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## **Astratto**

Durante l'ultima decade si è acceso il dibattito sull'adozione da parte dei paesi dell'eurozona di un asset sicuro, che indebolisse quel "diabolic loop" che partendo dal settore bancario e dal legame banche/stati sovrani si propaga a tutto il settore finanziario. Questa tesi mira a descrivere uno strumento chiamato European Safe Bonds, ideato da Brunnermeier e coautori, che si propone come asset sicuro allo scopo precitato di indebolire il legame esistente tra sistema bancario e stati sovrani. La descrizione avviene sia da un punto di vista qualitativo/quantitativo, sia nell'ottica dei proponenti di questo strumento, che ne esaltano le qualità sia in quella di coloro che lo criticano. Il risultato raggiunto è che gli European Safe Bonds sono sicuramente degli ottimi candidati a diventare un asset sicuro Europeo, ma necessitano sicuramente di riforme che gli accompagnino al loro scopo.

## INTRODUCTION

The creation of the Euro has been remarked by many as one of the biggest political achievement ever. To complete the integration process during the first 20 years of common currency, many reforms have been implemented, as well many other countries started joining the common currency. After the quiet of the early years, since 2008 Euro started to face many challenges, that could lead it to the end of the common currency: the financial crisis of 2008, the sovereign debt crisis of 2011, and nowadays the crisis due to coronavirus. From these difficulties it has always appeared that the toolkit of Eurozone has been not enough to face these challenges, and it will likely continue to be so also in the future.

From the “financial” side of the crises arose the fragility of banking sector inside the Eurozone. This fragility lead to the so called “diabolic loop” during crises. If “diabolic loop” persists, government act with massive bail-out to save banks, both during crises and in subsequent years after they occurred, as in the case of Italy (see Chapter 1).

The paper provides a description of an instrument that, if implemented, could help to weaken the crises in the future, the European Safe Bonds (ESBies). This instrument would act principally with the purpose to mitigate the fragility of banking sector. In fact, ESBies, would be high-liquid safe assets. They also would increase the supply of safe assets for the banking sector, becoming a substitute of sovereign bonds inside banks’ balance sheets (see Chapter 2).

However, ESBies would not be efficient per se if implemented alone. It requires an articulated process of creation as well as accompanying reforms of banking sector and financial system (see Chapter 3).

Chapter 4 and 5 of this paper will provide some alternatives and criticisms to ESBies. In fact, since ESBies has not been implemented yet, it is difficult to evaluate its true effectiveness ex ante and other proposals for a safe asset have been done during the years.

## CHAPTER 1: LOOP BETWEEN BANKS AND SOVEREIGNS

Eurozone has met two crucial periods of financial instability during the first two decades: the first was due to the financial crisis of 2007/2008, the second was a direct consequence of the former, i.e. the sovereign debt crisis of some of peripheral eurozone's countries during 2011/2012. These two periods showed there exists a very important and dangerous link between sovereigns, financial system and the banking system. As we saw, the nexus between sovereign and banks can lead to a vicious cycle, also called "diabolic loop" (Brunnermeier et al., 2011). Diabolic loop becomes much more dangerous the more banking system holds sovereign bonds of the countries in trouble. It does not matter from where the crises are triggered, whether from financial sector or from the domestic economy. What really matters is that these crises could require, at the end, the governments intervention to bail out the suffering banks and recapitalize them if they are large enough to threaten wide systemic risk, i.e. the risk of interbank contagion<sup>1</sup>. To recapitalize banks, sovereigns need to raise funds. They have two options to do so: higher taxation or issuing public debt (Acharya et al., 2013). During crises governments preferred the second option. In fact, recapitalize banks through higher taxation or cut on public expenditures would not be the best solution because it could be distorting for their economies. By issuing public debt, the creditworthiness of the governments risk deteriorating rapidly, especially for those countries not economically and financially stable (with low growth rate, high debt/GDP ratio, low rating on public debt<sup>2</sup>). Deterioration on sovereign's creditworthiness leads to higher stress on their public debts in financial markets: this is reflected in an increase in the "spread" on their CDS. This causes, as consequence, the creditworthiness deterioration of banks, that usually hold a huge amount of domestic sovereign bonds. During crises, banks prefer to hold claims on their own sovereign especially for those called "vulnerable" countries, whose bonds yields are high as shown in Figure 1 (Altavilla et al., 2017). This creates the diabolic loop, that tends to reinforce by itself.

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<sup>1</sup> The interbank market exposes the system to a coordination failure even if all banks are solvent through three channels: the payments system, the interbank market, and the market for derivatives (Freixas et al., 2000).

<sup>2</sup> Lower rating on public debt means higher expected loss for that debt. This implies higher interest rate required in the market.

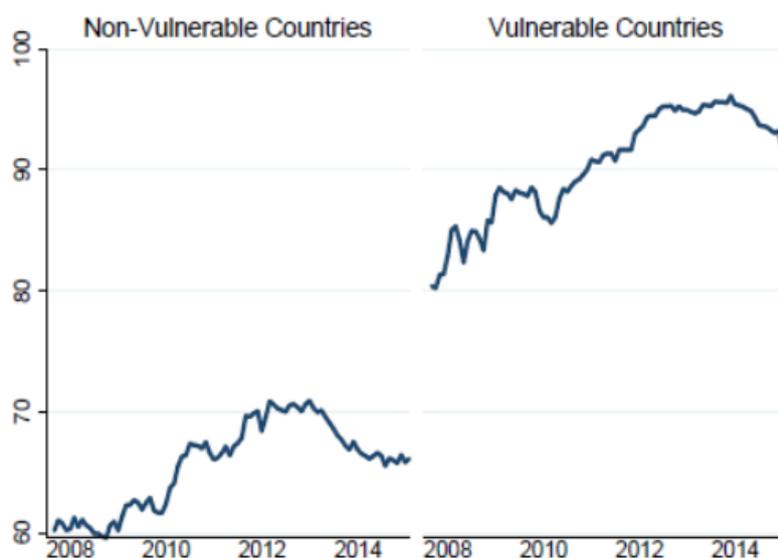


Figure 1. Median domestic sovereign exposure of head banks. Domestic sovereign exposure is the ratio between domestic sovereign debt holdings/main assets. Banks of vulnerable countries held in their balance sheets a relative higher amount of domestic exposures with respect to banks of non-vulnerable countries in 2008-2014 period. The amount of domestic sovereign exposures held increased rapidly during crises of 2008 and 2011/2012. Source: Altavilla et al. (2017).

Given the framework described above, it is quite clear that Eurozone would be unprepared in the eventuality of another deep crisis.

### *THE NEED OF A COMMON SAFE ASSET*

A first problem that can be argued regarding the holding of sovereign bonds by banks is the actual scarcity of safe assets within the Eurozone, as well as at global level.

The relative supply of safe assets has fallen to unprecedented levels over the past years (Giudice, 2019). This is due to a double aspect. The first regards the European supply of sovereign assets: it has relative decreased due to the downgrading that certain sovereign bonds have received so far<sup>3</sup>. The second regards the global supply: the increase in global GDP over the past years has been led mainly by the growth of China and India. Both these countries do not supply AAA securities. In 2018, AAA sovereign bonds in Eurozone represented 22% of Euro area GDP, a huge decrease from 52% reached in 2010 (Figure 2), and global AAA sovereign bonds 30% of world GDP (it was 44% in 2004, Figure 3). Nowadays just three Euro area countries (Germany, Netherlands and Luxembourg) are rated triple-A.

<sup>3</sup> Italy, that is the one of the main suppliers of sovereign bonds (due to high relative weight in the Eurozone GDP and due to the high level of debt/GDP ratio) was rated AA by Moody's in 2010. In 2017 Italy was rated BBB.

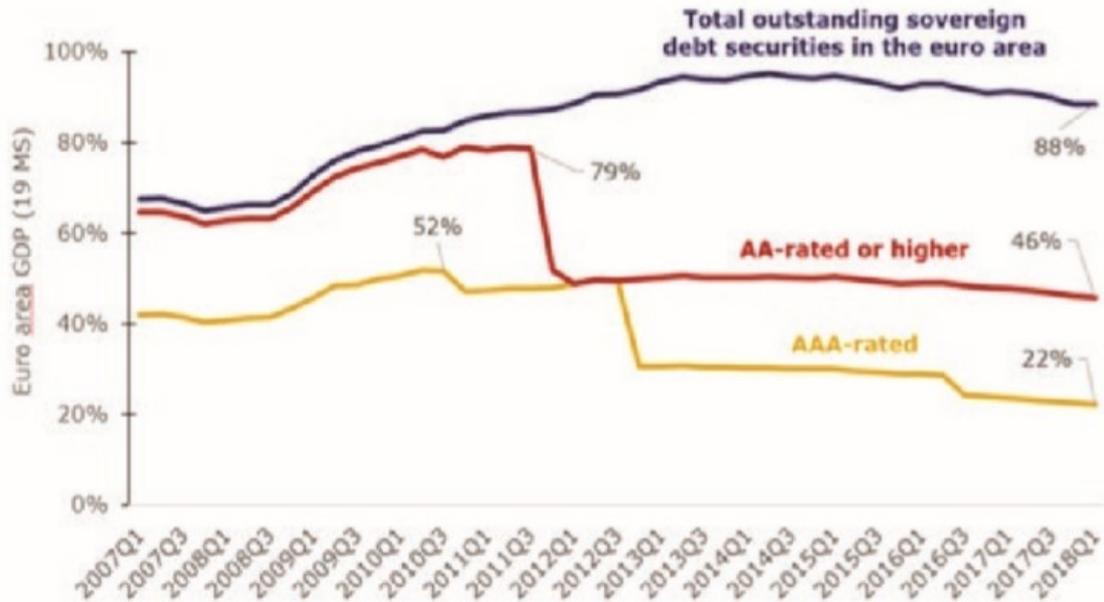


Figure 2. Graphic represents the total European relative (relative with respect to the Eurozone’s GDP) supply of sovereign debt securities, the total supply of AA-rated (or higher) securities, the AAA-rated securities from 2008 to 2018. While the total supply has increased (from about 70% to 88%), the supply of AA/AAA assets has decreased (from 79% to 46%). Source: Giudice (2019).

