The bail-in tool from a Swedish perspective

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In the spring of 2014, the European Parliament and the European Council[1] adopted the Bank Recovery and Resolution Directive (BRRD)[2]. It contains provisions on plans and tools to enable authorities in EU member states to intervene when banks[3] encounter various stages of financial difficulty. Part of the BRRD describes four resolution tools, one of which is the so-called bail-in tool. The bail-in tool empowers a resolution authority[4] to, in combination with other measures, write down a bank's liabilities to cover losses or to recapitalise the bank by converting its liabilities to equity according to a specific order of priority.

The bail-in tool and its potential effects have been greatly analysed internationally. However, there has been no in-depth analysis based on Swedish circumstances. This paper therefore aims to analyse the bail-in tool, as it is described in the BRRD, from a Swedish perspective. The analysis focuses on the four major Swedish banks, which are of decisive importance to the workings of the Swedish financial system.[5]

In this paper, we analyse how the introduction of a bail-in tool could affect the cost of funds, liabilities structure and investor base of the major Swedish banks. We have also studied potential contagion effects, both direct and indirect, of actually using the tool on one of the major Swedish banks.[6]

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1 Ultimately adopted by the European Parliament on 15 April 2014 and by the European Council on 6 May 2014.

2 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 and amending Council Directive 82/891/EEC, and Directives 2001/24/EC, 2002/47/EC, 2004/25/EC, 2005/56/EC, 2007/36/EC, 2011/35/EU, 2012/30/EU and 2013/36/EU, and Regulations (EU) No 1093/2010 and (EU) No 648/2012, of the European Parliament and of the Council.

3 "Banks" in this paper refers to credit institutions and investment firms, as well as undertakings included in the same group as such firms. It is such firms for which the BRRD constitutes a framework.

4 Each country is to appoint such a resolution authority, or several such resolution authorities, with responsibility for planning for financial crises and management thereof.

5 Combined, they account for around 80 per cent of lending and receive 75 per cent of deposits in Sweden. Financial Stability Report 2014:1, Sveriges Riksbank.

6 Direct contagion effects arise because participants in financial systems borrow from each other. If such loans are impaired, losses arise for the creditor, and problems spread in the financial system. Indirect contagion effects can arise through two main channels. First, markets can assume that there are direct contagion effects, even if this is not the case. Second, if a bank experiences financial difficulty, markets might anticipate that other banks in the same system will be affected by the same problems, which can in turn lead to investors wishing to exit their investments. Indirect contagion effects are thus problems that spread in financial systems, but that are not due to direct exposures.

A new method for managing distressed banks

The bail-in tool is a key tool in the EU's new regulatory framework governing how member states are to manage distressed banks – the Bank Recovery and Resolution Directive (BRRD). The Directive is one of several regulations established in the wake of the financial crisis.

The Directive provides authorities with tools for the recovery or resolution of failing banks in a way that should prevent serious disturbances in the financial system and minimises the cost to taxpayers. The bail-in tool empowers a resolution authority[7] in combination with other measures[8], to write down a bank's liabilities to absorb losses or to convert liabilities to equity to recapitalise the bank, according to a specific order of priority.

In order to implement the BRRD, member states are to adopt and publish the requisite laws by no later than 31 December 2014. They shall apply as of 1 January 2015. However, application of the bail-in tool is not required before 1 January 2016, although there is nothing that prevents member states from deciding to apply it earlier.

At the same time as the BRRD is now adopted by the EU, the Financial Stability Board (FSB) is developing proposals on how to ensure that global systemically important banks have sufficient loss-absorbing capacity once authorities have decided to place such a bank under resolution. It is a case of the ability of the bank's liabilities side to cope with incurred losses and recapitalisation needs without needing to use public funds. The BRRD contains a calculation method for a minimum requirement with the same objective (see the section *Calculation of minimum requirement* for more details). In the FSB discussions, the concept is called Gone-Concern Loss-Absorbing capacity (GLAC).

The questions that have come under most discussion for GLAC are what criteria that must be met for an instrument to be counted as GLAC, how much GLAC should global systemically important banks hold, and where in the organisational structures of such banks should GLAC be kept?[9]

FSB intend to submit its proposal at the G20 meeting in Brisbane in November 2014 and it will be then be circulated for consultation. The plan is to also perform a comprehensive impact analysis. The prospect of the EU potentially needing to revise its rules regarding the minimum requirement (at least for global systemically important banks), if the FSB's final proposal proves too dissimilar to the BRRD, cannot be ruled out. This article is however based on BRRD in its current form.

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7   Each member state is to appoint one or more resolution authority(ies), which will be empowered to apply the resolution tools. The resolution authority will be responsible for preparing for a financial crisis and management thereof. The resolution authority may be a separate authority, but the assignment can also be bestowed on a ministry, central bank or supervisory authority.

8   The bail-in tool can either be used on a stand-alone basis for the recovery of the bank under resolution, or in combination with one of the other resolution tools (the sale of business tool, the bridge institution tool or the asset separation tool).

9   See Mark Carney's letter to the finance ministers and central bank governors of the G20 countries (April 2014).

THE CONCEPT OF BAIL-IN

A bail-in tool empowers a resolution authority to, in combination with other measures, write down a bank's liabilities to absorb losses. In a scenario of a bank being placed into resolution, equity may not suffice to absorb the losses. In such a situation, the use of a bail-in tool creates additional loss-absorbing capacity in the bank. The intention is that the write-down of debt instruments should cover all incurred and expected losses. The authority is also empowered to convert debt instruments to equity to recapitalise the bank so that it may continue to function. Such conversion may take place either in combination with a write-down or as a stand-alone measure.[10]

The use of the banks' own liability side to absorb losses and recapitalise the bank means that the need to use public funds for that purpose can be postponed, reduced or completely avoided.

THE PURPOSE OF THE BAIL-IN TOOL

The bail-in tool has several, interlinked, purposes.

- Banks' creditors, rather than the taxpayers, should carry the cost of failing banks in the future.

- A reduction in implicit government guarantees. If the new rules are implemented, authorities will no longer need to choose between letting the bank fail and bailing it out using public funds. Reduced government guarantees could lead to creditors gaining more incentive to control the bank's risk-taking (see the section *Total cost of funds* for more details).

- It should be possible to recapitalise the bank swiftly while systemically important parts of the bank may continue to function at the same time. The bail-in tool theoretically enables authorities to manage a failing bank while limiting the effects on the financial system by avoiding a closure of the bank and hence liquidation of its assets. However, potential contagion effects cannot be entirely eliminated, which are further discussed in section *Potential contagion effects from application of the bail-in tool*.

An authority rescuing a bank using public funds is known as a bail-out. There are three primary reasons for authorities to perform a bail-out:

- Banks maintain critical functions of the financial system, and a failure would lead to the functions performed by the bank in question being suspended.

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10 It is easiest to envisage the write-down and conversion occurring in two stages. First, share capital is reduced and liabilities are written down until all losses are absorbed, and liabilities are subsequently converted to equities. In such a case, remuneration would be payable for the conversion by means of the creditor receiving the same value in the form of equities as he pays for in liabilities. Hence, the conversion does not bring about any transfer of value. In practice, however, the bail-in can be accommodated in the conversion by means of the conversion rate established by the resolution authority also taking account of the loss absorption.

- Banks often have substantial exposures to each other, so if one bank fails, others could follow.
- A failing bank could give indirect contagion effects, such as loss of market confidence.

So, the failure of one bank could result in considerable financial instability.

Historically, authorities have had to choose between two alternatives – letting the bank fail or bailing it out using public funds. The BRRD changes this. The intention of resolution is that there should be a way of resolving systemically important banks that does not risk triggering a financial crisis and which, at the same time, lets the bank's owners and creditors carry the cost, rather than taxpayers.

APPLICATION OF THE BAIL-IN TOOL

Figure 1 gives a simplified example of application of the bail-in tool on a distressed bank's balance sheet. Initially we can see the bank under normal circumstances ("business as usual" at the far left). On the liability side, the bank has equity, liabilities eligible for bail-in (such as unsecured bonds) and liabilities that are exempted from bail-in (such as covered bonds). Which debt instruments are potentially at stake is further discussed in the section *Liabilities exempted from bail-in*.

