying with its higher or simplified obligations. Higher obligations, for example, require the institution to have a recovery plan, to be assessed by the supervisor in consultation with the resolution authority. On the other hand, the resolution authority updates its resolution plan and sets the institution-specific MREL requirement, which takes the size of the O-SII buffer into account to some extent.<sup>102</sup> MREL on a non-risk-weighted basis can, in turn, limit the usability of the risk-weighted capital buffers, including the O-SII buffer, if the same units of capital are double-counted. If necessary, the resolution authority also requires the institution to have measures in place to remove impediments to resolvability (after consultation with the supervisor).<sup>103</sup> In this case, the institution has to propose the relevant measures within four months. If the resolution authority, in consultation with the competent and, if appropriate, the national macroprudential authority, determines these measures are inadequate, the resolution authority is required to order the institution to take the measures it deems necessary to remove the impediments (step 4).<sup>104</sup>

<sup>100</sup> Regulation (EU) No 806/2014 of the European Parliament and of the Council of 15 July 2014 establishing uniform rules and a uniform procedure for the resolution of credit institutions and certain investment firms in the framework of a Single Resolution Mechanism and a Single Resolution Fund (OJ L 225, 30.7.2014, p. 1).

<sup>101</sup> However, EU Member States may apply stricter thresholds. In Germany, O-SIIs are designated above 100 basis points. Institutions above 20 basis points are designated as potentially systemically relevant, which means that they have to fulfil the same obligations as O-SIIs but are not assigned an O-SII buffer. For institutions below 20 basis points, simplified obligations apply.

<sup>102</sup> MREL expressed in terms of risk-weighted assets includes a market confidence charge, which should ensure that the institution is sufficiently recapitalised in resolution to regain market access post-resolution. This confidence charge corresponds by default to the institution's CBR (of which the O-SII buffer is part), less the countercyclical buffer (see Article 45c(3) of the Bank Recovery and Resolution Directive II). See also "Interplay between capital buffers and minimum requirements" section.

<sup>103</sup> Assessing impediments to resolvability is part of the multi-annual work programme of the [Single Resolution Board](#) (the resolution authority of the banking union).

<sup>104</sup> See EBA [39].



### Appendix 3: Evaluation of the TBTF regulation

Whether a deeper integration of the—at present—largely separately calibrated approaches for reducing  ${}^sPD_i$  and  ${}^sLGD_i$  is necessary depends on the effectiveness of the regulatory measures currently in place. As part of an evaluation, it is useful to analyse how the risks stemming from SIIs have changed over time. While this would not necessarily establish a causal link between reforms and the change in risks, it informs whether the risks have decreased since the reforms were enacted. Accordingly, it can be determined whether  ${}^sPD_i$  and  ${}^sLGD_i$ , and thus the  ${}^sEL_i$ , have decreased. Proxies of these variables would allow for a determination of the distance to the  ${}^sEL_i$  as the target variable<sup>105</sup> or to the  ${}^sEL_i$  before the implementation

of the reforms. In addition, for an evaluation of the TBTF problem (Inequation 3), it is also necessary to estimate the bailout and moral hazard costs ( $C_i^B$  and  $C_i^{MH}$ ) that, together with  ${}^sPD_i$ , yield  ${}^B EL_i$ .

As a starting point, it is important to define whether the evaluation should take into account  ${}^sPD_i$  and  ${}^sLGD_i$ , and ( $C_i^B$  and  $C_i^{MH}$ ) in the short or long term. As a first step, operationalisation could focus on short-term effects (losses in the financial system and direct impact on the real economy), and if necessary, could include long-term effects (e.g. general equilibrium effects), which are subject to a higher degree of uncertainty, as part of a second step.

In terms of methodology, the  ${}^sEL_i$  can first be analysed based on the development of the indicators for determining systemic importance, since they approximate the  ${}^sLGD_i$ .

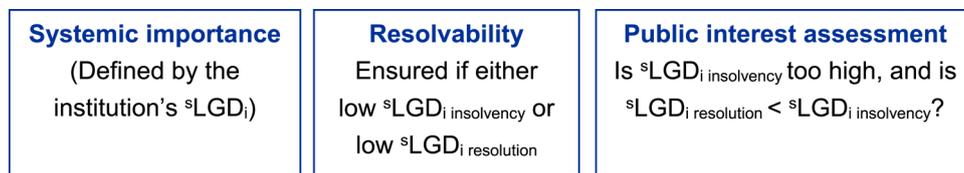


Fig. 4 Systemic importance, resolvability, and public interest assessment based on the LGD concept