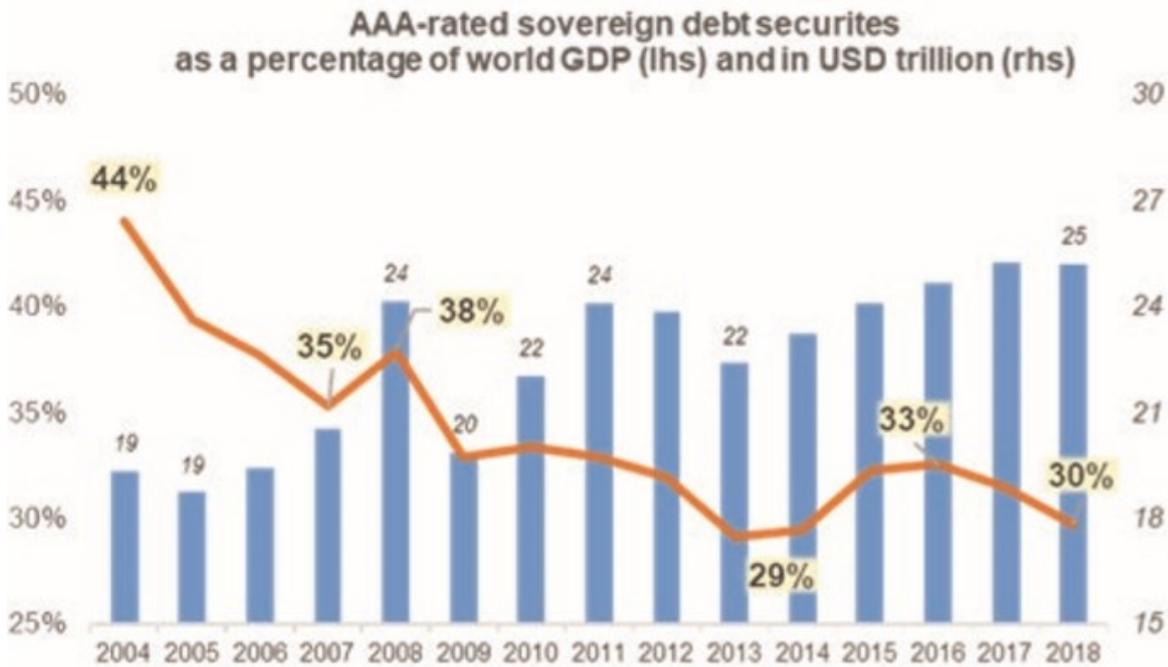


Figure 3. Global supply of AAA-rated sovereign debt securities in relative terms (red line, left scale) and in absolute terms in USD (blue bars and right scale) during period 2004-2018. Source: Giudice (2019).

Why should banks hold any government debt securities? One key reason is regulation (Gros, 2019). Banks must hold a remarkable amount of government bonds in their balance sheets in order to respect the “liquidity coverage ratio” (LCR). This requires banks to have enough “High Quality

Liquid Assets” (HQLA)<sup>4</sup>. To respect LCR, banks could use potentially any asset, which can be fast converted into cash. With the existing regulation framework, the first candidate for this purpose are the sovereign bonds. This because they are considered “level 1”<sup>5</sup> despite they are not all riskless (Gros, 2019). Euro area banks hold 1.9 trillion of euro sovereign bonds (in particular, peripheral countries hold huge amount of domestic bonds as seen in Figure 1) and this could easily trigger a new diabolic loop in the rise of a new crisis. This is one of the main reasons why Eurozone would need a common safe asset.

The purpose of its introducing is to make Eurozone banks safer, not only individually but at the systemic level as well. Safe asset would be the principal tool in order to guarantee no stress on banks and consequently systemic level as seen above during crises. The existence of an area-wide low-risk asset could contribute to financial stability.

#### *A POSSIBLE SOLUTION: AREA-WIDE LOW-RISK ASSET*

Area-wide low- risk assets nowadays are considered one of the most interesting and feasible solutions for a common safe asset (Pedersen, 2019). The main features of this type of assets would be the following: high liquidity, low volatility and minimal credit risk, especially during periods of stress in financial markets. These assets would not entail any debt mutualization<sup>6</sup> and their safety rely to the processes of “pooling” and “tranching” via financial engineering as in securitization process<sup>7</sup>. A proposal for Area-wide low-risk asset was given primarily by Brunnermeier et al. (2011), with the “European Safe Bonds” (ESBies). ESBies are considered the most developed proposal for a Eurozone safe asset (Pagano, 2019). Their proposal has been updated recently when in 2018 European Commission commissioned European Systemic Risk Board (ESRB) to create a High-Level Task Force on Safe Assets: they proposed the Sovereign bond-backed securities (SBBS), the “implementation” of ESBies (Pagano, 2019).

SBBS are securities backed by a diversified portfolio of euro area government bonds. SBBS are created with a process of pooling and tranching. The “pooling” process permits to diversify the idiosyncratic risk, the “tranching” one permits issue of prioritized claims (prioritized in how they absorb losses from the underlying portfolio). The most important feature that makes this structure interesting is the imperfect correlation of the underlying bonds. The underlying portfolio of SBBS would be formed by euro-denominated government bonds. The proportion of government bonds

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<sup>4</sup> HQLA should be at least enough to survive a 30-day stress period (Pohl, 2017).

<sup>5</sup> Level 1 assets are assets that have a regular mark to market mechanism for setting a fair market value. For this reason, they are high liquid assets.

<sup>6</sup> Their issuance would adhere to the “no bailout” and no monetary financing clauses of the EU Treaty.

<sup>7</sup> See Coval et al. (2009).

into the portfolio should be based on the ECB capital participation (Figure 4). This would reflect the UE member states' economic importance.

**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 PSCP 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.

Figure 4. Economic weight of each country inside Eurozone, by using ECB capital key and the eventual proportion of sovereign debt inside SBBS. Source: ESRB (2018).

The bonds which compose the portfolio would be purchased at market price: this should ensure a pricing relation between the underlying pool and all the securities in the same portfolio (the tranches). The second step is tranching. Tranches should have different seniority. The securities would be composed as follow: 70% by Senior bonds, 20% by Mezzanine, 10% by Junior bonds. Junior bonds would be the riskier and they would bear the first eventual loss (according to

simulations conducted by ESRB, 2018, they would be comparable to higher-risk euro area sovereign bonds). Senior bonds are the low-riskier bonds and they would have an expected loss rates like German sovereign bonds (ESRB, 2018). Mezzanine bonds would have risk features like Junior bonds, but they would bear losses after the latter.

The main purposes of these assets are the following: to eliminate the diabolic loop, to avoid the so called “flight to safety”, and to enlarge the supply of safe assets in Europe (Brunnermeier et al., 2017).

## CHAPTER 2: EUROPEAN SAFE BONDS

### *STRUCTURE OF EUROPEAN SAFE BONDS*

ESBies, as proposed by Brunnermeier et al. (2011) and Brunnermeier et al. (2017) need the following features to be effective: diversification and seniority (they would follow the same scheme used in the construction of CDOs).

The first stage is the “pooling”: a public or private institution purchase a portfolio of sovereign bonds issued by euro area states. Pooling would ensure risk diversification (Langfield, 2019). The volume of single state asset purchased should reflect its economic weight inside the euro area. For Brunnermeier et al. (2017) the best indicator for this purpose is the countries’ relative GDP<sup>8</sup>.

The second stage is the “tranching”: the entity issues two different type of securities, the senior tranche, the ESBies, and the junior tranche, the EJBies. The junior tranche is the subordinated one and its subordination level is 30% (called 70-30 scheme) of the previous pool<sup>9</sup>. For “subordination level” is meant the relative volume (relative with respect the overall issuance) of the junior tranche. Different seniority is the principal element to the safety of ESBies (Brunnermeier, 2017).

Figure 5 shows the stylized balance sheet of the entity in charge of issuing the securities.

Assets	Liabilities
Diversified portfolio of sovereign bonds	Senior Bonds (ESBies)
	Junior Bonds (EJBies)

Figure 5. The sum of ESBies and EJBies is equal to the face value of the purchased assets. Source: Brunnermeier et al. (2017).

### *SIMULATIONS WITH ESBies*

In 2017 Brunnermeier et al. conducted a quantitative simulation to test the properties of the ESBies under a benchmark scenario and an adverse scenario.

<sup>8</sup> The relative weight of national GDP with respect to whole Eurozone GDP was calculated over period 2010-2014.

<sup>9</sup> The main difference with respect to the SBBS of ESRB (2018) is the lack of the “mezzanine” tranche.

For each scenario they compared, in term of five-year expected loss rate and volume of safe assets supply, four different cases:

- Status quo: each country issues its own sovereign bonds, without pooling and tranching.
- National tranching: each country issues its own sovereign bonds. Bonds are then tranching into senior and junior tranches.
- Pure pooling: eurozone sovereign bonds are pooled. The weight considered is the same considered for the ESBies.
- Pooling and tranching: the pooled portfolio as seen above is tranching into the senior tranche (ESBies) and the junior tranche (EJBies).

The simulation needs a stochastic model of default and a distribution of loss-given default (LGD) rates for each euro area sovereign as inputs. They have been assumed as given. The model used is a two-level hierarchical model.

In the first hierarchical level they considered the aggregate state of eurozone's economy. They simulated 2,000 five-year periods and each of these can take one of the following values:

- State 1 - severe recession. In this state LGD is very high for each nation and it is positively correlated with the credit rating of these<sup>10</sup>.
- State 2 - mild recession. In this state the LGD are equal to the 80% of the loss-given default in the previous case.
- State 3 – the economy expands. In this state the LGD are equal to the 50% of those during severe recession.

In the model the good state occurs 70% of the whole time, mild recession 25% of the time and severe recession 5% of the time. Data on credit ratings, probability of default (PD) and LGD (five-year loss given default) for each euro area member, as well as their relative GDP and debt/GDP ratio are summarized in Figure 6.

In the second hierarchical level they considered the possible default of each eurozone sovereign. For every five-year period, conditional on the aggregate state in that period<sup>11</sup>, they took 5,000 draws of the sovereigns' stochastic default process. The random variable that determines whether a nation defaults, is assumed to have Student-t distribution with 4 degrees of freedom. Brunnermeier et al. considered a Student-t distribution because with this distribution is more likely for a sovereign to make a default with respect to a Normal distribution.

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<sup>10</sup> National rating is calculated as average of credit rating issued by Moody's and Standard and Poor's in December 2015. It is available on column (1) of Figure 6. Credit rating corresponding to AAA is signed with the number 1. Higher number corresponds to lower sovereign credit rating.

