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Containing runs on solvent banks: Prioritising recovery over resolution

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1 INTRODUCTION

The key reforms of banking regulation since 2008 had three goals: limit risk incentives, avoid bailouts and avoid spillover (contagion) effects.

The first goal was served by stronger Basel III capital and liquidity norms that produced a more resilient banking sector. Bailout and contagion risks were supposed to be addressed by bail-in capital and new Pillar II powers for capital guidance.

Yet, the experience with massive bank runs in 2023 imposes new conclusions.

Capital and liquidity requirements need to be recalibrated based on the new evidence. But next to this primary need, there are more specific implications. First, supervisory hesitation to intervene in the case of undercapitalised banks in a timely manner is driven by fears of triggering panics. Regulatory forbearance buys time, but it ultimately extends value deterioration and increases losses. Second, it has become painfully evident how, even at an early phase of distress, there are hardly any (bailout-free) policy tools to contain runs. Finally, the diffusion of social media usage led to an extraordinary acceleration of self-reinforcing panic runs (Cookson et al., 2023). At a time of rising rates and diffused losses on safe assets held in the banking book, a large share of the banking sector faces huge liquidity risk from uninsured depositors with no tools for containment (Jiang et al., 2023). Extensive reforms since 2008 have raised the level of the dams against flooding. However, once high water threatens to run over, there are no remedies (stored sandbags) other than absorbing losses by bailouts.²

The key timing of remedial actions on capital is once losses eat into a bank's conservation buffer. The limited tools available in this phase (at best, a suspension of dividends) are hardly ever activated, due to chilling concerns that any public action may lead to self-sustaining runs.

We propose a new framework to prioritise bank recovery over bank resolution which is beneficial in several aspects. The main goal is to give solvent but undercapitalised banks a chance to recover early enough, removing the bias towards forbearance. Second, it would improve the credibility of going concern supervisory powers, prompting more risk-absorbing capital once conservation buffers are about to be breached. Finally,

¹ We wish to thank Viral Acharya and Charles Goodhart for their very useful comments.

² Since 2008, the total amount of bail in for uninsured deposits is zero, in both the EU and the US. The notable exception is the Cyprus bank crisis resolution managed by international institutions, where large uninsured deposits banks (mostly foreign) were partially bailed in.

it would ensure private bail-in requirements are actually implemented. At the same time, reform proposals should ensure reliable access to own funds for depositors and a transparent process for bail-inable investors. These interim measures should be activated upon specific quantifiable indicators. The trigger may lead to automatic activation or empower supervisors to do so, with the aim of fostering the recovery of viable but undercapitalised banks. We detail the regulatory design for the activation of these interim measures in Section 5.

The rest of this Policy Insight is as follows. Section 2 describes some visible shortcomings of the current regimes. Once capital levels start to deteriorate, there are no credible tools to increase risk absorption or control run incentives. We discuss separately the poor incentives due to excess leverage and forbearance (Martynova et al., 2022) and the run incentives created by unconditional sequential service (Diamond and Dybvig, 1983; Matta and Perotti, 2023). Section 3 discusses some lessons from the last ten years of experience with resolution of EU and Swiss banks. Section 4 proposes the two key interim measures on capital and liquidity, namely, a credible regime for going concern recapitalisation and the introduction of contingent redemption charges, automatically triggered by uninsured deposit outflows. Section 5 discusses the economic and legal definition of ‘solvent but undercapitalised banks’ needed to legitimise interim supervisory powers and a capital bail-in process under going concern status. It then proposes the principles guiding the activation of these interim measures. Section 6 compares these proposals with other reform options in terms of risk allocation and risk incentives. Section 7 concludes.

2 A REGULATORY BLIND SPOT

Several reform proposals since March 2023 have focused on robust ex-ante prudential measures – on the one hand, higher capital and liquidity norms (Admati and Hellwig, 2023); on the other hand, an expansion of deposit insurance coverage (Heider et al., 2023). Higher buffers are most effective but hard to implement; public insurance reduces runs only at high fiscal costs and moral hazard incentives.

We argue that higher capital and liquidity buffers are indispensable. Yet it is also essential to strengthen interim measures aimed at preventing unnecessary resolution. The current recovery and resolution framework is not very credible and has poor preventive effects (Martino and Parchimowicz, 2021; Martynova et al., 2022). Too often, resolution reform has been seen narrowly as ensuring orderly liquidation, a ready plan for smoothly allocating gone concern losses. This approach leans towards a passive acceptance of insolvency risk and leads to excessive bailouts.

We argue that a new emphasis on preventive measures is crucial to avoid potentially viable banks sliding into insolvency once undercapitalised. At present, we have a blind intervention spot: once distress starts, we have no credible tools to promote recovery or contain run incentives, so outflows can easily escalate into self-fulfilling runs.

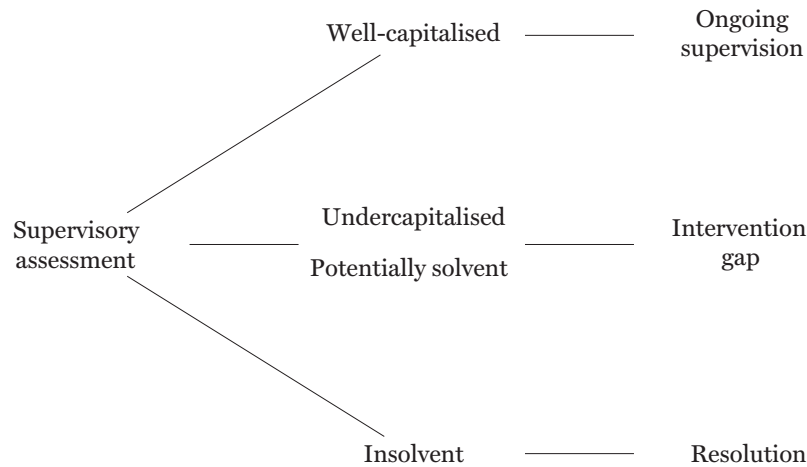
Consider the current sequence of Pillar II intervention steps. A stress test evaluation may lead to the conclusion that a bank is insolvent, or potentially solvent but undercapitalised (Figure 1). In the first case, the supervisor must put the insolvent bank into resolution; the second case calls for a path to going concern recapitalisation. However, at present there are no effective tools to support such a recovery, short of public risk absorption. We refer to this as a serious ‘intervention gap’.