In the next step, losses occur ("distressed bank", in the middle of the diagram). The assets decrease by the losses (the stripy blue box) and all the equity is wiped out. However, it does not suffice to cover all losses.

Figure 1. Simplified description of application of the bail-in tool on the balance sheet of a distressed bank
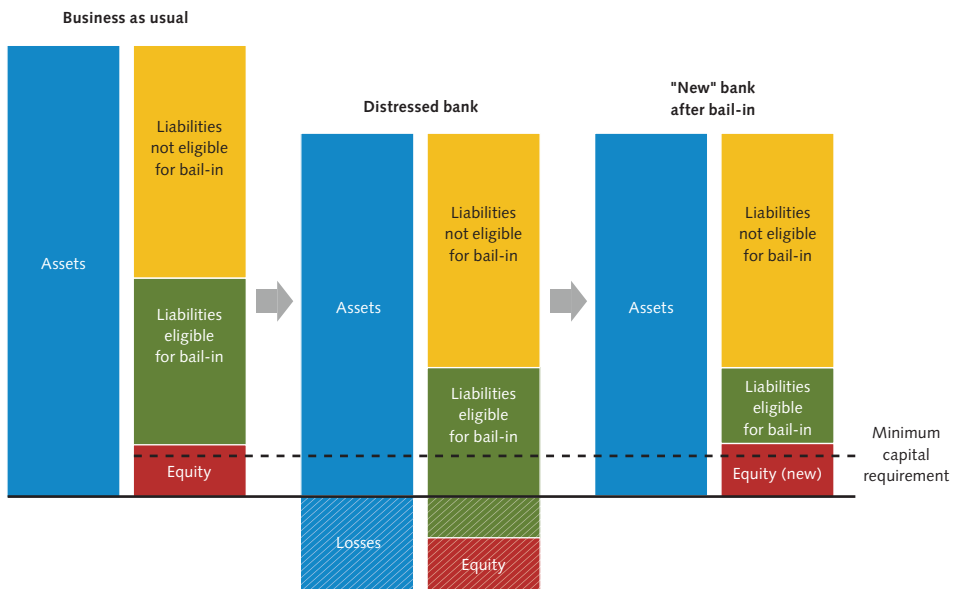
Subsequently, the resolution authority applies the bail-in tool. The liabilities eligible for bail-in are written down by an amount equal to the stripy green box in the middle balance sheet. Then, around half of the remaining liabilities eligible for bail-in are converted to equity (the red box in the balance sheet to the far right). The bank has now been recapitalised ("New" bank after bail-in, far right).

It is important to bear in mind that, as part of this process, a valuation of the bank will be needed. The resolution authority will, based on a valuation performed by an independent valuer, have to evaluate the extent of incurred and expected losses in order to write down and convert the right amount of outstanding liabilities. The write-down and conversion must also be sufficient for the bank to regain market confidence so that it may continue to conduct operations for at least a year. Such a valuation might have to be done under time pressure and with limited information – history has shown that distressed banks must be resolved swiftly to avoid bank runs and other funding problems. However, it is important for the valuation to be as accurate as possible. If the extent of losses is underestimated, a second round of bail-in might be required, and if it is overestimated, creditors (which have then been written down "unnecessarily") gain a fresh claim on the bank equal to the amount by which the losses were overestimated. Misjudgements on both fronts can lead to uncertainty in the process.

ALTERNATIVES TO BAIL-IN – BANKRUPTCY AND BAIL-OUT

In a bankruptcy, a bank's assets are sold and the proceeds distributed to the creditors of the bankruptcy estate. Such a procedure is generally associated with low recovery rates because the operations are divided up, assets have to be sold at low prices (compulsory sale) and costs are often incurred as a result of legal proceedings. Such costs are generally known as direct bankruptcy costs.

Application of the bail-in tool has two main advantages over bankruptcy, if the process works as intended.

- From the point of view of the bank's creditors, direct bankruptcy costs are avoided. Hence, both shareholders and creditors would likely suffer lower losses than in a bankruptcy.

- From the point of view of society, risks associated with shutting down the bank are avoided, since the idea is for the bank, or at least the parts of the bank that provide systemically important functions, to continue to operate.

However, bail-in of a distressed bank may still be problematic due to the risk of undermined market confidence, especially in a systemic crisis; that is, when the financial system as a whole sustains severe shocks. This is discussed more thoroughly in the section *Indirect contagion effects and systemic risk*.

As mentioned earlier, countries tend to bail-out banks using public funds because of the role banks play in the financial system. There are generally two types of bail-outs. The

first protects both shareholders and creditors, while the other only protects the creditors, not the shareholders. When Swedish authorities handled the banking crisis at the outset of the 1990s, parliament decided that shareholders of failing banks should not be protected against losses, but that creditors should.[11] The government guaranteed all liabilities and took over ownership of the banks which were later sold. This second type of bail-out reduces the moral hazard[12] risk compared to the first one, since shareholders then have incentives to control risk-taking in the bank (because they have to carry the losses, even in a bail-out). However, there remains a moral hazard for creditors, who have no incentives to control the bank's risk-taking if they know if they will be protected given default.

Today, state aid – including bail-outs – is regulated by the FEU treaty.[13] According to the state aid rules, owners of capital instruments in banks (such as shareholders) may not be protected against losses in the event of a bail-out. Bail-outs thus work today as the second type. When we use the term "bail-out" going forward in this paper, we will therefore refer to this type, which protects creditors but not shareholders.[14]

Compared with bail-out, it will (as intended) be more costly for a bank's creditors to use the bail-in tool. However, it will be more risky to apply the bail-in tool in terms of contagion effects. These can be both direct and indirect:

- Direct because the owners of debt instruments that may be subject to write-down can suffer losses equalling the required bail-in.
- Indirect due to e.g. reduced market confidence.

However, compared to a bankruptcy, application of the bail-in tool ought to imply that both types of risk are lower.

Both in a bail-out and in application of the bail-in tool, direct bankruptcy costs in the form of the compulsory sale of assets are avoided. Legal expenses and other costs pertaining to the process itself would also probably be lower in a bail-out and in application of the bail-in tool than in a bankruptcy.

Table 1 shows the three different resolution alternatives and compares the costs carried by creditors, direct bankruptcy costs and potential contagion effects.

If it is assumed that a bail-out protects creditors but not shareholders (as we have done above), the expected cost for the creditor[15] is zero in a bail-out. When the bail-in tool is applied, it will (as intended) be more costly for the bank's creditors ($a>0$). However, the expected cost will be lower for the creditors than in a bankruptcy ($b>a$) because the value destruction (the direct bankruptcy expenses) will probably be lower when the bail-in tool is used ($x \sim 0$) than in a bankruptcy ($y>x$). In a bail-out, direct bankruptcy costs are assumed to be zero.

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11 The so-called state bank support guarantee. See Ingves and Lind (1996).
12 The risk that arises from knowledge about a safety net (such as an insurance policy) affecting actions in a way that leads to an increase in the probability of an unfavourable outcome.
13 Articles 107 to 109 of the Treaty on the Functioning of the European Union – TFEU.
14 Applies, according to state aid rules, also to owners of other capital instruments, such as holders of hybrid capital and subordinate loans.
15 Except for owners of hybrid instruments and subordinated bonds.

Table 1. Illustrative comparison of resolution alternatives

	BAIL-OUT	APPLICATION OF THE BAIL-IN TOOL	BANKRUPTCY
Expected cost for the creditor	0	a (a>0)	b (b>a)
Direct bankruptcy costs[16]	0	x (x~0)	y (y>x)
Potential contagion effects	Low	Medium	High

RESOLUTION TRIGGERS

According to the BRRD, authorities shall take a resolution action only if they find that all of the following conditions are met:

- The authorities have determined that the bank is failing or likely to fail (for example, if the bank is in breach of its capital requirements or the bank is unable to pay its obligations as they fall due or requires government funding).

- There is no reasonable prospect that any alternative private-sector or supervisory measures would prevent the failure of the bank.