<sup>11</sup> State 1, state 2, state 3 seen in the first hierarchical level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Rating	Debt/GDP	Weight	pd1	pd2	pd3	lgd1
Germany	1	71	28.16	5	0.5	0	40
Netherlands	1	65	6.61	10	1	0	40
Luxembourg	1	21	0.18	10	1	0	40
Austria	1.5	86	3.21	15	2	0	45
Finland	1.5	63	2.02	15	2	0	45
France	3	96	21.25	25	3	0.05	60
Belgium	3.5	106	3.93	30	4	0.1	62.5
Estonia	4.5	10	0.03	35	5	0.1	67.5
Slovakia	5	53	0.66	35	6	0.1	70
Ireland	6.5	94	1.80	40	6	0.12	75
Latvia	7	36	0.17	50	10	0.3	75
Lithuania	7	43	0.25	50	10	0.3	75
Malta	7.5	64	0.07	55	11	0.4	78
Slovenia	9	83	0.37	60	15	0.4	80
Spain	9	99	10.77	60	15	0.4	80
Italy	9.5	133	16.52	65	18	0.5	80
Portugal	12	129	1.77	70	30	2.5	85
Cyprus	13.5	109	0.19	75	40	10	87.5
Greece	19	177	2.01	95	75	45	95
Average	4.58	91		31.30	8.07	1.12	59.47

Figure 6. In column (1) are reported average credit ratings in 2010-2014 of Eurozone's members. In column (2) there are their respective debt/GDP ratio and in column (3) their relative economic weight in Eurozone (computed as domestic GDP/Eurozone's GDP). In column (4), (5), (6) are given their five-year probability of default for each state (recession, mild state, good state). In column (7) is given their loss given default (LGD) in state 1. LGD for state 2 and state 3 are calculated respectively as  $0.8 \cdot \text{LGD}_1$  and  $0.5 \cdot \text{LGD}_1$ . Source: Brunnermeier et al. (2017).

## BENCHMARK SCENARIO

In the simulation of benchmark scenario Brunnermeier et al. aim to underline differences in term of five-year expected loss rate on different securities and the total economy-wide volume of safe debt for the four different cases as described above. Countries are expected to have a certain degree of default correlation each other's, as shown in Figure 7.



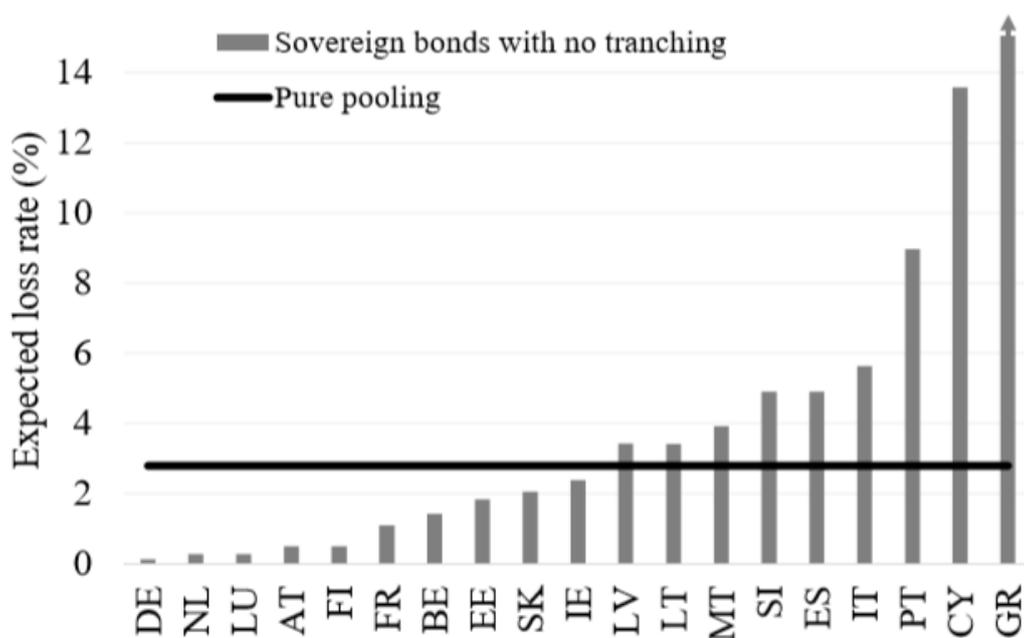


Figure 8. Status quo and pure pooling. Source: Brunnermeier et al. (2017).

Figure 9 compares *national tranching* and *pooling and tranching (ESBies)* in terms of five-year expected loss of the senior tranches. In the horizontal axis are represented the subordination levels, i.e. the relative weight of the junior tranche in the overall issuance. In the vertical axis is represented the five-year expected loss for Germany, France, Spain, and Italy (the four biggest economies of Eurozone), as well as the five-year expected loss for ESBies' senior tranches in correspondence to each subordination level<sup>13</sup>. With *national tranching*, the decrease in five-year expected losses rate is minimal<sup>14</sup> (except for Germany, that also without tranching reaches the safety threshold of 0.5%). ESBies with no tranching has a high five-year expected loss of 2.79% (very high compared to German's and French), i.e. the same we would have in the case of *pure pooling* (Figure 8). With subordination level at 20% ESBies would reach the "safety threshold" with a five-year expected loss below 0.5%. With subordination level at 30%, i.e. the same tranching rate supposed at the beginning as "base case", the five-year expected loss rate falls to 0.09%, below the German one in the case of "no tranching", that is 0.13%.

<sup>13</sup> When the subordination level is 0% it corresponds to *status quo* and pooled security correspond to *pure pooling* of Figure 8.

<sup>14</sup> Figure 10 shows five-year expected loss in detail for each country at each subordination level.

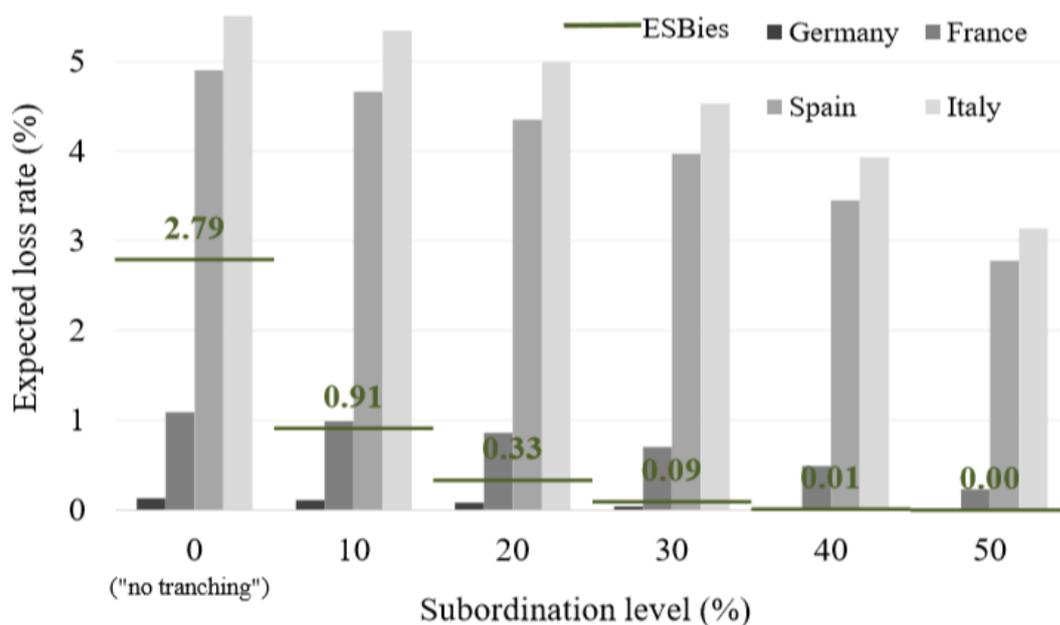


Figure 9. Nationals' senior tranching and ESBies. Figure shows for each subordination level, the five-year expected loss for the senior tranche in case of national tranching and pooling and tranching (ESBies). In case of pooling and tranching it would decrease quickly below the safety threshold of 0.5. Instead, for national tranching the decrease would not equally quick. Source: Brunnermeier et al. (2017).

Figure 10 reports each nation's five-year expected loss rate for the senior tranches in correspondence of each level of subordination (included the ESBies at the bottom). In order to reach the safety threshold, France would need a subordination level at 40% (the five-year expected loss would fall to 0.49%), Italy, as well as Spain, would need a tranching at 80% to fall below 0.5% in five-year expected loss for the senior tranche. Therefore, ESBies would decrease their five-year expected loss more rapidly than sovereign bonds with *national tranching*, increasing the subordination level.

Brunnermeier et al. (2017) in their simulations found that ESBies would even reach a five-year expected loss of 0.5% with a subordination level of 16%, in the benchmark scenario.

Moreover, with respect to each level of subordination tranche, Brunnermeier et al. calculated the amount supplied of safe assets. Results are shown in Figure 11. In the securitization sovereign supply simulation, they included bonds up to 60% of national GDP<sup>15</sup>, resulting to be €6.06tn, using 2014 GDP.

At *status quo*, only German, Dutch, Luxembourgish, Austrian and Finnish bonds are safe, and the resulting safe assets supply would be equal to €2.43tn.

<sup>15</sup> 60% of GDP is taken according to the actual European fiscal rules (expected from Stability and Growth path, 1997) for which national debt/GDP ratio should be equal or lower than 60%.

<b>Subordination</b>	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%
Germany	0.13	0.11	0.08	0.04	0.00	0.00	0.00	0.00	0.00	0.00
Netherlands	0.27	0.22	0.15	0.07	0.00	0.00	0.00	0.00	0.00	0.00
Luxembourg	0.27	0.22	0.15	0.07	0.00	0.00	0.00	0.00	0.00	0.00
Austria	0.50	0.42	0.32	0.19	0.06	0.00	0.00	0.00	0.00	0.00
Finland	0.50	0.42	0.32	0.19	0.06	0.00	0.00	0.00	0.00	0.00
France	1.09	0.99	0.86	0.70	0.49	0.23	0.00	0.00	0.00	0.00
Belgium	1.42	1.29	1.14	0.94	0.69	0.34	0.09	0.00	0.00	0.00
Estonia	1.83	1.70	1.53	1.32	1.05	0.67	0.30	0.00	0.00	0.00
Slovakia	2.05	1.91	1.74	1.52	1.23	0.83	0.40	0.00	0.00	0.00
Ireland	2.38	2.25	2.09	1.88	1.61	1.24	0.68	0.30	0.00	0.00
Latvia	3.42	3.22	2.97	2.65	2.24	1.68	0.85	0.38	0.00	0.00
Lithuania	3.41	3.21	2.96	2.64	2.23	1.68	0.85	0.38	0.00	0.00
Malta	3.92	3.72	3.46	3.13	2.70	2.14	1.30	0.67	0.00	0.00
Slovenia	4.90	4.65	4.35	3.96	3.45	2.78	1.77	0.91	0.00	0.00
Spain	4.90	4.66	4.35	3.97	3.45	2.78	1.77	0.91	0.00	0.00
Italy	5.63	5.34	4.99	4.53	3.93	3.14	1.97	0.98	0.00	0.00
Portugal	8.97	8.52	7.95	7.23	6.26	5.16	3.62	1.59	0.80	0.00
Cyprus	13.58	12.75	11.70	10.35	8.56	6.90	5.06	1.99	1.28	0.00
Greece	34.16	31.80	28.85	25.06	20.01	14.47	11.92	7.67	3.24	2.16
<b>Pooled</b>	<b>2.79</b>									
<b>ESBies</b>		<b>0.91</b>	<b>0.33</b>	<b>0.09</b>	<b>0.01</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>

Figure 10. It shows the five-year expected loss in correspondence of each subordination level for each country's sovereign bonds (i.e. in case of national tranching) and ESBies. Source: Brunnermeier et al. (2017).