Notionally, once supervisors become aware of bank-specific losses, they are empowered to initiate a ‘capital guidance process’, indicating capital surcharges based on the result of stress tests.³ However, bank shareholders are under no legal obligation

³ This process is organised differently across jurisdictions, with different consequences in case of non-compliance.

to contribute new equity, though they face the risk of insolvency. The main capital guidance tool is restricting the right to distribute dividends. Even this limited step is avoided, as supervisors fear triggering runs.

Figure 1 Bank status and regulatory practices



We discuss sequentially the risk incentives due to excess leverage and forbearance (Martynova et al., 2022) and the run incentives created by unconditional sequential service (Diamond and Dybvig, 1983; Matta and Perotti, 2023).

2.1 The bank recapitalisation games

Once supervisors recognise a capital shortfall under an adverse scenario, they activate the capital guidance regime, demanding an appropriate capital increase.⁴

The bank can be compliant via retained earnings or private recapitalisation. However, bank shareholders often resist retaining risk-absorbing equity as long as dividends are still allowed. They may claim that maintaining their payouts is necessary to avoid sending adverse signals, while supervisors postpone suspending payout rights for the same reason (Gambacorta et al., 2023).⁵

Unresolved losses lead easily into a phase of debt overhang, where private incentives to recapitalise deteriorate further. An undercapitalised bank with a viable business model may well be solvent once its deposit franchise (charter value) is recognised. The challenge is that private refinancing incentives are much weaker when forbearance is expected, leading to a strategic waiting game where bank shareholders, managers and regulators seek to buy time in the hope of inducing others to shoulder (increasing) losses. In this ‘capital forbearance’ game (Martynova et al., 2022), bank shareholders have incentive to play for a lucky recovery or public support. Lack of a credible measure leads to an ‘intervention gap’ until resolution (Cecchetti and Schoenholtz, 2023). Supervisors hesitate to take actions that indicate weak bank solvency as they fear a loss of confidence (Ahnert and Georg, 2018). They are left with exerting discreet ‘moral suasion’ (sending increasingly stern letters demanding recapitalisation) and finally declaring the bank insolvent. Bank investors can buy time to ‘gamble for resurrection’, with poor risk incentives leading to a steady loss of value. As became clear in the period before the March 2023 runs, once the bank enters a phase of elevated debt overhang, a private recapitalisation becomes unrealistic while risk incentives deteriorate rapidly.

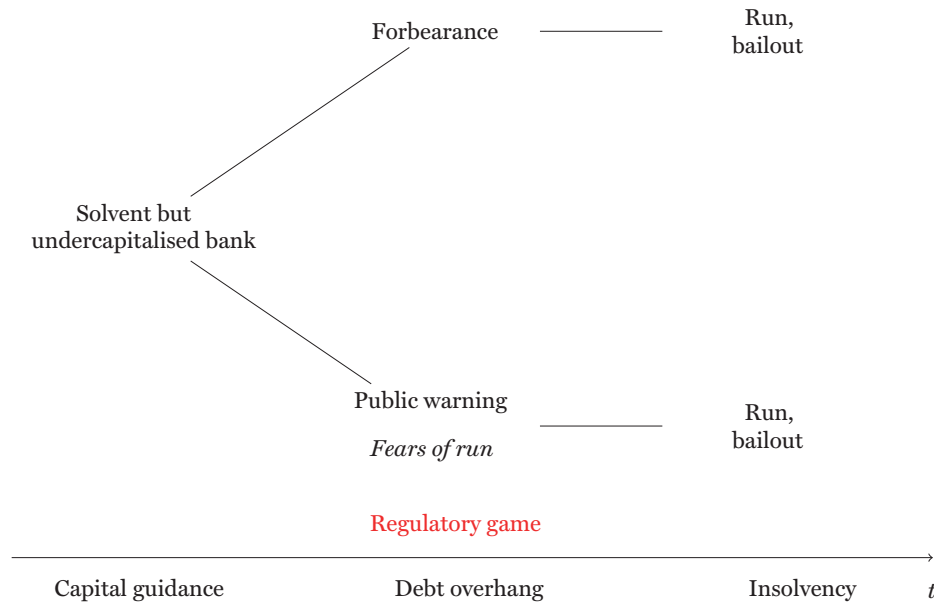
⁴ Capital surcharges reflect micro-prudential buffers and bank-specific guidance, as well as on macro-prudential surcharges.

⁵ After Deutsche Bank faced a legal restriction to pay a single coupon on its contingent convertible (CoCo) debt due to insufficient book equity, supervisors responded to a fall in bond prices by pressing for a revised legal interpretation of minimum requirement for own funds and eligible liabilities (MREL) norms to allow the payment, and in the same year allowed the bank to pay out a dividend.

Unfortunately, in this phase time is not on the side of regulators. There are few intervention tools, and fears of triggering runs are by now well justified. Forbearance serves as a delaying tactic, but discourages private recovery actions. In the absence of new risk-absorbing capacity, it is ultimately a gamble that leads to even larger expected fiscal losses even for an initially solvent but undercapitalised bank.