- A resolution action is necessary in the public interest.[17]

LIABILITIES EXEMPTED FROM BAIL-IN

The basic idea in bail-in is that all the bank's creditors should be able to contribute to recapitalisation. However, it is not considered appropriate to use the bail-in tool for all types of liabilities, as some of these may be too systemically important or too complex to be written down or converted to equity.

It follows that only a certain part of a bank's liabilities may be subject to write-down and conversion through application of the bail-in tool. These are known as eligible liabilities. The BRRD states that the following liability classes are exempt from bail-in and will thus neither be written down nor converted to equity:

- Secured liabilities (for example covered bonds[18] and repos)

- Interbank deposits with original maturities of less than seven days[19] and

- Certain other minor classes of liability such as obligations to employees and accounts payable.

Furthermore, most of the derivative contracts on the liabilities side of the Swedish banks are exempt, since netting agreements and pledged collateral will be fully taken into

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16 Assume that legal expenses for bail-out are negligible.

17 The BRRD also defines how this shall be interpreted. A resolution action shall be necessary to meet at least one of the resolution objectives better than what would have been the outcome in the event of a bankruptcy and the intervention itself shall be proportionate.

18 The BRRD also exempts the derivatives used to hedge the cover pool. The BRRD also specifically protects covered bonds; "Member States shall ensure that all secured assets related to a covered bond cover pool remain unaffected, segregated and with enough funding".

19 Interbank deposits with original maturities of less than seven days account for a large proportion of interbank deposits. Liabilities with a remaining maturity of less than seven days that have arisen through participation in systems for the transfer of payments and securities are also exempt.

account. If there is a netting agreement between two parties in a derivatives transaction (as there usually are) gross liabilities shall be netted against each other and pledged collateral deducted before the bail-in tool can be applied. Hence, the amount of derivatives that can be written down or converted is significantly lower than the amount reported under IFRS, the accounting standard Swedish banks follow.

Covered depositors will continue to be completely protected. However, if all other debt instruments that are eligible for bail-in have been written down or converted to equity, the Deposit Guarantee System (DGS) may be forced to carry losses on behalf of the depositor. The DGS may become liable for the amount which covered depositors would have lost, had they not been protected.

Figure 2 shows liabilities eligible for bail-in at the major Swedish banks. The boxes that are fully or partially red illustrate the exemptions above and the covered deposits can only be written down or converted through the Deposit Guarantee System; depositors who are protected by the DGS shall never incur any losses in connection with resolution.

Figure 2. Liabilities eligible for bail-in. Aggregate of the four major Swedish banks, percentage of total liabilities and equity, March 2014
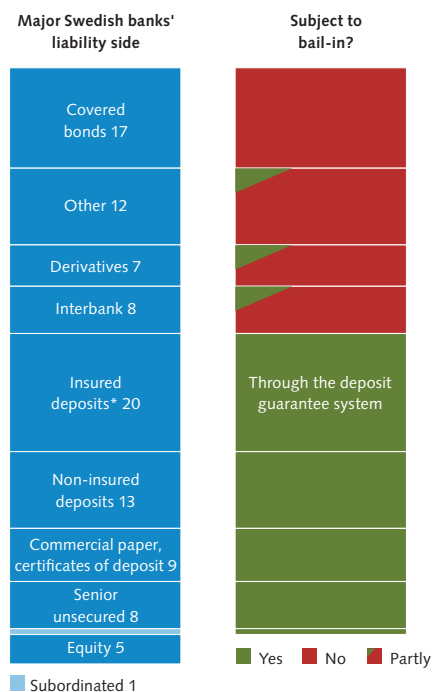
Note. The illustration is based on the consolidated level, not institution level.
* The percentage of covered deposits for all banks except SEB is an assumption based on calculations from Barclays.
Sources: The banks' financial statements, Barclays research, the BRRD and the Riksbank

The BRRD will introduce a couple of changes compared to current Swedish legislation concerning the priority of claims in bankruptcy. The current priority stipulates, in simplified terms, that the following order shall apply in a bankruptcy:

- First, creditors with a specific right of priority (such as owners of covered bonds) shall be paid,
- then creditors with a general right of priority (such as employees),
- then owners of unsecured exposures (this includes owners of senior unsecured bonds[20] and depositors),
- then owners of subordinated debt and
- finally shareholders.

There is, according to this order, no difference in priority between deposits and other unsecured exposures. However, the BRRD introduces new seniority for deposits whereby in the future, in order to cover losses and recapitalise the bank, primarily equity shall be reduced or diluted[21], and secondarily, the bail-in tool shall be used, with due consideration for the exemptions above, in the following order:

1. Subordinated debt.
2. Unsecured bonds, certificates and large corporate deposits.[22, 23]
3. Non-covered deposits from microenterprises, small and medium-sized companies and private individuals.
4. Covered deposits (eligible for bail-in through the deposit guarantee system).

According to the BRRD, member states shall ensure that the resolution authorities limit the extent of eligible liabilities held by other institutions. This means that the resolution authorities shall limit the possibility of other banks to invest in eligible debt instruments, with a view to limiting direct contagion effects to other banks.[24]

If another bank has invested in debt instruments written down through the bail-in tool, this will result in a direct loss for that bank. If the debt instrument in which the bank has invested is instead converted into equity, it will however not count as a direct loss.

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20 A bond whose holder does not have a specific right of priority in the event of a bankruptcy. Unsecured bonds normally entail a higher credit risk than covered bonds, which means that the borrowing costs are higher.
21 Primarily common equity Tier 1 capital. Other capital instruments are then written down or converted before the bail-in tool is used.
22 This category also includes the other liabilities not exempted, such as interbank deposits with original maturities exceeding seven days.
23 Deposits from companies that are not defined as microenterprises or small or medium-sized companies according to the definition in Article 2.1 in the appendix to Recommendation 2003/361/EC.
24 Another regulatory framework that also has the purpose of limiting direct contagion effects is that which governs large exposures of banks, in place in Sweden. Also, this regulatory framework will be strengthened because the newly published regulations from the Basel Committee regarding large exposures enter into force in 2019.

However, the investment will change from a "normal" investment to an investment in the share capital of another financial institution. Such investments can be deducted from Common Equity Tier 1 capital.[25] So, although the conversion does not involve a direct loss, it could mean a negative impact on the capital ratios of the investing bank.

CALCULATION OF MINIMUM REQUIREMENT

There is a risk that banks could restructure their liability sides in a way that makes the bail-in tool ineffective, for example by only issuing debt instruments that are exempt from bail-in or by relying on unstable short-term funding that may disappear in times of stress.

If such a bank then suffers substantial losses, remaining debt instruments would not suffice to be written down or converted to recapitalise the bank.

To counteract this risk and ensure that banks have sufficient capacity to cover losses in the event of failure, each member state is to ensure that its banks always hold sufficient equity and eligible liabilities of long maturity that can be bailed in. This is regulated by means of a minimum requirement in the BRRD, calculated as follows:

$$\frac{(\alpha + \beta + \gamma)}{(\delta + \alpha)} \geq x$$

α = Own funds[26]
β = Unsecured debt instruments with a remaining maturity >1 year[27]
γ = Large corporate deposits[28] with a remaining maturity >1 year
δ = Total liabilities[29]
x = Minimum requirement for own funds and eligible liabilities.

The BRRD does not set out a harmonised level for the minimum requirement at EU level. Instead, the national resolution authority sets the level in consultation with the supervisory authority.[30] If they set the level at 10 per cent for a bank with total liabilities and own funds equalling SEK 100, that bank will need to hold a minimum of SEK 10 in own funds, unsecured liabilities with an outstanding maturity exceeding a year and large corporate deposits with an outstanding maturity exceeding a year. This level shall be set individually for each bank and on a consolidated basis for entire groups. In each individual case, the authorities may, according to the Directive, also decide on the distribution between own funds and different types of liabilities in the numerator.

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25 According to Articles 43-48 of Regulation (EU) No. 575/2013 of the European Parliament and of the Council of 26 June 2013 regarding prudential requirements for credit institutions and investment firms (CRR).
26 Defined according to Article 72 of the Capital Requirements Directive (CRR). Own funds comprise the sum of common equity Tier 1 capital, Tier 1 capital contributions and Tier 2 capital.
27 Except for deposits.
28 Deposits from companies that are not defined as microenterprises or SMEs according to the definition in Article 2.1 in Recommendation 2003/361/EC.
29 Derivative liabilities shall be included in total liabilities on the basis of full account being taken of netting rights and pledged collateral.
30 In Sweden, Finansinspektionen is responsible for the supervision of banks.