With *pure pooling* we would have no safe assets because its five-year expected loss would be 2.79% as seen before (Figure 8). Increasing the level of subordination there would be an initial reduction in the supply of safe assets. This is due to the double effect triggered by tranching. The first is that tranching increases supply because the senior tranche of additional nation-states may become safe (for instance in the case of 10% subordination level no more nation's senior bonds supply becomes safe). The second is that the increasing subordination level reduces the supply of senior asset<sup>16</sup>.

<sup>16</sup> For a given amount of sovereign bonds, if they are divided into two tranches (junior and senior), increasing the relative size of a tranche makes decrease the relative size of the other tranche.

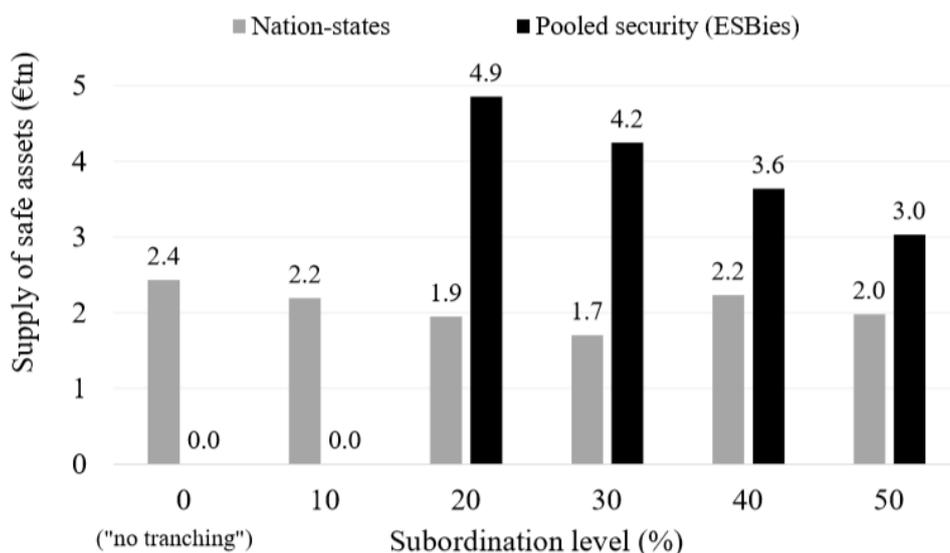


Figure 11. The supply of safe asset in correspondence of each subordination level, in case if national tranching (sum of all Eurozone safe assets) and ESBies. Source: Brunnermeier et al. (2017).

In Figure 11 it can be seen that the second effects dominate up to 40% of subordination level (for *national tranching*), i.e. when French sovereign bonds become safe (as seen in Figure 10), then there is a little increase in the safe supply but always lower than the “*status quo*” (€2.2tn against €2.43tn): therefore, the latter would be preferable to the former, if the main purpose of policymakers is to maximize the supply of safe assets within the Eurozone.

Figure 11 shows that by *pooling and tranching* the supply of safe assets would be higher than *national tranching*. In fact, at subordination level of 20% ESBies would be considered safe and their total amount would be approximately equal to €4.9tn. At subordination level of 30% (the “base case” level) their supply would be equal to €4.2tn, with a five-year expected loss of 0.09%. So, at this level ESBies would supply more than double of German sovereign bonds at *status quo*, with a huge increasing in the total supply of safe assets. Moreover, ESBies would also be safer than German Bund because their five-year expected loss would be lower (0.09% against 0.13%).

#### *BENCHMARK SCENARIO: PROPERTIES OF EJBies*

In benchmark scenario, with the 70-30 scheme, EJBies plays an important role. The subordinated tranche should bear the first loss in case of any sovereign default or any other losses during period of stress in the financial market. This makes them riskier than ESBies. Figure 12 shows, for each subordination level, the five-year expected loss of nationals’ junior tranching and EJBies.

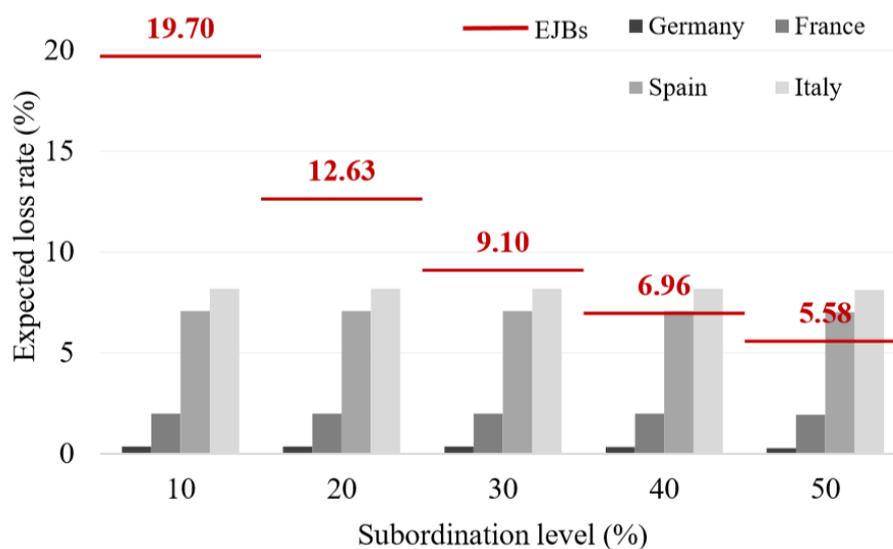


Figure 12. Nationals' junior tranching and EJBies. Figure shows for each subordination level, the five-year expected loss for the junior tranche in case of national tranching and pooling and tranching. Source: Brunnermeier et al. (2017).

Increasing the subordination level, the five-year expected losses of EJBies would fall dramatically, because default risk would be borne by a larger amount of assets in the junior portfolio. For *national tranching* there is not the same evidence. Figure 13 reports each nation's five-year expected loss rate for the junior tranches in correspondence of each subordination level (included the EJBies at the bottom). At the subordination level of 30%, according to the "base case", the five-year expected loss for EJBies would be equal to 9.10%<sup>17</sup> with an amount of €1.82tn. This is slightly higher than five-year expected loss of Portuguese sovereign bonds at *status quo*. EJBies therefore would be relative risky assets, with respect to both ESBies and others sovereign bonds in *status quo* (all Eurozone's sovereign bonds except for Greece and Cyprus). For this reason, they should be kept outside the banking system.

<sup>17</sup> It corresponds to the five-year expected losses of countries with a credit rating between BB and BBB.

<b>Subordination</b>	10%	20%	30%	40%	50%	60%	70%	80%	90%
Germany	0.36	0.36	0.36	0.34	0.27	0.22	0.19	0.17	0.15
Netherlands	0.73	0.73	0.73	0.67	0.54	0.45	0.38	0.34	0.30
Luxembourg	0.72	0.72	0.72	0.67	0.54	0.45	0.38	0.33	0.30
Austria	1.22	1.22	1.22	1.17	1.00	0.84	0.72	0.63	0.56
Finland	1.22	1.22	1.22	1.17	1.00	0.84	0.72	0.63	0.56
France	1.99	1.99	1.99	1.98	1.94	1.81	1.55	1.36	1.21
Belgium	2.52	2.52	2.52	2.50	2.49	2.30	2.02	1.77	1.57
Estonia	3.02	3.02	3.02	3.01	3.00	2.85	2.62	2.29	2.03
Slovakia	3.29	3.29	3.29	3.29	3.27	3.16	2.93	2.57	2.28
Ireland	3.53	3.53	3.53	3.53	3.51	3.50	3.26	2.97	2.64
Latvia	5.21	5.21	5.21	5.19	5.16	5.13	4.72	4.28	3.80
Lithuania	5.19	5.19	5.19	5.17	5.14	5.11	4.70	4.26	3.79
Malta	5.76	5.76	5.76	5.75	5.70	5.66	5.31	4.90	4.36
Slovenia	7.07	7.07	7.07	7.07	7.02	6.98	6.60	6.12	5.44
Spain	7.07	7.07	7.07	7.07	7.02	6.98	6.61	6.12	5.44
Italy	8.18	8.18	8.18	8.18	8.12	8.07	7.62	7.04	6.25
Portugal	13.03	13.03	13.03	13.03	12.78	12.53	12.13	11.01	9.96
Cyprus	21.11	21.11	21.11	21.11	20.26	19.26	18.55	16.66	15.09
Greece	55.39	55.39	55.39	55.39	53.85	48.99	45.51	41.89	37.72
<b>EJBies</b>	<b>19.70</b>	<b>12.63</b>	<b>9.10</b>	<b>6.96</b>	<b>5.58</b>	<b>4.65</b>	<b>3.99</b>	<b>3.49</b>	<b>3.10</b>

Figure 13. It shows the five-year expected loss in correspondence of each subordination level for each country's junior sovereign bonds (i.e. in case of national tranching) and EJBies. Source: Brunnermeier et al. (2017).

Brunnermeier et al. did not foresee a third tranche, between the senior and the junior tranche, what ESRB (2018) called “mezzanine” tranche. However, in Brunnermeier et al. (2017) was briefly considered the possibility for a third tranche.