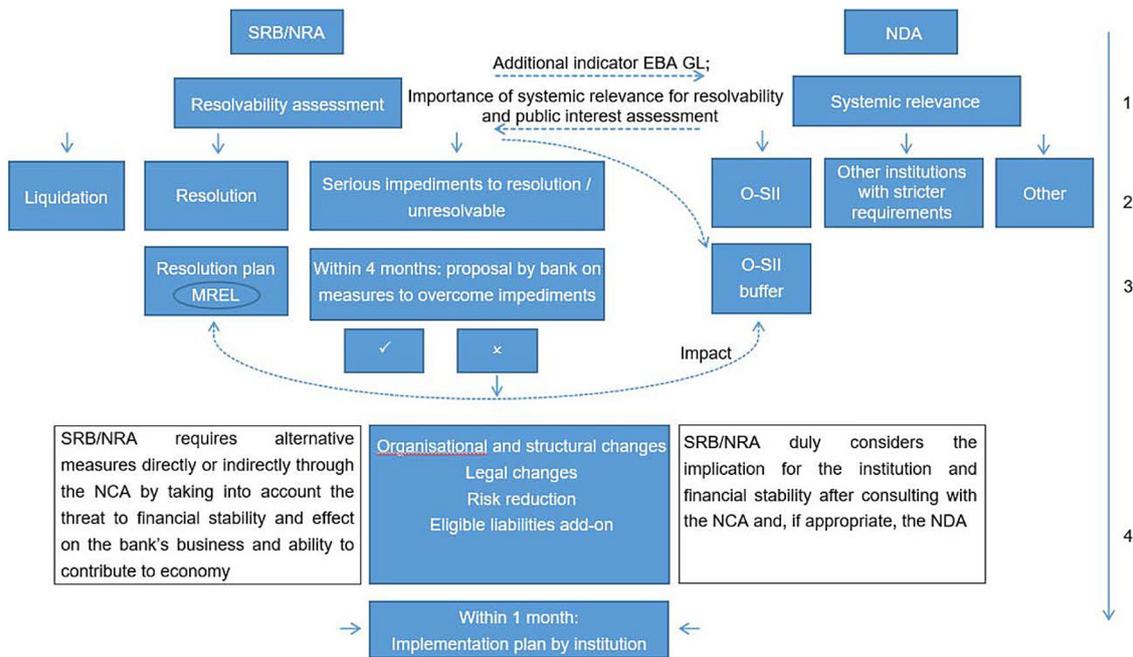


Fig. 5 Interaction between resolvability assessment and O-SII framework in the EU. Notes: See Article 10 SRMR regarding resolution in the banking union. See Articles 15 and 16 BRRD for EU Member States outside the banking union. SRB Single Resolution Board, NRA

National Resolution Authority, NDA National Designated Authority, O-SII Other Systemically Important Institution, NCA National Competent Authority, MREL Minimum Requirements on own funds and Eligible Liabilities, EBA European Banking Authority, GL Guideline

<sup>105</sup> For example, the target variable would fulfil Inequation 2 and/or correspond to an economically optimal value (see footnote 25).



According to the SII framework of the BCBS, the systemic importance of G-SIBs is determined by looking at the effects of their failure on the global financial system ( ${}^s\text{LGD}_i$ ), rather than their probability of default ( ${}^s\text{PD}_i$ ). The  ${}^s\text{LGD}_i$  of an institution is measured by the supervisory authorities based on indicators in five categories: size, cross-border activities, substitutability, interconnectedness and complexity. For evaluation purposes, different weights for the respective indicators may be used to estimate the  ${}^s\text{LGD}_i$  under insolvency vs resolution vs bailout, to which moral hazard and other costs related to government intervention would have to be added (see below).<sup>106</sup>

Additionally, initial conclusions on the  ${}^s\text{PD}_i$  can be drawn using the sub-indicators that are used to assess interconnectedness. A highly interconnected institution has a greater likelihood of being affected indirectly by the default of an institution in crisis, even if it has no direct business relations with this institution. An extended analysis is provided by network models which simulate both the  ${}^s\text{PD}_i$  and the  ${}^s\text{LGD}_i$  using multiple-round effects.<sup>107</sup> Here, interconnectedness across credit and securities portfolios can represent a starting point that could be extended through the modelling of reputational effects and dependencies on critical functions provided by institutions in difficulty. Resolution measures could be simulated by modelling bail-in effects, for example, and/or the application of the sale of business tool.

In addition to indicators and simulations, historical resolution cases may offer additional insights into the effectiveness of the TBTF reforms. In these cases ( ${}^s\text{PD}_i = 1$ ), the question of whether the underlying loss actually is an extreme value, which was not intended to be fully absorbed by the heightened resilience envisaged by the reforms, could be explored. In addition, in the EU, the resolution authorities have to decide for each bank whether resolution, as opposed to liquidation, is in the public interest, which essentially is a judgement about the  ${}^s\text{LGD}_i$  under both regimes. If impediments to resolvability exist,  ${}^s\text{LGD}_i$  is regarded as too high under both resolution and liquidation.

There are also approaches that explicitly model  ${}^s\text{PD}_i$  based on extreme value theory and  ${}^s\text{LGD}_i$  based on an exponential function or  $\Delta\text{CoVar}$ , as in Passmore and von Hafften [84] and Jiron et al. [77].

<sup>106</sup> This approach, using special weights representing risk preferences and the assumed impact of different approaches to coping with a failing bank, is proposed by Jarque et al. [76].

<sup>107</sup> With regard to methodology, these analyses could be based on models that simulate the loss in the banking system arising from interconnectedness across, for example, credit relationships, when an institution defaults. Both first-round effects and subsequent contagion effects could be examined in this context. Modelling bail-in mechanisms would enable simulation of how effects might change when applying resolution measures compared with insolvency.

As in the monetary quantification of the  ${}^s\text{LGD}_i$ , the (net)  $C_i^B$  can, ex ante, only be estimated according to the assumed losses of the institution, any income from a government intervention, the opportunity costs and the moral hazard costs. From a historical perspective, the long-term net costs in a specific case can be estimated on the basis of the aid granted and the progress made in restructuring the institution post-bailout (proceeds or market value of the government stake); however, the opportunity costs of the bailout are based on assumptions, including in historical cases. The effects of (implicit) government guarantees on the risk appetite and refinancing costs of the affected banks can be estimated to determine the moral hazard costs.<sup>108</sup>

An estimate of the  ${}^s\text{PD}_i$ ,  ${}^s\text{LGD}_i$ ,  $C_i^B$  and  $C_i^{\text{MH}}$ , taking into consideration the assumptions made, would allow for an evaluation of TBTF reforms and give an indication of the effectiveness of going and gone concern regulation.

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<sup>108</sup> Refinancing advantages can be estimated, for example, by comparing SIIs with other banks, “stand alone” with “with support” ratings, and the refinancing costs of various products within a bank.



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