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# A Review on ESBies

## *The senior tranche of sovereign bond-backed securities*

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# CPB Background document

## A Review on ESBies - The senior tranche of sovereign bond-backed securities

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# 1 Introduction

**Safe assets are the cornerstone for modern financial systems.** The biggest holders of safe assets are banks (IMF 2012), which need to hold safe assets to meet capital and liquidity requirements (Basel Committee on Banking Supervision, 2013<sup>1</sup>). Safe assets also provide high-quality, liquid collateral for banks' repo transactions (IMF, 2012). Besides, safe assets provide benchmarks for the price formation of other financial assets. Moreover, safe assets are an important component of monetary policy operations. Central banks in advanced economies influence the supply of safe assets via market operations in normal periods, and via exchanging riskier assets with safer ones during the crisis (IMF, 2012).

**The supply of safe assets in the euro area is lower than that in the United States.** In the euro area, safe assets are primarily composed of government bonds issued by countries with AAA rating. Brunnermeier et al. (2017) report that as of December, 2015, these countries include Germany, the Netherlands, Austria, Finland and Luxembourg, based on their sovereign credit ratings by S&P or Moody's. The face value of central government debt securities in 2015 issued by these five euro area member states stood at 1.9 trillion euro (18% of euro area GDP), much lower than that of 11.7 trillion dollars in the United States in 2015 (65% of US GDP).

**The lack of a union-wide safe asset is considered to impair financial stability in the euro area.** First, the scarcity of safe assets exacerbates capital flows to safe countries during a crisis (Brunnermeier et al., 2017). Second, European banks increased their holding of domestic government bonds during the crisis, leading to higher sovereign risk exposures (Brunnermeier et al., 2017). To resolve vulnerabilities in the euro area financial market, the European Commission (2017a)<sup>2</sup> lists "the development of a so-called safe asset for the euro area and the regulatory treatment of government bonds" among other medium-term measures to strengthen EMU beyond 2019.

**The goals of a euro-wide safe asset are to increase the supply of safe assets and to weaken the bank-sovereign nexus.** Both goals help enhance the financial stability in the euro area. To achieve these goals, economists have made different proposals to create a new safe finance instrument without joint liabilities among member states<sup>3</sup>. This background document provides a review on the proposals of European Safe Bonds (ESBies) from Brunnermeier et al. (2011, 2017), which have recently been extensively reviewed by a High-Level Task Force of the European Systemic Risk Board (ESRB 2018).

**Our review on ESBies suggests that they might increase financial stability in the euro area.** ESBies can achieve the goals of increasing the supply of safe assets and weakening the sovereign-bank nexus. However, ESBies may suffer great losses in a systemic crisis, and the

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<sup>1</sup> <http://www.bis.org/publ/bcbs238.pdf>

<sup>2</sup> [https://ec.europa.eu/commission/sites/beta-political/files/reflection-paper-emu\\_en.pdf](https://ec.europa.eu/commission/sites/beta-political/files/reflection-paper-emu_en.pdf)

<sup>3</sup> See Monti 2010; Juncker and Tremonti 2010; Delpla and Weizsäcker 2010, 2011; Beck, Wagner, and Uhlig 2011; Brunnermeier et al. 2011, 2017; Hellwig and Philippon 2011; Ubide 2015.

implicit guarantees by euro area states cannot be completely ruled out. The possibility of risk sharing is not ruled out in the current regime either. There are alternatives to ESBies that also limit the sovereign-bank nexus (e.g. risk weights and limits<sup>4</sup>).

**Regulation on sovereign exposure needs to be adjusted to create a level playing field for ESBies.** To see whether ESBies really work in practice, regulations need to be adjusted. In May 2018, the European Commission proposed an enabling regulatory framework for the development of sovereign bond-backed securities (referred as “the EC’s proposal” afterwards), which would grant neutral treatment of ESBies relative to sovereign government bonds.<sup>5</sup> This proposal is based on studies in ESRB (2018), which presented an enabling product regulation that “at a minimum, would align the regulatory treatment of ESBies with that of the underlying sovereign bonds”. This would pave the way for the demand of ESBies by banks and insurance corporations. The proposal by the European Commission will now be discussed by the European Parliament and the Council.<sup>6</sup>

This background document is structured as follows: after the introduction, Section 2 explains the design of ESBies, Section 3 presents necessary regulation adjustments to create the demand for ESBies, Section 4 reviews the issue of scarcity of safe assets and evaluates if ESBies can increase the supply of safe assets, and Section 5 discusses whether ESBies can help to weaken the government-bank nexus.