The junior tranche would be divided into two sub-tranches: a first-loss “equity” and a mezzanine<sup>18</sup>. They simulated three cases:

- First case: half of junior debt is issued as mezzanine tranche and the other half as equity tranche (70-15-15 scheme). In this case, according to their simulation, mezzanine tranche would have a five-year expected loss rate of 2.68% since the equity tranche has 15.52%.

<sup>18</sup> Mezzanine would bear losses after the first-loss equity.

- Second case: 10% mezzanine tranche and 20% in equity tranche. In this case mezzanine would have an expected loss rate of 2.4% (like expected loss of Ireland in *status quo*).
- Third case: 5% mezzanine tranche, 25% equity tranche. In this case mezzanine would have an expected loss rate of 1.54% (like expected loss of Belgium in *status quo*).

## ADVERSE SCENARIO

In adverse scenario, Brunnermeier et al. assumed default correlation among countries to be much stronger than the one in benchmark scenario. This was done to show the very effectiveness and good properties of ESBies also when stressed by a catastrophic economic phase. To prove so, they added further assumptions to the previous model:

- First. When Germany defaults, other countries have 50% of probability to default.
- Second. When France defaults, other countries have 40% of probability to default, except the five triple-A rated nations<sup>19</sup> that have 10%.
- Third. When Italy defaults, the five triple-A nations have 5% of probability to default, France, Belgium, Estonia have 10%, the others have 40%.
- Fourth. When Spain defaults, the five triple-A nations have 5% of probability to default, France, Belgium, Estonia have 10%, the others have 40%.

All data of cross-country correlation are summarized in Figure 14: they are higher with respect to benchmark scenario.

Figure 15 shows the new changes in the national tranching (senior and junior), as well as in the ESBies and EJBies, in term of five-year expected loss.

The most important change with respect to benchmark scenario, is that only German sovereign bonds, in this case, would continue to be considered safe at *status quo* (five-year expected loss of 0.4%), while sovereign bonds of all the other former triple-A rated countries would no longer be considered safe. The total supply of euro area safe asset in *status quo* would stop at €1.7tn, lower than €2.4tn seen with benchmark scenario. With *pure pooling*, without tranching, ESBies would have a five-year expected loss of 3.84%, much higher than before.

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<sup>19</sup> Germany, Netherlands, Luxemburg, Austria, Finland.



Subordination Tranche	0%	10%		20%		30%		40%		50%	
		S	J	S	J	S	J	S	J	S	J
Germany	0.50	0.40	1.43	0.27	1.43	0.11	1.42	0.00	1.26	0.00	1.01
Netherlands	0.69	0.55	1.94	0.38	1.94	0.16	1.93	0.00	1.73	0.00	1.38
Luxembourg	0.69	0.55	1.94	0.38	1.94	0.16	1.93	0.00	1.73	0.00	1.38
Austria	0.96	0.80	2.41	0.60	2.41	0.35	2.40	0.09	2.27	0.00	1.93
Finland	0.96	0.80	2.41	0.60	2.41	0.35	2.40	0.09	2.27	0.00	1.93
France	1.94	1.75	3.66	1.51	3.66	1.20	3.66	0.81	3.63	0.33	3.54
Belgium	2.64	2.40	4.80	2.10	4.80	1.71	4.80	1.22	4.76	0.54	4.74
Estonia	3.10	2.87	5.23	2.57	5.23	2.19	5.23	1.70	5.20	1.03	5.18
Slovakia	5.58	5.16	9.30	4.65	9.30	3.98	9.30	3.13	9.25	1.97	9.19
Ireland	6.05	5.68	9.40	5.21	9.40	4.62	9.40	3.83	9.37	2.80	9.30
Latvia	6.81	6.38	10.66	5.85	10.66	5.16	10.66	4.26	10.62	3.09	10.53
Lithuania	6.80	6.37	10.64	5.84	10.64	5.15	10.64	4.26	10.61	3.08	10.52
Malta	7.32	6.91	11.04	6.39	11.04	5.73	11.04	4.85	11.03	3.72	10.92
Slovenia	8.17	7.74	12.05	7.20	12.05	6.51	12.05	5.59	12.05	4.41	11.94
Spain	6.80	6.45	9.94	6.02	9.94	5.46	9.94	4.71	9.94	3.75	9.86
Italy	7.22	6.85	10.58	6.38	10.58	5.78	10.58	4.98	10.58	3.96	10.49
Portugal	11.80	11.21	17.12	10.47	17.12	9.52	17.12	8.25	17.12	6.78	16.82
Cyprus	16.07	15.12	24.61	13.93	24.61	12.41	24.61	10.37	24.61	8.41	23.73
Greece	35.19	32.79	56.77	29.79	56.77	25.94	56.77	20.80	56.77	15.15	55.23
<b>Pooled</b>	<b>3.84</b>										
<b>ESBies / EJBies</b>		<b>2.02</b>	<b>20.24</b>	<b>1.02</b>	<b>15.13</b>	<b>0.42</b>	<b>11.81</b>	<b>0.15</b>	<b>9.38</b>	<b>0.03</b>	<b>7.64</b>

Figure 15. Five-year expected loss in adverse scenario in case of status quo (that corresponds to 0% of subordination for each country), pure pooling (called "Pooled" in the bottom, with 0% of subordination), national tranching and pooling and tranching for each subordination level. Source: Brunnermeier et al. (2017).

## CHAPTER 3: HOW TO CREATE EUROPEAN SAFE BONDS

The creation of European Safe Bonds would not be treated as the creation of a simple similar financial instrument, such as CDOs. In fact, they would require to be regulated by strict rules and accompanied by reforms. With this purpose, Brunnermeier et al. (2017) proposed the creation of an “ESBies’ Handbook”, that should be ratified by all involved members, with precise guidelines of the issuing that issuers must respect. This would be done also with the purpose to avoid any type of political pressure in term of relative composition and level of seniority.

### *WHO WOULD ISSUE THEM?*

European Safe Bonds are designed to be issued by any institution, be it public or private. The choice of one of these does not exclude necessarily the other: public and private institutions could coexist and be multiple, for instance a public agency supported by multiple private institutions. Public institution could be either pre-existing or an appropriately created new institution called European Debt Agency (EDA). EDA must be independent from political pressures, such as the other European independent institutions (like ECB). EDA would be managed by a board of directors whose members should be selected among those who have already experienced managing of public debt at national level.

Private institutions instead would be either banks or other financial institutions. Moreover, Brunnermeier et al. (2017) proposed, as private institution, the creation of special purpose vehicle (SPV) to issue ESBies: using SPV would decrease the so called “counterparty risk”, i.e. the risk of default by private issuers.

The issuance by private institutions would be preferable compared to public issuance, for several reasons. First, private institutions would be less subject to political pressures than a public one, or even not subject at all. Second, issuing by private’s would not require any legal change<sup>21</sup>. Third, in the last decades private institutions have already largely experienced securitization and the creation of SPV to do so. Fourth, the existence of multiple institutions in charge to issuing ESBies could lead to a benefit effect deriving from the competition during the issuance<sup>22</sup>.

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<sup>21</sup> In fact, issuers would need only a “license” to issue these securities. They also require to be regulated.

<sup>22</sup> For example, Brunnermeier et al. (2017), refers to the competition on issuing differently sub-tranche junior securities that could be more attractive to investors

## *STEPS OF CREATION*

The issuance of European Safe Bonds would be entirely demand-led process. Therefore, the first step for the issuers would be to collect orders from investors. Second, they would assemble the pool of sovereign bonds by buying them on the market. Third, the issuers would sell ESBies to investors. ESRB (2018) also consider the presence of another body involved on the issuing, that they called “Arranger(s)”<sup>23</sup>, as showed in Figure 16. Arranger(s) would be legally independent from the issuers. In this case, the Arranger(s) would be the body that collect orders from investors. After collecting them, it would purchase sovereign bonds on the market and then it would transfer these assets to the issuers (that could be SPV). Issuers would create the securities (senior and junior tranches) and then would give them back to the Arranger(s), that would sell securities to investors.

Sovereign bonds can be purchased in primary bonds market, in secondary bonds market or a combination of both two, at market price. Purchase in secondary market could be preferable in order to avoid any type of heterogeneity, due to differences in term of timing nationals’ debt issuing and in term of auctions’ characteristics<sup>24</sup>. Different timing of issuing would increase volatility and credit risk for the issuers, especially during a crisis (Brunnermeier et al., 2017). In fact, issuers should keep on their portfolio sovereign bonds of single countries until they will have collected all the sovereign bonds necessary for the creation of ESBies. Once collected all the sovereign bonds they would start the securities’ creation process. ESRB (2018, Volume I) gave a solution to this potential problem, suggesting that countries should coordinate their debt issues. By doing so, issuer could purchase sovereign bonds directly from primary market, for example participating to competitive auctions.

The issuance of European Safe Bonds should start as gradual process. It would begin from the issuance in the secondary market, for a small amount for at least two reasons. First, at the beginning issuers may make some technical errors during the issuance, but with a limited size of the market, errors could be corrected easily. Second, at the beginning market would need time to take confidence with these securities and learn more about their properties. This gradual process could take from few months up to five years, before reaching the desired amount of 60% of Eurozone’s GDP of securities in circulation.

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<sup>23</sup> They specified that the “Arranger(s)” could be a private entity, multiple private entities or a single public entity.

<sup>24</sup> Nowadays Eurozone’s member states’ issuing of sovereign bonds are not timing coordinated. Moreover, different countries use different type of auctions (Cottarelli, 2019, Brenner et al., 2008).