Supervisors are currently confronted with two sub-optimal options. Available tools (such as a suspension of payouts) offer little immediate relief while sending a signal about bank losses, thus triggering a run. On the other hand, prolonged forbearance worsens capital deterioration, increasing the probability of a run at a rising fiscal cost (Figure 2).

Figure 2 The Intervention gap and regulatory game



Before we detail our proposals aimed at timely recovery over resolution and avoiding forbearance, we discuss the EU's experience with CoCo debt as well as the key insights from the recent Credit Suisse AT1 conversion.

3 LESSONS FROM EUROPEAN RESOLUTION EXPERIENCE

3.1 The EU recovery and resolution framework

The EU Recovery and Resolution Directive is arguably misnamed; it is largely focused on containing bailouts through bail-in upon default, rather than offering options for timely recovery. The lack of effective recovery tools also endangers the credible implementation of gone concern resolution tools when necessary, increasing the regulatory gap (Martino, 2020). National resistance has undermined the formal resolution process, bypassing it by declaring standard bankruptcy (Dewatripont et al., 2023). In the US, the Federal Deposit Insurance Corporation (FDIC) is the sole authority and benefits from more instruments. However, in practice it has been ultimately forced into bailouts. The amount of uninsured demandable deposits bailed-in since 2007 in the US is exactly zero.

In principle, Basel III encouraged bank issuance of CoCo debt as a form of pre-issued equity capital to be used ahead of distress (Kashyap et al., 2008). Conversion of debt into equity ensures a sharp drop in leverage upon early signs of distress, reducing risk incentives and giving a chance of recovery ahead of resolution (Martynova and Perotti, 2018). It was thus intended as a form of **going concern bail-in**, alleviating solvency

concerns at a critical time.⁶ This potential has not been realised in EU legislation. It allows CoCo debt to count as AT1 capital, although its equity conversion would occur once book equity falls to a risibly low level (just above 5%, when the bank is quite insolvent). In addition, the choice of a book trigger for conversion is ineffective, as it requires the bank to publicly recognise huge losses that certify near insolvency – a guarantee of massive runs. EU supervisors have (perhaps understandably) shown no intent to ever call for a conversion that would highlight such losses. In their view, any public hint of undercapitalisation may trigger an unstoppable run (Chan and van Wijnbergen, 2015). This is a justifiable concern if conversion takes place too late (i.e., at a book equity trigger far too low) and there are no safeguards in place to contain runs.

As a result, no CoCo bonds have ever been converted in the EU ahead of default. In actual default, they suffered losses like any other bond. In fact, not a single coupon has ever been suspended, as regulators have feared triggering panic. They should be then treated as gone concern instruments and removed from AT1 status. Overall, EU CoCo bond prices have reflected zero conversion risk since 2016, when the EU authorities failed to suspend a single coupon on a Deutschebank CoCo bond (Glasserman and Perotti, 2017). Clearly, the market no longer believed in any going concern loss absorption. Finally, virtually all CoCo instruments so far have been called at the first possible redemption window (usually five years), making the instruments perpetual only in name. In conclusion, there are no effective tools in the EU legislation giving a solvent but undercapitalised bank a chance to recover, outside of public bank recapitalisation. As a result, forbearance has been the general outcome.

3.2 Lessons from the Credit Suisse AT1 going concern bail-in

In contrast to the EU bank capital legislation, Switzerland adopted a much more vigorous approach to AT1 going concern bail-in, with the express goal of avoiding costly bailouts like the UBS rescue in 2009. The legislation imposed larger capital buffers and higher CoCo conversion triggers at or above 7% of book equity (thus ensuring a full capital conservation buffer upon conversion). Critically, Swiss banks issuing CoCo were required to include a ‘discretionary trigger’ in the bond indenture (Martino and Vos, 2023). This enhanced Pillar II power enabled a successful going concern bail-in operation for Credit Suisse, which averted a fiscal costly default and a messy resolution process Perotti (2023b).

Specifically, the Swiss supervisor FINMA was empowered to force the conversion without a formal accounting restatement of book equity, upon a ‘viability event’ that would have led to default even when the bank was deemed in principle solvent (as Credit Suisse was assessed to be a few days before conversion). The standard clause in Credit Suisse CoCo indentures states that conversion will be activate if “(A) ... customary measures to improve CSG’s [Credit Suisse Group] capital adequacy are at the time inadequate or unfeasible, an essential requirement to prevent CSG from becoming insolvent...” or “(B) ... CSG has received an irrevocable commitment of extraordinary support from the Public Sector ... that has ... the effect of improving CSG’s capital adequacy and without which, in the determination of the Regulator, CSG would have become insolvent...”.

In other words, the regulatory trigger was authorised as soon as failure to convert would imply some fiscal risks for the Swiss treasury. This is indeed the principle for a rigorous preventive bail-in procedure, focused on recovery.

The Credit Suisse experience has a valuable lesson on the necessity of legal clarity. Credit Suisse had experienced for quite some time a steady deterioration in value and investor confidence. Yet the Swiss regulator chose to delay activating a conversion,

⁶ CoCo bonds have not been issued in the US as they did not qualify as debt for fiscal purposes.

even though the need for this was already evident (as FINMA's recent report attests to). Supervisors hesitated for at least two years, arguing over the conditions under which they had a clear legal right to activate the regulatory trigger.