So, there is a difference between eligible liabilities and which liabilities are included in the numerator in this requirement. The numerator does not include liabilities with shorter maturities or the deposits which are given priority. However, these can nevertheless be written down or converted (see previous section).

EXEMPTING ELIGIBLE LIABILITIES

Allowing creditors to carry part of the losses can lead to contagion effects (see the section *Potential contagion effects from using the bail-in tool)*. It may be the case that certain liabilities that should normally be subject to write-down and conversion may need to be exempted in an individual case in order to avoid contagion effects and other risks to financial stability. The BRRD therefore includes an exception. This empowers national resolution authorities to exempt certain eligible liability classes from write-down and conversion and to shift the costs that they would have carried to other eligible liability classes, or limit the extent to which certain creditors are to carry losses. However, the exemption only applies in exceptional circumstances and the authority must first have notified the EU Commission. This entails certain creditors potentially having to carry more costs than others, who should actually have had equal or worse priority. Ultimately, the costs that may be carried by an individual liability class are limited by the "no creditor worse off" principle. According to this principle, an individual creditor shall be no worse off than in regular bankruptcy proceedings.

In order for the authority to apply the exception, a number of conditions also have to be met. These relate to the possibility of using the bail-in tool in a timely manner, achieving continuity in the critical functions provided by the bank and avoiding contagion effects and value destruction for other creditors.

Another possibility, linked to the first exception, is that a resolution fund can contribute to[31] absorbing the costs and recapitalize the bank instead of the costs being shifted to other eligible liabilities. However, this requires;

- Approval from the EU Commission, and
- The write down or conversion to equity of equity and liabilities equivalent to at least 8 per cent of the bank's liabilities side or 20 per cent of its risk-weighted assets.

In addition, the second alternative can only be applied if the member state:

- Has a pre-financed resolution fund exceeding 3 per cent of the state's covered deposits,
- does not have access to the European Stability Mechanism (ESM), and
- the bank in question has a consolidated balance sheet equalling less than EUR 900 billion.

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31 By an amount equalling no more than 5 per cent of the bank's liabilities side.

Based on how the Financial Crisis Commission has interpreted the BRRD[32], Sweden does not currently meet the requirement for a pre-financed resolution fund equalling at least 3 per cent of covered deposits. Sweden and other EU member states that do not have access to ESM may however apply this alternative in future once they have built up their resolution funds to that level.

In certain circumstances, the BRRD also enables member states to employ precautionary recapitalisation using public funds for banks that meet their capital requirements but which, based on a stress test, need more capital.

Analysis of how the introduction of a bail-in tool could affect the major Swedish banks

In this section, we analyse a couple of direct effects on the major Swedish banks and their funding situation from the introduction of a bail-in tool.

TOTAL COST OF FUNDS

A bankruptcy procedure as described above is generally associated with low recovery rates because the operations are divided up, assets might have to be sold at low prices (compulsory sale) and costs are often incurred as a result of legal proceedings. Such costs are generally known as direct bankruptcy costs. Because of such costs, the value of a bank is generally lower in bankruptcy than as a going concern. Through resolution, division, compulsory sale and at least part of the legal costs are avoided (see Table 1). Hence, a higher recovery rate can be expected in resolution than in bankruptcy. The lower expected bankruptcy costs will, all else equal, *reduce* the bank's cost of funding[33], because creditors expect higher recovery rates should the bank default.

If the default of a specific bank has major negative externalities, the government could have an incentive to bail it out. In the section *Alternatives to bail-in – bankruptcy and bail-out,* we defined (in simplified terms) government bail-outs in terms of creditors[34] being protected, but not shareholders. Creditors hence do not carry any losses if the bank is bailed out by the government. Hence, the risk a bank chooses to take will not be particularly important to creditors, since they will enjoy full protection if the bank defaults and is bailed out by the government.

One purpose of introducing the bail-in tool is to reduce the probability of a government bail-out and hence reduce the value of the implicit government guarantee. Consequently, the risk of creditors having to carry losses increases. This ought to lead creditors to demand higher compensation which, all else equal, ought to *increase* the bank's cost of funds.

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32 SOU 2014:52. The Financial Crisis Commission was appointed to make a review of the set of rules for handling financial crisis, including the implementation of the BRRD in Sweden.

33 Defined as total interest expense/interest-bearing liabilities.

34 Except for owners of hybrid instruments and subordinated bonds.

In summary, an introduction of the bail-in tool would potentially lead to two opposite effects on the cost of funds of banks. On the one hand, lower expected bankruptcy costs should lead to a lower cost of funds. On the other hand, reduced implicit government guarantees should lead to costs increasing. These two opposite effects are analysed in more detail in Appendix A. Below, we go through these effects and how they could alter the total funding cost of the major Swedish banks, since the latter are of crucial significance to how the Swedish financial system works. Factors that could affect the funding cost are evaluated from a qualitative perspective since it would be too great a challenge to attempt to quantify the individual factors. The analysis does not take account of contagion effects. These are instead discussed in the section *Potential contagion effects from application of the bail-in tool*.

We start with the first effect; that is, an expected recovery rate that is higher than in a bankruptcy. The expected cost for creditors is much lower in the application of the bail-in tool than in a bankruptcy (see Table 1) because the direct bankruptcy costs are lower. The Financial Crisis Commission writes in its Swedish Government Official Report[35] that resolution will as a rule probably lead to much lower value destruction than a bankruptcy. This hence indicates a *reduced* cost of funds for the major Swedish banks when the framework is introduced.

If we then study the other effect – that is, a reduced probability of government bail-out – we can start by ascertaining that the credit ratings of the four major Swedish banks are currently three notches higher than what they would otherwise have been due to their "very high systemic support" (according to the credit rating agency Moody's[36]). This indicates that the probability of a government bail-out is currently high in Sweden. Swedish authorities have also historically supported banks and in 2008, the Bank Support Act was enacted, authorising the government to support ailing banks with guarantee programmes, capital injections and other appropriate measures. The Swedish government also has relatively low sovereign debt in an international comparison[37], which can be assumed to underpin the perception that the probability of government bail-out is high.

According to Standard & Poor's, this high probability of government bail-out decreases with the implementation of the BRRD. Standard & Poor's establishes that outlook for the four Swedish systemically important banks is negative because it expects implicit government guarantees to decrease over the next two years.[38] Moody's also finds that the BRRD reduces the probability of government bail-out because the probability of bail-in increases and that it is negative for senior unsecured debt in Swedish banks. This applies in particular to the four largest banks because they are most probably the ones that would receive government bail-out currently.[36]

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35 SOU 2014:52.
36 Moody's Investor Service, "Sweden's Implementation of EU Bank Bail-In Plan Is Credit Negative," 15 August 2013.
37 2013. Public sector gross debt, Total economy, Per cent of GDP, IMF WEO, Forecast.
38 Standard & Poor's, "Various Rating Actions Taken On Nine Swedish Banks On Stabilizing Economic Risks And Government Support Review," 29 April 2014.

If the probability of government bail-out for major Swedish banks decreases, this would indicate an *increased* cost of funds for them.

There are thus, as described above, two opposite effects on the cost of funds of the major banks. Both of these effects affect the loss given default for creditors in the event of a bank defaulting.

A bail-in tool also affects the probability of default. The BRRD provides authorities with extensive possibilities to put a bank into resolution at an early stage, if they find that a default is probable (see more in the section *Resolution triggers*). Application of the bail-in tool (in this case conversion) would then occur ahead of a regular bankruptcy, which on the one hand increases the probability of default.

On the other hand, the risk a bank chooses to take ought to be of greater importance to creditors. They might then opt to attempt to control the bank's risk-taking to a greater extent by demanding higher remuneration for lending money, or refrain from lending money to a bank that is judged too risky. This could, for example, lead to the bank choosing to issue more equity or subordinated debt to protect other creditors, hence reducing the costs of its loan financing. If a bank issues more equity, that reduces the probability of default.

