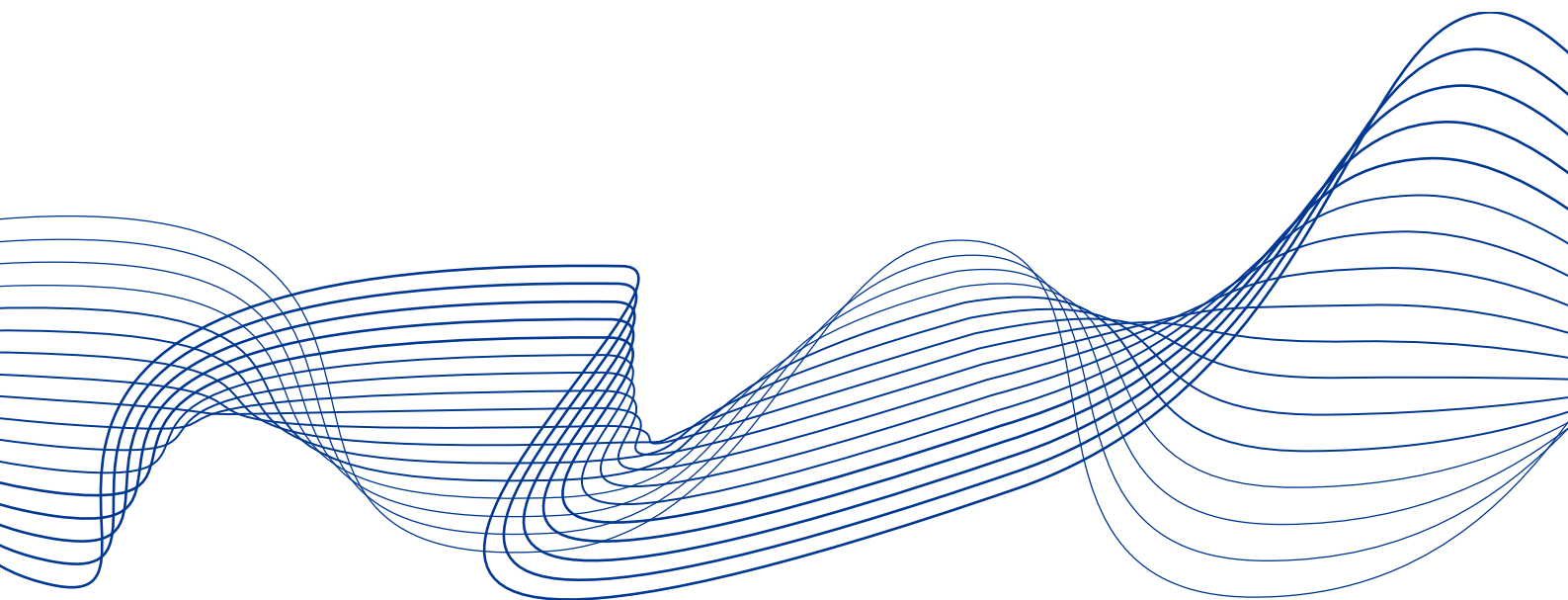


Sovereign bond-backed securities: a feasibility study

January 2018

Volume I: main findings

by
ESRB High-Level Task Force on Safe Assets



ESRB
European Systemic Risk Board
European System of Financial Supervision

Contents

| | |
|--|-----------|
| Foreword by the Chair | 2 |
| Executive summary | 4 |
| 1 Motivation | 6 |
| 1.1 Portfolio diversification, de-risking, and banking union | 7 |
| 1.2 Financial integration and capital markets union | 8 |
| 1.3 Options for low-risk assets | 8 |
| 2 Security design | 11 |
| 2.1 Cover pool | 11 |
| 2.2 Seniority structure | 14 |
| 2.3 Contractual features | 17 |
| 3 Market development | 20 |
| 3.1 Security issuance | 21 |
| 3.2 Investor base | 25 |
| 3.3 Market size | 32 |
| 4 Regulatory policy | 35 |
| 4.1 Treatment under the existing regulatory framework | 35 |
| 4.2 Principles of an enabling product regulation | 38 |
| 4.3 Implications of the treatment of sovereign exposures | 40 |
| 5 Conclusion | 46 |
| References | 48 |
| Members of the ESRB High-Level Task Force | 49 |
| Imprint and acknowledgements | 50 |



Foreword by the Chair



In 2016, the General Board of the European Systemic Risk Board (ESRB) agreed that the pooling and tranching of cross-border portfolios of national sovereign bonds represents an interesting and attractive approach that could contribute to the ESRB's objectives. On this basis, the General Board commissioned a *High-Level Task Force on Safe Assets* to investigate the practical considerations relating to sovereign bond-backed securities (SBBS).

In principle, the design of SBBS could facilitate the diversification and de-risking of sovereign bond portfolios without mutualising sovereign risks in Europe. To analyse the feasibility of this design, the Task Force undertook technical analysis and sought feedback from market participants. I am grateful to Task Force

members and officials from ESRB member institutions for their contributions to this project. I would also like to thank the many market participants who engaged constructively. This report represents the outcome of these analyses and discussions, without necessarily reflecting individual views on all aspects.

The Task Force's main finding is that a gradual development of a demand-led market for SBBS might be feasible under certain conditions. One necessary condition is for an SBBS-specific enabling regulation to provide the conditions for a sufficiently large investor base, including both banks and non-banks. To enhance financial stability, this regulation would need to treat the different tranches of SBBS according to their unique design and risk properties. For banks, regulating senior SBBS no more severely than sovereign bonds could incentivise them to hold these low-risk securities. The regulatory treatment of mezzanine and junior SBBS should reflect their greater riskiness.

In addition, the Task Force analysed how investor demand for SBBS would be affected by the regulatory treatment of sovereign exposures (RTSE). This analysis was conducted without prejudice to policy discussions on RTSE ongoing in other fora. If those discussions result in changes to the treatment of sovereign exposures to reflect credit or concentration risk, demand for senior SBBS would be substantially enhanced. Clearly, however, this finding does not provide sufficient justification for embarking upon such regulatory reform, which should be evaluated on its own merits.

Ultimately, the level of investor demand for SBBS and its impact on financial markets is an empirical question, which can only be tested if an enabling regulation for the securities is adopted.



Task Force members expressed a range of views on whether other conditions, in addition to an SBBS-specific enabling regulation, would be necessary for an SBBS market to achieve its policy objectives and for potential risks to be contained. For example, some members saw RTSE reform as necessary to address systemic risks by inducing banks to diversify and de-risk their sovereign bond portfolios. By contrast, others believed that RTSE reform, particularly in the absence of a functioning SBBS market, would be undesirable owing to its broader implications for sovereign bond markets.

The impact of SBBS on the functioning of national sovereign bond markets was a recurrent theme in the work of the Task Force. The report addresses this issue from a range of perspectives, and proposes an incremental approach to the issuance of SBBS. This would allow for an evidence-based development of the securities, informed by their interaction with national markets.

Owing to its length, the report is divided into two volumes: this volume summarises the Task Force's findings, while the second volume contains the underpinning analysis. With its publication, I invite policymakers, market participants and others to assess the work of the Task Force.



Philip R. Lane

Chair of the ESRB High-Level Task Force on Safe Assets



Executive summary

Sovereign bond-backed securities (SBBS) are defined as securities with varying levels of seniority backed by a diversified portfolio of euro-denominated central government bonds.

Because they are created through private contracts, SBBS do not mutualise sovereign risks, as each government would remain responsible for servicing its own debt obligations.

This report summarises the findings of an ESRB High-Level Task Force on the feasibility and impact of creating a market for SBBS as a tool to enhance financial stability. The technical findings are based on analytical work and insights from market participants and other stakeholders. The Task Force's report represents the outcome of these analyses and discussions, without necessarily reflecting individual views on all aspects or pre-judging future decision-making on SBBS. This volume of the report conveys the Task Force's main findings; Volume II contains the analysis underpinning those findings.

The Task Force's main finding is that a gradual development of a demand-led SBBS market might be feasible under certain conditions. One necessary condition for the feasibility of SBBS is that an enabling product regulation recognises the unique design and risk properties of the securities, reflecting their underlying portfolio of sovereign bonds and varying levels of seniority. In addition, Task Force members expressed a range of views on whether other conditions would also be necessary for an SBBS market to achieve its policy objectives and for potential risks to be contained. For example, some members saw RTSE reform as key for the viable implementation of SBBS and to address systemic risks by inducing banks to diversify and de-risk their sovereign bond portfolios. By contrast, others believed that RTSE reform, particularly in the absence of a functioning SBBS market, would be undesirable owing to its broader implications for bond markets.

Section 1 of this volume sets out the motivation for an area-wide low-risk asset from a financial stability perspective. Such an asset could help to facilitate the diversification and de-risking of banks' sovereign bond portfolios. Diversification would reduce the exposures of banks to domestic sovereign risk. De-risking would mitigate the system-wide contagion that might otherwise result from common risk exposures. Thus, by holding more diversified and lower-risk sovereign bond portfolios, the banking sector could be a source of risk reduction, rather than amplification, during adverse conditions. In addition, a well-developed area-wide low-risk asset could be used as collateral, as a store of value, and as a pricing benchmark. These outcomes would contribute to the ESRB's objectives of mitigating systemic risk and supporting the smooth functioning of the internal market. The rest of the report explores whether and how an area-wide low-risk asset could be created without introducing undesirable distortions.

Section 2 describes the design of SBBS with the aim of creating an area-wide low-risk asset.

First, to achieve the policy objective of greater diversification in bank balance sheets, the report proposes that the cover pool of sovereign bonds be weighted based on participating Member States' contributions to the European Central Bank (ECB) capital key. Euro-denominated sovereign bonds would be eligible for inclusion in this cover pool if they have a competitive price in well-functioning markets. Second, to achieve the policy objective of creating a low-risk security, the report proposes that the senior layer be 70% thick. Quantitative analysis indicates that a 70%-thick senior security would perform at least as well as lower-risk sovereign bonds in terms of their



expected loss, value-at-risk, expected shortfall, and expected loss conditional on tail events. To cater to investors with different risk appetites, market intelligence suggests that the 30% of subordinated securities could be divided into a 20%-thick mezzanine security and a 10%-thick junior security. These securities would offer higher returns and embed higher risks: any non-payment on bonds in the cover pool would be borne by holders of the most subordinate security according to a contractually-defined automatic cash flow waterfall.

Section 3 outlines the possible development of a market for SBBS and the implications for sovereign bond markets. Issuance of SBBS could be arranged by private entities, subject to standardisation requirements, or by a public entity, conditional on political agreement regarding the appropriate institutional architecture. To assemble the cover pool, arranger(s) could purchase sovereign bonds at competitive prices on dedicated primary markets, which would require national debt management offices to coordinate their issuance strategies. Alternatively, arranger(s) could obtain sovereign bonds on existing primary or secondary markets, which might require them to temporarily fund a warehouse of bonds while assembling the cover pool. In this case, private sector arrangers would require compensation for bearing warehousing risks, while a public sector arranger would require participating Member States to agree to contribute a limited amount of paid-in capital. To minimise the need for these funding sources, arranger(s) could make use of a (binding) order book, whereby investors submit purchase commitments before arranger(s) assemble cover pools. Regardless of the identity of the arranger(s) and how they assemble the cover pool, SBBS-issuing entities would be bankruptcy-remote from the arranger(s). The sole activity of issuers would be to issue SBBS, hold the cover pool of sovereign bonds and pass cash flows from those assets to investors in SBBS. Issuers would not receive any public guarantees or paid-in capital. All securities would be placed in the market, with no retention by issuers. As such, issuance of SBBS would depend entirely on the level of demand for each of the three securities. Demand would vary according to investors' risk appetites and constraints imposed by regulation, which would influence their required return and the consistency between SBBS yields and the yields of the cover pool. Depending on investor demand, the SBBS market could develop incrementally at first, similar to initial issuances of bonds by the European Stability Mechanism, which have attained adequate liquidity despite limited volumes. Over time, SBBS could reach much more substantial volumes in the order of €1.5 trillion or more, conditional on the continued smooth functioning of sovereign bond markets with respect to liquidity and price formation.

Section 4 evaluates regulatory policy. Under the existing framework, SBBS would receive an unfavourable regulatory treatment compared to sovereign bonds, which helps to explain why they have not yet been created. One necessary condition for market development is for SBBS to be treated in line with their unique design and risk properties, considering the lower risk of the senior security and the higher risks of the subordinated securities. An enabling product regulation covering SBBS holdings across regulated financial sectors could provide for a prudentially adequate treatment. In addition, the outcome of ongoing discussions regarding the regulatory treatment of sovereign exposures will affect the relative appeal of SBBS. Any reform of such treatment that is sensitive to concentration or credit risk would substantially enhance demand for senior SBBS. However, this finding does not pertain to the overall merits or demerits of such reform, which should be assessed on its own merits.



1 Motivation

The existence of an area-wide low-risk asset could contribute to financial stability. An area-wide asset is one that is based on the debt of all participating EU Member States. A low-risk asset is one that offers reliable nominal pay-offs, characterised by high liquidity, low volatility and minimal credit risk, including during periods of stress in financial markets. An asset in abundant supply with both *area-wide* and *low-risk* properties could contribute to two financial stability objectives:

- **First, an area-wide low-risk asset could help to weaken the bank-sovereign nexus.** In 2012, euro area governments affirmed that it is “imperative to break the vicious circle between banks and sovereigns”. Subsequent reforms have contributed to this objective by improving the quality of banking supervision, regulation and resolution. However, these reforms have not been sufficient to meaningfully break the bank-sovereign nexus and the systemic risk it creates. The existence of an area-wide low-risk asset would help to break this nexus insofar as banks use it to reduce their sovereign risk exposures.¹
- **Second, an area-wide low-risk asset could improve stability in a financially integrated union.** Financial integration within a well-functioning internal market can contribute to financial stability by providing for automatic stabilisation without requiring active policy intervention. To this end, an area-wide low-risk asset in sufficiently abundant supply could facilitate cross-border financial activity by being used as collateral, as a store of value, and as a pricing benchmark. Greater cross-border activity could, in turn, enhance financial stability by absorbing the impact of idiosyncratic shocks. In addition, the availability of a euro yield curve associated with a liquid secondary market for an area-wide low-risk asset could foster a more level playing field across countries with respect to the credit conditions available to non-financial firms.

An area-wide low-risk asset should be evaluated in the light of other initiatives to improve the functioning of Economic and Monetary Union. Such an asset would complement broader endeavours to improve economic and financial stability, including efforts to complete the banking and capital markets unions. In addition, an area-wide low-risk asset would stand alongside initiatives towards fiscal consolidation and structural reforms of product and labour markets (where appropriate). Rather than substituting for these policy measures, such an area-wide low-risk asset would aim to contribute more narrowly to financial stability. This explains the technical nature of this report, which is based on the ESRB’s objectives of mitigating systemic risk and contributing to the smooth functioning of the internal market.²

This section elaborates on the role of an area-wide low-risk asset. Section 1.3 then outlines options for creating such an asset. Subsequent sections focus on sovereign bond-backed securities

¹ “Area-wide” can be understood to refer to the euro area. However, as Section 2 explains, SBBS cover pools could in principle include euro-denominated debt issued by non-euro area EU Member States.

² The ESRB’s two objectives are defined in article 3(1) of the ESRB Regulation, which states that the ESRB shall “contribute to the prevention or mitigation of systemic risks to financial stability [and] the smooth functioning of the internal market”.



(SBBS), which represent one possible way of creating an area-wide low-risk asset by way of contractual subordination of higher-risk securities. To enhance financial stability, SBBS would need to be properly designed and regulated, as explained in later sections. Before turning to SBBS, however, Sections 1.1 and 1.2 outline the role of area-wide low-risk assets in enhancing financial stability, assuming that such an asset could exist in abundant supply without introducing undesirable distortions. For SBBS, this assumption is examined in later sections.

1.1 Portfolio diversification, de-risking, and banking union

Excessive home bias in euro area bank portfolios is a macroprudential concern. Europe's bank-based financial system renders the stability and cohesion of its banking sector a pre-eminent policy objective. This is the rationale for the banking union agenda, which has established common institutions and rules for banking supervision and resolution. In addition, discussions regarding a possible common deposit insurance scheme are ongoing. Excessive home bias on the asset side of bank balance sheets is an impediment to the completion of a full banking union.

Excessive home bias in banks' sovereign exposures strengthens the nexus between bank risk and domestic sovereign risk. Heightened sovereign risk reduces the net worth of banks exposed to such risk. When this happens, local banks can reduce their lending to the real economy, tightening financial conditions and exacerbating recessionary impulses. During a sovereign debt crisis, excessive holdings of domestic sovereign bonds by banks adversely affect crisis management and increase the costs associated with sovereign debt restructuring.