It took an explicit act of legislation by the Swiss parliament to firmly establish FINMA's right of activation. At the time, Credit Suisse had already been forced to request emergency liquidity assistance (ELA) from the Swiss National Bank, backed by the fiscal capacity of the Swiss Federal State. In an emergency meeting, the Swiss Parliament passed a law clarifying that such an ELA operation indeed represented a case of fiscal exposure, thus enabling the regulator to act. This led, for the first time ever, to a going concern recapitalisation of AT1 bonds, and to bank recovery rather than resolution.⁷

It is important to stress that the final outcome was indeed the intent of the law. The specific contractual formulation of the Credit Suisse AT1 CoCo debentures implied that creditors ended up being fully wiped out while shareholders retained a stake in the enterprise. This was not the explicit intent of the law, but rather a private choice to designate the outcome of going concern bail-in as a complete debt cancellation, a simpler legal construction than the creation of a new equity interest. Because of the confusion created by the wipe out, in future all CoCo conversions could consist of (at least partially) a transformation into equity capital.

It is important to learn from the experience of this sole example of a successful, if chaotic, going concern bail-in.

4 INTERIM MEASURES TO PROMOTE RECOVERY

We now turn to discuss specific contingent tools to protect bank capital and liquidity in early distress. We propose an early distress measure on capital and an acute distress measure on liquidity. We seek a definition of a solvent but undercapitalised bank, necessary to legitimise a regulatory-driven capital bail-in. We will argue that measures to contain uninsured runs should instead be automatic, as they address a core stability issue.

On the capital side, we propose strengthening the Pillar II mandate on the going concern loss-absorption of contingent convertible debt. On the liquidity side, we propose introducing simple liquidity fee rules (i.e., contingent charges) on uninsured deposits in case of large outflows. These two measures complement each other, allowing qualifying banks to recover without public funding while minimising the risk of unnecessary runs.

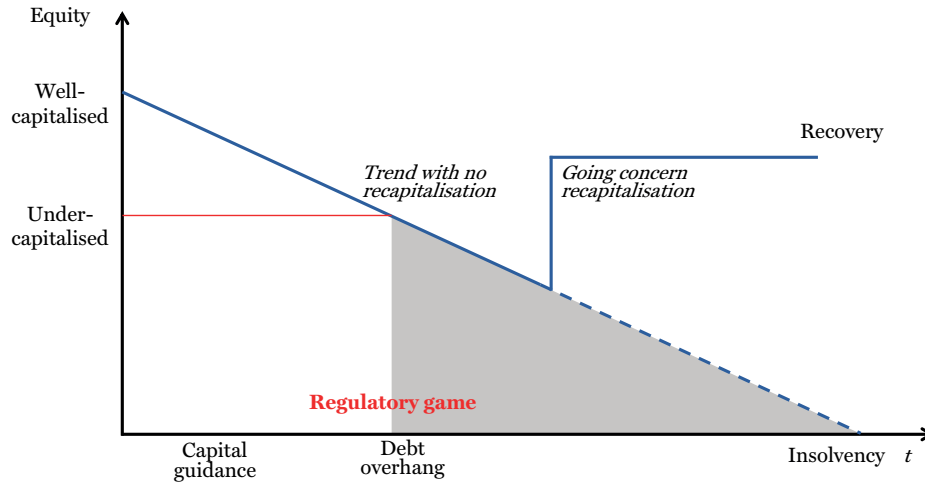
4.1 Going concern bail-in

Any reform aiming at a credible preventive recapitalisation would require two steps. The first is an increase in capital norms to be mandatorily satisfied by a minimum of CoCo capital, convertible on a higher trigger than currently admissible (certainly above the minimum capital conservation buffer of 7%). Second, it would involve an enhanced Pillar II mandate to both enable and force authorities to activate conversion, upon a supervisory assessment that the bank is undercapitalised but solvent. A timely reduction in leverage would grant immediate breathing space and remove run incentives. Such a preventive recapitalisation can be seen as a form of 'in loco bancaruptae', a going concern recapitalisation that does not require default. Even an effective conversion process may be delayed too long by concerns that it may serve as a coordinating event for self-fulfilling runs. Accordingly, we turn to outlining a complementary and necessary component of our reform proposal to favour recovery over resolution.

⁷ CoCo bondholders who were wiped out are currently suing FINMA, disputing that the bank "has received an irrevocable commitment of extraordinary support from the public sector".

Figure 3 depicts the effect of going concern recapitalisation, timed when new private risk absorption is not forthcoming due to debt overhang. For such a tool to become credible, the regulatory norms and contractual feature of AT1 contingent capital have to be redefined to ensure that the going concern loss absorption would happen promptly. This requires resolving current legal ambiguity over the executability of the conversion trigger ahead of default.

Figure 3 Capital adequacy and going concern bail-in



There are legitimate concerns that any decisive going concern bail-in would require equally credible tools to contain subsequent panic, generating runs. However, this is not a state of things that we should passively accept. Rather, the interim recapitalisation through the going concern bail-in of CoCos should be made credible by complementary reforms addressing the panic concerns. The following sections discuss the key nodes of uninsured deposit outflows and how redemption charges can contain runs. This, in turn, makes going-concern bail-in more credible.

4.2 Run incentives

Typically, a run does not come completely unannounced. Looking at US banks that failed between 1934 and 2022, Ohlrogge (2023) shows significant outflows of uninsured deposits in the four years before failure, showing how runs should be understood as a dynamic process. Unfortunately, recent runs have proven much faster, as they were driven by intense social media concerns leading to a fulminating run coordination. Such a context renders current supervisory options virtually useless, imposing strict blackmail for fiscal bailouts of uninsured claims.