In our opinion, the combined effect of all of these factors can contribute to a slightly higher cost of funds for the major Swedish banks. However, this is by no means a firm conclusion because it is difficult to quantify the individual factors with any great precision.

Besides the factors discussed above, uncertainty surrounding how the bail-in tool will be applied could lead to increased risk premia, because If creditors are uncertain about how they should calculate expected losses, they might perceivably add a safety margin onto their required interest rate.

The resolution decision[39] will be in the hands of Swedish authorities. It is possible that foreign creditors in particular see this as an uncertainty factor. This also applies to the fact that the BRRD also empowers national authorities, in certain circumstances, to exempt certain classes of liability from write-down and conversion and transfer them to costs that would have been carried by such classes to other eligible liabilities. This could also be viewed as an uncertainty factor and lead to increased risk premia.

SHIFTING OF INTEREST EXPENSE BETWEEN LIABILITY CLASSES

Some classes of liability will be completely exempt from bail-in (such as covered bonds). Others will get seniority when the BRRD is implemented (such as private deposits). Because certain deposits will have higher seniority, other categories will instead become more subordinated than they are today.

This ought to lead to a shift in interest expenses between different liability classes. Riskier liabilities will probably be more expensive, while liabilities with a more secure position will be cheaper.

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39 and hence the trigger for bail-in.

Figure 3 shows a comparison between the order of priority for the major Swedish banks before and after the implementation of BRRD. As can be seen, some liability classes will become more subordinated than they are currently, namely unsecured bonds, certificates and non-guaranteed major corporate deposits (the green boxes in the diagram to the right). Hence, losses that would have been equally split before (between all the green boxes in the diagram to the left) will now primarily be carried by these three classes. Only if it does not suffice will losses also be allocated to non- covered deposits from SMEs and private individuals (grey box). In a third instance, they are also allocated to the deposit guarantee system (purple box).

Figure 3. Order of priority for eligible liabilities of the major Swedish banks before and after implementation of BRRD. Losses are absorbed from the bottom of the diagram.
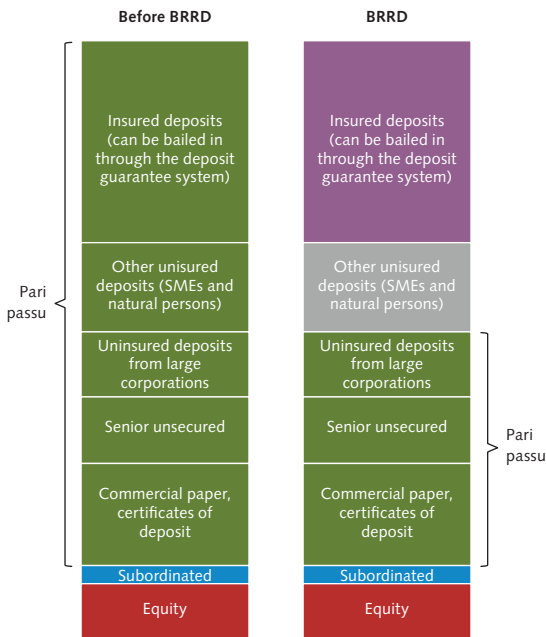
Note: For illustrative purposes, aggregate of the four major banks. The diagram does *not* show the liabilities that are partially exempt from bail-in, such as interbank deposits (read more in the section *Liabilities exempted from bail-in*). The share of non- covered deposits is based on a research report from Barclays for the three banks that do not report the share of covered deposits. The share of large corporate deposits is based on assumptions. Pari passu means that an equal degree of losses will be incurred.
Sources: The banks' financial statements, Barclays research and the Riksbank

We estimate that such subordination could lead to a cost increase of between 30 and 60 basis points for senior unsecured debt (see Appendix C for calculations) if creditors fully take their new, lower, priority into account. Figure 4 gives an illustration of how much increases of 30 and 60 basis points, respectively, would affect the Credit Default Swap spreads for the four major Swedish banks, which can be seen as an indicator of how much the cost of senior unsecured debt can increase. However, that increase could be much higher in a stressed scenario, i.e. when a bank or the financial market is encountering

difficulty for one reason or another. If the probability of default increases, creditors will demand a higher return, or refrain from investing at all in eligible debt instruments. In terms of interest expense for unsecured debt, in a relative sense the new regulatory framework benefits banks that already have a high volume of equity or subordinated debt, because it provides a "buffer" for the unsecured debt instruments (see Figure 3).

The increased price sensitivity of senior unsecured debt will, on the one hand, emit distress signals earlier on, hence inciting various participants into early action to prevent problems. On the other hand, it could make the bank's creditors more sensitive to stress. The bank could then experience funding problems earlier on. This is discussed in more detail in the section *Indirect contagion effects and systemic risk.*

Figure 4. Average CDS spreads on 5-year senior unsecured debt for the four major Swedish banks (basis points, unweighted average)
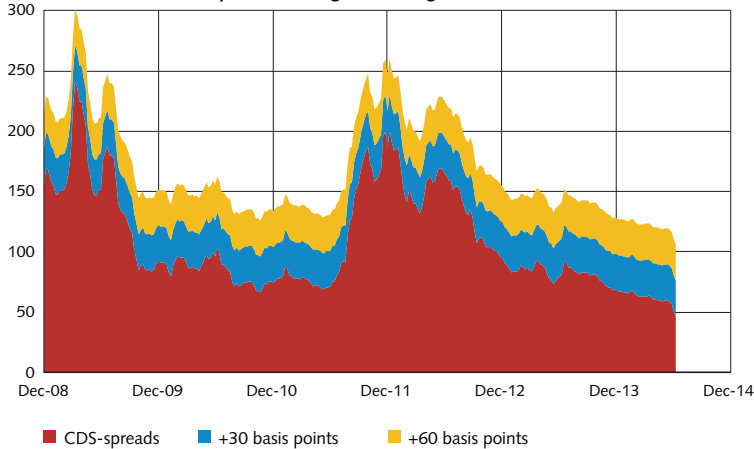
Source: Ecowin

Covered bonds might benefit from the new rules. Moody's states that "the new resolution framework will increase the probability that financial institutions will either remain going concerns or go through an orderly wind-down", and as the draft directive "explicitly exempts covered bonds from the bail-in process, it reduces the likelihood of an issuer ceasing to perform its obligations under the covered bonds following bail-in (default) of the issuer's senior unsecured debt."[40]

Moody's also states that "in cases where an issuer is subject to bail-in but emerges from resolution as a going concern/with key operating activities intact, we expect the covered bonds to benefit from the improved credit strength of the issuer following the bail-in."[41]

Fitch also states that covered bonds benefit from the new framework: "A preservation of the issuing bank as a going concern would avoid the source of covered bonds payments switching from the issuer to the cover pool. Even though the senior unsecured debt could

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40 2014 Outlook – Global Covered Bonds, Moody's investor service.
41 Moody's Approach to Rating Covered Bonds, 12 March 2014.

suffer a default, covered bonds would continue to be serviced by their issuer."[42] This implies that the cost of covered bonds could decrease.

On the whole, the implementation of a bail-in tool would make unsecured instruments riskier for investors, and hence probably more expensive. At the same time, covered bonds are in a safer position and will therefore probably be cheaper. However, it is possible that account has already been taken of the introduction of the bail-in tool in the calculation of creditors, and that the price change has hence already transpired, at least partially. This shift also implies that the higher the level at which the minimum requirement for own funds and eligible liabilities (see more in the section *Calculation of minimum requirement*) is set, the more the total cost of funding could increase.

The shift in costs between various liability classes could benefit certain asset classes. Assets that are commonly funded through covered bonds, such as mortgages, could benefit from this compared with e.g. corporate loans, which are usually funded through unsecured debt.

EFFECTS ON LIABILITY STRUCTURE AND INVESTOR BASE

Since some classes of liabilities will be exempt from bail-in, banks have incentives to issue such debt instruments in order to minimise the reduction in the value of the implicit government guarantee. This implies that minimum requirements for banks might be necessary to force them to issue unsecured debt, or upper limits on the encumbrance of assets.