## 2 What are ESBies?

**ESBies are the senior part of sovereign bond-backed securities (SBBS) in which government bond yields from all euro-countries are divided into a senior and a junior part.** Figure 2.1 shows the balance sheet of a future issuer of ESBies (see paragraph 2.5). On the asset side, the issuer buys a diversified pool of government bonds from the euro countries at market prices on the primary or secondary market. The purchase of sovereign bonds would be financed by issuing tradable securities in two (or more) tranches: a senior tranche, which Brunnermeier et al. (2017) call “European Senior Bonds” (ESBies), and one or several subordinated tranches, referred to as “European Junior Bonds” (EJBies).<sup>7</sup> While ESBies could be interesting for banks to hold as a safe store of value, the riskier EJBies would be attractive to investors who seek for higher yield (such as hedge funds) (Brunnermeier et al., 2017).

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<sup>4</sup> See more discussions in Soederhuizen and Teulings (2018).

<sup>5</sup> [https://ec.europa.eu/info/business-economy-euro/banking-and-finance/banking-union/sovereign-bond-backed-securities-sbbs\\_en#commission-proposal-on-sbbs](https://ec.europa.eu/info/business-economy-euro/banking-and-finance/banking-union/sovereign-bond-backed-securities-sbbs_en#commission-proposal-on-sbbs).

<sup>6</sup> [http://europa.eu/rapid/press-release\\_MEMO-18-3726\\_en.htm?locale=en](http://europa.eu/rapid/press-release_MEMO-18-3726_en.htm?locale=en).

<sup>7</sup> Brunnermeier et al. (2011, 2017) propose just one subordinated tranche. ESRB (2018) suggests that this tranche could be split into two: a mezzanine tranche (20 percent), subordinated to the senior tranche, and a junior tranche (10 percent), subordinated to both the senior and mezzanine tranches. For simplicity, we keep consistent with Brunnermeier et al.’s (2017) terminology and refer to the subordinated tranches as “EJBies.”

**Figure 2.1 The balance sheet of an issuer of ESBies**

Assets	Liabilities
Diversified portfolio of Euro countries' bonds	EJBies Junior Tranche
	<b>ESBies Senior Tranche</b>

## 2.1 Issuer

**SBBSs can be issued by either private or public entities.** Brunnermeier et al. (2017) suggest that private issuers may include large banks or asset managers, and one candidate for a public issuer can be the European Stability Mechanism. EC's proposal only includes private issuer at this moment. To make sure that private issuers keep consistent with the issuers' purchase limits on the market size of the SBBS, ESRB (2018) suggests that private issuers should be subject to "registration requirements and ongoing supervision by a competent EU authority". ESRB (2018) also suggests that the function of SBBS issuers is to collect cash flows accruing on the asset side of their balance sheets (from the coupon and principal payments on the underlying portfolio of sovereign bonds), and then allocate these cash flows to the holders of securities on the liability side (in this case, ESBies and EJBies) according to the seniority. In this manner, ESRB (2018) argues that SBBS issuers would receive no internal equity or external credit support (e.g. any public paid-in capital or guarantees), and they would not be exposed to any market or credit risk on their own account. EC's proposal also states that this could protect investors from the risk of insolvency of the issuers.

**Issuers can purchase underlying sovereign bonds in primary markets, which may change the current microstructure of primary markets.** ESRB (2018) considers competitive auctions or syndications as one way of placing market order in primary markets. In this purchasing manner, National Debt Management Offices (DMOs) across different countries need to coordinate to facilitate the assembly of underlying portfolio for SBBSs within a very short period.<sup>8</sup> DMOs later expressed their concern with the Task Force of ESRB that the simultaneous issuance of sovereign debts may require them to adapt their issuance strategy (ESRB, 2018). ESRB (2018) also point out that this would make government less

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<sup>8</sup> ESRB (2018) also list another two ways of purchasing underlying government bonds on primary markets. One is that SBBS issuers purchase sovereign bonds privately from DMOs by creating new SBBS-specific ISINs. This also requires a degree of simultaneous issuance, and DMOs think that this purchasing method violates their principles of transparency and equal treatment of investors (ESRB, 2018). The other way is to purchase sovereign bonds in ordinary competitive auctions or syndications which would not be coordinated across countries. This way of purchasing has similar effects as purchasing on secondary markets. See discussions in the next paragraph.

flexible to issue new debt; furthermore, markets would be overburdened with excessive duration, which could put upward pressure on bond yields.

**Issuers can also purchase underlying sovereign bonds in secondary markets, but issuers are subject to warehousing risk.** The warehousing risk of issuers is identified in existing studies (Brunnermeier 2017; ESRB, 2018; Leandro & Zettelmeyer, 2018). Before ESBies issuers can complete assembling the portfolio of sovereign bonds based on pre-determined weights (such as ECB capital key), they may need to hold sovereign bonds for some time. During this time, issuers might need to fund a warehouse of sovereign bonds, exposing them to market and credit risk. According to ESRB (2018), both private and public issuers would require compensation for funding the warehouse risks, while public issuers would require participating Member States to agree to contribute a limited amount of paid-in capital.