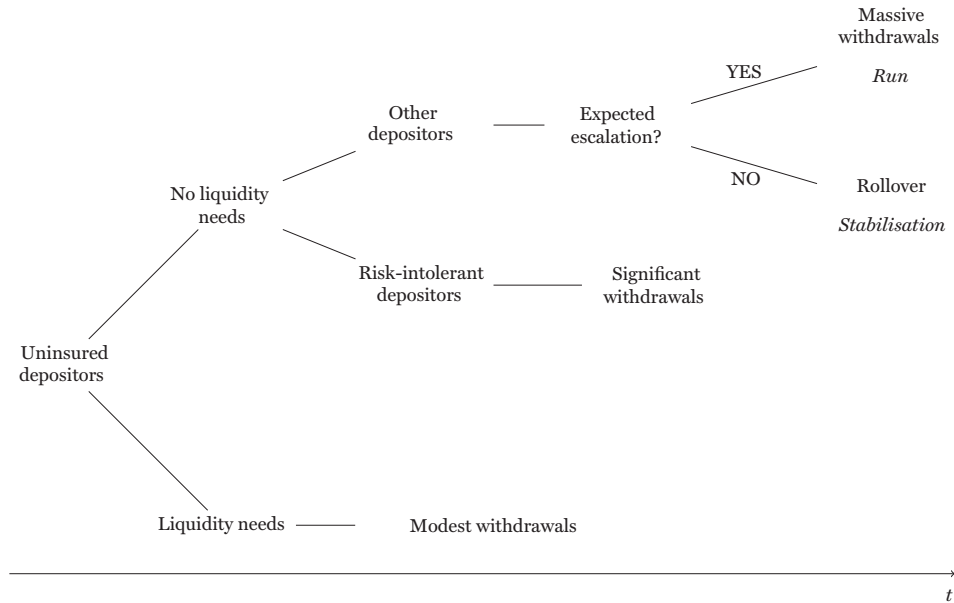
Yet too often a bank run is seen as a black box, a self-escalating process that cannot be contained once it is triggered. This is a simplistic and self-defeating view. To be able to deal lucidly with this threat, it is important to break down the dynamics of run incentives. The key determinant is the net rollover payoff – the difference between the expected value of joining the queue and rolling over (Matta and Perotti, 2023).

Runs tend to start after some adverse signal induces depositors with an immediate need for liquidity to withdraw. These early outflows include investors that front-run, and extremely ‘risk-intolerant’ depositors who would not accept even an infinitesimal risk of default. But the key issue is whether the larger group of depositors with no cash needs become concerned about a full escalation. Under current norms there are no exit costs, so the net rollover payoff in case many choose to withdraw is negative even for solvent banks. Once expectation that others will run sets in, withdrawing becomes a one-way sure bet, triggering a full-blown panic. This is the classic self-fulfilling logic of panic runs, which can take down even solvent banks (Diamond and Dybvig, 1983).

Thus a decisive intervention may be effective in taming the perception of an escalation in outflows. At present, bank supervisors (unlike MMF supervisors) have no tools to stop a run in progress

Figure 4 depicts the progress of uninsured outflows, at first building slowly, then escalating into a self-fulfilling run. The key inflection point is when depositors with no immediate liquidity needs start to fear a large escalation.

Figure 4 Withdrawal stabilisation through redemption charges



4.3 Containing escalation of outflows

It is essential to protect bank liquidity upon large outflows of uninsured deposits. Next to higher reserves for uninsured deposits, it is important to introduce interim measures to address the problem when it presents itself. We propose introducing ‘liquidity pricing’ in the form of flat redemption charges upon large withdrawals. This procedure allows savers and firms to withdraw anytime, only suffering a minor discount to face value in extreme events.

The approach follows the money market fund (MMF) reform after the 2008 crisis, revamped in March 2020. MMFs had been the main destination for corporate cash pools, so they are a natural benchmark for corporate needs. The 2016 MMF reforms focused on slowing down outflows through temporary suspensions. Funds were mandated to impose such gates upon rapid outflows to avoid encouraging front-running, once liquid reserves were almost exhausted. This regime was functionally similar in the US and the EU.

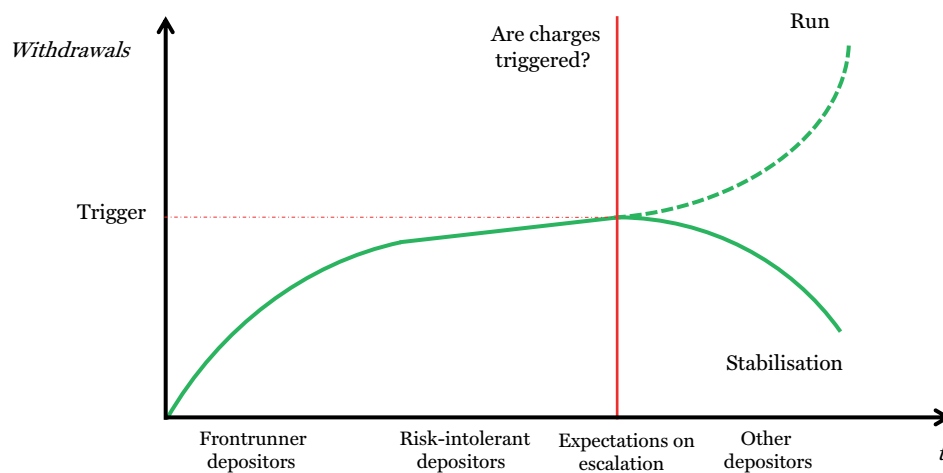
However, in March 2020 MMF managers proved reluctant to impose gates. Instead, they sold less liquid claims to avoid triggering a mandatory suspension of redemptions, leading to fire sales. After a long debate, the Securities and Exchange Commission (SEC) decided to eliminate gates. In their place the new norms aim at containing runs by introducing the equivalent of ‘congestion charges’. Investors now regain unconstrained access to their funds even in a run, but at a small discount from net asset value (NAV). This contingent penalty is automatically triggered by large outflows, thus avoiding a discretionary choice by the fund administrators. Allowing withdrawals even in a run but at a discount ensures access to own funds but also serves as a reliable brake on run incentives, protecting those who do not run. Repricing removes run incentives driven by dilution risk, since illiquidity here is fully priced (Matta and Perotti, 2023).