As described in the section *Calculation of minimum requirement*, the BRRD introduces a minimum requirement for own funds and eligible liabilities. This should reduce the risk of the Swedish banks changing their liability structures too much in favour of secured debt or short-term debt instruments.[43] The minimum requirement obliges banks to hold a minimum amount of unsecured liabilities with an remaining maturity of at least a year on their balance sheets. The extent depends on the limits that the national authorities choose to set for their banks.

The subordination of unsecured debt (see Figure 3) and the potential conversion of that type of debt instrument into equity could potentially affect who is willing to invest in such debt instruments ("the investor base").

In an investor survey conducted by J.P. Morgan in 2012[44], as many as 89 per cent of respondents considered debt eligible for bail-in as an investible asset class. However, the fact that these instruments are convertible may lead to lesser interest from traditional debt investors who may not have the skill or mandate needed to manage a potential equity exposure in the future. There is also uncertainty surrounding how such instruments will be treated in new and existing regulatory frameworks. However, both mandates and regulatory frameworks should be adapted in the slightly longer term.

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42 Fitch Ratings "Covered Bonds Rating Criteria," 10 March 2014.
43 There are other new regulations that also work to extend the maturity of banks' liabilities, such as the Net Stable Funding Ratio (NSFR).
44 J.P. Morgan, "European bank bail-in survey result," 9 July, 2012.

The J.P. Morgan investor survey concluded that the greatest issue for investors would be if the new debt eligible for bail-in were rated non-investment grade. That would, according to the investors, render such debt instruments an asset class in which they would be unable or unwilling to invest. The risk of this affecting the major Swedish banks is low, however. Even if the credit ratings for unsecured liabilities were downgraded three notches (equivalent to completely removing implicit government guarantees), the credit ratings of the major banks would still be investment grade. In light of this, in our view this ought not to pose any major difficulty in the funding possibilities of the major Swedish banks when the bail-in tool is introduced.

On the other hand, it could be a problem for banks which are considered weaker, because their eligible liabilities could be downgraded to credit ratings equalling non-investment grade through the introduction of a bail-in tool, which would make it more difficult for them to issue unsecured debt. One way the banks could resolve that problem could be to issue equity, convertibles or other subordinated debt instead. That would protect other creditors from losses, in turn reducing the effects of subordination for the unsecured debt classes and would hence probably lead to better credit ratings for them.

Potential contagion effects from using the bail-in tool

DIRECT CONTAGION EFFECTS

Maes and Schoutens (2010) have pointed out that debt instruments that may become subject to write-down and conversion (and other convertibles) can increase the risk in the financial system as a whole. The idea is that if bail-in is implemented at one bank, it can lead to losses for other financial institutions that have invested in such instruments. This can create "a potential domino effect of institutions in distress". The risk of contagion effects if any party in the financial system encounters difficulty is thus a source of systemic risk. Moreover, they point out that if insurance companies hold significant amounts of bail-in debt, there is a risk of contagion from the banking sector to the insurance sector. Only a small proportion of the outstanding unsecured debt is currently owned by Swedish insurance companies.[45] However, this does not prevent the holding accounting for a substantial part of a specific insurance company's portfolio, and they can thus nevertheless be affected by a bail-in process.

Zhou et al. (2012) propose that contagion risks should be mitigated by limiting financial institutions' cross-holdings of eligible debt instruments (and other convertibles). For banks, there are regulations limiting the extent of their exposures to an individual counterparty.[46]

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45 Around 9 per cent of outstanding unsecured bonds issued by all Swedish banks are owned by Swedish insurance companies according to Statistics Sweden. It should be noted that this data includes SEB's covered bonds and therefore it cannot be ruled out that it is the covered bonds the insurance companies actually own.
46 Such a regulatory framework is already in place in Sweden. Also, this regulatory framework will be strengthened because the newly published regulations from the Basel Committee regarding large exposures enter into force in 2019.

The BRRD also states that member states shall limit the possibility of other banks to invest in eligible debt instruments, for the very purpose of limiting direct contagion effects and ensuring that the bail-in tool can be applied.

Since the deposit guarantee system is not exempt from bail-in, the Swedish government could suffer direct losses through that. However, since the deposit guarantee system assumes the priority of depositors (which tops the order of priority for the eligible debt instruments), the risk is probably limited.

Large corporate deposits are not given priority, however (see Figure 3). Applying the bail-in tool could hence bring about contagion effects to large companies. Interbank deposits with a maturity of seven days or more also fall into this category. In a stressed situation, fear among large companies and banks of deposits being written down could trigger a run on the deposits of these two categories. The same can be said about uninsured deposits from microenterprises, SMEs and private individuals, but to a lesser extent because both of these categories enjoy priority.

Another potential issue is that investors in Swedish equity-linked bonds could be exposed to losses in a bail-in procedure. Investors in such instruments do not usually possess sufficient knowledge to assess the risk either. Equity-linked bonds have been marketed as very safe investments, but they are based on an unsecured bond that can subject to conversion or write-down through the bail-in tool.[47]

INDIRECT CONTAGION EFFECTS AND SYSTEMIC RISK

Indirect contagion effects could potentially be extensive in the application of the bail-in tool or threat thereof. Application of the bail-in tool on one Swedish bank could for example lead to a sharp decline in confidence in the other Swedish banks too, even if they have limited investments in eligible debt instruments. This would be particularly poignant in a systemic crisis scenario; that is, when the financial system as a whole sustains severe shocks.

Goodhart (2011) argues that bail-in is suitable in a situation in which failure is random and idiosyncratic – i.e. in which banks fail independently of each other – but less so in a world where failures occur in connection with systemic crises. He argues that there is a risk that when a bail-in trigger is pulled for the first bank, the market of funding for other banks will be closed as well. Hence, there is a risk that banks will be forced to sell assets, thereby exacerbating the downward spiral in asset prices during a systemic crisis.

The main investors in Swedish senior unsecured debt, both long-term and short-term, are foreign.[48] A large proportion of short-term funding is obtained through US money market funds.[49] In terms of owners of long-term unsecured bonds, available information[50]

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47 In 2008, 4,000 Swedish customers invested in Acta Asset Management's equity-linked fund which was originally issued by Lehman Brothers. When Lehman Brothers went bankrupt the customers lost their money.
48 Includes certificates.
49 For more information about money market funds and how they are linked to the Swedish banking sector, see "Shadow banking and the Swedish financial system" Financial Stability Report 2014:1.
50 Through Statistics Sweden. The information is deficient, however, and the data includes SEB's covered bonds.

indicates that around 80 per cent of long-term unsecured covered bonds are owned by foreign investors. Swedish banks and mortgage institutions own around 4 per cent and the government around 3 per cent.[51] Foreign investors are mainly funds and asset managers, pension companies, insurance companies and other banks.[52] They know that the Swedish banking system is concentrated and closely interlinked[53], which increases the risk of market confidence in all the Swedish banks diminishing when the bail-in tool is applied on a Swedish bank. A fall in market confidence would also affect Swedish banks more than those in other countries because of their major reliance on market funding.

To sum up, in our view the indirect effects of applying the bail-in tool might be greater in Sweden than in most other countries because the Swedish banks are closely interlinked with each other and highly dependent on market funding.

Concluding comments

In this paper, we have analysed how the introduction of a framework containing a bail-in tool could affect the cost of funds, liabilities structure and investor base of the major Swedish banks. We have also studied potential contagion effects, both direct and indirect, of actual application of the tool on one of the major Swedish banks. We have ascertained that when a framework containing a bail-in tool is introduced, it could lead to a somewhat higher total cost of funds for Swedish banks. One reason for this is that the previously strong implicit government guarantee should decrease and risk premia potentially increase due to uncertainty about national authorities' discretion to set trigger levels. This could also lead to a shift in the cost of funding between different classes of liability. If some unsecured debts are given a lower degree of subordination than under current law, this ought to lead to a higher borrowing cost for such liabilities.

Covered bonds may on the other hand benefit from the new regulatory framework, as it increases the probability of a bank either continuing as a going concern or undergoing an orderly wind-down. As covered bonds are exempt from bail-in, they may benefit from the improved capitalisation and credit rating of the issuer once the bail-in tool has been applied. The risk of them having to obtain payments directly out of the cover pool instead of from the issuer also decreases. Thus, covered bonds can, to a greater extent than before, remain unaffected by the failure of a bank, which ought to lead to a lower borrowing cost for such liabilities.