**To minimize issuers' warehousing risk exposure, the issuers of ESBies could fill an order book before assembling the cover pool.** This binding order book approach is proposed by ESRB (2018), and can be implemented as follows: the order book would contain orders from investors, which are placed before issuers assemble the underlying sovereign bonds of ESBies. Investors would commit to purchase the securities from issuers. This reduces the funds required to manage a warehouse of sovereign bonds. ESBies issuers would then start to assemble the cover pool only when investors have collectively placed orders for both ESBies and EJBies.

## 2.2 Portfolio weights

**Euro area sovereign bonds are pooled in a portfolio according to certain weights.** In principle, a well-defined weighting scheme has the benefit of transparency and predictability (Brunnermeier et al., 2017; ESRB, 2018). The portfolio weights could be based on each country's share in euro area GDP, or contributions to European Central Bank capital (ECB capital key). Table 2.1 compares underlying portfolio weights of ESBies in ESRB (2018), Brunnermeier et al. (2017), and Leandro & Zettelmeyer (2018). Indicative SBBS portfolio weights in ESRB (2018) target ECB capital key.<sup>9</sup> Weights of underlying sovereign bonds in Brunnermeier et al. (2017) are based on the share of sovereign's GDP in overall Eurozone GDP, with the constraint that the pooled portfolio cannot include more than 100% of nation-states' outstanding debt. The portfolio weights from Leandro & Zettelmeyer (2018) are constructed with the purchases of 60 percent of each country's GDP, limited to 50 percent of outstanding government debts, and the remaining debt should at least be 200 billion for all countries.

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<sup>9</sup> According to ESRB (2018), 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 euros.

**Table 2.1 Proposed Portfolio weights of underlying government bonds of ESBies**

Countries <sup>10</sup>	(1) ECB capital key share among euro area Member States (%) (as at 2015)	(2) ESRB (2018) Indicative SBBS portfolio weights (%) <sup>11</sup>	(3) Brunnermeier et al. (2017)	(4) Leandro & Zettelmeyer (2018)
Germany	25.6	26.2	28.2	26.5
The Netherlands	5.7	5.9	6.6	3.3
Luxembourg	0.3	0.1	0.2	0.1
Austria	2.8	2.9	3.2	2.4
Finland	1.8	1.8	2.0	1.0
France	20.1	20.8	21.3	26.2
Belgium	3.5	3.6	3.9	3.6
Estonia	0.3	0.0	0.0	0.0
Slovakia	1.1	0.8	0.7	0.4
Ireland	1.7	1.7	1.8	1.2
Latvia	0.4	0.1	0.2	0.1
Lithuania	0.6	0.3	0.3	0.1
Malta	0.1	0.1	0.1	0.1
Slovenia	0.5	0.5	0.4	0.3
Spain	12.6	13.0	10.8	13.1
Italy	17.5	18.0	16.5	19.7
Portugal	2.5	2.6	1.8	1.3
Cyprus	0.2	0.1	0.2	0.1
Greece	2.9	1.6	2.0	0.6

## 2.3 Diversification and seniority

**The safety of ESBies results from diversification and seniority.** A diversified portfolio of euro area sovereign bonds could mitigate concentration risk for banks which hold a large proportion of their national government bonds. However, diversification on its own is insufficient to make ESBies a safe asset. Brunnermeier et al. (2017) argues that with diversified portfolios, banks' risk exposures become more similar, which implies that all banks would still be vulnerable to sovereign debt repricing or default. To provide additional protection for banks against sovereign credit risk, Brunnermeier et al. (2017) introduce the seniority structure of ESBies. By design, ESBies do not bear any losses until all junior tranches have been entirely wiped out (Brunnermeier et al., 2017; ESRB, 2018; Leandro & Zettelmeyer, 2018).

<sup>10</sup> Countries are ranked according to their credit ratings as of December 2015.

<sup>11</sup> This method of constructing underlying portfolio weights is also mentioned in EC's proposal, which states that "the structure of the underlying asset pool for SBBSs is pre-determined (e.g., the weights of the individual Member States' central government bonds would be in line with their contribution to capital of the European Central Bank, with little deviation)."



## 2.4 Market size

**The introduction of ESBies would influence the liquidity of existing sovereign bond markets.** ESRB (2018) has envisaged two likely competing impacts from the introduction of ESBies. On the one hand, with a large market size of ESBies, a large proportion of a sovereign's outstanding debt would be included in ESBies. This may result in a sharp shrinkage of freely-traded sovereign bonds on secondary markets, especially in those small and medium sized sovereign debt markets. Consequently, sovereign bond markets become less liquid. This constrains governments to finance their public spending (Leandro & Zettelmeyer, 2018). Besides, less liquid sovereign bond markets could increase inventory holding risks,<sup>12</sup> and become less effective in generating prices of both sovereign bonds and other financial assets, such as corporate bonds. On the other hand, ESRB (2018) also claims that with a sufficiently large ESBies market, its liquidity could help to hedge the aforementioned inventory holding risks. Combined with diversification opportunities, the divergence of bid-ask spreads between national and SBBS markets would be reduced.<sup>13</sup> Such positive spillover effects may offset the decrease in the liquidity of sovereign bond markets, but it is unclear yet which effects dominate.