The effects of the national bank-sovereign nexus have been widely recognised. In June 2012, proceedings from a summit of euro area governments affirmed that "it is imperative to break the vicious circle between banks and sovereigns". In March 2015, the ESRB assessed the role played by financial regulation in the bank-sovereign nexus and outlined policy options to weaken it. One option put forward in the ESRB's report is to induce banks to reinvest their sovereign bond portfolios into a new area-wide low-risk asset with in-built protection against idiosyncratic sovereign risk. In June 2015, a report by the five EU presidents stated that "bank-sovereign negative feedback loops ... were at the heart of the crisis" and proposed that policymakers consider reviewing the regulatory treatment of banks' sovereign exposures (Juncker, 2015). In June 2016, the European Council agreed to await the outcome of the Basel Committee's work on the regulatory treatment of sovereign exposures before considering the next steps.

The existence of an area-wide low-risk asset could help to facilitate the diversification and de-risking of banks' sovereign bond portfolios. Such an asset would represent a ready-made security that banks could use to diversify and de-risk their portfolios. Importantly, both the *area-wide* and *low-risk* properties of such an asset are necessary to achieve this outcome. On its own, an area-wide diversified portfolio of sovereign bonds would not have the credit risk characteristics or hedging properties of a low-risk asset. Diversification on its own would still entail the risk of system-wide contagion, as banks would have common exposures to idiosyncratic sovereign risk. Correspondingly, a purely low-risk asset, without being area-wide, would not help to avoid the destabilising re-nationalisation of sovereign bond holdings in times of crisis.



1.2 Financial integration and capital markets union

Reserve currencies with deep and liquid markets for government debt are attractive to global investors. The United States has historically benefited from a large safe haven premium on its domestic government debt. While the euro area encompasses a stable currency and an average government debt ratio below that of the United States, it lacks a deep and liquid market for low-risk government debt, in part because of its decentralised fiscal framework. This puts the euro area at a disadvantage, since average borrowing costs are elevated in the absence of a generalised safe haven premium. In addition, heterogeneity of sovereign risk in the euro area leads to capital flows across country borders when investors seek safety, which creates additional destabilising effects. With an area-wide low-risk asset, such flows would be re-directed.

Further steps towards a capital markets union could be facilitated by an area-wide low-risk asset in sufficiently abundant supply that serves as a benchmark for asset pricing. In the absence of an area-wide low-risk pricing benchmark, the valuation of equities, riskier bonds and other assets must be based on alternative discount rates, such as interest rate swap markets or national sovereign bond markets. These imperfect substitutes do not foster the integration of capital markets or the enhancement to financial stability that would be achieved through greater market-based risk-sharing.

Financial market participants need low-risk assets to collateralise transactions. Repo and derivatives transactions depend on a sufficiently abundant supply of assets that may be used as collateral. However, there is some evidence that euro area financial markets currently exhibit pronounced collateral scarcity, particularly during crises when only a fraction of government debt is widely accepted as collateral. Moreover, in the euro area, there is no area-wide low-risk asset of sufficient scale. Consequently, financial institutions must collateralise cross-border repo and derivative transactions with national assets, which are heterogeneous with respect to their idiosyncratic credit and liquidity risk. An area-wide low-risk asset could relieve these tensions insofar as it is accepted and used as collateral by market participants.

1.3 Options for low-risk assets

The institutional framework of the euro area is distinctive in that a single currency is combined with national sovereignty in fiscal policy within common rules. This setting renders the design of an area-wide low-risk asset challenging, notwithstanding its potential benefits.

In this context, several design options for a new low-risk asset have been proposed. The common feature of these options is that low-risk is achieved by embedding contractual seniority, thereby complying with the institutional framework of the euro area. They can be distinguished along two dimensions: whether they embed some joint liability among governments and whether they entail diversification. Table 1.1 characterises three options along these two dimensions.



Table 1.1

Options for new low-risk assets

| Name | Description | Design characteristics |
|---|---|---|
| Senior tranche of national bonds¹ | National sovereign bonds with varying levels of seniority | No joint liability among governments by design; diversification is not embedded but could be achieved by means of complementary regulatory reform of sovereign exposures; low-riskiness is embedded contractually |
| Senior SBBS² | Securities with varying levels of seniority backed by a diversified portfolio of euro sovereign bonds | No joint liability by design; diversification and low-riskiness are embedded contractually |
| E-bonds³ | Securities backed by a bundle of national senior bonds, possibly with the additional protection of joint guarantees | Diversification and low-riskiness are embedded contractually, and could be enhanced by limited joint liability among governments |

Source: ESRB.

Note: The table summarises the design properties of three options for low-risk assets. This report provides a feasibility and impact study of one of these assets (i.e. SBBS), in line with the Task Force's mandate. The feasibility and impact of the other two assets have not been analysed in detail. For a thorough comparison, see Leandro and Zettelmeyer (2018).

¹⁾ National tranching is proposed by Wendorff and Mahle (2015). The securities are created by euro area Member States issuing bonds of varying levels of seniority.

²⁾ Also known as "European safe bonds" (ESBies), senior SBBS are proposed by Brunnermeier et al (2011) and elaborated in Brunnermeier et al (2016, 2017). These papers provide the intellectual foundation for this report, although the Task Force does not necessarily endorse all their contents.

³⁾ E-bonds are proposed by Monti (2010) and Juncker and Tremonti (2010). They are created by a common European issuer and backed by a diversified portfolio of national senior bonds. The proposal shares some features with the blue-red proposal of Delpla and Von Weizsäcker (2010), except that the latter also entails a joint guarantee among governments.

SBBS represent the focus of the remainder of this report, in line with the mandate of the ESRB High-Level Task Force.

The reason for this focus on SBBS is that these securities would, by design, embed diversification and de-risking for investors while precluding uncontrolled mutualisation of sovereign risks. As such, SBBS represent an interesting and attractive idea. National senior bonds also avoid the mutualisation of sovereign risks, but do not embed diversification contractually; instead, diversification could only be achieved by reforming the regulatory treatment of sovereign exposures. By contrast, E-bonds embed diversification contractually, but entail limited joint liability among governments depending on their size. However, the design and impact on financial stability of E-bonds and national tranching are not analysed in detail in this report, as the Task Force's mandate centres on SBBS. Section 2 provides more details on the design of SBBS.

The proposed design of SBBS is intended to maintain the fiscal status quo without impeding possible future reforms of the fiscal framework.

By design, SBBS respect the responsibilities of individual governments within the prevailing fiscal policy framework. The securities would be issued by bankruptcy-remote pass-through entities that retain no risk, and the accruing payment flows would not be guaranteed by EU institutions or Member States. SBBS therefore do not entail any built-in promise to offer a stable source of funding for governments. If policymakers provide the policy conditions necessary for the development of an SBBS market, it would be important to ensure that their interventions are not misperceived by market participants as providing an implicit guarantee for SBBS payment flows. The risk of such misperception increases with the degree of



public sector involvement in the SBBS market; with significant involvement, dispelling such misperceptions might be challenging. Moreover, their occurrence would be undesirable, as it would impede the efficient pricing of sovereign risks, which is necessary for the viability of SBBS. To avoid this eventuality, it would be important for authorities to clearly and credibly communicate to market participants that there are no guarantees, implicit or otherwise, for SBBS payment flows. Such communication would preserve market pressure on Member States to maintain budgetary control. At the same time, the creation of an SBBS-specific enabling regulation would not impede efforts to enhance the resilience of Member States and strengthen existing governance and integration.

SBBS are interesting and attractive; the purpose of this report is to assess their feasibility and impact, which hitherto has not been analysed in detail. This report assesses the conditions under which a market for SBBS could develop and the impact that it would have on financial stability, including the smooth functioning of sovereign bond markets. Financial innovations do not always improve outcomes. By design, SBBS do not eliminate sovereign risk, but rather repackage it into lower-risk and higher-risk components. Hence, to achieve the stated policy objectives, SBBS must be properly designed, as discussed in Section 2; the market must develop incrementally, led by investor demand, as explained in Section 3; and the issuance and holdings of the securities must be prudently regulated, as proposed in Section 4. These conditions are necessary for SBBS to contribute to financial stability. In addition, as explained in Box 4.A, Task Force members expressed a range of views on whether other conditions would also be necessary for an SBBS market to achieve its policy objectives and for potential risks to be contained. For example, some Task Force members saw comprehensive RTSE reform as key for the viable implementation of an SBBS market and to address systemic risks. Moreover, these members considered such reform as essential to counteract any market misperceptions regarding implicit guarantees for SBBS payment flows, the presence of which would cause mispricing of SBBS and sovereign debt that could in their view lead to self-fulfilling sovereign risk mutualisation. By contrast, other Task Force members saw such reform as undesirable, particularly in the absence of a functioning SBBS market, owing to its broader implications for bond markets.



2 Security design

SBBS are claims on an underlying portfolio of sovereign bonds. They are created by bundling bonds from different sovereigns into a cover pool, which backs the issuance of securities with varying levels of seniority. The bundling of multiple sovereign bonds allows SBBS to embed diversification of idiosyncratic sovereign risk. The contractual seniority structure, with senior and non-senior securities, leads to the creation of lower-risk and higher-risk securities respectively. This section elaborates on these core features of SBBS and the contractual features that they would therefore possess.

Within this broad framework, the precise design of SBBS is a policy choice. The composition of the cover pool and the calibration of the seniority structure are open parameters that can be defined by policymakers in view of the overarching policy objective of improving financial stability. This objective requires senior SBBS to have the properties of an area-wide low-risk security which banks and others could use as a safe store of value. If SBBS were not designed in accordance with this principle, the issuance of SBBS could fail to enhance financial stability, and even endanger it.

To shed light on the potential design of SBBS, the High-Level Task Force conducted a public survey in December 2016.³ The purpose of this survey was to gather input from market participants and other stakeholders. Respondents to the survey emphasised that SBBS should have a simple and transparent design, allowing the securities to act as a substitute for conventional sovereign bonds and providing the conditions for ample market liquidity. To further enhance substitutability between SBBS and sovereign bonds, the SBBS payoff structure should mimic that of conventional sovereign bonds, with regular fixed coupon payments and a single bullet payment of principal. Similarly, market participants reported that the regulatory treatment of SBBS would need to reflect the composition of their underlying portfolio and the relative riskiness of the securities. These insights are described in more detail in Volume II and are incorporated into the SBBS design outlined here.

2.1 Cover pool

The cover pool of SBBS is formed of government bonds. In their responses to an ESRB survey, market participants emphasised the importance of straightforward contract design (see Volume II). As such, it would be best for the portfolio underlying SBBS to include only the eligible euro-denominated central government debt securities of participating EU Member States, as indicated in Table 2.1. Other categories of central government debt, and the debt of state, regional or local authorities, would therefore be excluded, as these instruments vary in terms of their credit risk, liquidity and other properties. Similarly, to avoid currency mismatches, only euro-denominated debt securities would be included. To provide for broad portfolio diversification with respect to

³ Details of the survey are available at <https://www.esrb.europa.eu/mppa/surveys/html/ispcsbsbs.en.html>.



sovereign risk, the cover pool should include central government debt securities issued in euro by all participating Member States whose debt trades at competitive market prices. In principle, this would allow EU Member States whose currency is not the euro to elect to be included in the cover pool, subject to eligibility requirements. As a secondary benefit of SBBS, the inclusion of euro-denominated debt securities issued by non-euro area EU Member States could help to improve the smooth functioning of the internal market by providing those Member States with a convergence path to euro area membership.

Table 2.1
Indicative portfolio weights in SBBS

| | Share of outstanding euro area central government debt securities (%) (as at end-2016) | ECB capital key share among euro area Member States (%) (as at 2015) | Share of Eurosystem PSPP holdings of national debt instruments (%) (as at end-2017) | Indicative SBBS portfolio weights (%) |
|--------------------|---|---|--|---------------------------------------|
| Austria | 3.39 | 2.79 | 3.01 | 2.88 |
| Belgium | 5.08 | 3.52 | 3.80 | 3.63 |
| Cyprus | 0.09 | 0.21 | 0.01 | 0.14 |
| Germany | 16.77 | 25.57 | 26.65 | 26.15 |
| Estonia | 0.00 | 0.27 | 0.00 | 0.00 |
| Spain | 12.62 | 12.56 | 13.36 | 12.96 |
| Finland | 1.45 | 1.78 | 1.69 | 1.84 |
| France | 23.15 | 20.14 | 21.80 | 20.78 |
| Greece | 0.94 | 2.89 | 0.00 | 1.55 |
| Ireland | 1.78 | 1.65 | 1.47 | 1.70 |
| Italy | 26.54 | 17.49 | 18.95 | 18.04 |
| Lithuania | 0.17 | 0.59 | 0.17 | 0.28 |
| Luxembourg | 0.09 | 0.29 | 0.14 | 0.14 |
| Latvia | 0.10 | 0.40 | 0.10 | 0.13 |
| Malta | 0.08 | 0.09 | 0.06 | 0.09 |
| Netherlands | 4.85 | 5.69 | 5.96 | 5.87 |
| Portugal | 1.99 | 2.48 | 1.80 | 2.55 |
| Slovenia | 0.38 | 0.49 | 0.40 | 0.51 |
| Slovakia | 0.51 | 1.10 | 0.63 | 0.77 |

Source: ECB and ESRB calculations.

Note: The table shows indicative SBBS portfolio weights compared to the ECB capital key (re-weighted to include only euro area Member States) and the portfolio shares of national debt instruments under the Eurosystem's public sector purchase programme (PSPP). SBBS portfolio weights are calculated by targeting the ECB capital key and assuming that: (i) only (and all) euro area Member States are included in SBBS; (ii) only central government debt securities are included; (iii) securities are included only up to 33% of the outstanding face value of each government's debt securities; and (iv) the face value of the total SBBS cover pool amounts to €1.5 trillion. Final SBBS portfolio weights, and the extent to which arranger(s) may deviate from these weights, would be defined in an SBBS-specific product regulation, as explained in Section 4.



SBBS portfolio weights should be based on the ECB capital key, which is well-defined and institutionalised as a measure of EU Member States' economic importance. It is recalculated every five years (or whenever a country joins or leaves the EU) based on GDP and population, so the portfolio weights of newly issued SBBS would change infrequently. To accommodate Member States with very little outstanding debt, an enabling product regulation for SBBS could permit minor deviations from the ECB capital key, as explained in Section 4. The final column of Table 2.1 shows indicative SBBS portfolio weights under the assumption that only and all EU Member States whose currency is the euro participate in SBBS. These indicative portfolio weights would change if the SBBS cover pool were smaller or larger than this constituency, for example because a Member State whose currency is not the euro elects to have its euro-denominated debt included in the SBBS cover pool.

The SBBS cover pool would be assembled by purchasing sovereign bonds at market prices.

Assembling the cover pool at market prices ensures that there would be a strong pricing relation between the cover pool and all securities backed by that same portfolio (namely senior, mezzanine and junior SBBS). If SBBS arranger(s) were instead to assemble the cover pool off-market, price formation with respect to SBBS, and the attractiveness of junior securities in particular, would be hindered, and could even result in the absence of any market clearing price for SBBS. Therefore, to ensure smooth market functioning, SBBS arranger(s) would be required to adopt the following rules on how they assemble the cover pool to be transferred to the issuers, depending on whether sovereign bonds are purchased on primary or secondary markets.

- **On primary sovereign bond markets, SBBS arranger(s) should only purchase bonds from sovereigns that have primary market access.** Participating Member States would therefore only be included in new series of SBBS if they have contemporaneous access to primary markets. A Member State that is assessed as having lost market access would not have its debt included in new SBBS series, as no such debt would be available on primary markets. This reflects the fact that SBBS are not intended to be a crisis management tool to help illiquid Member States return to capital markets, as other stabilisation mechanisms exist for this purpose. Market access would be assessed by an existing competent and politically autonomous authority, based on objective indicators such as primary market issuance volumes and the maturity structure of those issuances.
- **On secondary markets, SBBS arranger(s) should only purchase sovereign bonds for which a competitive market price exists.** Purchases must take place at competitive market prices to avoid SBBS being used to fund illiquid governments, and to ensure that senior, mezzanine and junior SBBS would themselves have market-clearing prices. Ordinarily, the competitive market price for sovereign bonds can be inferred from the best quotes on electronic trading platforms. Where these are not available, quotes could be obtained over-the-counter insofar as there is evidence that they represent a competitive market price. In the absence of an observable competitive market price, SBBS arranger(s) could organise a reverse auction between buyers and sellers to find the competitive market price.