This could in turn lead to assets usually funded by covered bonds – such as mortgages – benefiting from the introduction of a bail-in tool, unlike corporate loans, which are usually funded by unsecured debt. This ought also to affect the end customer's cost of funding.

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51 Through municipalities and social insurance systems.
52 Discussions with market participants.
53 Links between banks can be direct or indirect. Direct links arise when, for instance, a bank funds another bank's lending or acts as counterparty in a financial transaction. Indirect links can arise when banks have similar exposures and are hence exposed to similar risks, or market participants choose not to differentiate between banks, but instead base their assessments of individual banks on the situation of the banking sector as a whole.

Because certain classes of liability are exempt from bail-in, there may be a risk of banks only issuing such liabilities, and in that case there would not be anything to write down in a resolution procedure. To counteract this, BRRD contains rules setting out that national resolution authorities shall set a minimum requirement governing how much capital and eligible debt instruments banks must hold on their balance sheets. This reduces the risk of Swedish banks changing their liability structures too much in favour of liabilities that are exempt from bail-in.

In our view, when the new rules are introduced, there should only be a limited risk of investors being unable or unwilling to invest in eligible debt instruments issued by the major Swedish banks. This is based on the fact that polled investors[54] have expressed that they do not view the introduction of the new regulations as a problem if it does not lead to debt instruments being downgraded to non-investment grade. The prospect of that occurring at present is not very plausible for the debt instruments issued by major Swedish banks. However, the introduction of new rules could in the short term lead to uncertainty in terms of mandates and regulations.

It is also ascertained in the paper that eligible debt instruments will probably be more sensitive to financial stress through the introduction of a bail-in tool. In a stressed situation, the cost of such liabilities ought to increase more and the bank should find it more difficult to obtain funding. Furthermore, we also believe that banks that are considered weaker could experience problems in issuing eligible liabilities.

Direct contagion effects[55] to other banks from actual application of the bail-in tool should be limited. This is thanks to existing regulations governing the large exposures of bank[56], and because BRRD sets out that member states shall ensure that the resolution authorities limit the extent of eligible debt instruments held by the banks. Other creditors may be affected, however.

Indirect contagion effects[57] (such as a sharp decline in market confidence) from application of the bail-in tool could be particularly severe in Sweden due to the closely interlinked[58] banking system and reliance on market funding of the major Swedish banks.

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54 J.P. Morgan, "European bank bail-in survey result," 9 July 2012.

55 Direct contagion effects arise because participants in financial systems borrow from each other. If such loans are impaired, losses arise for the lender, and problems spread in the financial system. This is called a direct contagion effect.

56 Such a regulatory framework is already in place in Sweden. Also, this regulatory framework will be strengthened because the newly published regulations from the Basel Committee regarding large exposures enter into force in 2019.

57 Indirect contagion effects can arise through two main channels. First, markets can assume that there are direct contagion effects, even if this is not the case. Second, if a bank experiences financial difficulty, markets might anticipate that other banks in the same system will be affected by the same problems, which can in turn lead to investors wishing to exit their investments. Indirect contagion effects are thus problems that spread in financial systems, but that are not due to direct exposures.

58 Links between banks can be direct or indirect. Direct links arise when, for instance, a bank funds another bank's lending or acts as counterparty in a financial transaction. Indirect links can arise when banks have similar exposures and are hence exposed to similar risks, or market participants choose not to differentiate between banks, but instead base their assessments of individual banks on the situation of the banking sector as a whole.

In order to avoid using the bail-in tool at all, it is therefore important that the banks' resilience is strengthened through bolstered capital levels and reduced liquidity risks. The Riksbank has, in its Financial Stability Report, published a number of recommendations to this end[59].

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59 See Financial Stability Report 2014:1.

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Appendix A. Theoretical foundation

In this appendix, we describe the theoretical framework underlying the analysis in the section *Total cost of funds*. Based on academic literature, we discuss possible theoretical consequences of the introduction of a bail-in tool on the cost of funds of banks. First, we analyse the effects of lower bankruptcy costs, and we then study the consequences of reduced government guarantees.

THE EFFECT OF LOWER BANKRUPTCY COSTS

Expected losses on holdings of bank bonds are usually determined by two factors. The first factor is the probability of default, *p(D)* and the second is the loss given default, *LGD*. Multiplying *p(D)* by *LGD* gives a measure of expected losses.

(1) $E(loss) = E(p(D) \times LGD)$

If expected losses decrease due to a lower *p(D)* and/or a lower *LGD*, investors will demand a lower interest rate, all else equal, and the funding cost for the bank will hence decrease.[60]

If bankruptcy costs are lower in bail-in than in liquidation, then loss given default should also be lower, all else equal:

(2) $(LGD|bail\text{-}in) < (LGD|liquidation)$

It hence follows from equation (1) that expected losses for investors will be lower in bail-in than in liquidation. Hence, investors ought to accept a lower interest rate, which reduces the bank's cost of funds, all else equal.[61]

The introduction of a bail-in tool might however change the probability of default. Also, uncertainty and hence risk premiums might rise if the circumstances for using a bail-in tool are unclear. An explicit objective of the implementation of a bail-in tool is also to reduce the value of the current implicit government guarantees. *To summarise, it is impossible to determine with any certainty whether the introduction of a bail-in tool will actually reduce the cost of funds for banks.*

There are few papers in academic literature which, in a structured manner, study the introduction of different types of liabilities eligible for conversion or write-down on a

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60 The value of a bond is determined by the expected value of future cash flows. If there are no coupon payments and the nominal amount is repaid in one period, the value of the bond is the discounted value of the bond's nominal amount:

$$Value\ of\ bond = \frac{Nominal\ amount\ (1-E(loss))}{(1+r_f+risk\ premium)} \equiv \frac{Nominal\ amount}{(1+R)}$$

where r_f is the risk-free rate, $E(loss)$ is expected loss as a share of the bond's nominal amount, and R is the bond's promised return (yield).

61 This conclusion is based on the regular rollover of debt; otherwise the lower loss given default will only benefit existing investors.

bank's balance sheet. In a recent paper, Chen et al. (2013) develop a theoretical model with liabilities eligible for bail-in beside covered deposits and senior and subordinated debt. One purpose of their study is to gain deeper insight into how the incentives of a bank's shareholders and the value of equity are changed by the introduction of a bail-in tool.

They show that, under a number of strict assumptions, a bank's cost of funds is reduced through the introduction of a bail-in tool. Chen et al. hence conclude that existing shareholders may benefit from replacing conventional debt with debt eligible for bail-in.

First and foremost, they assume that all bankruptcy costs are avoided in bail-in (or at least that the loss given default in bail-in is lower than that in ordinary liquidation). Furthermore, they make the following assumptions:

1. There are no implicit or explicit government guarantees

2 A certain percentage of liabilities is renegotiated each period (i.e. debt rollover)[62]

3 There is no regulatory uncertainty, i.e. bail-in only occurs when the original shareholders declare bankruptcy[63]

4 The size of the investor base for debt eligible for bail-in is sufficiently large[64]

If not all of the above assumptions are met, there is a risk that the reduction in the bank's funding cost will be small, or that costs will actually increase. An essential aspect in the introduction of a bail-in tool is, for example, that the resolution authority, not the shareholders, decides when liabilities are to be written down or converted to equity. Another important issue is the presence of government guarantees. Next, we analyse how a reduction in these guarantees affects a bank's cost of funds.

THE EFFECT OF REDUCED GOVERNMENT GUARANTEES

As mentioned earlier, the government has strong incentives to rescue a bank from bankruptcy if its failure would come at a major economic cost. Chen et al. (2013) assume, however, that there are no implicit or explicit government guarantees. This makes it difficult to draw any firm conclusions about the impact on a bank's cost of funds from the introduction of a bail-in tool when significant guarantees of this kind are present.

In the absence of a more structured model that includes government guarantees, we can however analyse the effects of introducing a bail-in tool in a simple static model. We know that investors will demand a lower interest rate if expected losses for them are reduced as a consequence of a lower probability of default and/or of a lower loss given default from

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62 Debt rollover each period reduces shareholders' incentives to increase the bank's debt ratio and risk level because in that case the new investors will demand a higher return in exchange for the heightened risk.