**The size of the ESBies market should be chosen such that they have limited negative effects on sovereign bond market liquidity.** ESRB (2018) caps the market size of ESBies by using the purchase limits of the European Central Bank's Public Sector Purchase Programme (PSPP). The maximum shares of outstanding debt purchased by the PSPP are 33 percent of each member state's eligible debt. To make sure that private issuers keep consistent with the purchasing limits, they should be incorporated into regulatory framework (see discussions in section 2.1). Under such purchase limits, ESRB (2018) finds that a steady-state SBBS market size of 1.5 trillion could have minor effects on national bond market liquidity. Leandro & Zettelmeyer (2018) also introduce two alternative upper bounds based on the principle that enough debt must remain in the market to ensure liquidity: for countries with debt stocks below 400 billion euros, half the debt stock is purchased, while for countries above 400 billion euros, all debt except for a residual 200 billion euros is purchased. Under these purchase rules, they calculate the initial ESBies volume between 2.5 trillion and 3.7 trillion.<sup>14</sup>

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<sup>12</sup> According to Dunne (2018), if there are less orders in smaller sovereign bond markets, or "if orders of a type needed to reduce inventories are inelastic with respect to dealer pricing", then dealers have to hold inventory positions for a longer period, and the issuance costs would rise to keep continuous liquidity.

<sup>13</sup> This argument from ESRB (2018) is based on the analyses from Dunne (2018).

<sup>14</sup> To avoid an over-representation of countries with large debt stock but low credit rating, in Leandro & Zettelmeyer (2018), they also experiment with the introduction of one more constraint: the deviation of the country portfolio weights from the ECB capital keys, expressed using the root mean squared error, is less than or equal to that of the ECB's Public Sector Purchase Programme (namely, 0.93 as of December 2017). Under this constraint, less ESBies are generated, between 2.2 trillion and 2.6 trillion.

## 2.5 Risk sharing

### **The introduction of ESBies does not have to lead to risk sharing between countries.**

According to Brunnermeier et al. (2017), every government remains responsible for its own government debt. This is clearly different from Eurobonds (Brunnermeier et al., 2011), with all members guaranteeing joint bonds. As a result, Eurobonds are sensitive to moral hazard, with one country issuing too many bonds and sharing its risk with other countries (Brunnermeier et al., 2011). Besides, ESRB (2018) states that if there is no demand for junior SBBS (EJBies), no ESBies would be issued; this implies that ESBies would not receive any government guarantees to offer financial sources to repay government debts during a crisis.

### **However, the possibility of risk sharing cannot be completely ruled out with ESBies.**

During a new crisis, if all banks get into trouble when the ESBies lose value, governments may feel compelled to support the ESBies, similar to the support of Greek government debt (which went against the no-bailout clause). Some studies<sup>15</sup> claim that the potential risk sharing is not likely because ESBies are safe under most scenarios, and therefore it is not necessary for governments to intervene. However, analyses from Leandro and Zettelmeyer (2018) show that when a new debt crisis becomes so systemic, ESBies can suffer from sufficiently large and systemic losses, creating pressures to bail out the holders of the assets. The possibility of risk sharing is not ruled out in the current regime either; see the Greek.

## 2.6 EJBies: attractiveness and impacts

**EJBies are attractive for investors who seek higher risks, but the demand for the junior tranche may dry up in a crisis.** Potential investors may include hedge funds, which specialize in high-yield debt (Brunnermeier et al., 2017). Nevertheless, in adverse situations, the demand for the riskier tranche decreases, resulting in lower prices of the EJBies. As a result, capital would shift from EJBies to ESBies, and push up the prices of ESBies. However, since the arbitrage between EJBies and ESBies is not perfect, there is no guarantee that the total market value of senior and junior tranches of SBBS covers the costs of buying the underlying government bonds. As a result, the decreasing demand for the junior tranche will undermine the issuance of ESBies.

**Nevertheless, the risk from a drying-up junior market can be contained.** According to Leandro and Zettelmeyer (2018), a “freeze” risk of the junior market can be minimized if the following conditions are satisfied: 1) sovereign bonds with no primary market access, or no competitive market prices on secondary markets, are not included in the underlying portfolio of ESBies (ESRB, 2018); and 2) the issuers of ESBies are not themselves risky, and 3) sovereigns are prohibited from discriminating against ESBies intermediaries from other creditors in the event of debt restructuring. Furthermore, Leandro and Zettelmeyer (2018) claim that with sufficiently low prices on the junior tranche, there could still be demand for

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<sup>15</sup> See Leandro and Zettelmeyer, 2018.