Imposing temporary and automatic redemption charges upon uninsured deposit outflows would target the one-sided incentive to withdraw at par, directly reducing run incentives. Critically, charges may also shift expectations of further withdrawals by others, avoiding escalation driven by fear of dilution rather than solvency concerns. Contingent charges serve as a Pigouvian tax on withdrawals with no liquidity needs, as they internalise (and therefore eliminate) the strategic complementarity they may cause.⁸

Charges appear superior to gating when immediate access to liquidity is unconditionally more important than absolute safety, as is likely the case for corporate deposits.⁹

Contingent charges would not (and should not) alter the behaviour of depositors with immediate liquidity needs. Their role is to reshape the response by depositors with no liquidity needs, and stop the risk of a self-fulfilling escalation (Figure 5). Charges aimed at discouraging the escalation of run incentives still support the principle of unconditional access to liquidity, at a modest price in times of distress.

Figure 5 Depositors' reaction to adverse information



4.4 Resolving the regulatory gap

Crucially, an automatic stabilising tool that discourages sudden outflows would reduce concerns that public measures may lead to inevitable escalation. This increases the effectiveness of capital-related interim measures and reduces the incentives for forbearance. Both measures represent a form of preventive partial bail-in that would preserve going concern value for solvent intermediaries.

Effective interim measures can change the dynamics discussed in Section 2. Figure 6 depicts the key nodes for a solvent but undercapitalised bank when recovery measures are in place.

The key insight is that once effective contingent tools are available, the supervisor has a credible alternative to forbearance and can be more firm in promoting a timely private recapitalisation.

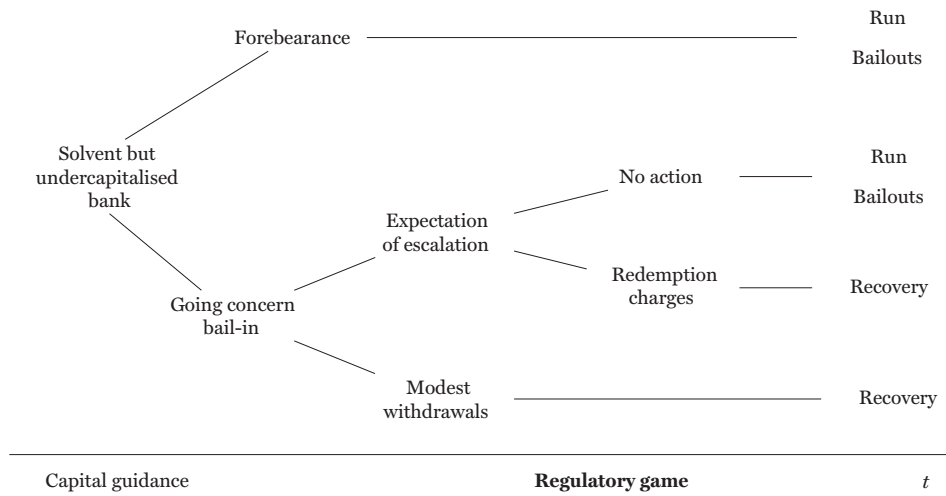
As discussed in the previous section, contingent charges should target depositors with no liquidity needs and no extreme risk intolerance so to reshape their incentives to withdraw and stop the risk of a self-fulfilling escalation. This happens through both a direct and an indirect channel. First, the incentive to stay (net rollover risk) is increased by the temporary exit cost imposed by the charge. Moreover, charges clearly discourage

⁸ In fact, they represent a contingent implementation of Pigouvian charges aimed at controlling risky incentives for unstable funding (Perotti and Suarez, 2011).

⁹ As a secondary tool, charges may be combined with a very limited (such as 5%) residual amount at risk (RAR) (Berner et al., 2023). Uninsured withdrawals would have a small amount gated, with the right to withdraw within a month at a lower seniority than undrawn deposits.

immediate exit by everyone, reducing the expectation that other depositors will be inclined to front run to avoid dilution. As depositor fears about escalation subside, charges imposed at the critical inflexion point can reverse the self-fulfilling prophecy.

Figure 6 Interim interventions favouring recovery



To make sure the imposition of charges is effectively timed, daily liquidity disclosure to the supervisor is essential. The ideal trigger should be automatic and based on actual outflows, rather than a measure that may be subject to discretionary choices by bank management. In addition, it is prudent to stipulate a secondary **regulatory trigger**, based – just as in the case of CoCo conversion – on a supervisory assessment that the bank is in principle solvent. This would allow the regulatory gap to be filled.

Figure 6 sketches the possible responses to a potentially solvent but undercapitalised bank. Currently, supervisors can only forbear or decide to voice their concerns about the bank's status. Both options are ultimately likely to trigger runs and consequential bailouts. On the one hand, forbearance makes the capital deterioration continue up to the point where adverse news triggers the run. This was the case for SVB and, in part, Credits Suisse. On the other hand, raising public concerns and possibly triggering recovery measures such as going concern bail-in would be helpful but remains currently not viable due to panic concerns.

Our proposals fill this regulatory gap. The supervisors would be entrusted with enhanced Pillar II powers, up to the performance of a going concern bail-in. This early and effective move is made viable by the contingent redemption gate that is activated upon large withdrawals. The existence of these contingent charges may also discourage massive withdrawals ex ante.

The combination of interim measures on both capital and liquidity provides the supervisor with viable tools to ensure the recovery of solvent but undercapitalised banks.

5 PROMPTING RECOVERY WITH INTERIM MEASURES

5.1 When is a bank undercapitalised?

Preventive bail-in measures must be targeted at banks deemed solvent but undercapitalised. If a bank is insolvent, resolution (ideally with adequate risk-absorbing capacity) is the sole legitimate policy. So, a credible and fair recovery regime requires a definition of a legitimate candidate bank that would benefit from going concern bail-in measures, not least to stand legal scrutiny.