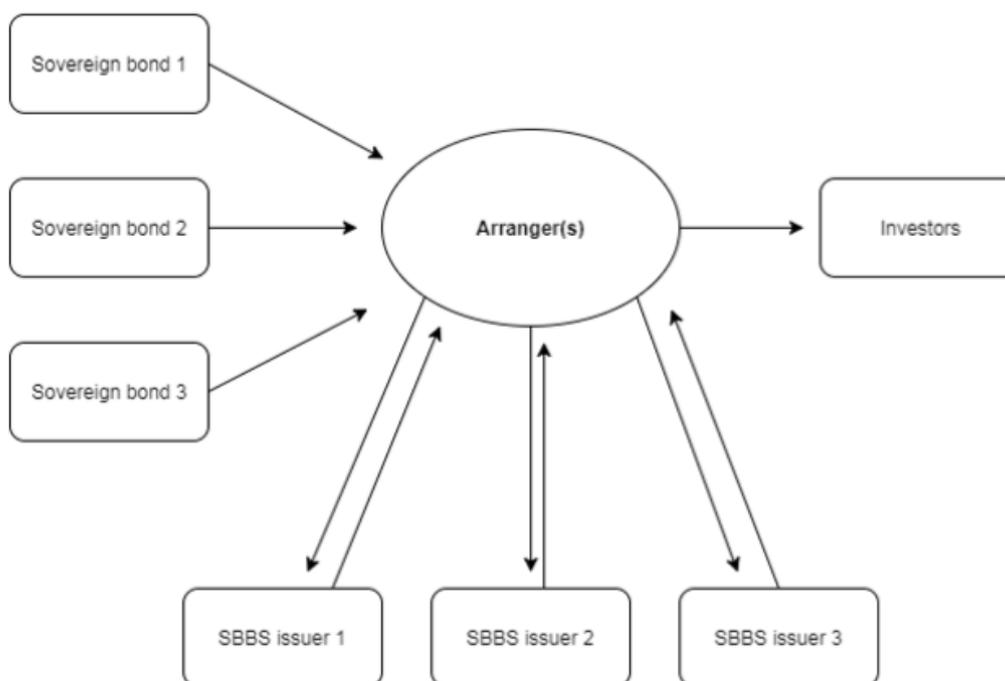


Figure 16. Scheme proposed by ESRB (2018, Volume II) with the presence of an Arranger(s). The Arranger(s) in the first stage would collect orders directly from investors. Then it would buy the amount of sovereign bonds necessary for this. The sovereign bonds would be sold to the issuers, that would create the securities and sell them back to the Arranger(s). Eventually they sell the securities to the investors. Source: ESRB (2018, Volumell).

### ACCOMPANYING REGULATORY REFORMS

Authors of ESBies think that these instruments should not be issued without any change in the today's regulatory framework. They thought, in fact, regulatory reforms of banking sector on sovereign exposures treatment to accompanying them (Pagano, 2019). For example, with the current regulatory regime, banks of peripheral countries are still likely to prefer domestic sovereign bonds against ESBies. This because the former would guarantee a higher return and have a zero risk-weight, according to Basel standardized approach on credit risk<sup>25</sup>. The two ways to follow in order to lower banks' concentration of sovereign debt and facilitate the holding of ESBies should be simultaneous: first, a higher risk-weight should be attached to risky sovereign bonds, although they are domestic; second, a favourable treatment should be applied to securities that allow risk diversification to encourage their purchase. These two mentioned reforms must be done together. The reason is that only applying higher risk-weight to domestic sovereign bonds of vulnerable countries would lead to a huge "sell-off" of this debt. This sell-off would likely trigger to a

<sup>25</sup> It requires no equity to cover domestic exposures.

sovereign debt crisis as in 2011. With this line agrees also Brunnermeier et al. (2017) adding that a single reform on regulatory treatment of sovereign exposures (RTSE) that increases risk-weight of sovereign exposures could even amplify risky sovereigns' trouble during a crisis. So, the suggestion is to accompany this reform with the introduction of ESBies, to which it should be attached zero-risk weight. Otherwise, their introduction may not be effective.

Brunnermeier et al. (2017) suggested another accompanying reform. It refers to setting capital charge as function of banks' individual sovereign bonds concentration: the higher the banks' individual sovereign bonds concentration, the higher would be the capital charge<sup>26</sup>.

Slightly different from the previous ones is the proposal by Corsetti et al. (2016) and it is based on two steps. Step 1 consist in assigning different risk-weight to Eurozone's countries. Risk weight would be assigned based on debt/GDP ratio of each member. They proposed zero risk-weight on debt below 60% of GDP, x% risk-weight on debt between 60-90% of GDP and y% risk-weight on debt over 90% of GDP<sup>27</sup>. Then, the overall risk-weight to be attached to a single country's sovereign bonds would be the weighted average of different risk-weights, based on its debt/GDP ratio. Step 2 consists in allowing creation of CDOs backed by portfolio of Eurozone's sovereign bonds. This CDOs must respect a certain proportions of each Eurozone's member sovereign bonds and must have different tranches (ESBies and EJBies).

Finally, ECB could announce (Brunnermeier et al., 2017, Garicano and Reichlin, 2014) that they would accept ESBies as collateral in monetary policy operations and the haircut rate applied should reflect their safety. This point was argued also by ESRB (2018, Volume I), underlining that under current regulatory framework these securities would be treated as a securitised product<sup>28</sup> and so they would be treated unfavourably.

### *WHO WOULD BUY THE DIFFERENT TRANCHES?*

Tranches with different seniorities should be bought by different types of investors. For instance, in order to avoid the diabolic loop, the riskiest tranche must be kept outside the banking system.

ESBies and EJBies, as well as SBBS subsequently, have been created with this purpose: the composition of the investor base would vary across senior and junior tranches.

Junior tranche, as seen in simulations, would be risky. For this reason, junior tranche would likely not achieve an investment grade rating (ESBR, 2018, Volume I). Its investor base would be

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<sup>26</sup> This would deter banks from concentrating exposures.

<sup>27</sup> Where  $0% < x% < y%$ . They proposed for example x% equal to 10% and y% equal to 20%.

<sup>28</sup> Because junior tranche would entail credit risk.

preferable formed by private investors and retail investors, hedge funds, pension funds, insurance institutions.

For senior tranche instead, the main and preferable investors base would be formed by commercial banks, insurance corporations, pension funds, central banks and sovereign wealth funds.

In the case that a mezzanine tranche was introduced, as seen in Chapter 2, investor base would vary with respect the other two tranches: demand for it is expected to come from asset managers and institutions that invest in fixed income securities, including sovereign bonds (ESRB, 2018, Volume I).

There is another important aspect regarding the structure of each tranches, according to Brunnermeier et al. (2011). Indeed, it would be possible to differentiate investor base even inside the single tranches: this could be achieved by setting different maturities to securities. For example, a 3-months ESBies are suitable for monetary policy operation with ECB. Conversely a long-term ESBies would be more suitable for pension funds and forward-looking investors.

To make this distinction feasible, regulatory reforms aimed at promoting the keeping by banks of safer tranches as explained in the previous section are needed.

## CHAPTER 4: ALTERNATIVES TO EUROPEAN SAFE BONDS

European safe bonds are not the only proposal for a Euro-area common safe asset. Almost all arose during the period of financial crisis due to sovereigns' debt in 2011-2012.

There are many varieties of proposals for this, facing different grounds (Giudice, 2019), as summarized in Figure 17.

The chapter aims to provide a description of some other proposals<sup>29</sup> and highlight the main differences between them and European Safe Bonds.

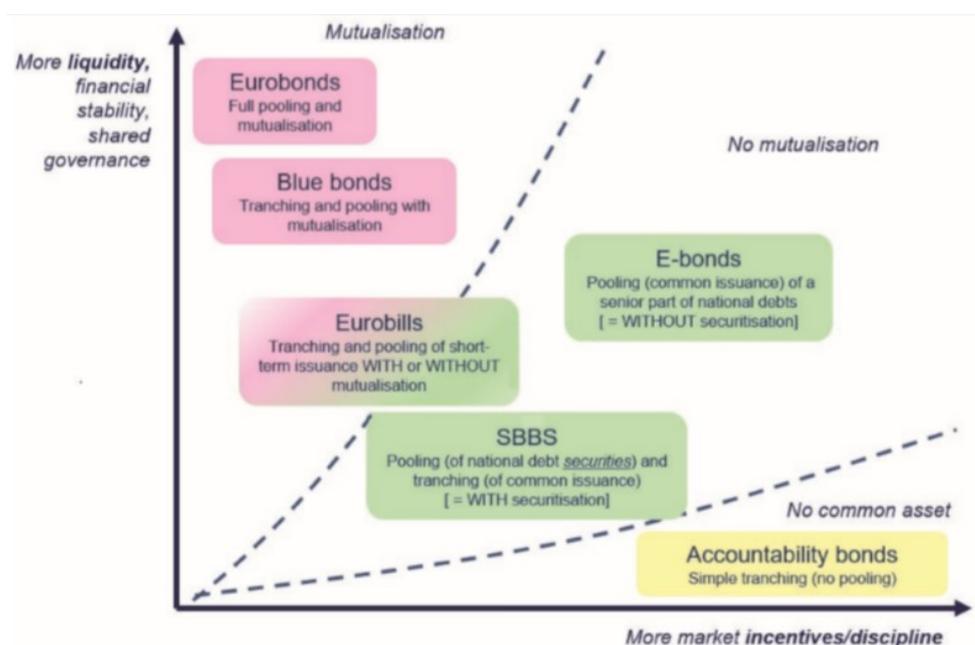


Figure 17. Safe assets proposed as Euro-area common safe assets. They are measured in two dimensions: liquidity/financial stability and market incentives/discipline. As result, three groups of safe assets arise: assets that involve mutualization of debts, assets that do not involve mutualization of debts, and assets that are not common. Source: Giudice (2019).

### STABILITY BONDS

Stability bonds were a proposal, never implemented, by European Commission (2011) to face the sovereign debt crisis that hit Eurozone at the beginning of the last decade and prevent others in the future. Stability bonds would have been securities that Eurozone's member could have used to finance themselves through common issuance, at centralized or decentralized level. They involve the partial or complete mutualization of Eurozone's members' debt. Their purposes were: managing

<sup>29</sup> There will be showed few and specific proposals, each one representative for others similar (to avoid redundancy).

sovereign debts' crisis of 2011 and prevent future crises; reinforce Eurozone's financial stability<sup>30</sup>; facilitate the transmission of monetary policy; improving market efficiency<sup>31</sup>. European Commission proposed two different approaches to issue them. First approach, full substitution of Stability Bond issuance for national issuance, with joint and several guarantees (provided by all euro-area Member States, implying a pooling of their credit risk). Under this approach, euro-area government financing would be fully covered by the issuance of Stability Bonds. Second approach, Stability bonds would not cover all euro-area debt<sup>32</sup>, but only a fraction of it, either with joint and several guarantees or with joint but not several guarantees.

As ESBies, also Stability Bonds have the potential to become safe assets (Brunnermeier et al, 2011), highly liquid and with low yield.

The first difference from the two types of safe bonds is that Stability Bonds, in their main form (the first approach)<sup>33</sup>, involve joint and several guarantees. This means that all countries involved in these bonds are "guarantor" of the others, and this does not occur with the ESBies. The joint and several guarantees could easily lead to moral hazard by the members<sup>34</sup>. However, moral hazard could be mitigated either by reinforcing fiscal rules or by introducing them as partial substitution of Eurozone's debt (i.e. the second approach seen above), with joint but not several guarantees (European Commission, 2011). Closely related to Moral Hazard issues is the fact that yield on sovereign bonds in the bond market is a signal of their fiscal account (Brunnermeier et al, 2011). With debt mutualization, these "signals" will be lost, encouraging members not to comply any fiscal disciplines.