EJBies. The underlying portfolio of ESBies and EJBies has similar risks with national bonds, but it still promises income stream, and it is cheaper to buy. This should increase demand for both senior and junior tranches, contradicting the assumption that the markets for the junior tranche are “frozen”.

**The issuance of junior tranches of SBBS (i.e. EJBies) will change the supply of higher-risk sovereign debts in different risk buckets.** Leandro and Zettelmeyer (2018) define higher-risk European sovereign debts broadly with five-year expected losses of about 4 percent and higher.<sup>16</sup> They show that the introduction of EJBies would slightly decrease the volume of higher-risk euro area sovereign debt securities. Leandro and Zettelmeyer (2018) further divide higher-risk euro area sovereign debt securities into three “buckets”: with 5-year expected loss rates between 4 to 8 percent, 8 to 14 percent, and above 14 percent. They find a very large increase in the supply of sovereign debt-based securities with 5-year expected loss rates between 4 to 8 percent (competing with Portuguese sovereign bonds), while the supply of sovereign debts in the other two buckets falls.

**Changes in the supply of sovereign debts in specific risk buckets may impose upward pressure on lower-rated countries.** Having found a large increase in the supply of sovereign debt-based securities with 5-year expected loss rates between 4 to 8 percent, Leandro and Zettelmeyer (2018) suggest that this could put additional pressure on bond prices, and drive up borrowing costs for lower-rated countries that already face relatively high spreads. Nevertheless, Leandro and Zettelmeyer (2018) also point out that whether bond prices will be hit also depends on the demand from investors. If more demand for the junior tranches is created after regulatory changes,<sup>17</sup> this might partly absorb the large increase in supply. Besides, if markets for sovereign debt securities across different risk buckets are less segmented (i.e. investors don’t have strong preferences to a particular risk bucket), a higher supply of sovereign debts in a specific risk bucket will not lead to large fluctuations in bond prices.

### 3 Adjustments in regulation

**Under current regulations, banks and insurance companies would not demand ESBies.**

Currently, ESBies are treated unfavorably relative to the underlying portfolio of sovereign bonds, because the feature of subordination of credit risk makes them more comparable with securitized products (ESRB, 2018). As a result, holding ESBies gives rise to higher capital requirements than holding sovereign bonds (both for banks and insurance corporations<sup>18</sup>). In terms of liquidity requirements, ESBies would not qualify as liquid assets under the liquidity coverage ratio (LCR) (ESRB, 2018), while sovereign bonds are listed in

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<sup>16</sup> The sovereign debts with five-year expected losses below 4 percent are considered as safe assets.

<sup>17</sup> See discussions over the regulation treatment on junior SBBS in ESRB (2018).

<sup>18</sup> For insurance corporations, securitizations are subject to capital requirements in the calculation of the Solvency Capital Requirement under the Solvency II standard formula (except for type 1 securitizations guaranteed by the European Investment Bank or the European Investment Fund) (ESRB, 2018).

the category of level 1 liquid asset.<sup>19</sup> Since level 1 liquid asset can be held without cap and is subject to no haircut,<sup>20</sup> sovereign bonds are more appealing than ESBies for banks to hold. Moreover, ESRB(2018) points out that ESBies cannot be used as collateral currently. Although ESBies are similar to asset-backed securities (ABS), the underlying financial assets for ESBies are sovereign bonds, which are not covered in the current collateral framework. Besides, if ESBies would follow the same haircut schedule as for ABS, haircuts for ESBies would be higher than that for government bonds.

**ESBies could be attractive to hold for banks and insurance companies, if current regulations are adjusted to grant ESBies the same favorable treatment as sovereign bonds.** In this principle, the EC's proposal presents a regulatory framework which would enable the demand for SBBSs. It is based on the enabling product regulation presented in ESRB (2018). Some important regulation adjustments in ESRB (2018) include: first, ESBies could have a zero risk weight as sovereign bonds, so that banks will have the same capital requirement by holding ESBies and sovereign bonds.<sup>21</sup> Moreover, analyses from ESRB (2018) show that if the regulatory treatment of sovereign exposures has changed (e.g. applying positive risk weights for sovereign exposures), banks and insurance corporations will find ESBies more attractive than sovereign bonds to hold under the enabling product regulation. Second, just like sovereign bonds, ESBies could qualify as level 1 liquid assets under LCR requirements because they are expected to achieve similar level of liquidity. Third, under the monetary policy collateral framework, if the types of accepted assets underlying ABS could be extended to include sovereign bonds, ESBies would be eligible as collateral. In addition, a less strict haircut schedule could be placed on ESBies.

## 4 ESBies and the shortage of safe assets

The ESBies are proposed mainly for the purpose of increasing the supply of euro-dominated safe assets (ESRB, 2018). This section will describe the demand and supply of safe assets, and analyze whether the introduction of ESBies can increase the supply of safe assets.