63 If bail-in is triggered prior to the point in time at which shareholders should have declared bankruptcy, this involves a loss for shareholders because keeping the bank going would potentially imply an increase in the value of equity from a value of zero (or close to zero).

64 Chen et al. take into account however that if debt instruments are converted to equity, some investors may be forced to sell their new shares at a discount following conversion. That is their way of modelling that some investors are not legally or contractually permitted to hold equities, as pointed out by Coffee (2010) and others.

the introduction of a bail-in tool. The cost of funds for the bank will thus decrease, all else equal.

If we denote the change in loss given default when a bail-in tool is implemented by ΔLGD, it can be expressed as follows (for derivation, see Appendix B):

(3) $\Delta LGD =$
        $\left(1 - p(bail\text{-}out)_{gg}\right) \times \left((LGD|bail\text{-}in) - (LGD|liquidation)\right) +$
        $\Delta p(bail\text{-}out) \left((LGD|bail\text{-}out) - (LGD|bail\text{-}in)\right),$

where $p(bail\text{-}out)$ is the probability of a government bail-out given default before the bail-in tool is introduced, $(LGD|bail\text{-}in)$ is loss given default in a bail-in, $(LGD|liquidation)$ is loss given default at failure when the bank is not rescued by the government, $(LGD|bail\text{-}out)$ is the loss given default in a government bail-out and $\left(\Delta p(bail\text{-}out) \equiv \left(p(bail\text{-}out)_{bail\text{-}in,gg} - p(bail\text{-}out)_{gg}\right)\right)$ denotes the changed probability of bail-out.

The intuition underlying equation (3) is straightforward. On the one hand, due to lower bankruptcy costs, loss given default should be lower in a bail-in than in liquidation. This fact is captured by the fact that the term $\left((LGD|bail\text{-}in) - (LGD|liquidation)\right)$ ought to be negative. However, the reduced loss given default is only relevant if the bank is not bailed out by the government. The reduction in loss given default must therefore be multiplied by $\left(1 - p(bail\text{-}out)_{gg}\right)$. The first part of equation (3) should thus be negative, implying that loss given default at failure for investors should *decrease*, all else equal.

On the other hand, the probability of bail-out would probably decrease when the bail-in tool has been introduced, i.e. $\Delta p(bail\text{-}out) < 0$. In addition, the loss given default in bail-out ought to be lower than that in bail-in, i.e. the term $\left((LGD|bail\text{-}out) - (LGD|bail\text{-}in)\right)$ ought to be negative. The second part of equation (3) should thus be positive, implying that loss given default at failure for investors should *increase*, all else equal.

Appendix B. A technical note

Expected losses for investors in the presence of government guarantees but no bail-in tool, $E(loss)_{gg}$, is a function of the probability of default and loss given default:

$$(4) \qquad E(loss)_{gg} = E\big(p(D)_{gg} \times LGD_{gg}\big),$$

where subscript $_{gg}$ denotes *"in presence of government guarantees"*. In this case, loss given default can be expressed as:

$$
\begin{aligned}
(5) \qquad LGD_{gg} =& \big(1 - p(bail\text{-}out)_{gg}\big) \times (LGD|liquidation) + p(bail\text{-}out)_{gg} \times \\
& (LGD|bail\text{-}out) = (LGD|liquidation) - p(bail\text{-}out)_{gg} \times \\
& \big((LGD|liquidation) - (LGD|bail\text{-}out)\big),
\end{aligned}
$$

where $p(bail\text{-}out)_{gg}$ is the probability of a government bail-out given default, $(LGD|liquidation)$ is loss given default for investors at failure when the bank is not bailed out (i.e liquidation), and $(LGD|bail\text{-}out)$ is loss given default for investors in a government bail-out.

Expected losses for investors in presence of both government guarantees and a bail-in tool, $E(loss)_{bail\text{-}in,gg}$, is a function of the probability of default and loss given default:

$$(6) \qquad E(loss)_{bail\text{-}in,gg} = E\big(p(D)_{bail\text{-}in,gg} \times LGD_{bail\text{-}in,gg}\big),$$

where subscript $_{bail\text{-}in,\ gg}$ denotes *"in presence of government guarantees and a bail-in tool"*. In this case, loss given default can be expressed as:

$$
\begin{aligned}
(7) \qquad LGD_{bail\text{-}in,gg} =& \big(1 - p(bail\text{-}out)_{bail\text{-}in,gg}\big) \times (LGD|bail\text{-}in) + \\
& p(bail\text{-}out)_{bail\text{-}in,gg} \times (LGD|bail\text{-}out) = (LGD|bail\text{-}in) - \\
& p(bail\text{-}out)_{bail\text{-}in,gg} \times \big((LGD|bail\text{-}in) - (LGD|bail\text{-}out)\big),
\end{aligned}
$$

where $p(bail\text{-}out)_{bail\text{-}in,gg}$ denotes the probability of a government bail-out given default when a bail-in tool is available.

The change in loss given default after a bail-in tool is introduced, ΔLGD, is hence expressed as follows:

$$
\begin{aligned}
(8) \qquad \Delta LGD =& LGD_{bail\text{-}in,gg} - LGD_{gg} = \\
& \big((LGD|bail\text{-}in) - p(bail\text{-}out)_{bail\text{-}in,gg} \times \\
& \big((LGD|bail\text{-}in) - (LGD|bail\text{-}out)\big)\big) - \big((LGD|liquidation) - \\
& p(bail\text{-}out)_{gg} \times \big((LGD|liquidation) - (LGD|bail\text{-}out)\big)\big),
\end{aligned}
$$

This expression can be simplified as:

(9) $\Delta LGD =$
$\left(1-p(bail\text{-}out)_{gg}\right) \times \left((LGD|bail\text{-}in) - (LGD|liquidation)\right) +$
$\Delta p(bail\text{-}out)\left((LGD|bail\text{-}out) - (LGD|bail\text{-}in)\right).$

Appendix C. Greater subordination for certain liability classes

Given the large volumes of deposits that will be given priority with the implementation of the BRRD, unsecured debt (primarily unsecured bonds and certificates) will have to carry much heavier losses given default (see Figure 3). This is because the losses that would previously have been borne by the deposit guarantee system, private individuals and SMEs, will now be applied to senior unsecured bonds, certificates and large corporate deposits.

Below follows an analysis of how much interest expense for unsecured debt would potentially rise if LGD increased to 100 per cent; that is, if investors in unsecured debt fully priced in the shift in risk.

To derive the impact on unsecured senior debt, we take a look at the components of the premium to the risk-free rate[65]. From Hull's approximation[66] it follows that:

(10) $Premium_{Senior\ unsecured} = p(D) \times LGD_{senior\ unsecured}$,

where $p(D)$ denotes the probability of default, that is, i.e. the riskiness of the bank, and LGD denotes loss given default.

We then assume that loss given default for subordinated debt is 100 per cent (otherwise LGD for senior debt would be zero). By using the CDS spread on subordinated debt as a proxy, we can now derive the probability of default, because it will be equal to the spread on subordinated debt.

(11) $Premium_{Subordinated} = p(D) \times 100\% = p(D)$

Equation (12), which also follows from Hull's approximation, then gives us the LGD for senior unsecured debt.

(12) $LGD_{Senior\ unsecured} = \dfrac{Premium_{Senior\ unsecured}}{p(D)}$

It follows from equations (10) to (12) that if $LGD_{Senior\ unsecured}$ increases to 100 per cent, the spread on senior unsecured debt would be equal to the spread on subordinated debt.

(13) $Premium_{subordinated} = Premium_{Senior\ unsecured,\ when\ LGD=100\%}$

---

65 CDS spreads are used as proxies for the spread to the risk-free rate.
66 *Options, futures and other derivatives* by John C. Hull.

The spread between senior and subordinated CDS spreads for the major Swedish banks is between 30 and 60 basis points. Hence, the spread between senior debt and the risk-free rate would be expected to increase by 30-60 points if investors in this debt category fully discount their new, lower seniority.