These two rules are necessary to ensure that an SBBS replicating portfolio has the same payoff structure as the underlying sovereign bonds. An SBBS replicating portfolio is one that comprises senior, mezzanine and junior SBBS in proportion to their relative thickness in the seniority structure. As explained in Section 3.1, SBBS would be issued by a purely pass-through



entity, which passes cash flows from sovereign bonds to SBBS holders. As such, an SBBS replicating portfolio would have the same payoff structure as the underlying sovereign bonds. If those sovereign bonds all have a market price, i.e. there are buyers and sellers willing to trade them at that price, then an SBBS replicating portfolio backed by those same sovereign bonds should also have a market price, conditional on sufficient liquidity (see Section 3) and appropriate regulatory treatment (see Section 4). This neutrality feature ensures that SBBS represent a repackaging of existing risks. Nevertheless, the existence of an SBBS market could affect relative bond yields, and hence the pricing of risk, for example via a “local supply” effect, whereby investors’ preferred habitats interact with the change in risk composition brought about by SBBS, analogously to Greenwood and Vayanos (2014).

Significant variation in the composition of cover pools would reduce the fungibility of different SBBS series. Insofar as the cover pool changes over time – due to recalculations of ECB capital key weights, changing availability of central government debt securities, or the nonexistence of competitive market prices – SBBS series would be imperfect substitutes for each other, at least for a transitional period, which could reduce the overall liquidity of the SBBS market. However, the extent of this reduction in liquidity would be limited given that off-the-run government bonds are anyway less liquid than on-the-run bonds, as they tend to be traded less frequently. This insight suggests that it could be possible to engineer changes in the cover pool compositions of SBBS series over time without excessively impairing market liquidity. Moreover, for small changes in cover pool compositions, it would be possible to re-open an SBBS series if the changes are within the parameters defined in an SBBS master prospectus – in which case liquidity would be unaffected. These issues regarding market development are discussed in more detail in Section 3.

2.2 Seniority structure

Diversification on its own is insufficient to generate a low-risk portfolio. A diversified portfolio of euro area sovereign bonds exhibits low price volatility and provides some protection against idiosyncratic default, which can occur even in seemingly low-risk single-name sovereign bonds. Hence, excessive concentration, for example in the form of home bias, represents a source of systemic risk, which would be mitigated by greater diversification. However, the overall credit risk of a diversified portfolio would be higher than that of several individual sovereigns. In fact, the left-hand panel of Figure 2.1 indicates that a fully diversified portfolio would carry a higher credit risk than the current portfolios of more than half of the significant banks in the euro area (according to a “stress test” described in Volume II). At the same time, a large minority of banks currently holding higher-risk portfolios would see a substantial reduction in their sovereign risk exposure if they were to hold the diversified portfolio. These insights reveal that measures to induce greater diversification would be insufficient to achieve a broad-based de-risking of banks’ exposures, notwithstanding the considerable reduction in exposure that some banks would enjoy in such a scenario.

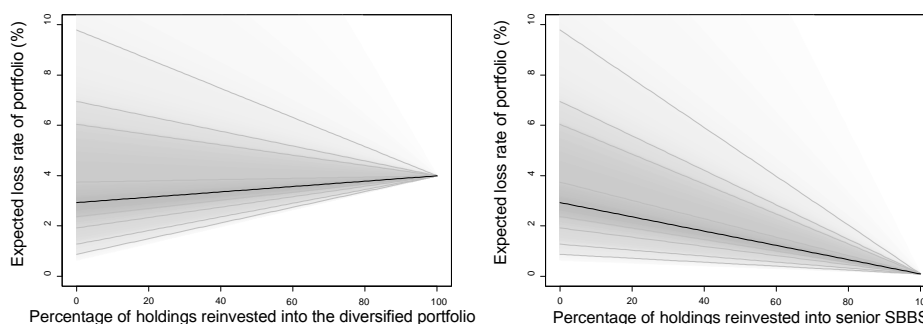
Diversification without de-risking could spread systemic risk. With diversified portfolios, banks’ risk exposures become more similar. While this would eliminate excessive concentration, in particular by weakening the national bank-sovereign nexus arising from home bias, the increased commonality of exposures implies that all banks would still be vulnerable to sovereign debt repricing or default. In a theoretical model, Brunnermeier et al (2017) show that common exposures



to idiosyncratic sovereign risk could generate contagion insofar as banks are weakly capitalised. From a systemic risk perspective, this provides motivation for inducing banks to reduce excessive sovereign risk exposures. As outlined in the ESRB report on the regulatory treatment of sovereign exposures, published in 2015, such a framework for risk reduction could include: higher overall capital requirements for banks; a targeted reform of the regulatory treatment of their sovereign exposures; and/or the creation of a low-risk asset into which banks could reinvest their sovereign bond portfolios. In line with the mandate of the ESRB High-Level Task Force on Safe Assets, this report focuses more narrowly on one of these policy options, namely the role that SBBS could play in facilitating not only the diversification, but also de-risking, of banks' sovereign bond portfolios, without necessarily reducing the size of those portfolios.

SBBS could facilitate de-risking as well as diversification. By contract, SBBS would create low-risk securities by allocating cash flows from an underlying portfolio according to a predefined waterfall of seniority. Any losses in the cover pool would first be borne by holders of junior SBBS – and, if those securities are exhausted, by holders of mezzanine SBBS, which in turn protects senior SBBS. The right-hand panel of Figure 2.1 shows that all banks would de-risk their sovereign bond portfolios (without reducing the size of those portfolios) if they reinvested (some fraction of) current holdings into senior SBBS. This follows from the fact that a portfolio comprised solely of senior SBBS would embed less credit risk than that of the least risky bank sovereign bond portfolio.

Figure 2.1
Credit risk of banks' sovereign bond portfolios reinvested into a diversified portfolio (left-hand side) and a portfolio comprising senior SBBS (right-hand side)



Source: EBA transparency exercise (2017), Brunnermeier et al (2017) and ESRB calculations.

Note: The figure plots the cross-sectional distributions of the estimated expected loss rates of banks' sovereign bond portfolios under two reinvestment scenarios. In the left-hand panel, banks are assumed to reinvest a given percentage of their sovereign bond portfolios into a diversified portfolio of euro area central government debt securities weighted by the ECB capital key. In the right-hand panel, banks instead reinvest into senior SBBS. Expected loss rates are estimated according to the benchmark calibration of the simulation model of Brunnermeier et al (2017), which is described in Volume II. In both panels, 0% reinvestment refers to the cross-bank distribution of expected losses based on banks' sovereign bond portfolios as at mid-2017 according to the EBA transparency exercise (2017). Black lines refer to the median euro area bank and grey lines to percentiles at 10 point increments.

The seniority structure of SBBS should be fixed with the aim of creating a low-risk security.

To achieve the policy objectives set out in Section 1, senior SBBS should have risk characteristics which are at least as good as those of lower-risk euro area sovereigns. Moreover, since the seniority structure would be fixed over the lifetime of each SBBS series, calibration of the seniority



structure should be robust to parameter uncertainty. With an appropriately conservative calibration, senior SBBS could perform the function of low-risk assets in financial markets.

Quantitative analysis indicates that a 70%-thick senior SBBS would have risk characteristics that are at least as good as those of lower-risk euro area sovereigns. Numerical simulations in Volume II find that 70%-thick senior SBBS would have expected and unexpected loss rates similar to German sovereign bonds. This conclusion holds when the simulation model is calibrated to aggravated default probabilities in the spirit of a stress test. Moreover, estimates for senior SBBS yields suggest that they would have closely tracked those of German sovereign bonds historically. Based on these estimated yields, a dynamic risk assessment implies that 70%-thick senior SBBS would have low levels of tail-risk exposure – often lower than the tail risks of lower-risk euro area sovereigns.⁴ Senior SBBS also possess hedging properties similar to those of lower-risk sovereign bonds, providing protection against tail events that affect junior and, to a lesser extent, mezzanine SBBS. In addition, SBBS exhibit lower average spillovers of shocks between the junior, mezzanine and senior securities than the spillovers observed between single-name sovereign bonds.⁵ These results are robust to different sets of assumptions regarding correlation structures.

In terms of the subordinated securities, market intelligence and quantitative risk assessment recommend an intermediate mezzanine security protected by junior SBBS. The existence of a mezzanine security allows for a smaller first-loss security; otherwise, with just one subordinated security, 30%-thick junior SBBS might be too large for specialist high-yield investors to absorb in significant quantities. Based on numerical simulations described in Volume II, 20%-thick mezzanine SBBS would have risk characteristics similar to those of lower investment grade sovereign bonds, so that they could in principle be bought by investors with rating-based mandate restrictions. 10%-thick junior SBBS would be substantially riskier. In terms of expected loss, they would be comparable to higher-risk euro area sovereign bonds; in terms of unexpected loss, they would be even riskier owing to its elevated exposure to systematic risk. To compensate investors for bearing this risk, junior SBBS would embed substantial leverage at low implicit financing costs. Market intelligence suggests that this property of low-cost embedded leverage would be attractive for yield-seeking investors, such as active buyers of emerging market sovereign debt, high-yield corporate bonds and structured products. Since the existence of an investor base for junior SBBS is necessary for mezzanine and senior securities to be issued, Section 3.2 explores the potential investor base in more detail. Ultimately, however, the level of investor demand is an empirical question, which can only be tested if an enabling product regulation is adopted.

⁴ See De Sola Perea, Dunne, Puhl and Reininger (2018).

⁵ See Cronin and Dunne (2018).



2.3 Contractual features

SBBS would combine elements of sovereign bonds, securitised products and covered bonds. SBBS are comparable to sovereign bonds, as the cash flows that accrue to SBBS derive exclusively from the underlying sovereign bonds. Like securitised products and many covered bonds, however, the securities would be issued by a dedicated, independently established entity with no previous trading or indebtedness. This entity would therefore be protected from any insolvency or other legal proceedings associated with its arranger: it would, in short, be bankruptcy-remote. The issuing entity is thus simply a pass-through vehicle, the function of which is to manage the cash flows accruing from its holdings of sovereign bonds by passing them to SBBS investors. To shed further light on the contractual features of SBBS, Table 2.2 summarises other similarities and differences compared with securitisations and covered bonds.

To provide certainty to investors regarding their property rights, SBBS contracts would specify the obligations of SBBS issuers. These contractual obligations would cover all states of the world, including states in which sovereign bonds continue to be serviced and states with non-payments on sovereign bonds. If SBBS issuers respect these state-contingent obligations, they can never default on the contract. This distinguishes SBBS from conventional sovereign bonds, which typically define a fixed payment stream in every state of the world. Default on SBBS contracts would only occur in the event of operational failure or fraud by SBBS issuers. Adequate supervision of issuing entities would be necessary to preclude these outcomes, as explained in Section 4.

Contract completeness implies that SBBS issuers behave algorithmically. When contracts are complete, SBBS issuers follow an algorithm that deterministically delivers an output (i.e. a cash flow allocation to the security holders according to their seniority) for a given input (i.e. cash flows accruing from the sovereign bonds in a given state of the world). The algorithmic behaviour of SBBS issuers implies that SBBS could be serviced with very low fees, since the software that implements each issuer's contractual obligations can be scaled at negligible marginal cost. Although writing a complete contract appears legally challenging, it has been done successfully in mortgage-backed security (MBS) markets, in which partial non-payments of underlying mortgages frequently occur. The non-performing mortgage is then said to be in default. But owing to the completeness of MBS contracts, the MBS itself would not be in default, since the MBS would respect its contingent obligations. The existence of legal solutions for complex mortgage markets implies that a solution for relatively straightforward sovereign bond markets would be feasible. Hence, as long as SBBS issuers meet their contractual obligations, SBBS would never be in default, even if some sovereign bonds underlying SBBS are in default.



Table 2.2

Features distinguishing SBBS from existing securitisations and covered bonds

| Features of SBBS | Featured in typical securitisations? | Featured in typical covered bonds? |
|---|--|--|
| Issuing entity is bankruptcy-remote from arranger | Yes | Yes ¹ |
| Trustee represents interests of secured bondholders | Yes | Yes |
| Single recourse to cover pool | Yes | No |
| Seniority structure | Yes | No |
| Junior securities held by third-party investors | No (first-loss piece is typically retained by the arranger) | No |
| Cover pool comprises central government bonds issued by participating Member States | No (cover pool typically comprises thousands of claims against non-government agents) | No (cover pool typically comprises thousands of claims against non-government agents) |

Source: ESRB.

Note: The table summarises the main contractual features of SBBS compared with typical securitisations and covered bonds.

¹⁾ In some countries, covered bonds are issued out of the issuer's balance sheet (rather than a bankruptcy-remote separate entity), but the cover pool is protected by law from insolvency proceedings against the arranger.

The rights of investors to receive payments on their SBBS holdings would be determined by a contractually agreed priority of payments waterfall.

Contracts would provide for investors to agree to limited recourse and non-petition provisions, so that their claims against the issuing entity are limited to the assets secured in their favour. This means that recourse would apply solely to the secured assets of the issuing entity; SBBS investors may not initiate insolvency proceedings against the issuing entity as long as the entity complies with the provisions of the contract, including with respect to the cash flow waterfall, which defines the priority of payments of both coupon and principal payments. In the event of coupon or principal non-payment on any bond in the cover pool, coupons from performing sovereign bonds are first paid to senior SBBS; if their nominal claim is entirely satisfied, remaining coupons are paid first to mezzanine SBBS and then to junior SBBS. This cash flow waterfall is therefore sufficient to ensure the proper application of the priority of payments waterfall at each point in time. Contractual clarity on this waterfall would give investors certainty on their property rights in all states of the world, including those in which sovereigns default.

In a debt restructuring scenario, sovereign bonds in SBBS cover pools must be treated in the same way as those held by investors directly.

The treatment of bonds by a defaulting sovereign must therefore not discriminate according to whether investors hold sovereign bonds directly or through SBBS. This ensures that there would be a strong pricing relationship between the SBBS replicating portfolio and a diversified portfolio of sovereign bonds held directly. To prevent governments from selectively defaulting, the regulatory changes considered in Section 4 could include a non-discrimination requirement. Such a provision would define the actions with which governments might seek to influence bond values selectively and stipulate that, to the extent that any such action makes some creditors better off, it must automatically apply to all creditors, including SBBS issuers. This would ensure that sovereign bonds held in SBBS cover pools have an



equal seniority to bonds held directly. To enforce this non-discrimination requirement, violation could entail a prolonged exclusion from SBBS cover pools, among other sanctions. As such, SBBS would add another element to existing mechanisms by which sovereign debt is restructured. Nevertheless, SBBS are intended to be neutral with respect to sovereign debt restructuring: their existence would neither prevent nor actively encourage debt restructuring from taking place. Volume II elaborates on the features of SBBS with respect to sovereign debt restructuring.

SBBS investors would be represented by a third-party trustee in a restructuring process.

Although SBBS issuers are the legal owners of the sovereign bonds, they would not submit discretionary votes in a debt restructuring process, since SBBS issuers are algorithmic entities without skin in the game. As such, SBBS issuers must be instructed on how to cast their formal votes. The most straightforward option would be for SBBS contracts to pre-appoint a third-party trustee with a professional fiduciary duty to represent the interests of all SBBS holders by maximising the expected value of the cover pool in a debt restructuring process. An alternative option would be to allow SBBS holders to submit votes directly, possibly with some aggregation by SBBS issuers, but the trustee option is more standard in existing securitisations and therefore more familiar to investors. Some combination of the two approaches could also be considered by the contracting agents.

Following a debt restructuring event, old sovereign bonds are typically exchanged for modified bonds with a reduced present value. In the case of a nominal haircut to principal or reduction in coupon payments, the modified bonds would simply replace the old bonds in the SBBS cover pool. The relevant provisions in each SBBS contract specifying the cash flow waterfall would then take into account the nominal haircut. In the case of a present value reduction via maturity extension, the new bonds would also replace the old bonds, with the difference that SBBS issuers would grant the marginal SBBS investors direct ownership rights over the modified bond upon the expiry of the original SBBS contracts. All of these contingent obligations of SBBS issuers would be specified in each contract governing each SBBS series.



3 Market development

This section describes how a market for SBBS could develop and the potential implications for existing sovereign bond markets. To create the securities, an arranging entity – which could be public or private – would purchase sovereign bonds and exchange them for a replicating portfolio of SBBS, which would then be sold by the arranger to investors. The counterparty in that exchange would be an SBBS-issuing entity, which would be bankruptcy-remote from its arranger. The issuing entity's activities would solely consist of holding the cover pool of sovereign bonds and passing cash flows from those assets to investors in SBBS. This implies neutrality between the SBBS replicating portfolio and the underlying sovereign bonds.