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<sup>19</sup> According to ESRB (2018), ESBies are similar to asset-backed securities (ABS), so ESBies may be treated to achieve the same liquidity as ABSs, which are classified as level 2b assets and subject to a 25% minimum haircut under current regulation. However, the underlying financial assets for ESBies are sovereign bonds, which are not included in the list of eligible underlying assets for ABS. Therefore, it is difficult to include ESBies in the current regulation.

<sup>20</sup> <https://www.bis.org/publ/bcbs238.pdf>

<sup>21</sup> While both ESBies and sovereign bonds have zero risk weight, banks may still incline to hold domestic national bonds. To weaken the bank-sovereign nexus and ensure the demand for ESBies, the requirements for holding bonds from the home country would then have to be stricter.

## 4.1 Demand and supply of safe assets

**Safe assets, which have low risk and are liquid, act as the cornerstone for modern financial systems.** From the supply side, the sovereign debts issued or guaranteed by sovereign governments with AAA or AA rating<sup>22</sup> have been a key source of safe assets in global financial markets.<sup>23</sup> The most widely held safe assets are US Treasury bills and bonds. In the euro area, safe assets are primarily supplied by German Bunds, and also include government bonds issued by Netherlands, Luxembourg, Austria and Finland (Brunnermeier et al., 2017). From the demand side, safe assets are used by banks as a store of value and collateral for repo transactions, and to meet capital and liquidity requirements in prudential regulations.

**The global demand for safe assets has been increasing, and this trend is expected to continue.** Sode and Faubert (2013) estimate that between 2007 and 2014, the demand for safe assets is likely to increase by around 4.4 trillion US dollars. Banks, the largest holders of safe assets, need more safe assets to meet the requirements of the Basel III Liquidity Coverage Ratio (LCR) (Brunnermeier et al., 2017). It is currently discussed whether zero risk weights of riskier sovereigns should be removed. If this would occur, demand for the safest sovereign assets would become stronger, since zero risk weighting for sovereign debt biases banks capital adequacy ratios upward (IMF, 2012). Furthermore, the European Markets Infrastructure (EMIR), adopted in 2012, moves the over-the-counter (OTC) derivatives to central counterparties (CCPs), which only accept cash and selected government bonds as safe collateral. The new regulation has fueled the demand for safe assets as collateral. For the insurance companies, ESRB (2018) shows that Solvency II may also boost their demand for highly rated safe assets, since insurance companies' capital requirements would be related to the credit ratings of their asset holdings.

**The global supply of safe assets also increases.** Sode and Faubert (2013) have estimated that the global supply of safe assets increased by around 8 trillion US dollars between end-2007 and end-2014. The estimated increase is mainly driven by an increase in government bond issued in OECD countries (such as the US), although the downgrading of certain large-sized sovereign bonds (notably Italy and Spain) has decreased the supply of safe assets.

**Low yields on safe assets indicate that the increase in the supply of safe assets does not fully satisfy its demand.** Bullard (2017)<sup>24</sup> attributes the low expected natural rate of interests to investors' strong desire for safe assets. Besides, Carbellero et al. (2017) show that the divergence between short-term rates and the expected return on equity has been broadened after 2002, and even further since the beginning of the Great Recession. This

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<sup>22</sup> In Bank of International Settlements (BIS) (2015) ([link](#)), sovereign bonds with credit assessment between AAA and AA have zero weights. Besides, IMF (2012) includes AAA-rated and AA-rated OECD government securities as potentially safe assets.

<sup>23</sup> Safe assets can also be privately issued. In Gorton et al. (2012), privately-produced safe assets take different contractual forms over time, for example, money market mutual funds, commercial paper, high-quality corporate debt, AAA tranches of asset-backed securities (ABS), mortgage-backed securities (MBS) and collateralized debt/loan obligations (CDO/CLO). Our document focuses only on government-issued safe assets.

<sup>24</sup> [https://www.stlouisfed.org/~media/files/pdfs/bullard/remarks/2017/bullard\\_amelia\\_island\\_8\\_may\\_2017.pdf?la=en](https://www.stlouisfed.org/~media/files/pdfs/bullard/remarks/2017/bullard_amelia_island_8_may_2017.pdf?la=en)

imbalance is also analyzed by others.<sup>25</sup> Safe asset scarcity will increase risk premia, and imposes negative macroeconomic effects, pushing the economy into a 'safety trap' (Caballero et al., 2016).