The second difference is that European Safe Bonds would provide different levels of seniority to increase their safety, while Stability Bonds would not.

The third difference is that European Safe Bonds should be issued in a maximum amount of 60% of Eurozone's GDP, while for Stability Bonds it is not so clear the issuing amount: European commission (2011) proposed either the full substitution of national sovereign bonds either the partial substitution but without specifying the relative amount.

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<sup>30</sup> Banks would have held on their portfolio these low-risk assets instead of domestic sovereign bonds with high-risk (especially in the case of peripheral countries).

<sup>31</sup> For authors they would have guaranteed a large, low risk and high-liquidity market of securities.

<sup>32</sup> Ubide (2015) proposed Stability Bonds with an issuance level at 25% of all Eurozone's GDP.

<sup>33</sup> The president of European Commission in 2011, Juan Manuel Barroso, indicated the full substitution of Stability Bonds as the principal solution to the crisis (Brunnermeier, James & Landau, 2017).

<sup>34</sup> Members could not respect any fiscal discipline without troubles for their costs of refinancing. This is the main reason why Stability Bonds are not credible and feasible (Brunnermeier, James & Landau, 2017).

## *BLUE AND RED BONDS*

Blue and Red bonds were proposed by Bruegel institution (2010). They are composed by Blue debt and Red debt. Blue debt refers to the first 60% of each national's debt/GDP ratio. This debt should be pooled and then issued as "Blue Bonds" with joint guarantees. Red debt refers to other debt above the 60% debt/GDP. This Red Bonds would be issued by each national treasury, for which they are entirely responsible in case of default<sup>35</sup>. Red bonds, in fact, would be considered a sort of "junior" tranche, and for this reason authors proposed to keep them out from banking system (Delpla and Von Weizsacker, 2010).

The major difference between ESBies and Blue Bonds is that the latter would involve joint and several guarantees, like Stability Bonds of European Commission (2011).

## *SYNTHETIC EURO BONDS*

Beck, Wagner, Uhlig (2011) proposed Synthetic Eurobonds without public guarantees by a creations of a European debt mutual fund, which holds a mixture of the debt of Eurozone member (for example, in proportion to their GDP). This fund then issues tradable securities whose payoffs are the joint payoffs of the bonds in its portfolio. The pay-off would be the combined interest rate payments of the bonds held by the fund. Synthetic Eurobonds are comparable to ESBies without tranching because they do not require any type of joint liability.

The main difference between the Synthetic Eurobonds and ESBies is that the previous do not foresee any type of seniority, i.e. no senior and junior tranche. This difference must not be underestimated, because as we saw in simulation on Chapter 2, what makes ESBies so safe is the different tranching<sup>36</sup>. Despite Synthetic Eurobonds seem to be very close to ESBies, they would not be as safe as the latter. To confirm this, Alogoskoufis and Langfield (2019) reported the results of a simulation (Figure 18). They compared the case of an Area-wide safe asset, without credit protection (i.e. no tranching, as Synthetic Eurobonds) and an Area-wide low risk asset (they referred directly to ESBies). Both, in term of diversification reflect the economic weight of each Eurozone member<sup>37</sup>. The result was that with no credit protection, the five-years expected loss for banks is higher with respect the case of Area-wide low-risk asset: diversification per se, would reduce losses for banks in case of stress in financial markets, but would not eliminate them.

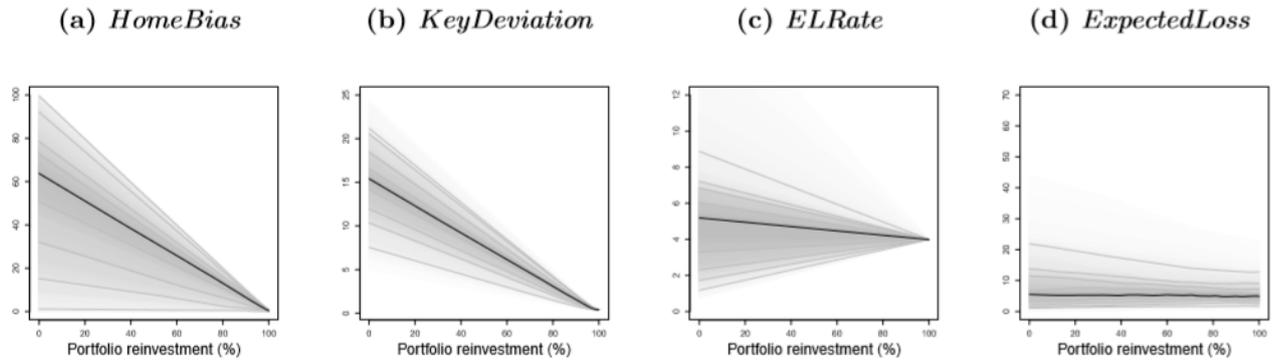
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<sup>35</sup> Unlike Blue bonds, Red bonds are not issued with joint and several guarantees.

<sup>36</sup> For Brunnermeier et al. (2011) the mere diversification by pooling that Synthetic Eurobonds' authors proposed is not enough in order to have safe assets.

<sup>37</sup> They used the ECB key capital instead of the relative weight of each member' GDP with respect to Eurozone's GDP.

Panel A: Area-wide asset without credit protection



Panel B: Area-wide low-risk asset

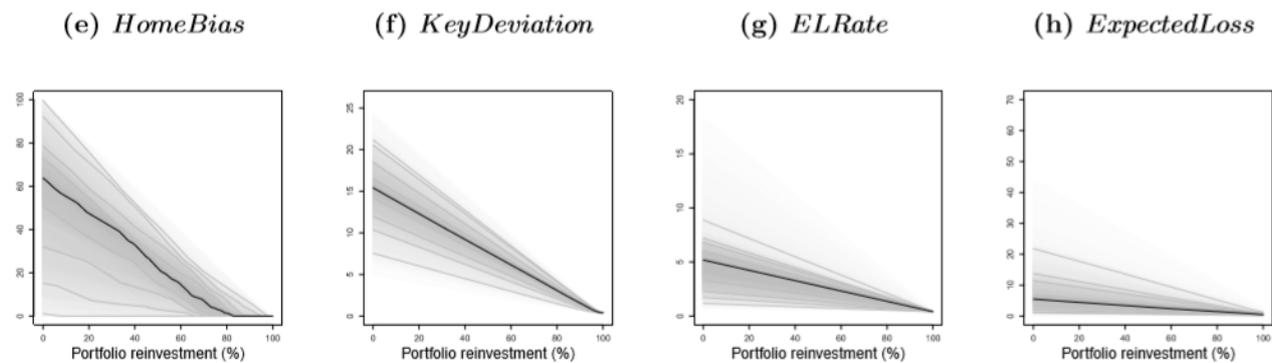


Figure 18. Panel A shows the results of simulations with an Area-wide asset without credit protection, Panel B results with an Area-wide low-risk asset. HomeBias refers to banks' domestic exposures. KeyDeviation measures the extent to which a bank's portfolio deviates from ECB capital key weights. ELRate refers to bank's five-years expected loss rate. ExpectedLoss is calculated as banks' exposures to sovereign bonds by ELRate. HomeBias and KeyDeviation are similar across the two panels. Instead, ELRate and ExpectedLoss vary. In the case of an Area-wide low-risk asset they are lower. ELRate after 100% of portfolio reallocation is 4.4% in portfolio A, only 0.42% in portfolio B. In term of ExpectedLoss, it remains relatively high in portfolio A (around 5% also after 100% of portfolio reallocation), instead it falls near 0% in portfolio B. Source: Alogoskoufis and Langfield (2019).

## CHAPTER 5: MAIN CRITICISMS TO EUROPEAN SAFE BONDS

ESBies gained some traction in the economic and political debates after being presented in detail (Claeys, 2018). At the same time, these securities have been severely criticized by many. This chapter aims to provide some of these criticisms, touching five main grounds: first, the real safety of these securities; second, the constraints that these securities would face; third, whether these securities would eliminate any problem concerning the so called “spread”; fourth, whether banks would be really willing to buy them; fifth, whether policymakers would be really willing to introduce them.

### *WOULD EUROPEAN SAFE BONDS BE REALLY SAFE?*

S&P Global Ratings (2017) provided a report in which they discussed the effective safety (in terms of rating) of the European Safe Bonds. They reached a conclusion in deep contrast with respect to those of Brunnermeier et al. (2017) and ESRB (2018).

First, they compare ESBies with similar structured securities, the CDOs. Their result is that ESBies would be less safe than private CDOs for the following reasons: the underlying assets of a CDOs (those that compose the “pool”) are many more than the assets that compose ESBies (that would be 19, as Eurozone’s members) and so the differentiation is greater; the assets composing the pool of CDOs are chosen “uncorrelated” with each other (in order to ensure even more diversification), instead Eurozone’s members’ sovereign bonds yield are correlated each other’s. The last point is argued also by De Grauwe (2018). In fact, evidence shows that yield of high-risk sovereign assets (those of peripheral countries) were highly correlated during period of stress on financial markets. At the opposite, they were uncorrelated with low-risk sovereign assets (assets of Germany, Netherland, France and Finland)<sup>38</sup> during the same period. Results are shown in Figure 19.

Second, under their rating approach, they would rate ESBies with a rating that could vary from the rating of the lowest rated country (i.e. ‘B-’ as Greece) to the highest (i.e. ‘AAA’). If the underlying’s pool structure reflected the relative Eurozone’s GDP, ESBies would receive rating ‘BBB-’. This is because the sum of the weighted GDP of countries rated equal or below ‘BBB-’ would be higher than 30%, i.e. the threshold of junior tranche (Figure 20). ESBies, instead, would be rated ‘B-’ as Greek sovereign bonds.

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<sup>38</sup> This is because of the so called “run to safe”.