The creation of SBBS would be demand-led. Ultimately, the level of investor demand for SBBS is an empirical question, which cannot be answered with full certainty in the absence of an enabling product regulation for the securities. If such a regulation is adopted, the likely composition of the investor base for the securities – insofar as an investor base exists at all – would vary according to the securities' seniority, owing to heterogeneity in investors' risk aversion and the extent to which they are constrained by regulation. In particular, demand from euro area banks for senior SBBS, which is important to achieve the envisaged objectives, depends on their interest in using senior SBBS to rebalance or add to their existing sovereign bond portfolios. To protect the financial system against excessive concentrations of risk, the regulation of SBBS should be adequately risk-sensitive, with a relatively severe treatment of non-senior SBBS holdings, particularly for systemically important sectors and institutions. In addition, competent authorities should continuously monitor the composition of the investor base for non-senior SBBS to ensure that the distribution of sovereign risk exposures does not endanger financial stability.

A market for SBBS would interact with existing sovereign bond markets. Pricing in the two sets of markets would be linked by arbitrage opportunities and diversification in dealing activities. If the SBBS market becomes sufficiently large, its liquidity could help to improve sovereign bond market liquidity insofar as the securities could be used for hedging or other purposes. However, it is possible that SBBS would not fully substitute sovereign bonds as hedging instruments, particularly before the market reaches a critical mass. Under certain circumstances, SBBS could therefore also reduce the liquidity of sovereign bonds, which would be trapped in the balance sheets of SBBS issuers. To carefully manage the development of an SBBS market and maintain the smooth functioning of sovereign bond markets, policymakers could control the number of SBBS licence numbers that they grant. At first, the SBBS market could develop incrementally in line with investor demand, similar to initial issuances of bonds by the European Stability Mechanism (ESM), which have attained adequate liquidity despite limited volumes. Over time, SBBS could reach much more substantial volumes of €1.5 trillion or more, conditional on adequate investor demand and the continued smooth functioning of sovereign bond markets with respect to liquidity and price formation.



3.1 Security issuance

SBBS would be issued by bankruptcy-remote pass-through entities. As explained in Section 2, the purpose of these issuing entities would be to act as pure pass-through vehicles. Cash flows accruing on the asset side of their balance sheets (from the coupon and principal payments on the underlying portfolio of sovereign bonds) would be passed on to the liability side (according to the seniority structure) in a predetermined, algorithmic manner. All components of the liability side – namely the senior, mezzanine and junior securities – would be marketable securities. As such, the issuing entities would have no internal equity or external credit support and would therefore not bear any market or credit risk on their own account. The systemic irrelevance of SBBS-issuing entities is crucial in view of the overarching financial stability objective of SBBS.

SBBS issuers would not receive any public paid-in capital or guarantees. A key tenet of SBBS is that the cash flows accruing on the asset side of an SBBS issuer's balance sheet are passed through to the liability holders (according to the relative seniority of the securities). This ensures neutrality between the SBBS replicating portfolio and the underlying sovereign bonds. Even in the absence of any public paid-in capital or guarantees, however, there is a risk that market participants misperceive authorities' intentions with respect to SBBS. For example, market participants might expect a public entity to continue to service SBBS payment flows if a sovereign defaults. The risk of such misperception increases with the degree of public intervention and involvement in the SBBS market. At a minimum, the avoidance of misperception would require clear communication to market participants; otherwise, misperceptions could impede the efficient pricing of sovereign risks, which is necessary for the viability of SBBS.

Each SBBS series would be backed exclusively by a segregated and pre-defined pool of sovereign bonds. In the absence of paid-in capital or guarantees from EU institutions, Member States or any other entity, the cash flows accruing to junior, mezzanine and senior SBBS depend exclusively on the income from the underlying sovereign bonds. This underlying portfolio is the sole component of the asset side of SBBS issuers' balance sheets. Owing to this segregation, coupled with the pass-through nature and bankruptcy-remoteness of SBBS issuers, investors would have certainty with respect to the assets backing SBBS. The cash flows accruing to SBBS investors would therefore depend entirely on their position in the seniority structure and the cash flows accruing to the underlying sovereign bonds, with no public support.

To improve market liquidity, existing SBBS series could be re-opened. This is standard practice in sovereign bond and other markets, where issuers often re-open ("tap") existing bonds to extend their on-the-run life and thereby improve market liquidity. This approach would have the same effect in the SBBS market. The contracts governing each SBBS series would define the modalities by which it may be re-opened. These modalities could require the re-opening to precisely replicate the portfolio weights in the original cover pool, or they could permit small deviations within predefined constraints. The extent to which such deviations are permitted would have implications for the risk and return characteristics of a specific series and potentially for its market acceptance.



Arrangement of SBBS cover pools

To maintain the “pass-through” nature of SBBS issuers, the cover pools would be assembled by a separate entity or entities, i.e. “arranger(s)”. SBBS arranger(s) would be legally independent from issuing entities. In principle, there could be multiple private sector arrangers, a single public sector arranger, or both. The function of the arranger(s) would be to obtain (binding) orders for SBBS from investors, assemble the cover pool of sovereign bonds, and transfer ownership of those bonds to a newly created bankruptcy-remote entity (an “issuer”) in exchange for a replicating portfolio of senior, mezzanine and junior SBBS. The arranger(s) would then distribute these securities to investors to satisfy initial orders. As in existing securitisations, the issuing entity would be bankruptcy-remote from its arranger throughout the life of each SBBS series. Payments accruing to SBBS investors would depend exclusively on the performance of the underlying sovereign bonds. This is necessary to ensure that SBBS investors do not bear counterparty risk with respect to either issuers or arranger(s).

Institutional design depends on whether SBBS arranger(s) are private or public entities

(although certain policy interventions would be required in either case). In particular, the following considerations apply in the case of private and public sector arrangement:

- **Private sector arrangers would require returns and would need to be regulated and supervised by a competent EU authority.** Private sector arrangers would require compensation for bearing any warehousing risks associated with assembling SBBS cover pools and any operational costs attached to cover pool assembly. These costs would be passed on to SBBS investors. In addition, to harmonise different SBBS series, private sector arrangers would need to be subject to minimum regulatory standards. A competent supervisory authority would issue “SBBS licence numbers” to certify that each SBBS series meets the requisite criteria. By restricting the number of licence numbers that it issues, the authority could control the maximum size of the SBBS market, in view of its transitional effects on sovereign bond market liquidity and other policy considerations.
- **A public sector arranger (or any hybrid public-private initiative) would require political agreement on the appropriate institutional framework.** This framework could include limits on the extent to which the arranger bears placement and warehousing risks, which would give rise to market and credit risk. For example, a public sector arranger could receive a one-time fixed endowment of a limited quantity of paid-in capital to assemble SBBS cover pools. Such resources would be small relative to existing collective arrangements, such as the ESM, which has subscribed capital well above what would be necessary to fund temporary warehouses of sovereign bonds. Naturally, providing an arranger with any public funding or support, however limited, would require political agreement, since it would imply a certain degree of mutualisation. Beyond such limited loss-sharing, a public sector arranger (or any public involvement in a hybrid public-private initiative) would increase the risk that market participants misperceive such activity as providing an implicit guarantee for SBBS payment flows. Avoiding this misperception would be both important and challenging, requiring clear and credible communication to market participants that there are no guarantees, implicit or otherwise, for SBBS payment flows. This would help to reinforce the contractual provision that SBBS payment flows depend exclusively on the cash flows accruing to sovereign bonds.



The length of time between cover pool assembly and placement of all the securities with investors affects the extent to which arranger(s) bear risks,

including placement and warehousing risks, which would give rise to market and credit risk. To minimise this risk exposure, SBBS arranger(s) could fill an order book before assembling the cover pool. This order book would contain orders from investors; in the case of a public sector arranger, these orders could be binding, meaning that investors would commit to purchase securities from the arranger, thereby minimising the extent to which funding would be required. Under this binding order book approach, SBBS arranger(s) would then proceed to assemble the cover pool only insofar as investors have collectively placed orders for all three securities. The timing of transaction execution under this approach would be critical, given heterogeneity and possible price volatility in the underlying sovereign bonds and in investor demand for the three securities. In view of these complexities related to cover pool and order book execution, Volume II elaborates on the possible design of SBBS issuance, which would need to be refined and tested by market practitioners.

Primary or secondary market purchases by SBBS arranger(s)

To assemble the cover pool, SBBS arranger(s) could purchase sovereign bonds on primary or secondary markets. The choice of venue for purchasing sovereign bonds represents a trade-off between various considerations, such that no single solution is cost-free. On one hand, if purchases were made on primary markets via coordinated auctions, syndications or private placements, debt management offices (DMOs) would need to adapt their issuance strategy. On the other hand, if purchases were made on existing primary or secondary markets, SBBS arranger(s) would represent just another buyer for central government debt securities, so that there would be limited or no impact on DMOs' primary market activity. However, arranger(s) would need to fund a temporary warehouse of sovereign bonds until cover pools are fully assembled. The extent to which this would be necessary is a function of the degree of heterogeneity in the markets in which arranger(s) operate and whether they make use of the "binding order book" approach. Overall, the decision on the venue where sovereign bonds are assembled by SBBS arranger(s) should take these considerations into account, as explained in Volume II.

Purchases on primary markets could be made in one of three ways (or some combination thereof).

First, SBBS arranger(s) could purchase sovereign bonds in competitive auctions or syndications. Their timing and characteristics would be coordinated across DMOs to facilitate a quick assembly of cover pools by arranger(s). However, in conversations with the Task Force, DMOs expressed the view that this issuance model would create market risk insofar as markets would be overburdened with excessive duration, which could put upward pressure on bond yields. Second, SBBS arranger(s) could purchase sovereign bonds privately from DMOs (at prices inferred from secondary markets), either by DMOs creating new SBBS-specific ISINs or by DMOs tapping existing ISINs and allocating those taps to SBBS arranger(s). The case of SBBS-specific ISINs would be comparable to DMOs' existing practice with respect to private placements, while the case of allocated taps would be similar to DMOs' standard practice of reserving re-openings for primary dealers, although these typically take place within a day or two of the initial issuance, whereas allocated taps to SBBS arranger(s) could take place some weeks later. Notwithstanding these broad similarities, DMOs expressed concerns that this SBBS issuance model could contradict their principles of transparency and equal treatment of investors, as prices for these SBBS-specific taps



would be inferred from secondary rather than primary markets. Third, SBBS arranger(s) could place market orders for sovereign bonds in ordinary competitive auctions or syndications, which as now would not be coordinated across countries. This would maintain the current microstructure of primary markets, but increase the extent to which arranger(s) would need to temporarily fund a warehouse of sovereign bonds and bear the associated risks.

In conversations with the Task Force, DMOs expressed concerns regarding the first two of these primary market issuance models, which would require a degree of simultaneous issuance. Coordination in the execution of primary market issuance would constrain governments' flexibility on the timing and characteristics of the new debt issuance that is intended for inclusion in SBBS. Moreover, in the view of DMOs, coordinated execution could create market risks. The design of any SBBS issuance model should take into account these concerns. Analysis in Volume II provides further insights into their quantitative importance, and outlines possible issuance models which could minimise disruption to the functioning of sovereign debt markets.

One alternative would be for SBBS arranger(s) to place market orders for sovereign bonds in secondary markets. Similar to arranger(s) operating in existing primary markets, this approach would not require DMOs to change their issuance strategy. However, it could generate price volatility in secondary markets unless arranger(s) were able to source cover pools directly from existing portfolios. With purchases in open secondary markets, it could take some time for an arranger to assemble sovereign bonds with the necessary portfolio weights. During this time, arranger(s) might need to fund a warehouse of sovereign bonds, thereby briefly exposing them to market and credit risk, depending on the extent to which investors submit binding orders. In the case of private sector arrangement, any such funds would need to be adequately remunerated, which would affect equilibrium yields on the three securities. In the case of public sector arrangement, the provision of any such funds would require political agreement.

SBBS issuance would be demand-led, regardless of the precise way in which the cover pool is assembled. Given that the current approaches of DMOs with respect to sovereign debt issuance are well-established and accepted by market participants, the introduction of SBBS should be demand-led; otherwise, the securities could disrupt market functioning. On this basis, SBBS would only be created insofar as investors demand the securities. A consequence of this demand-led approach is that demand for junior SBBS might diminish during periods of stress in financial markets. In the worst case, and notwithstanding the arbitrage relationship between SBBS and the underlying sovereign bonds, there is a risk that the primary market issuance of SBBS would fail because arranger(s) are unable to find a clearing price for junior SBBS. Hence, no new SBBS would be issued. This reflects the fact that SBBS do not entail any built-in promise to offer a stable source of finance for governments during a crisis. Nevertheless, if the SBBS market does become large, participating Member States might end up relying on their ability to place debt with SBBS arranger(s), even though much of their issuance would still be placed with non-SBBS investors using their standard issuance process. The sudden absence of SBBS arranger(s) from primary markets could therefore create a temporary market dislocation for sovereign bonds in the SBBS basket, as DMOs would need to revert to their standard issuance model for all new debt issuance.



3.2 Investor base

If SBBS were properly designed and regulated, their price would be linked to that of the underlying sovereign bonds. SBBS issuers pass payments from the underlying bonds to SBBS holders without adding additional counterparty risk. In a sovereign debt restructuring event, bonds in the SBBS cover pool would be treated identically to bonds held directly, owing to the non-discrimination provision outlined in Section 2.3. Hence, SBBS issuers simply repackage existing risks. These risks are already borne by investors, since the cover pool of newly issued SBBS only contains bonds from participating Member States with primary market access or with an observable secondary market price, as explained in Section 2.1. Hence, the existence of buyers for sovereign bonds included in the SBBS cover pool suggests that there might also be buyers for a replicating portfolio of SBBS. At the same time, the existence of an SBBS market could affect relative bond yields, and hence the pricing of risk, for example via a “local supply” effect, since the creation of the securities would decrease the relative net supply of medium-risk securities. In addition, SBBS could affect average bond yields insofar as the existence of the securities attracts additional demand for euro area sovereign risk from global investors.

The extent to which a no-arbitrage condition exists between SBBS and sovereign bonds depends on the strength of financial frictions, including liquidity and regulatory constraints in constructing the arbitrage trade. Section 3.3 and Section 4 consider these two frictions. The remainder of this section assumes that these frictions would be small, so that a no-arbitrage relation exists between the two markets and buyers therefore exist for SBBS. On this basis, the section assesses the likely composition of the investor base for the three securities, in view of the overarching financial stability objectives of SBBS.

SBBS issuance would occur only insofar as there is investor demand for all three securities. By design, SBBS arranger(s) would not retain any exposure to the securities after the issuance process has been completed. This implies that SBBS would only be created insofar as investors have collectively placed orders for all three securities. Demand for the different securities might vary over time, depending on prevailing financial conditions. In benign conditions, demand might be stronger for the subordinated securities owing to their higher-yielding properties, in which case order volumes for senior SBBS would represent the binding constraint on the overall quantity of SBBS that could be issued. The reverse could be true in less favourable financial conditions, when senior SBBS possess attractive safety properties, while junior SBBS are relatively less attractive. In this case, junior SBBS could represent the binding constraint on overall issuance, notwithstanding the cash flow neutrality between SBBS and the underlying sovereign bonds.

The composition of the investor base for the three different securities would have important implications for financial stability. Investors differ with respect to their risk appetites, external financing constraints, and regulatory requirements. As such, the composition of the investor base would vary across senior, mezzanine and junior SBBS. To mitigate systemic risks, a fundamental policy objective of SBBS is that they facilitate the diversification and de-risking of banks’ sovereign bond portfolios. As such, to avoid the emergence of systemic risk, it would be important for banks not to hold non-senior SBBS in excess. Indeed, the regulation of SBBS should be designed with this outcome in mind, as explained in Section 4. This begs the question of which investors would be expected to hold non-senior SBBS, and whether they would be better suited to handle the risks,



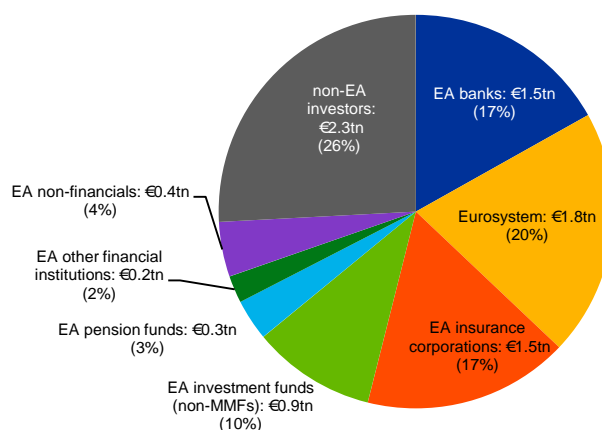
which is relevant for assessing whether non-bank investors' sovereign risk exposures pose systemic risks.