**Demand and supply of safe assets seem to be even more imbalanced in the euro area, where demand has increased but supply declined.** Aggarwal et al. (2017) document that in 2017Q1, the total amount of safe assets in the euro area<sup>26</sup> was 3.48 trillion dollars, only half of its peak value of 6.9 trillion dollars reached in 2009Q2. During this period, the most notable decrease happened in 2012, when the total amount of safe assets fell by about 2.3 trillion dollars. The notable decrease of safe assets in the euro area can be largely attributed to the deterioration of some European countries' fiscal profiles.<sup>27</sup> Meanwhile, Germany, as the primary supplier of safe assets in the euro area, kept its outstanding amount of debt at a stable and even slightly decreasing level. Similarly, Sode and Faubert (2013) estimated that between 2007 and 2014, value losses of government securities from countries most affected by the crisis amounted to 2.4 trillion euros, offsetting newly issued debts from countries with high ratings or from the European Financial Stability Facility. In total, the supply of safe assets falls by less than 100 billion euros. On the demand side, Sode and Faubert (2013) estimated that the demand for safe assets has risen by 1.6 trillion euros between 2007 and 2014, mainly driven by the increase in secured finance transactions, derivative market regulations, the implementation of LCR ratios, and the introduction of Solvency II.

**Overall, safe assets appear to be relatively scarcer in the euro area than on a global scale, and may result in financial instability.** First, US government bonds keep on increasing in the wake of recent fiscal expansions (IMF, 2018), which can be held by banks and other agents in euro area member states as safe assets. However, investors may lose confidence in US treasury bonds once they suspect that they are unsustainable (IMF, 2018). Second, German bunds still serve as a euro-dominated safe assets, but they are projected to be on a downward track (IMF, 2018). Third, ECB also provides safe assets through unconventional monetary policies, but at some point in time, monetary policies will be normalized (CPB, 2018), limiting the supply of safe assets. Finally, recent economic recoveries have improved the fiscal profiles of all euro area countries to a different extent (ECB, 2017), but it is uncertain if and when they regain the position of safe assets suppliers. Therefore, an increased supply of safe assets would benefit the euro area in the long run, and prepare for possible new market turbulence.

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<sup>25</sup> see e.g. Bernanke et al. 2011, and Barclay's 2012, IMF (2012), and Brunnermeier et al. (2017).

<sup>26</sup> Aggarwal et al. (2017) split safe assets into three categories: i) German government bonds (Germany is the largest economy in the euro area and has kept its AAA rating throughout the sample period), ii) non-German government bonds rated AAA or AA+ by Standard & Poor's, and iii) privately-produced safe assets including AAA tranches of structured financial products such as ABS, MBS, and CDO/CLO.

<sup>27</sup> IMF (2012) uses levels of credit default swap (CDS) spreads on sovereign debt as the criterion to exclude certain countries as suppliers of safe assets. Using spreads above 350 basis points at end-2011 as the cutoff, Greece, Hungary, Ireland, Italy, Portugal, Slovenia, and Spain are no longer qualified as suppliers of safe assets. If the cutoff is set with five-year CDS spreads above 200 basis points at end-2011, Belgium, France, Iceland, Poland, the Slovak Republic, and Turkey are also excluded. A large proportion of these countries are euro area member states.

## 4.2 Do ESBies increase the supply of safe assets?

**Simulation analyses suggest that the introduction of ESBies will increase the volume of safe assets in the euro area.** The simulations from Brunnermeier et al (2017) suggest that with a 30% junior tranche and a 70% senior tranche, the creation of ESBies would more than double the *status quo* supply of safe assets. Leandro and Zettelmeyer (2018) document that under different purchasing rules of government debt securities, between 3.8 trillion and 5.6 trillion euros diversified government bonds will be purchased by ESBies issuers. With different ratios of the senior tranche (65.5 to 68.5 percent), between 2.5 trillion and 3.7 trillion euros volume of ESBies will be created.<sup>28</sup> Besides, the EC's proposal shows that AAA-rated safe assets would increase by 30% if the market size of SBBSs reaches the steady-state (i.e. 1.5 trillion euros).

**Simulation analyses also suggest that ESBies can be as safe as AAA-rated bonds in most circumstances.** The safety of ESBies depends on the ratio of the senior to junior tranches. According to Brunnermeier et al. (2017), a higher ratio of junior tranches would result in safer ESBies, but would decrease the volume of ESBies at the same time, which limits the increase of the supply of safe assets. Therefore, the choice of the ratio of the senior to junior tranches should balance between the safety and the volume of ESBies. Simulation analyses from Brunnermeier (2017) and ESRB (2018) indicate that with a 70% senior tranche and a 30% junior tranche, ESBies would be slightly safer than German bunds (with the five-year expected loss rate of ESBies below 0.5 percent) in the benchmark and adverse calibrations. Leandro and Zettelmeyer (2018) compare two standard measures for unexpected losses, the value at risk (VaR) and the expected shortfall (ES), across three proposals of new safe financial instruments – national tranching, E-bonds, and ESBies.<sup>29</sup> At various probability levels (from 5 percent to 1 percent), VaR and ES are generally lower in ESBies than in other proposals in the benchmark calibration.<sup>30</sup> In the adverse calibration with much higher cross-country correlations in default probabilities, ESBies still have lower VaRs at probability levels from 5 percent to 2 percent.