The Basel regulatory framework almost exclusively focuses on adjusted book equity measures. The use of market values has been resisted on the grounds of potential manipulation of trigger indicators.¹⁰ Yet, accounting figures are at best past and infrequent measures of net value, so interim supervisory assessments of bank solvency are necessary. Stress tests are the standard method to assess resilience under adverse scenarios and define the degree of capitalisation. Yet, book equity is a measure of current assets, while the value of a bank includes future prospects driven by its deposit franchise. Stress tests implicitly factor in such values, which may be positive or negative.

From an economic perspective, a bank with inadequate equity may be considered solvent if it has a viable business model, especially if its losses are on safe asset holdings so that the downside risk of credit losses is limited. Such a bank may be at the mercy of run expectations, as both the value of its assets and the value of its deposit franchise cannot be realised in a quick sale. This is the category of banks that would benefit from going concern conversion. A contingent bail-in would favour recovery as long as it is coupled with tools to prevent panics and runs, such as the liquidity charges we propose.

In contrast, a bank with the same level of book equity value but with sizeable losses, low deposit franchise value and very poor future prospects is a prime candidate for resolution. In this case, a going concern bail-in would not create the conditions for recovery and should be seen as unfair treatment of some investors. A consistent and legally binding definition is needed to justify the additional supervisory powers.

Beyond capital requirements, the post-2008 regulation also introduced the total loss-absorption capacity (TLAC) requirements to ensure resolution without bailout. TLAC is the minimum stock of bail-inable capital, currently set at 18% of risk-weighted assets for systemic banks.¹¹ This comprises common equity, AT1 capital instruments and long-term, subordinated unsecured debt which will be wiped out upon insolvency. These requirements are crucial for an orderly resolution of banks that does not rely on a fiscal backstop. High risk-absorbing capacity also has an effect on risk appetite as it decreases risk-shifting incentives. However, the designated function for TLAC/MREL capital is to ensure bail-in in a gone concern resolution, so it has no direct counterpart in a recovery process.

The recovery measures we propose should be seen as a recovery-aimed complement to the resolution and loss-absorbency requirements. They parallel the mandate for the resolution authority to convert or write down TLAC liabilities once a bank becomes insolvent, or to impose moratoria on withdrawals to avoid runs when very close to insolvency.

5.2 The activation of interim measures

What are the appropriate thresholds to trigger going concern bail-in and liquidity charge? Interim measures should be activated upon signals justifying the activation of these measures. This makes sense both from an economic and legal perspective. Table 1 displays four quantifiable signals that should legitimately trigger interim measures to prompt the recovery of solvent banks.

¹⁰ This view is also consistent with the idea that banks' stability requires some level of opacity (Dang et al., 2020).

¹¹ TLAC rules were transposed in the EU as the minimum requirement for own funds and eligible liabilities.

Table 1 The activation of interim measures

Signal	Nature of the signal	Level of the trigger	What is triggered?	Actions
High deposit outflows	Easy to measure (requires daily disclosure)	Once 5% of uninsured deposits leave in one day	Redemption charges	Automatic application of a 3% flat charge Complementary discretionary power to the supervisor if the bank fails to act
Stress test result	Precise but infrequent	Severe shortfall in the adverse scenario or Any shortfall in the baseline scenario	Supervisory evaluation of bank viability	If bank deemed insolvent - resolution If deemed viable but undercapitalised - aim at recovery 1) current Pillar 2 corrective actions (including payout restrictions) 2) new power to trigger CoCo Conversion
Market value	Strong, frequent, prone to distortions	Sharp drop in share price to low valuation CDS spread increase	Supervisory evaluation of bank viability	If insolvent - Resolution If solvent but undercapitalised - aim at recovery 1) current Pillar 2 prompt corrective actions (including payout restrictions) 2) new power to trigger CoCo Conversion
Book equity level	Infrequent, opaque, prone to manipulation	Minimum capital (4.5%) + Capital conservation buffer (2.5%) + Other buffer and bank-specific charges	Supervisory evaluation of bank viability	If insolvent - resolution If solvent but undercapitalised - aim at recovery 1) Automatic CoCo Conversion

Daily outflows represent the key signal for triggering redemption charges. These are targeted at stopping unnecessary escalation, so they must be automatically triggered once the level of outflows is excessive. Daily redemption is a strong signal which is easy to measure as long as banks disclose it in an appropriate and timely manner to the supervisor. Charges on panic redemptions, such as the fees imposed by the SEC on MMF excess outflows, should be activated automatically to avoid any credibility issue. We argue that they are best intended to support recovery for viable banks. Yet they should be seen as legitimate market stabilisers for any bank, even ahead of a declaration of gone concern resolution.¹²

To ensure its timely activation, banks must disclose daily information on outflows to the supervisor (i.e., at a much higher frequency than to the market). The supervisor should activate the redemption charges if the bank fails to do so in response to high outflows. Critically, as fees would apply to excess withdrawals on any bank, they should be seen as market-stabilising norms rather than implying a supervisory assessment that the bank is viable. Otherwise, depositors bailed in after default could claim legal recourse against the supervisor action as misleading them. We propose the same calibration that the SEC designed for US MMFs. Charges are triggered upon the daily withdrawal of 5% of uninsured depositors. Once this contingency materialises, a flat 3% charge applies. In the design of the measure, it is best to steer away from more refined and dynamic calibration mechanisms, such as swing pricing where the charge is contingent on the liquidity of banks' assets. Its complexity does not fit the complex nature of banking and would jeopardise the effectiveness of the interim measures.