The remainder of this section sheds light on the potential investor base for SBBS. It begins with an overview of the current investor base for euro-denominated general government and supranational debt securities. Drawing on quantitative analysis and market intelligence, the section then evaluates the possible sectoral composition of SBBS holdings by seniority and the likely implications of these cross-sectoral risk distributions for financial stability.

Current sovereign debt holdings

The euro area has approximately €2.3 trillion of outstanding general government debt securities at face value (as at the second quarter of 2017). As Figure 3.1 shows, €2.3 trillion of these securities is held by investors resident outside of the euro area, while the remainder is held by euro area residents. Of the latter, the largest holders are the Eurosystem, which holds €1.8 trillion, followed by euro area banks and insurance corporations, which each hold €1.5 trillion.

Figure 3.1
Holdings of euro area general government debt securities by sector



Source: ECB and Eurostat.

Note: The figure refers to the breakdown by sector of holdings of euro area general government debt securities as at Q2 2017. "EA" refers to the euro area; "MMFs" refers to money market funds.

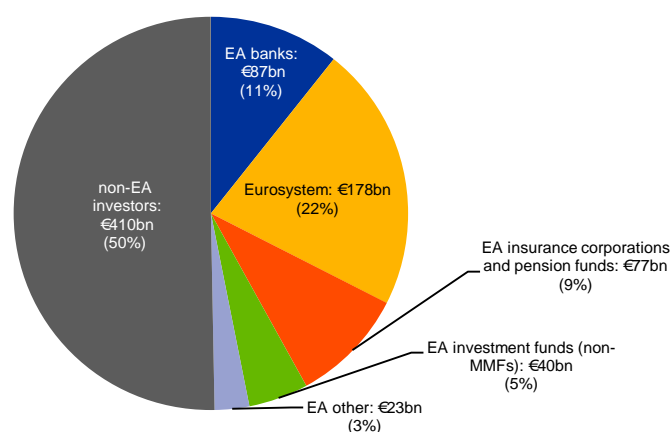
Investors hold sovereign bonds for a variety of reasons. The broad base of investors for euro area government debt implies that the motivations for these holdings are correspondingly diverse. For banks, sovereign bonds act as a safe store of value, are typically liquid, and are therefore widely used to collateralise repo and derivatives transactions. In addition, banks receive zero risk weights for most of their sovereign bond holdings under current regulation and benefit from low haircuts in Eurosystem open market operations. For non-bank investors executing buy-and-hold strategies, such as insurance corporations and pension funds, a greater emphasis tends to be placed on asset/liability management considerations and expected return rather than liquidity.



Understanding these sector-specific motivations is important to gauge the potential investor base for SBBS.

The investor base for European supranational debt securities is more global than that for national debt. Of the €808 billion of European supranational debt securities outstanding, half is held by non-residents of the euro area (Figure 3.2), compared with one-quarter for general government debt securities. By comparison, 43% of US Treasuries are held by non-US residents according to official data, and 36% (30%) of German (French) general government debt securities are held by non-euro area residents. This suggests that global investors are disproportionately interested in holding supranational, rather than national, securities. SBBS could therefore have an investment-enhancing effect with respect to aggregate demand for European sovereign risk, depending on the regulatory treatment of SBBS in other jurisdictions.

Figure 3.2
Holdings of European supranational debt securities by sector



Source: ECB.

Note: The figure refers to the breakdown by sector of holdings of European supranational debt securities as at Q2 2017. In total, the face value of such securities outstanding is €808 billion, including securities issued by the European Investment Bank (EIB), the European Financial Stability Facility, the European Stability Mechanism, the European Union, the Nordic Investment Bank, and the Council of Europe (which are backed by a number of countries outside of the EU, but represent only 2.5% of total European supranational debt securities). "EA" refers to the euro area.

Investor base for senior SBBS

A broad set of institutions could be expected to hold senior SBBS, including commercial banks, insurance corporations, pension funds, central banks and sovereign wealth funds. In view of the policy objective of breaking the bank-sovereign nexus, euro area banks in particular are expected to be significant holders of senior SBBS. The existence of senior SBBS would facilitate the diversification and de-risking of banks' sovereign bond portfolios. This would occur to the extent that banks have an interest in adjusting their portfolio allocation, which partly depends on regulation.



Market participants expect that the yield on senior SBBS would have a small positive spread with respect to comparable German sovereign bonds, particularly at the early stages of market development when liquidity would be at its thinnest. In survey responses, market participants noted that the yield on senior SBBS would most likely be somewhere between the German sovereign bond yield and the ESM bond yield. Quantitative analysis undertaken in Volume II regarding the likely yield on senior SBBS supports this view. As such, once the market has become established, senior SBBS could be attractive to risk-averse investors in search of a small amount of extra yield pick-up.

A high credit rating would help to establish and maintain substantial demand for senior SBBS. As described in Section 2, SBBS would be designed so that the senior securities would have risk properties resembling those of lower-risk sovereign bonds. In the survey, most respondents reported that they expected the senior securities to be rated AAA, with a minority predicting the second highest rating notch. One rating agency has already published a preliminary assessment of how they would rate a security similar to senior SBBS.⁶ In that publication, however, the agency makes assumptions regarding the composition of the cover pool that are inconsistent with Section 2. Final ratings would be subject to the precise calibration of security design and the methodologies of the credit rating agencies from which ratings are solicited by SBBS arranger(s). As with bonds issued by the ESM and other securities, there would be no requirement for SBBS arranger(s) to solicit ratings from all agencies. Moreover, under EU law, any such ratings would be subject to supervision by the European Securities and Markets Authority to ensure that they meet quality and transparency requirements.

In their responses to the market intelligence survey, non-bank investors emphasised the role of liability-driven investment, which calls for long-dated, fixed income assets. Liquidity is less important for these buy-and-hold investors, which include insurance corporations and pension funds. Their main focus in terms of portfolio selection is on finding assets with low credit risk and returns that at least match their obligations on the liability side. In the survey, these non-bank investors emphasised that the attractiveness of senior SBBS would be a “relative value” proposition: investment decisions would be based on the expected risk/return properties of senior SBBS relative to other investible assets.

Sovereign wealth funds and central banks represent another potential investor base for senior SBBS. For these institutions, credit risk tends to be the most important factor when making investment decisions. In this respect, senior SBBS could be expected to meet their conservative credit risk requirements, although this would clearly be subject to review by their respective decision-making bodies.

Senior SBBS might also attract interest from non-euro area investors. Securities holdings statistics suggest that more than 60% of EU supranational bonds are held by investors outside the euro area (see Figure 3.2). By contrast, non-euro area investors hold just 28% of outstanding euro

⁶ Kraemer, M. (2017). “How S&P Global Ratings would assess European ‘Safe’ Bonds (ESBies).” S&P RatingsDirect.



area general government debt securities (Figure 3.1). These data support qualitative feedback from market participants suggesting that there could be demand for senior SBBS from investors resident outside the euro area (see Volume II). In this context, international recognition of an enabling product regulation at EU level would be important.

Investor base for mezzanine SBBS

Demand for mezzanine SBBS is expected to come from a broad range of asset managers.

These institutions are large investors in fixed income securities, including sovereign bonds, because these securities have payoff structures that allow them to meet their obligations to clients. The higher yield on mezzanine SBBS compared to lower-risk sovereign bonds could therefore be attractive to such institutions, which currently account for approximately 20% of total holdings of euro area sovereign bonds.

The target portfolio compositions of insurance corporations vary depending on their asset-liability requirements and exposure to duration risk.

Life insurers typically invest in longer-dated, higher-yielding assets, while non-life insurers tend to have more liquid, shorter-maturity holdings. Feedback from the insurance sector suggests that mezzanine SBBS would be attractive to life insurance corporations in particular, conditional on appropriate regulatory treatment. Moreover, an investment grade rating would enhance demand for mezzanine SBBS. Insurance corporations would take other factors into account as well before investing in mezzanine SBBS, such as their expected returns, duration, availability and risk properties.

Pension funds often have similar investment profiles to insurance corporations, but typically with a wider spectrum of investment strategies.

Pension funds typically focus on the risk/return properties of securities, rather than their liquidity, owing to their long investment horizon. Moreover, pension funds often track benchmark indexes. They have well-defined mandates that determine the investible universe of securities for each fund according to the level of risk with which a client is comfortable.

Quantitative analysis suggests that mezzanine SBBS would have credit risk properties similar to those of lower investment grade sovereign bonds.

Volume II provides the details of these simulations. Lower investment grade sovereign bonds – including those of Italy, Spain, Portugal and Slovenia – have a combined weight of approximately 34% in the SBBS cover pool. But with the tranching structure proposed in Section 2.2, mezzanine SBBS would be just 20% thick. Hence, 20 units of lower investment grade equivalent securities would be created for every 34 units that are retained in the SBBS cover pool. SBBS would therefore decrease the net supply of “mid-tier” securities. With “local supply” effects, the yields on these mid-tier securities might therefore marginally decrease, owing to the reduction in their net supply.

The development of adequate demand for large-scale mezzanine SBBS could depend on certain structural changes on the side of investors,

including changes with respect to investor mandates which currently prevent some institutional investors from holding such instruments. Moreover, the amount of mezzanine SBBS that certain institutional investors would purchase also depends on the risk tolerance of their clients.



Investor base for junior SBBS

Junior SBBS would be the riskiest security and would likely not achieve an investment grade rating. This security would therefore be more attractive to investors looking for a higher risk-return investment. Demand for junior SBBS could come from a combination of investors in lower-rated corporate bonds, emerging market sovereign bonds, structured products and other securities with similar characteristics. The creation of an SBBS market would expand the investible universe of high-yield securities, since the 10%-thick junior layer is larger than the sum of portfolio weights of Member States in the cover pool that currently have a credit rating below investment grade. This begs the question of which risk-tolerant investors would be willing to hold these securities. From a financial stability perspective, it is imperative that the distribution of holdings of junior SBBS across investors does not generate new systemic risks. The rest of this section sheds light on the potential investor base for junior SBBS.

Other asset classes have similar characteristics to junior SBBS in terms of credit risk and price volatility, including lower-rated corporate bonds, emerging market sovereign bonds and structured products. As is the case in these markets, investors trading junior SBBS would require higher levels of due diligence together with ongoing monitoring of liquidity and sovereign credit risks and their correlation in the underlying portfolio. In addition, as first-loss instruments in the SBBS structure, junior SBBS are expected to trade with higher levels of price volatility than the more senior securities. As such, it is reasonable to expect investors with a greater tolerance for credit risk, liquidity risk and price volatility to form the investor base for junior SBBS. While investors in lower-rated corporate bonds, emerging market sovereign bonds and structured products should have a natural demand for junior SBBS, these securities cannot be considered as perfect substitutes. Overall, however, it could be expected that – insofar as there is any demand for junior SBBS – it would come disproportionately from these specialised investors.

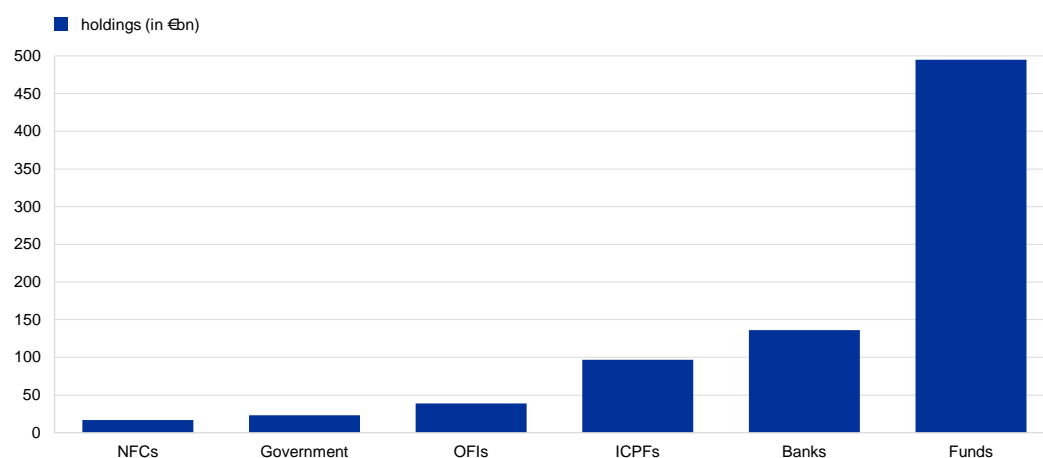
Other asset classes have similar characteristics to junior SBBS in terms of credit risk and price volatility, including lower-rated corporate bonds, emerging market sovereign bonds and structured products. As is the case in these markets, investors trading junior SBBS would require higher levels of due diligence together with ongoing monitoring of liquidity and sovereign credit risks and their correlation in the underlying portfolio. In addition, as first-loss instruments in the SBBS structure, junior SBBS are expected to trade with higher levels of price volatility than the more senior securities. As such, it is reasonable to expect investors with a greater tolerance for credit risk, liquidity risk and price volatility to form the investor base for junior SBBS. While investors in lower-rated corporate bonds, emerging market sovereign bonds and structured products should have a natural demand for junior SBBS, these securities cannot be considered as perfect substitutes. Overall, however, it could be expected that – insofar as there is any demand for junior SBBS – it would come disproportionately from these specialised investors.

Data from the ECB's securities holdings statistics shed light on the investor base for high-yield securities. The data document security-by-security holdings at the ISIN level. Matched with the ECB's centralised securities database, these data contain information on the characteristics of securities held by euro area residents, including their yield and credit rating. Figure 3.3 shows the breakdown by sector of euro area residents' holdings of high-yield securities, defined as those securities which had a non-investment grade rating and a yield of at least 3.5% at the end of 2016, corresponding to the estimated yield on junior SBBS (see Volume II). The total universe of euro area residents' holdings of such securities amounted to approximately €800 billion at the end of 2016. Investment funds form the largest category, with more than half of total holdings. Banks, insurance corporations and households are much smaller holders of high-yield securities. This suggests that the investment funds sector would disproportionately comprise the investor base for junior SBBS. Such an outcome would be reinforced by the regulatory treatment of junior SBBS, which would penalise holdings by banks in particular. This is critical if SBBS are to enhance financial stability.

Data from the ECB's securities holdings statistics shed light on the investor base for high-yield securities. The data document security-by-security holdings at the ISIN level. Matched with the ECB's centralised securities database, these data contain information on the characteristics of securities held by euro area residents, including their yield and credit rating. Figure 3.3 shows the breakdown by sector of euro area residents' holdings of high-yield securities, defined as those securities which had a non-investment grade rating and a yield of at least 3.5% at the end of 2016, corresponding to the estimated yield on junior SBBS (see Volume II). The total universe of euro area residents' holdings of such securities amounted to approximately €800 billion at the end of 2016. Investment funds form the largest category, with more than half of total holdings. Banks, insurance corporations and households are much smaller holders of high-yield securities. This suggests that the investment funds sector would disproportionately comprise the investor base for junior SBBS. Such an outcome would be reinforced by the regulatory treatment of junior SBBS, which would penalise holdings by banks in particular. This is critical if SBBS are to enhance financial stability.



Figure 3.3
Holdings of high-yield securities by sector



Source: ECB.

Note: The figure shows the sector breakdown of euro area residents' holdings of high-yield securities, defined as those securities which had a non-investment grade rating and a yield of at least 3.5% at the end of 2016. "NFCs" refers to non-financial corporations; "OFIs" refers to other financial institutions; "ICPFs" refers to insurance corporations and pension funds; and "funds" refers to investment funds.

The attractiveness of junior SBBS depends on clear communication to investors that the euro area policy stance on fiscal discipline will not weaken as a result of SBBS issuance.

Investors should be clear that junior SBBS are not "built to fail" in the sense that they are not intended as a precursor to sovereign debt restructuring. At the same time, junior SBBS would be the first in line to bear losses if such an event were to occur. With the emergence of an SBBS market, authorities would have a responsibility to run sound policies at national level and continue their stability-oriented multilateral surveillance activities, with a readiness to implement ESM programmes where appropriate.

Ultimately, the level of demand for junior SBBS is an empirical question that depends on many factors, including structural issues (such as regulation) and conjunctural issues (notably perceptions of fiscal and political risks, investors' risk appetites and financial market conditions, which affect yields). SBBS issuance depends on the ability of arranger(s) to fill order books for all securities, including the junior one. The issuance of high-yield debt tends to be procyclical, which might also be the case for junior SBBS. In the absence of orders for junior SBBS, no new SBBS of any kind would be issued; sovereign bonds would therefore be issued in primary markets by conventional means. This reflects the fact that SBBS do not entail any built-in promise to offer a stable source of finance for governments during a crisis.