**The safety of ESBies may not be ensured in extreme systemic crises.** In the same aforementioned simulation analyses of Leandro and Zettelmeyer (2018), if tail events occur with probability of 1 percent in the benchmark calibration, 20 to 30 percent of the value of the ESBies would be wiped out, which is higher than the VaRs in the other two proposals. This least likely tail event refers to a catastrophic systemic crisis where all euro area countries rated AA and better default.<sup>31</sup> In this case, any additional default comes fully at the expense of the senior bondholders, and ESBies loss rates rise very steeply. Furthermore, results in

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<sup>28</sup> After excluding 0.8 trillion euros to 1.4 trillion euros German Bund which are used to create ESBies and are no longer available to the public, the net increase in the volume of ESBies would still range from 1.7 trillion to 2.3 trillion euros. If the purchase of government bonds issued by the Netherlands and Luxembourg (which are also AAA rated) are also excluded from the gross increase, the net increase in safe asset volume could be further lower.

<sup>29</sup> Detailed explanations on national tranching and E-bonds can be found in Leandro and Zettelmeyer (2018).

<sup>30</sup> Leandro and Zettelmeyer (2018) find only one exception at probability of 1 percent, where ES in ESBies is about the same with ES in national tranching and E-bonds.

<sup>31</sup> In the adverse situation, the authors introduce four additional contagion assumptions, which stipulate that when Germany, France, Italy, or Spain defaults, so that cross-country correlations in default probabilities will be raised.

Leandro and Zettelmeyer (2018) show that in the adverse calibration, the expected shortfall of ESBies is also generally higher than those of national tranching and E-bonds.

**ESBies may not be rated as safe bonds by rating agencies.** So far only one rating agency, Standard & Poor, has published its rating on the ESBies.<sup>32</sup> In its report, the ESBies are classified as investment-grade bonds (BBB + or BBB-), which is much lower than the AAA rating for safe assets such as German government bonds. The lower rating reflects S&P's concern over low diversification of the sovereign bond portfolio underlying ESBies, and the high correlation of Eurozone sovereign default risk. However, the provisional S&P rating assumes that the portfolio weights are in proportion to the size of the respective sovereign bond markets. Countries with high debt levels would then have higher weights in the underlying portfolio of ESBies<sup>33</sup>, making ESBies less safe. This is not consistent with portfolio construction methods in Brunnermeier et al. (2017), ESRB (2018) or Leandro and Zettelmeyer (2018). Therefore, it is premature to disregard the safety of ESBies on this provisional S&P rating.

## 5 Can ESBies help loosen the government-bank nexus?

**The government-bank nexus is recognized as one of the most important problems of the euro area.** During the crisis, euro area banks, especially those in periphery countries, increased their holdings of their own sovereign's debt (Altavilla et al., 2016). Consequently, a shock to the market value of sovereign bonds causes banks' book and market equity value to fall. This could in turn amplify the initial sovereign risk via two channels. First, due to national governments' implicit guarantees on banks' deposits, home countries will save banks when they are in serious problems. This channel could be weakened by the bail-in system, but it has not been sufficiently tested (CPB, 2018). Second, in response to the increase in leverage, banks will reduce loans to firms and households (Altavilla et al., 2016), ensuing credit crunch which reduces economic activity.

**With high diversification of the underlying sovereign bond portfolio, ESBies can weaken the bank-sovereign nexus by reducing concentration and home-bias of banks' domestic sovereign bonds holding.** This is illustrated by a theoretical model in Brunnermeier et al. (2016). The probability of sovereign defaults is reduced by more diversified banks' sovereign portfolios. The diabolic loop can be avoided if banks are adequately capitalized. At lower levels of bank equity, the possibility of a diabolic loop can still be avoided if banks hold ESBies.

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<sup>32</sup> [https://www.politico.eu/wp-content/uploads/2017/05/2017\\_04-How-we-would-rate-ESBies.pdf](https://www.politico.eu/wp-content/uploads/2017/05/2017_04-How-we-would-rate-ESBies.pdf)

<sup>33</sup> For example, S&P(2017) assumes that Italian sovereign bonds would account for 27.6% of the underlying portfolio of ESBies, which is higher than the proposed portfolio weights indicated in Table 2.1.



**However, ESBies are complicated and there are other options to reduce the interconnectedness between banks and governments.** Two alternatives are the introduction of risk weights or the setting of government bond limits on bank balance sheets.<sup>34</sup> Simulations from Soederhuizen and Teulings (2018) show that the application of risk weights would moderately affect the capital position of banks, while setting concentration limits (e.g. 50 percent) would force banks to sell off great amounts of their sovereign debt exposure. Compared with these alternatives, the introduction of ESBies results in major adjustments in the composition of banks' balance sheets. Note that in the same period the ECB might shorten its balance sheet (CPB, 2018). This is risky, if the demand for some bonds is not enough to absorb supply.

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<sup>34</sup> See more discussions in the special topic in EMU (CPB, 2018).

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