Clearly, the activation of going concern capital bail-in is more delicate to design and calibrate as it is justified only for potentially solvent banks. Banks deemed insolvent, thus with no recovery prospects, should enter into resolution as soon as possible. To ensure this process, we consider three different, imperfect signals triggering going-concern bail-in and, more generally, Pillar 2 recovery measures.

We first consider the outcome of a supervisory stress test. This represents a precise, but infrequent, measure that can detect early deterioration of a bank's viability. Because of these characteristics, we propose that a serious shortfall in the adverse scenario or any shortfall in the baseline scenario should trigger an assessment on a bank's viability. If the bank turns out to be solvent, the supervisor should be empowered with additional Pillar 2 tools to initiate recovery. This comprises current Pillar 2 tools, including payout restrictions, and the new, additional power to trigger the CoCo conversion.

Signals from stress testing should be complemented with warning signals provided by market value indicators (Acharya et al., 2010). While regulators are reluctant to use automatic market value triggers as they are prone to distortion (Sundaresan and Wang, 2015), they should be considered as significant information.¹³ Adverse market signals in the form of a sharp drop in share price or a jump in CDS spread should trigger a supervisory evaluation and empower the supervisor to initiate recovery measures (Hart and Zingales, 2011).

The traditional measure of book equity provides a notionally correct, but in practice opaque signal. As it is prone to accounting manipulation, it will not signal capital deterioration in time. Given its role in capital regulation, book equity should retain a complementary role. We propose retaining the automatic trigger based on book equity in line with current practice, provided its threshold be raised considerably to ensure that conversion will support the recovery of a solvent but undercapitalised bank.

¹² Once the bank is declared insolvent and put in resolution, depositors potentially bear losses according to their seniority in the bankruptcy waterfall.

¹³ We view the calibration of market-based triggers (such as a specific threshold for market to book equity ratios) as beyond the scope of this contribution.

The regulatory trigger should be set at least at 7% of book equity. This equals to the core equity requirement of 4.5% plus the capital conservation buffer of 2.5% that applies to all banks at all times and is designed to ensure that banks build up capital buffers to withstand periods of stress. If the bank is systemically important or is deemed particularly risky, the AT1 bonds should carry a correspondingly higher conversion threshold at issuance.

6 COMPARING SOLUTIONS BY RISK ALLOCATION

The experiences of March 2023 have reignited the debate over banking regulation reforms, such as widening deposit insurance or higher capital and liquidity requirements. These proposals focus on ex-ante solutions, the equivalent of increasing the height of dams for growing flood reservoirs. We argue that such reforms do not entirely capture the dynamic evolution of bank distress that we have depicted in the previous sections, and that contingent, interim measures (the storing of sandbags by the dam) may need more attention.

Table 2 summarises the main reform options, including state-contingent options, and highlights how the allocation of risk affects moral hazard and run incentives, trading off liquidity, capital and fiscal costs (Perotti, 2023a).

Table 2 Potential reforms to strengthen deposit stability

Type of reform	Allocation of risk	Effect on insolvency risk	Effect on liquidity risk	Effect on risk incentives
Ex-ante measures				
Higher capital norms	Investors (high bail-in)	High at all times	Positive, indirect	Very positive
Deposit insurance	Taxpayers (bailouts)	Ambiguous	Highest reduction	Very negative
Interim measures				
Going concern recapitalisation	Investors (high bail-in)	High (if the trigger is effective)	Positive, indirect	Positive
Redemption charges	Uninsured depositors (modest bail-in)	Positive but limited	High and positive	Positive

Deposit insurance and higher capital have the strongest effects and highest cost and would face extensive resistance. Interim measures targeted at going concern preservation and recovery may be embedded as prompt responses containing the escalation of runs. This calls for solid pre-resolution regulatory powers to activate pricing and gating in response to uninsured runs on banks deemed solvent.

In any run, allowing outflows at par value directly dilutes those who do not withdraw. As a result, once outflows start, all depositors have an incentive to run if they expect others to do the same. To de-escalate run incentives, it is critical to penalise or slow down rapid outflows at the right time. Thus, the choice of the precise volume of outflows that would activate the temporary charges is an important calibration. Just as in the case of contingent conversion of AT1 debt, it is highly advisable to introduce a regulatory trigger that may be activated at an early stage when banks deemed to be solvent become exposed to rumours that may trigger an escalation. Comparable norms have already been applied to money market fund norms. This is a significant precedent, since money market funds are the main historical destination of corporate

cash pools and can serve as a natural benchmark. Critically, modest charges can maintain access to safe liquidity for businesses at a modest price and protect taxpayers from avoidable unnecessary runs.

7 CONCLUSION

The sequence of distressed bank runs in March 2023 has made painfully clear that supervisors have no effective tools and poor incentives to take early actions, out of fear of triggering runs. We have advanced the notion of a strengthened regime of contingent intervention aimed at avoiding unnecessary default (in loco bankruptae) and giving a chance for banks deemed in principle to be viable to recover. The contingent measures involve targeting run incentives by pre-emptive partial bail-in of investors or uninsured depositors acting as automatic stabilizers, triggered by large outflows. Credible preventive measures pressure bank shareholders into a timely response, limit forbearance and improve the chances of a bank's recovery over its resolution. Contingent measures complement ex-ante capital and liquidity buffers, and would not rely as much on book equity measures. They are vastly preferable to an expansion of deposit insurance for uninsured corporate deposits, which would lead to greater moral hazard and risk creation. Deposits serve a primary safety role for households, so household deposit insurance is a legitimate public goal. On the other hand, businesses can bear a modest amount of price risk on their cash pools, and have historically held cash in MMFs for a better yield at a modest price risk. As a final piece of evidence, almost \$300 billion in corporate deposits shifted in March-April 2023 from banks into MMFs, which are subject to redemption fees (Brooke et al., 2023).

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