3.3 Market size

The size of an SBBS market would be an equilibrium market outcome. This follows from the fact that SBBS issuance would be demand-led: the securities would only be created insofar as investors demand them. At present, the equilibrium SBBS market size is zero due to their unfavourable regulatory treatment. One necessary step towards developing an SBBS market would be to establish an enabling product regulation that defines the treatment of the securities in line with their unique design and risk properties, reflecting their underlying portfolio of sovereign bonds and varying levels of seniority. The characteristics of such a regulation are discussed in more detail in Section 4.

If an enabling product regulation for SBBS is adopted, the market would develop gradually, conditional on investor demand. SBBS represent innovative securities. As such, SBBS arranger(s) would be required to proceed cautiously at first, allowing time for investors to acquaint themselves with the new securities and for the necessary market infrastructures to develop (as discussed in Volume II). Comparable experiences in the markets for bonds issued by the European Financial Stability Facility (EFSF) and ESM provide insights into the gradual development of the SBBS market. The EFSF placed €16 billion of long-term marketable debt securities in 2011, the first year of issuance; similarly, the ESM issued €10 billion of long-term marketable debt securities when it began issuing in 2013. Taking into account SBBS' tranching structure, a comparably large market for senior SBBS in the first year would require overall issuance of approximately €24 billion (given that non-senior SBBS would also need to be placed). This quantity represents approximately 3% of primary issuance by DMOs in 2016. Even at these relatively small volumes, SBBS could attain reasonable liquidity, as the experience with the EFSF and ESM bond markets suggests. These bonds trade at low interest rate premia over German and Dutch central government bonds and below French bonds, despite having a much lower market turnover. Lessons from the EFSF and ESM regarding the market microstructure of a successful issuance programme could be usefully applied to the development of the SBBS market, as explained in Volume II. Nevertheless, these bonds are clearly different securities to SBBS, which might imply somewhat different levels of liquidity for a given market size.

To reap the full benefits of SBBS with respect to their policy objectives, policymakers could opt to allow the market to expand beyond its initial size, by means of greater primary and/or secondary market purchases by SBBS arranger(s) or a large-scale portfolio swap. Conditional on investor demand and the continued smooth functioning of sovereign bond markets, an enlarged SBBS market would be more conducive to its policy objectives with respect to financial stability, which include the diversification and de-risking of banks' sovereign bond portfolios and greater financial integration. A primary motivation here is the home bias in banks' sovereign exposures. Therefore, for SBBS to achieve their intended effect, a sizeable fraction of banks' current holdings of sovereign bonds would need to be replaced by holdings of senior SBBS. The €1.9 trillion of banks' holdings of general government debt securities thus illustrates the order of magnitude necessary to reap the financial stability benefits of SBBS. In addition, such a magnitude would allow the SBBS market to develop greater liquidity, which could generate positive spillover effects for national sovereign bond markets in the long-run insofar as the securities could be used for hedging and arbitrage purposes. Analysis indicates a high likelihood of significant positive liquidity externalities if senior and mezzanine SBBS were to become more liquid than smaller sovereign



bond markets.⁷ This could arise at relatively modest levels of SBBS issuance without affecting the efficiency of the price discovery process in individual sovereign bond markets.

The smooth functioning of sovereign bond markets is crucial for the viability of SBBS. As explained in Section 3.1, arranger(s) of the securities would purchase sovereign bonds at market prices in primary or secondary markets (or some combination of both). Hence, SBBS issuance requires price formation in sovereign bond markets to continue to be efficient. In addition, the smooth functioning of sovereign bond markets is important for other policy spheres, including monetary and fiscal policy. The SBBS market should therefore be developed so that sovereign bond market liquidity and price formation are not adversely affected. Given that SBBS do not yet exist, there is some uncertainty regarding the conditions that would satisfy this imperative. Nevertheless, one relevant factor is that the creation of SBBS would imply that some fraction of outstanding central government debt securities is “frozen” on the balance sheets of SBBS issuers, thus making those securities unavailable in the absence of any securities lending facility. If the free float of bonds traded on secondary markets were to shrink too much, sovereign bond markets could become less liquid, depending on the relative magnitude of the offsetting spillover effect. This eventuality would be undesirable and could drive up financing costs, as explained by DMOs in their conversations with the Task Force (see Volume II). As such, policymakers might wish to avoid a situation in which an excessively large proportion of a sovereign’s outstanding debt is included in SBBS.

The liquidity of SBBS and sovereign bond markets therefore depends on their relative size and the corresponding strength of the offsetting freezing and spillover effects. If spillover effects dominate, both SBBS and sovereign bond markets could be liquid. On the other hand, if freezing effects dominate, there would be a trade-off between the liquidity of SBBS and sovereign bonds. In this case, the maximum size of the SBBS market could be controlled by policymakers to maintain effective price discovery in national markets. One way in which policymakers could control SBBS market size would be for an existing authority to be granted the competence to issue “SBBS licence numbers”. By restricting the quantity of licence numbers that it grants, the competent authority would be able to place a cap on SBBS market size. The appropriate calibration of such a cap should be informed by evidence regarding the functioning of sovereign bond markets with SBBS in place, including their respective liquidity levels. If the competent authority saw evidence that sovereign bond market liquidity had been impaired by SBBS, it could constrain the total volume of SBBS to include no more than a certain fraction of the outstanding central government bonds issued by each participating Member State. A somewhat similar “issuer limit” is implemented in the Eurosystem’s public sector purchase programme (PSPP), which constrains the Eurosystem to buy no more than 33% of a country’s total outstanding debt and no more than 50% of EU supranational bonds. These issuer limits are intended to safeguard market functioning and price formation as well as to mitigate the risk of the ECB becoming a dominant creditor of euro area governments. Drawing a parallel with the PSPP, an issuer limit for SBBS could be introduced to maintain market functioning and price formation in national sovereign bond markets. Nevertheless, even with issuer

⁷ See ESRB High-Level Task Force on Safe Assets (2018) and Dunne (2018).



limits in place, the existence of an SBBS market could affect relative bond yields, and hence the pricing of risk, for example via a “local supply” effect. The second motivation for issuer limits in the case of the PSPP – namely the “dominant creditor” concern – does not apply to SBBS, since the issuing entities are mere pass-through vehicles and therefore cannot themselves become dominant creditors.

Given current volumes of outstanding debt, the maximum SBBS market size could be set at €1.5 trillion or more, depending on liquidity conditions. With an issuer limit of 33%, for example, a reasonable steady-state size of the SBBS market would be €1.5 trillion. At this level, there is relatively little underweighting in the underlying portfolio: namely 2.7 percentage points in total, driven by Greece, Estonia, Latvia, Lithuania, Luxembourg, Cyprus and Slovakia (see Section 2). Underweighting of Germany would begin after €1.53 trillion, after which point total underweighting increases more quickly as a function of SBBS market size, as described in Volume II. Although a higher issuer limit would allow the SBBS market to grow beyond this level, it might accentuate concerns regarding sovereign bond market liquidity, notwithstanding the positive spillover effects of greater SBBS market liquidity.

An SBBS market of €1.5 trillion is expected to have a limited negative impact on sovereign bond market liquidity. In the long-run – when the Eurosystem’s PSPP holdings will presumably diminish – the application of a 33% issuer limit for SBBS implies that SBBS issuance would not have a more adverse impact on market liquidity than the recent and ongoing implementation of the PSPP by the Eurosystem. Evidence presented in Volume II suggests that there has been no significant generalised increase in bid-ask spreads following the commencement of the PSPP in March 2015, notwithstanding some temporary and country-specific increases. However, SBBS differ from the PSPP in that the former constitute a partial replacement of long-term bonds with different long-term securities, whereas the PSPP essentially replaces long-term bonds with money. This implies that – unlike the PSPP – SBBS by themselves could be a source of liquidity and hedging opportunities, helping dealers to provide market liquidity elsewhere. For example, the three securities could be combined to price sovereign bonds. Hence, once the SBBS market becomes adequately large, it could improve price discovery in the underlying sovereign bond markets. The coexistence of a large SBBS market with sovereign bond markets therefore implies that liquidity in the two markets would be interrelated, with SBBS market liquidity creating positive spillover effects for sovereign bond market liquidity, as explained in Volume II.

If the SBBS market were to develop, the senior securities could help to alleviate the perceived scarcity of current low-risk assets. Some observers take the view that euro area financial markets currently exhibit pronounced collateral scarcity, particularly during times of financial stress, when only a fraction of outstanding government debt is widely perceived as low-risk. The implementation of the PSPP might have contributed to this scarcity in some market segments. One explanation for this view is that German sovereign bonds are particularly scarce relative to demand, given the role those bonds play as a benchmark asset for the entire euro area. However, with SBBS, there would be 70 units of senior SBBS for every 26 units of German sovereign bonds retained by SBBS issuers. Hence, senior SBBS could alleviate the pressure on German sovereign bonds to be used as the de facto low-risk asset in euro area financial markets. This would require widespread acceptance of senior SBBS as collateral by financial market participants and infrastructures, which could occur following a successful implementation period.



4 Regulatory policy

This section deals with regulatory considerations for SBBS. Existing regulations are not designed to capture the unique properties of SBBS, the underlying assets of which are tradable, simple, transparent, and well-known to market participants. Despite these properties, SBBS would at present receive an unfavourable treatment compared with sovereign bonds, for which regulations make specific provisions. This represents a significant obstacle to the demand-led emergence of SBBS and could justify a dedicated regulation that treats the securities in line with their risk, taking into account the higher risk embedded in the subordinated securities. In addition, the outcome of ongoing discussions regarding the regulatory treatment of sovereign exposures will affect the relative appeal of SBBS.

4.1 Treatment under the existing regulatory framework

Under the current framework, SBBS would be treated as securitised products because they entail subordination of credit risk. As a result, SBBS holdings would be treated unfavourably by prudential policy relative to the underlying portfolio of sovereign bonds, particularly in terms of capital and liquidity requirements. Moreover, the securities would be treated unfavourably in the collateral framework for monetary policy.

Capital requirements

For banks, holding a securitised product rather than the underlying portfolio gives rise to higher capital requirements. The justification for non-neutrality in the current treatment of securitisations relative to the underlying portfolio stems in part from agency risk, since securitisation involves a greater number of parties with potentially conflicting interests (e.g. servicing, counterparty and legal risks). Consequently, the capital requirements imposed on a replicating portfolio of senior, mezzanine and junior SBBS under current regulations would be higher than those imposed on the underlying sovereign bond portfolio. However, agency risk is less relevant in the case of SBBS owing to their unique design and risk properties.

Similarly, for insurance corporations, securitisations are subject to capital requirements in the calculation of the Solvency Capital Requirement under the Solvency II standard formula (except for type 1 securitisations guaranteed by the European Investment Bank or the European Investment Fund). Consequently, SBBS would be subject to these requirements, putting them at a disadvantage relative to direct holdings of Member State central government bonds denominated and funded in domestic currency (which would not be subject to such requirements).



Liquidity requirements

Neither senior nor non-senior SBBS would qualify as liquid assets under the liquidity coverage ratio (LCR) by virtue of being treated as securitised products. This also affects their treatment in the net stable funding ratio (NSFR), which adopts the same definition of liquid assets as the LCR. Under certain criteria, senior tranches of asset-backed securities may be classified as level 2b assets and subject to a 25% minimum haircut. SBBS would not meet these criteria, however, because sovereign bonds are not included in the list of eligible underlying assets. As such, the current treatment would be highly unfavourable relative to the underlying sovereign bonds, all of which are classified as level 1 liquid assets.

Other prudential rules pertaining to SBBS

Banks, insurance corporations and alternative investment funds are allowed to invest in securitised products if the arranger retains a material net economic interest. However, CRR, Solvency II and the Alternative Investment Fund Managers Directive (AIFMD) provide exceptions to this requirement, including when the securitised product generates exposure to a Member State central government that is denominated and funded in the domestic currency of that central government (or fully guaranteed by a central government). Given their design features, SBBS would qualify for such an exception, despite arranger(s) not retaining a material net economic interest. In addition, Solvency II would require insurance corporations to apply the prudent person principle when investing in SBBS by understanding the main risk drivers responsible for changes in the valuation of the security.

The ability of central counterparties (CCPs) to accept SBBS as collateral would depend on whether they can be considered low credit risk and highly liquid. The assessment would be based on whether there are active repo markets and reliable price data for the securities. In general, senior SBBS are expected to fulfil these conditions. Senior SBBS would also be eligible collateral for uncleared derivatives. In addition, CCPs may invest their own funds in senior SBBS under current rules if they are considered highly liquid. In line with their investment policies, however, CCPs would probably not be able to invest in junior SBBS since these securities would be perceived as too risky.

When providing bank-like ancillary services, central securities depositories (CSDs) can accept instruments from client accounts as collateral. In addition to debt instruments issued or guaranteed by a government, CSDs can accept other types of collateral that are eligible at a central bank if the CSD service provider has access to regular, non-occasional credit from that central bank.

Rules related to SBBS arranger(s) and issuers

The obligation for the arranger of a securitisation to retain at least 5% of the issuance as “skin in the game” does not apply to SBBS because the underlying exposures are guaranteed by central governments. The retention obligation was introduced to account for agency risk in



securitised products, which arises from the information disadvantage that investors could have vis-à-vis the arranger and the underlying pool. This motivation is therefore not relevant for SBBS issuers.

If the arranger of SBBS were a bank, it might be subject to capital requirements for credit risk. However, an arranging bank may apply a maximum capital requirement for the securitisation position it holds, equal to the capital requirements that would be calculated in respect of the underlying exposures had they not been securitised. The rationale for this provision is that, from the perspective of the arranger, a securitisation should not generate additional risk. In practice, therefore, an arranging bank would not face additional risk-weighted capital requirements from arranging and issuing SBBS under the current regulatory treatment of sovereign exposures.

Monetary policy collateral framework

SBBS are not specifically covered by the Eurosystem collateral framework. Although the Eurosystem cannot provide pre-issuance advice, the current rules on collateral eligibility for credit operations offer some indication of the current treatment of SBBS (see Guideline (EU) 2015/510).

SBBS appear to meet most of the points of the definition of asset-backed securities under existing guidelines (see Article 2(3)). This is because SBBS are debt securities backed by a pool of ring-fenced financial assets and issued by a special entity. Payments accruing to holders of SBBS would depend on the underlying bonds, subject to a cash flow waterfall given by the relative seniority of the securities. If SBBS were indeed classified as ABS, then under existing guidelines they would be subject to ABS-specific collateral eligibility criteria, in addition to the general criteria for marketable assets that all eligible debt securities must fulfil.

Under existing guidelines, however, SBBS would not be eligible for collateral as the list of financial assets that may underlie ABS does not include sovereign bonds. This is because SBBS cash flows are generated by a distinct asset category (i.e. sovereign bonds) that is not specified on the list of cash flow-generating assets that may underlie a collateral-eligible ABS. This list was devised based on the common types of securitisation that exist in the European market, which explains the exclusion of sovereign bonds. Apart from this obstacle, senior SBBS should fulfil the ABS eligibility criteria, although non-senior SBBS would not meet the criterion for non-subordination of ABS.

Applicable haircuts for senior SBBS would follow the same schedule as for ABS and would be deducted from the market value of the asset to protect the Eurosystem against the risk of financial losses. The haircut schedule applicable to ABS is consistently higher than the comparable haircuts for government bonds (see Table 4.1).



Table 4.1

Eurosystem haircuts for government bonds and ABS

| Credit quality step | Residual maturity | Haircut for government bonds | Haircut for ABS | Difference (in % points) |
|--------------------------------------|-------------------|------------------------------|-----------------|--------------------------|
| Steps 1 and 2 (AAA to A-) | 0-1 years | 0.5% | 4.0% | 3.5 |
| | 1-3 years | 1.0% | 4.5% | 3.5 |
| | 3-5 years | 1.5% | 5.0% | 3.5 |
| | 5-7 years | 2.0% | 9.0% | 7.0 |
| | 7-10 years | 3.0% | 13.0% | 10.0 |
| | 10+ years | 5.0% | 20.0% | 15.0 |

Source: ECB.

Note: The table refers to Eurosystem haircuts for government bonds and ABS at credit quality steps 1 and 2 (corresponding to a credit rating between AAA and A-) according to their residual maturity.

4.2 Principles of an enabling product regulation

SBBS would be treated unfavourably relative to sovereign bonds under current regulations.

SBBS would be treated as securitised products, whereas own-currency sovereign bonds are subject to specific treatments in regulation. The relatively unfavourable treatment of SBBS is a significant obstacle to their demand-led emergence.

Many of the features that give rise to securitisation-specific risks would not be present in the case of SBBS. This includes opaqueness of the underlying assets and absence of market prices to value them. In particular, the underlying assets in the case of SBBS would be well-known and understood by investors. The fact that the composition of the cover pool is largely predefined excludes adverse selection issues. The transparency of SBBS would be ensured by the fact that the underlying assets – central government bonds – are tradable and liquid securities.

The current regulatory framework is therefore not designed to adequately reflect the unique characteristics of SBBS. A new treatment reflecting the unique characteristics of SBBS therefore seems warranted in that the existing treatment is inappropriately unfavourable. Such a treatment would be tailored to reflect the design and risk properties of the securities of varying seniority. This section provides an overview of the principles that could inform the design of an enabling product regulation for SBBS with respect to the prudential treatment of holdings and the regulation of issuers and arranger(s). It also discusses options for how the monetary policy collateral framework could be adapted to accommodate SBBS, recognising that decisions regarding this framework are under the exclusive purview of the Governing Council of the ECB.



Prudential regulation of SBBS holdings

An enabling prudential regulatory framework would be necessary to reflect the unique properties of SBBS. The unique design of SBBS means that their prudential treatment could be defined in stand-alone legislation. The purpose of such legislation would be to set out the conditions for a product to be classified as SBBS (in terms of portfolio composition and seniority structure). In addition, the legislation would define the regulatory treatment of all the securities, which should reflect their respective risk properties given that SBBS repackage sovereign risk into lower-risk and higher-risk components. Based on the analysis described in Volume II, holdings of senior SBBS could justify a risk weight of zero (or one that corresponds to the lowest credit quality step). Like sovereign bonds, senior SBBS could qualify as level 1 liquid assets under LCR requirements insofar as they would be expected to achieve similar levels of liquidity.

The treatment of mezzanine and junior SBBS would reflect the relatively higher risk of these two securities. These non-senior securities would be risky and should be treated by regulation as such to ensure that banks and others benefit sufficiently from the de-risking possibility that SBBS provides. Otherwise, the introduction of SBBS could endanger financial stability by allowing banks to increase their exposure to sovereign risk. To avoid this outcome, holdings of mezzanine and junior securities should be subject to restrictions, such as risk weights that reflect their relative riskiness and/or position limits. In this way, banks and other relevant sectors would not have incentives to hold these securities in excess. This risk-sensitive approach would discourage or prevent excessive holdings of junior and mezzanine securities. Otherwise, banks and other relevant sectors could use subordinated SBBS to enhance their exposure to the sovereign risk, thereby endangering financial stability. This underscores the importance of adopting a risk-adequate regulatory framework. Finally, in terms of liquidity requirements, the status of mezzanine and junior SBBS under the LCR would depend on the liquidity and credit ratings that they would be expected to achieve.⁸

Regulation of SBBS arranger(s) and issuers

SBBS issuers would be exempt from retention rules, which are common for securitised products. This exemption is already envisaged as SBBS are securitised exposures guaranteed by central governments, but would be further warranted by the absence of moral hazard in portfolio selection due to the narrowly predefined composition of SBBS.

More broadly, an enabling product regulation would need to define a licensing regime for SBBS arranger(s). If SBBS are arranged by private sector entities, those entities should be subject to registration requirements and ongoing supervision by a competent EU authority. A licensing regime would provide a legal instrument enabling some features of SBBS to be kept under

⁸ A status of level 2A liquid asset would correspond to high-quality covered bonds and corporate debt securities, while a status of level 2B liquid assets would be comparable to shares.



regulatory control, including time-varying limits on the overall size of the SBBS market, as discussed in Section 3.

Monetary policy collateral framework

The unique design and risk properties of SBBS might warrant consideration of their treatment under the monetary policy collateral framework. The collateral eligibility of SBBS would have significant implications for their investor base and market price. The Eurosystem collateral framework is defined by the ECB Governing Council, in compliance with the principles of collateral availability and adequacy (in terms of sufficient risk protection). The ECB Governing Council has the sole competence to amend the collateral framework to accommodate SBBS, taking into account their unique properties.

One technical change could be to extend the types of accepted assets underlying ABS to include sovereign bonds. In addition, it is reasonable to expect that the required submission of loan-level information on the relatively simple cover pool underlying SBBS would be straightforward, given the proven ability of ABS issuers to provide necessary loan-level information on the underlying cash flow-generating assets.

The valuation haircuts for senior SBBS could also be considered. Existing haircuts for ABS were calibrated by taking into account the risk properties and volatility of currently eligible ABS. Owing to the different risk properties of senior SBBS, there could be a case for classifying them under a less onerous haircut schedule. Such a schedule for SBBS could be based on an existing one (like that for sovereign bonds) or an entirely new one that would be tailored to senior SBBS. In the latter case, the senior securities – insofar as they offer superior safety relative to sovereign bonds – could benefit from a haircut that is lower than that for some underlying bonds.

A more substantial, and therefore demanding, change to the current framework would be required to make non-senior SBBS eligible. Non-senior SBBS could only be made eligible if the non-subordination rule were not applied to SBBS. The provision of a different treatment for SBBS would need to be justified in terms of the unique risk profile of non-senior SBBS compared with other subordinated securities, which would depend on a rigorous risk assessment. If non-senior SBBS were deemed ineligible for use as collateral in monetary policy operations, SBBS would reduce the total quantity of eligible collateral.

4.3 Implications of the treatment of sovereign exposures

In 2015, the Basel Committee on Banking Supervision initiated a review of the regulatory treatment of sovereign exposures (RTSE). Following extensive analysis, the Basel Committee published a discussion paper in December 2017 with the aim of soliciting the views of interested stakeholders to inform its longer-term thinking on this issue (BCBS, 2017). Some potential policy ideas outlined in that discussion paper include positive risk weights for sovereign exposures to address credit or concentration risk. Nevertheless, at this stage, the Committee has not reached a consensus on making any changes to the regulatory treatment of sovereign exposures.



This section assesses the implications for SBBS of different RTSE options, without prejudice to ongoing policy discussions. The analysis compares the impact on capital requirements attributable to existing sovereign exposures (under various regulatory regimes) with the impact arising if those exposures were replaced by senior SBBS. The motivation for financial institutions reinvesting into senior, rather than subordinated, SBBS is based on the assumption that the regulation of SBBS would be calibrated in a risk-sensitive manner, so that the treatment of subordinated SBBS would be relatively severe. Based on an illustrative quantitative analysis, the section then infers the corresponding relative appeal of senior SBBS under different RTSE options. Clearly, however, the findings of this analysis do not provide sufficient justification for embarking on RTSE reform, which should be considered in other fora owing to its broader implications for sovereign bond markets. Moreover, if RTSE reform were to take place, the treatment of SBBS would need to be consistent with such reform.

In addition, Task Force members expressed a range of views on the link between SBBS and RTSE. As explained in Box 4.A, some members saw RTSE reform as key for the viable implementation of SBBS and to address systemic risks, while others believed that such reform would be undesirable owing to its broader implications for bond markets. Notwithstanding these diverging views, the demand-led incremental development of an SBBS market could provide useful information to policymakers regarding regulation and investors' demand for sovereign risk.

Box 4.A

Views on the link between SBBS and the regulation of sovereign exposures

The focus of this report is on SBBS. The regulatory treatment of sovereign exposures (RTSE) is relevant for SBBS' feasibility insofar as it affects the relative attractiveness of the securities compared with sovereign bonds. Any RTSE reform that is sensitive to concentration or credit risk would substantially enhance demand for senior SBBS insofar as banks and insurance corporations could use that security to mitigate the resulting impact on capital requirements.

Some Task Force members went a step further, and asserted that RTSE reform is key for the viable implementation of SBBS and to address systemic risks. In their view, since regulation does not incentivise banks to diversify or de-risk their sovereign bond holdings, an SBBS market could only develop following comprehensive RTSE reform as well as an SBBS-specific regulation. With these reforms in place, both SBBS and sovereign bonds would be treated adequately, which could include risk-sensitive capital charges and concentration limits. Following such reforms, SBBS could develop into a sizeable market, and represent one way to break the bank-sovereign nexus insofar as banks reinvest into senior SBBS. However, in the absence of regulatory reforms, these members asserted that SBBS would not exist in adequate quantities, and so would not achieve their objectives. In their view, continued prudential imprudence represents a regulatory-driven risk to financial stability insofar as banks maintain or increase their sovereign risk exposures, for example by holding non-senior SBBS in excess, given that these securities repackage, rather than eliminate, sovereign risk. More broadly, these members asserted that comprehensive RTSE reform is necessary to credibly and time-consistently exclude sovereign risk mutualisation. This could arise in a self-fulfilling manner if markets were to misperceive the SBBS initiative as providing implicit guarantees of payment flows, because misperceptions would lead to mispricing in SBBS and



sovereign debt securities. Avoiding this eventuality is necessary for financial stability, but might be difficult under the RTSE status quo in which the bank-sovereign nexus persists.

By contrast, other Task Force members believed that RTSE reform would be unnecessary to counteract market misperceptions of SBBS, as the two issues are unrelated. In their view, RTSE reform would be undesirable, particularly in the absence of a functioning SBBS market, given the key role that sovereign bonds play in financial markets and the conduct of monetary and fiscal policy, as explained in BCBS (2017), and the distinct role of government in the economy. Moreover, in the view of these members, banks can help to stem the effect of market dislocations unrelated to fundamentals. Before the crisis, banks' holdings of sovereign bonds had been in secular decline, despite benefiting from a distinct regulatory treatment, because private sector lending typically has higher returns. During the crisis, however, banks with stable sources of funding increased their sovereign bond holdings. Banks' contrarian purchases of sovereign bonds can therefore be stabilising given multiple equilibria. This gives rise to concerns that RTSE reform could prevent banks from stabilising bond markets. Moreover, such reforms could increase the procyclicality of capital requirements and would impair the global competitiveness of EU banks insofar as market-making would be more costly. Regarding SBBS, these members did not consider RTSE reform to be necessary for market development, but instead focused on the importance of an SBBS-specific product regulation to provide for their treatment.

Notwithstanding these diverging views, Task Force members agreed that the findings in this report do not independently justify RTSE reform, since this should be evaluated on its own merits.

Implications for banks

To quantify the implications of RTSE for banks' demand for SBBS, the following options have been considered in various policy fora. For the purposes of the subsequent quantitative analysis, the calibration of the RTSE reform options is more severe than that envisaged in BCBS (2017).

- **Status quo:** the existing regulatory treatment.
- **Reform option 1:** a flat risk weight of 2%.
- **Reform option 2:** positive risk weights depending on credit ratings.
- **Reform option 3:** positive risk weights that increase with the concentration of a bank's holdings of a single issuer.
- **Reform option 4:** a combination of options 2 and 3.

For each of these options, the analysis quantifies bank capital requirements with no SBBS market compared with two scenarios with differing regulatory treatments of SBBS. The latter two scenarios assume that banks would reinvest their current sovereign bond portfolios into senior SBBS (given that subordinated SBBS would be subject to a relatively severe treatment). An ample supply of senior SBBS would allow financial institutions to diversify and de-risk their sovereign bond



holdings, thereby mitigating the impact on capital requirements that would otherwise be caused by RTSE reform. This highlights the relationship between SBBS and RTSE reform. Naturally, the extent to which such mitigation occurs would be a function of the regulatory treatment of SBBS. The following scenarios regarding the prudential treatment of SBBS are considered.

- **No SBBS:** Banks hold their existing sovereign bond portfolios.
- **SBBS with current regulations:** Under this scenario, banks exchange their current holdings of euro area sovereign bonds for senior SBBS, which are subject to a risk weight of 20% for credit risk under the standardised approach. The look-through approach is applicable for any concentration risk-based capital charge.
- **SBBS with an enabling product regulation:** As above, banks hold senior SBBS, but the treatment of these holdings is defined in a new enabling regulation. It is assumed that this regulation would eliminate capital requirements linked to securitisation and exempt senior SBBS from any concentration risk charges.

The results shown in Table 4.2 confirm that the current treatment of SBBS would be discouraging under all RTSE options. This is most apparent under the RTSE status quo, in which sovereign bond holdings currently attract zero capital requirements, while a portfolio comprised of senior SBBS would require banks to raise an additional 5% of CET1 capital. But this also holds for all four RTSE reform options considered here, since they would all generate additional capital requirements for sovereign bond holdings that are lower than the 5% increase that senior SBBS would attract. These insights help to explain why SBBS do not currently exist.

If an enabling product regulation for SBBS were adopted, there would be no difference for banks in terms of regulatory requirements between holding senior SBBS and holding their current portfolios. As Table 4.2 shows, the scenario in which banks hold senior SBBS under an enabling product regulation entails zero increase in capital requirements under the RTSE status quo. As such, senior SBBS would no longer be treated unfavourably relative to sovereign bonds.

The findings also confirm that the appeal of senior SBBS for banks would be affected by the regulatory treatment of sovereign exposures. If an enabling product regulation for SBBS is adopted, banks could hold senior SBBS (rather than sovereign bonds directly) to mitigate the impact of RTSE reform on capital requirements. In particular, Table 4.2 shows that such charges would make senior SBBS more attractive than sovereign bonds under the assumption that senior SBBS would be exempt from capital charges based on concentration risk in their sovereign exposures. The same is true for capital charges based on credit risk in sovereign exposures, albeit to a lesser extent, since by assumption senior SBBS would not be exempt from such charges, but instead would be subject to the capital charge that accrues to the first credit quality step (set at a risk weight of 2% under the RTSE reform option considered here).



Table 4.2

Bank capital requirements under RTSE reform options and scenarios for the treatment of senior SBBS

| | No SBBS (current sovereign bond holdings) | | Senior SBBS under current regulation (credit risk weight on senior SBBS: 20%) | | Senior SBBS under new regulation (credit risk weight on senior SBBS: 0-2%) | |
|--|--|-------------------------|---|-------------------------|--|-------------------------|
| | € billions | As % of CET1 capital | € billions | As % of CET1 capital | € billions | As % of CET1 capital |
| RTSE status quo | 0 | 0 | 70.7 | 5.0 | 0 | 0 |
| Reform option 1 (flat risk weight) | 7.3 | 0.5 | 70.7 | 5.0 | 7.3 | 0.5 |
| Reform option 2 (credit risk) | 10.8 | 0.8 | 70.7 | 5.0 | 7.3 | 0.5 |
| Reform option 3 (concentration risk) | 37.6 | 2.7 | 76.9 | 5.5 | 0 | 0 |
| Reform option 4 (concentration and credit risk) | 48.3 | 3.4 | 76.9 | 5.5 | 7.3 | 0.5 |

Source: EBA and ESRB calculations.

Note: The table reports the additional CET1 capital that banks would need to raise to keep their capital ratio constant, both in billions of euro and as a percentage of CET1 capital. Calculations are based on data from 105 banks in the EBA transparency exercise (2015), and include exposures to central government, regional government and local authorities. In the first column, SBBS do not exist, and banks hold their current sovereign bond portfolios; in the second column, banks reinvest their sovereign bond portfolios into senior SBBS, which are subject to current regulatory treatment with a credit risk weight of 20%; in the final column, banks' senior SBBS holdings are subject to a new regulatory treatment, with a risk weight that depends on the regulatory treatment of sovereign exposures (namely a credit risk weight of 2% under reform options 1, 2 and 4, corresponding to the lowest credit quality step that is assumed to prevail under a particular calibration of those reform options).

In addition, reforms under the simple and transparent securitisation initiative will have implications for the treatment of SBBS. Since SBBS are transparent, institutions would always have knowledge of the exposures underlying SBBS, meaning that the look-through approach would be applicable. This could allow certain banks' holdings of senior SBBS to attract the risk weight that would have prevailed if the sovereign bonds had not been securitised. However, these reforms of the treatment of securitisations would not apply to all banks. Moreover, it would not affect bank liquidity requirements or regulatory requirements pertaining to non-banks. Providing for a new treatment of SBBS in an enabling product regulation makes it possible to cover all aspects of the regulatory treatment of senior SBBS and to define a prudentially adequate treatment of non-senior SBBS, which is of critical importance in view of the financial stability objective of de-risking banks.



Implications for insurance corporations

A similar analysis has been conducted for insurance corporations. Table 4.3 shows estimates of the absolute and relative increase in the Solvency Capital Requirement (SCR) for euro area solo insurance corporations if they were to reinvest their current holdings of euro-denominated sovereign bonds, which in the table are assumed to be treated under the current regulatory framework, into senior SBBS. In addition, Table 4.3 shows the impact of three possible alternative SBBS treatments that could be provided in a new product regulation.

Table 4.3
Increase in SCR requirements for euro area solo insurance corporations

| | Status quo: Treatment of senior SBBS as type 2 securitisation | Scenario 1: Treatment of senior SBBS as type 1 securitisation | Scenario 2: Treatment of senior SBBS akin to corporate bonds | Scenario 3: Treatment of senior SBBS akin to sovereign bonds |
|--|--|--|---|---|
| Increase in SCR (€billions) | 963 | 166 | 54 | 0 |
| Percentage increase in SCR | 262 | 45 | 14 | 0 |

Source: EIOPA and ESRB calculations.

Note: The table refers to the additional capital that insurers would need to raise to keep their current SCR ratio constant, both in billions of euro and as a percentage of initial capital. In all columns, insurers are assumed to reinvest their current holdings of euro-denominated sovereign bonds into senior SBBS; naturally, if insurers were to reinvest only a fraction of their current holdings, the numbers in the table would need to be scaled accordingly. The columns differ with respect to the underlying assumption on the prevailing regulatory treatment of senior SBBS.

In addition, reform of the regulatory treatment of sovereign exposures for insurance corporations would affect the relative appeal of senior SBBS.

If insurance corporations were subject to capital charges for concentration and/or spread risk in their sovereign exposures, they would have an incentive to rebalance their portfolios towards senior SBBS. For concentration risk, one conceivable approach could be to treat European Economic Area (EEA) sovereign bonds in the same way as local currency non-EEA sovereign bonds.⁹ Under this approach, the capital charge would also depend on the credit rating of the exposure. Consequently, the additional concentration risk charge would in many cases be near zero. The SCR increase would nevertheless be meaningful in some cases. On aggregate, the increase in the SCR for euro area insurers would be approximately €23 billion, which represents 6.2% of capital.¹⁰ If senior SBBS were regulated according to Scenario 3 in Table 4.3, insurance corporations affected by the SCR increase could use senior SBBS to mitigate the additional charge.

⁹ See Article 187(4) of Commission Delegated Regulation 2015/35.

¹⁰ Similar results in terms of the dispersion of risk charges across countries can be observed if the risk weights are determined in accordance with Article 186(1) of Commission Delegated Regulation 2015/35.



5 Conclusion

This report conducts a feasibility study of SBBS. It constitutes a technical evaluation of the conditions under which SBBS could be viable and studies the side-effects that such a market might entail in view of the overarching policy objective of creating a more stable financial system.

An SBBS market might be feasible under certain conditions. Properly designed, the securities embed euro area-wide diversification and low risk due to contractual subordination (rather than joint liability). Properly regulated, the treatment of SBBS would reflect their unique design and risk properties, and incentivise banks to hold lower-risk securities while providing for a relatively severe treatment of riskier securities, thereby protecting financial stability. In addition, as explained in Box 4.A, Task Force members expressed a range of views on whether other conditions would also be necessary. For example, some members saw RTSE reform as key for the viable implementation of SBBS and to address systemic risks, while others believed that such reform would be undesirable, particularly in the absence of a functioning SBBS market, owing to its broader implications.

A viable SBBS market would complement broader efforts to complete Economic and Monetary Union – most notably in the areas of banking union and capital markets union – that aim to reduce risks in the banking sector, improve the fiscal framework and implement structural reforms. SBBS would support these efforts insofar as they help to improve financial stability. However, SBBS are not intended as a substitute for such efforts, which should continue apace.

Banks could use SBBS to diversify and de-risk their sovereign bond portfolios. An ample supply of SBBS could help to alleviate excessive home bias (since the underlying portfolio would comprise euro-denominated central government bonds weighted by the ECB capital key) and facilitate de-risking (since junior and mezzanine SBBS protect the senior securities from losses).

Quantitative analysis shows that a 70%-thick senior SBBS would have risk characteristics similar to those of lower-risk euro sovereign bonds. This finding is robust to a range of adverse scenarios. Market intelligence suggests that a 20%-thick mezzanine SBBS could be purchased by relatively conservative investors with mandate restrictions. The 10%-thick junior SBBS would be marketed to high-yield investors.

SBBS respect existing fiscal rules. In particular, their issuance would adhere to the “no bailout” and no monetary financing clauses of the EU Treaty. SBBS issuers would be bankruptcy-remote pass-through entities; they would not bear any market or credit risk themselves, and neither Member States nor European institutions would guarantee SBBS payment flows. Clear communication would be necessary to avoid any misperception of implicit guarantees. Contracts would define how the holders of SBBS bear losses in the event of a sovereign debt restructuring. To ensure that there is a market for the securities of varying levels of seniority, the SBBS cover pool would only include sovereign bonds for which a competitive market price exists.

SBBS could be arranged by multiple private sector entities or a single public institution.

With purely private sector arrangement, regulation and supervision would be necessary to coordinate the creation of relatively homogenous SBBS. With public sector involvement in the



SBBS issuance process, the institutional setting would have to be designed to preclude uncontrolled sovereign risk mutualisation and would require political agreement. Regardless of their identity, SBBS arranger(s) would assemble the cover pool of sovereign bonds on primary or secondary markets only insofar as investors submit (binding) orders for all securities, and would not retain any exposure to SBBS. However, depending on the issuance model, arranger(s) might need to temporarily fund a warehouse of sovereign bonds while the cover pool is assembled.

One necessary condition for the creation of SBBS is to change the regulatory treatment of these securities. Under existing regulations, SBBS would receive unfavourable treatment compared with a portfolio of the underlying sovereign bonds. This prevents the demand-led emergence of SBBS. An enabling product regulation for SBBS could define a new risk-adequate treatment of these securities across financial sectors. As such, junior and (to a lesser extent) mezzanine SBBS would be subject to relatively high capital charges and/or position limits.

In addition, the outcome of ongoing discussions regarding the regulatory treatment of sovereign exposures will affect investor demand for SBBS. Any reform of such treatment that is sensitive to concentration or credit risk would substantially enhance demand for senior SBBS insofar as banks and insurance corporations use the senior security to mitigate the resulting impact on capital requirements. However, this finding does not pertain to the overall merits or demerits of such reform; this assessment should be made in other policy fora owing to its broader implications.

Following the introduction of an enabling product regulation, the size of the SBBS market would be demand-led, with speed limits set by policy. The SBBS market should develop gradually at first, conditional on investor demand, like the market for ESM bonds, which has achieved adequate liquidity. In the medium-term, SBBS would need to be sufficiently abundant across the curve to meet its policy objectives. At the same time, the implementation of SBBS should not unduly impede the functioning of national sovereign bond markets. To maintain an adequate secondary market free float, a competent authority working with relevant stakeholders could, if needed, impose limits on the total SBBS market size, which could amount to €1.5 trillion or more, depending on the observed impact on sovereign bond markets.

In summary, SBBS might be feasible under certain conditions. The three securities would represent new financial instruments which investors might want to hold in a new regulatory environment. Over time, an appropriately designed SBBS market could enhance financial stability while preserving fiscal discipline. Ultimately, however, the level of investor demand for these novel securities is an empirical question, which can only be tested if an enabling SBBS-specific product regulation is adopted.



References

- Basel Committee on Banking Supervision (2017). "The regulatory treatment of sovereign exposures – a discussion paper."
- Brunnermeier, M.K., L. Garicano, P. Lane, M. Pagano, R. Reis, T. Santos, D. Thesmar, S. Van Nieuwerburgh and D. Vayanos (2011). "European Safe Bonds (ESBies)." The Euronomics Group.
- Brunnermeier, M.K., L. Garicano, P. Lane, M. Pagano, R. Reis, T. Santos, D. Thesmar, S. Van Nieuwerburgh and D. Vayanos (2016). "The sovereign-bank diabolic loop and ESBies." *American Economic Review Papers and Proceedings*, 106(5): 508-512.
- Brunnermeier, M.K., S. Langfield, M. Pagano, R. Reis, S. Van Nieuwerburgh and D. Vayanos (2017). "ESBies: safety in the tranches." *Economic Policy*, 32(90): 175-219. Previously published as ESRB working paper no. 21.
- Cronin, D. and P. Dunne (2018). "How effective are euro area sovereign bond-backed securities as a spillover prevention device?" ESRB working paper no. 66.
- De Sola Perea, M., P. Dunne, M. Puhl and T. Reininger (2018). "Sovereign bond-backed securities: a VAR-for-VaR and Marginal Expected Shortfall assessment." ESRB working paper no. 65.
- Dunne, P. (2018). "Positive liquidity spillovers from sovereign bond-backed securities." ESRB working paper no. 67.
- ESRB (2015). "ESRB report on the regulatory treatment of sovereign exposures."
- ESRB High-Level Task Force on Safe Assets (2018). "Sovereign bond-backed securities: a feasibility study." Volume II.
- Greenwood, R. and D. Vayanos (2014). "Bond supply and excess bond returns." *Review of Financial Studies*, 27(3): 663-713.
- Juncker, J.-C. (in close cooperation with D. Tusk, J. Dijsselbloem, M. Draghi M. and M. Schulz) (2015). "The five presidents' report: completing Europe's economic and monetary union".
- Juncker, J.-C. and G. Tremonti (2010). "E-bonds would end the crisis." *Financial Times*.
- Leandro, Á. and J. Zettelmeyer (2018). "Evaluating proposals for a euro area safe asset." Working paper, Peterson Institute for International Economics.
- Monti, M. (2010). "A new strategy for the single market." Report to the President of the European Commission.
- Wendorff, K. and Mahle, A. (2015). "Staatsanleihen neu ausgestalten – für eine stabilitätsorientierte Währungsunion." *Wirtschaftsdienst*, 95(9): 604-608.
- Von Weizsäcker, J. and J. Delpla (2010). "The Blue Bond proposal." *Bruegel Policy Brief* 2010/03.



Members of the ESRB High-Level Task Force

Chair of the High-Level Task Force

Philip R. Lane (Central Bank of Ireland)

Secretary

Sam Langfield (ECB)

Assistant Secretary

Spyros Alogoskoufis (ESRB)

Members of the Plenary High-Level Task Force

Ulrich Bindseil, Thomas Jorgensen, Massimo Rostagno and Carmelo Salleo (ECB); Alberto Giovannini and Marco Pagano (ESRB ASC); Mario Nava (European Commission); Anne Leclercq and Thomas Wieser (Economic and Financial Committee); Lars Overby (European Banking Authority); Matjaž Sušec and Rolf Strauch (European Stability Mechanism); Ewald Nowotny and Helene Schuberth (National Bank of Austria); Mathias Dewatripont, Hans Geeroms and Jean Hilgers (NBB); Kalin Hristov (National Bank of Bulgaria); Constantinos Papadopoulos (Central Bank of Cyprus); Karel Bauer (Czech National Bank); Marja Nykänen and Paavo Miettinen (Bank of Finland); Anne Le Lorier (Banque de France); Claudia Buch and Benjamin Weigert (Bundesbank); Thorsten Freihube (BaFin); Krystallo Michou (Bank of Greece); Daniel Palotai and Barnabás Virág (Central Bank of Hungary); Giorgio Gobbi (Bank of Italy); Paul Hilbers (Netherlands Bank); Jacek Osieński (National Bank of Poland); Adelaide Cavaleiro and Ana Cristina Leal (Banco de Portugal); Daniel Daianu (National Bank of Romania); Jesús Saurina (Bank of Spain); Martin Flodén (Riksbank)

Workstream A: Motivation and Institutional Framework

Chair: Carmelo Salleo (ECB)

Secretary: Giulio Nicoletti (ECB)

Demosthenes Ioannou, Johannes Lindner, Antonio Riso and Leopold Von Thadden (ECB); Gabriele Giudice (EC); Thomas Wieser (EFC); Andreja Lenarcic and Matjaz Susec (ESM); Helene Schuberth (National Bank of Austria); Luc Aucremanne (NBB); Kalin Hristov (Bulgarian National Bank); Guillaume Richet-Bourbousse (Banque de France); Ulrich Grosch (Bundesbank); Thorsten Freihube (BaFin); Mary Keeney (Central Bank of Ireland); Adam Glogowski (National Bank of Poland); Daniel Daianu (National Bank of Romania); Maria Rodriguez (Bank of Spain)

Workstream B: Regulation

Chair: Mario Nava (EC)

Secretaries: Alexandra Hild and Davide Lombardo (EC)

Marco Pagano (ESRB ASC); Thomas Jorgensen, Antonio Riso and Carmelo Salleo (ECB); Michael Thiel (EC); Lars Overby (EBA); Joachim Keller and Guy Van Den Eynde (NBB); Emilie Fialon (Banque de France); Robert Düll (Bundesbank); Aniko Szombati (Central Bank of Hungary); Giorgio Gobbi (Bank of Italy); Lorraine McDonald (Central Bank of Ireland); Adelaide Cavaleiro (Bank of Portugal); Javier Mencia (Bank of Spain)

Workstream C: Security and Market Design

Chair: Mathias Dewatripont (NBB)

Secretary: Maite de Sola Perea (NBB)

Joao Amaro, Ulrich Bindseil and Cyril Schlund (ECB); Christian Engelen (EC); Anne Leclercq and Kristin Vandenbergen (EFC); Thomas Reininger (National Bank of Austria); Jan De Wit and Régis Lanove (NBB); Petr Frydrych (Czech National Bank); Virginie Coudert (Banque de France); Krystallo Michou (Bank of Greece); Peter Dunne, Patrick Haran and Kitty Moloney (Central Bank of Ireland); Tina Engler and Thilo Liebig (Bundesbank); Martin Flodén (Swedish Central Bank); Maria Rodriguez (Bank of Spain)

Drafting Team

Coordinators: Spyros Alogoskoufis and Alessandro Scopelliti (ESRB) and Sam Langfield (ECB)

Yannick Timmer (ESRB); Alexandra Born, Barbara Meller, Giulio Nicoletti and Leopold von Thadden (ECB); Alexandra Hild and Davide Lombardo (EC); Martin Puhl and Thomas Reininger (Austrian National Bank); Régis Lanove and Maite de Sola Perea (NBB); Robert Düll and Tina Engler (Bundesbank); Mauro Bufano (Bank of Italy); Peter Dunne, Patrick Haran and Micheal O'Keefe (Central Bank of Ireland); Jeroen Hessel (Netherlands Bank)

Liquidity Team

Chair: Sam Langfield (ECB)

Secretary: Spyros Alogoskoufis (ESRB)

Marco Pagano (ESRB ASC); Giulio Nicoletti (ECB); Lars Boman and Alexandra Hild (EC); Anne Leclercq (EFC); Jan De Wit and Régis Lanove (NBB); Virginie Coudert (Banque de France); Ulrich Grosch and Joachim Keller (Bundesbank); Thorsten Freihube (BaFin); Peter Dunne and Patrick Haran (Central Bank of Ireland); Mauro Bufano (Bank of Italy)

Legal Team

Chair: Sam Langfield (ECB)

Secretary: Spyros Alogoskoufis (ESRB)

Giulio Nicoletti and Leopold von Thadden (ECB); Davide Lombardo (EC); Jeromin Zettelmeyer (Peterson Institute for International Economics); Thomas Hurner and Gilles Stuer (NBB); Emmanuel Buttin and Guillaume Richet-Bourbousse (Banque de France); Jari Friebel (Bundesbank); Thorsten Freihube and Frank Pierschel (BaFin); Feargal Byrne, Paul McBride and Dara McNulty (Central Bank of Ireland)



Imprint and acknowledgements

This report was prepared by the ESRB High-Level Task Force on Safe Assets. The members of the Task Force are listed on the previous page.

In producing this report, the Task Force benefited from feedback provided by market participants and other stakeholders. That feedback is gratefully acknowledged.

Correspondence concerning this report may be sent to the coordinators of the Task Force listed below.

Philip R. Lane (Chair of the High-Level Task Force)
Central Bank of Ireland, Dublin, Ireland; email: governor@centralbank.ie

Sam Langfield (Secretary of the High-Level Task Force)
European Central Bank, Frankfurt am Main, Germany; email: sam.langfield@ecb.europa.eu

Spyros Alogoskoufis (Assistant Secretary of the High-Level Task Force)
European Systemic Risk Board Secretariat, Frankfurt am Main, Germany;
email: spyridon.alogoskoufis@esrb.europa.eu

© European Systemic Risk Board, 2018

Postal address 60640 Frankfurt am Main, Germany
Telephone +49 69 1344 0
Website www.esrb.europa.eu

All rights reserved. Reproduction for educational and non-commercial purposes is permitted provided that the source is acknowledged.

The cut-off date for the data included in this report was 31 December 2017.

ISBN 978-92-9472-027-6 (pdf)
DOI 10.2849/262403 (pdf)
EU catalogue No DT-01-18-067-EN-N (pdf)