Table A1. Correlation of yields before crisis (2000M1-2009M12)

	Germany	Finland	Netherlands	Austria	France	Belgium	Italy	Spain	Ireland	Portugal	Greece
Germany	1.00										
Finland	0.97	1.00									
Netherlands	0.97	1.00	1.00								
Austria	0.94	0.99	0.99	1.00							
France	0.98	1.00	1.00	0.99	1.00						
Belgium	0.95	1.00	0.99	1.00	0.99	1.00					
Italy	0.89	0.97	0.96	0.99	0.96	0.98	1.00				
Spain	0.94	0.99	0.99	1.00	0.98	1.00	0.99	1.00			
Ireland	0.61	0.78	0.76	0.83	0.74	0.81	0.88	0.83	1.00		
Portugal	0.90	0.98	0.97	0.99	0.96	0.99	0.99	0.99	0.87	1.00	
Greece	0.68	0.83	0.82	0.87	0.80	0.86	0.92	0.88	0.96	0.91	1.00

Table A2. Correlation of yields during crisis (2010M1-2012M09)

	Germany	Finland	Netherlands	Austria	France	Belgium	Italy	Spain	Ireland	Portugal	Greece
Germany	1.00										
Finland	0.98	1.00									
Netherlands	0.99	0.99	1.00								
Austria	0.89	0.93	0.91	1.00							
France	0.83	0.89	0.87	0.98	1.00						
Belgium	0.45	0.58	0.54	0.74	0.80	1.00					
Italy	-0.66	-0.57	-0.58	-0.34	-0.21	0.28	1.00				
Spain	-0.62	-0.60	-0.55	-0.48	-0.34	0.02	0.81	1.00			
Ireland	0.16	0.24	0.24	0.28	0.38	0.68	0.38	0.44	1.00		
Portugal	-0.62	-0.52	-0.54	-0.32	-0.19	0.29	0.88	0.73	0.54	1.00	
Greece	-0.82	-0.79	-0.78	-0.62	-0.50	-0.13	0.81	0.81	0.23	0.85	1.00

Table A3. Correlation of yields after crisis (2012M10-2017M12)

	Germany	Finland	Netherlands	Austria	France	Belgium	Italy	Spain	Ireland	Portugal	Greece
Germany	1.00										
Finland	1.00	1.00									
Netherlands	1.00	1.00	1.00								
Austria	1.00	0.99	1.00	1.00							
France	0.99	0.99	0.99	0.99	1.00						
Belgium	0.99	0.99	0.99	0.99	0.99	1.00					
Italy	0.92	0.91	0.92	0.93	0.95	0.95	1.00				
Spain	0.90	0.90	0.90	0.92	0.92	0.94	0.97	1.00			
Ireland	0.93	0.93	0.93	0.95	0.95	0.96	0.97	0.99	1.00		
Portugal	0.78	0.78	0.79	0.82	0.83	0.85	0.93	0.93	0.92	1.00	
Greece	0.31	0.31	0.31	0.35	0.34	0.38	0.45	0.58	0.55	0.57	1.00

Figure 19. Correlation of main Eurozone's members' yield on their 10-years sovereign bonds, before sovereign debts crisis, during it and after it. Tables are provided by ECB. Smallest country (like Luxembourg) are not considered here. What concerns more is the correlation during crisis (Table A2). In fact, yields of peripheral countries (Italy, Spain, Ireland, Portugal, Greece) were highly correlated with each other's, and highly uncorrelated with respect to other virtuous countries such as Germany, Netherland, Finland, Austria, France, Belgium. Source: De Grauwe (2018).

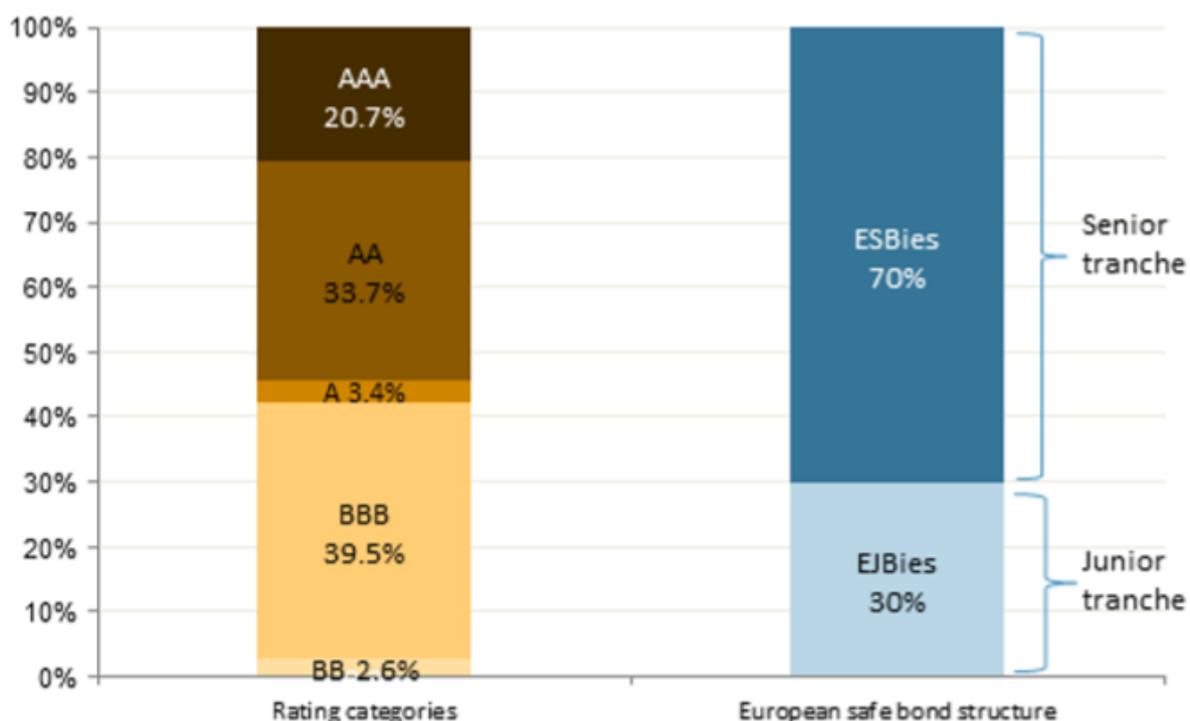


Figure 20. S&P simulation. Left column represents the progressive sum of Eurozone’s sovereign bonds by their credit rating. Right column the composition of European Safe Bonds. Around to 30% of seniority (i.e. the threshold between junior tranche and senior’s one) it is notable that ESBies would correspond to a ‘BBB’ rating of the left column. Close to the bottom, EJBies would correspond to ‘B-’ rating. Source: S&P (2017).

### CONSTRAINTS ON THE ISSUE

The issuance of ESBies faces mainly two constraints. The first constraint concerns the placement of the junior tranche. Demand for different tranches could in fact vary over time (ESRB, 2018).

Especially during period of crisis is likely that EJBies would become less attractive also for their usual investors (Claeys, 2018), constraining the overall issuance<sup>39</sup>.

The second constraint concerns the low-debt countries (Claeys, 2018). Since the overall issuance of ESBies would be up to 60% of Eurozone’s debt/GDP ratio, and since composition of portfolio must respect the relative contribution to Eurozone’s GDP of member, the composition of ESBies would be slightly biased due to low-debt countries (with a debt/GDP ratio below 60%)<sup>40</sup>. Moreover, as argued by Minenna (2017) the public debt of these low-debt countries, as well as other countries with higher debt/GDP (but slightly below or around 60%, like Germany, Netherland, Finland)

<sup>39</sup> Recalling the issuance must respect the 70-30 scheme.

<sup>40</sup> These countries are the smallest of Eurozone (such as Luxembourg and Estonia) in term of contribution to overall GDP. For this reason, the composition of ESBies would not change so much.

would end up the collateral portfolio, almost zeroing the government bonds available for market trade, as shown in Figure 21.

Country	Public Debt 2016 (€ bn)	Weights (ESBies proposal-GDP proportional)	Govies in the Collateral Portfolio	Govies in the Collateral Portfolio /Debt
<i>Germany</i>	2140	28,2%	1690	79%
<i>France</i>	2147	21,3%	1275	59%
<i>Italy</i>	2218	16,5%	991	45%
<i>Spain</i>	1107	10,8%	646	58%
<i>Netherlands</i>	434	6,6%	397	91%
<i>Belgium</i>	447	3,9%	236	53%
<i>Austria</i>	296	3,2%	193	65%
<i>Greece</i>	315	2,0%	122	39%
<i>Finland</i>	136	2,0%	121	89%
<i>Ireland</i>	201	1,8%	108	54%
<i>Portugal</i>	241	1,8%	107	44%
<i>Slovakia</i>	42	0,7%	40	94%
<i>Slovenia</i>	32	0,4%	22	69%
<i>Lithuania</i>	16	0,3%	15	94%
<i>Cyprus</i>	19	0,2%	11	60%
<i>Luxembourg</i>	11	0,2%	11	98%
<i>Latvia</i>	10	0,2%	10	100%
<i>Malta</i>	6	0,1%	4	70%
<i>Estonia</i>	2	0,0%	2	90%

Figure 21. In column 2 are reported each country's 2016 debt, in absolute terms. Column 3 reports their relative Eurozone's GDP weight. In column 4 and 5 are reported the value of their debts inside the collateral portfolio, in absolute terms and in relative terms. For certain countries, almost all the debt would end up the collateral portfolio (Netherland 91%, Luxembourg 98%, Finland 89%). For the higher debt occurs the opposite (Italy 45%, Greece 39%, Belgium 53%). Source: Minenna (2017).

### *WOULD ESBies ELIMINATE HIGH YIELD ON CERTAIN SOVEREIGN BONDS?*

A criticism made by all the ESBies-sceptics is that the introduction of European Safe Bonds would not decrease the “spread” on secondary market sovereign bonds, rather “spread” could still increase with respect to a benchmark scenario. The first critique is made by Minenna (2017) and it is related to the previous argument on debt constraints. In fact, unlike low-debt countries, the peripheral countries, notoriously high-debt countries, would have relatively little of their public debts inside ESBies.

Figure 22 shows the residual debt outside ESBies for the high-debt countries, in relative terms. For these countries huge part of their sovereign bonds would continue to be bought by private investor

directly, instead of by banks: the latter, in fact, would be satisfied by the purchase of ESBies, and they would not have any need to buy sovereign bonds directly. This would likely be reflected in an increase in the “spread” for these not-securitised sovereign bonds.

Country	Residual Govies (as % of total outstanding debt)
<i>Greece</i>	61%
<i>Portugal</i>	56%
<i>Italy</i>	55%
<i>Belgium</i>	47%
<i>Ireland</i>	46%
<i>Spain</i>	42%
<i>France</i>	41%

Figure 22. Residual relative debt outside ESBies for high-debt countries. These debts would continue to be issued directly by each treasury. For countries like Greece (61%), Portugal (56%) and Italy (55%) debt to be issued by treasury remains still very high amount. Source: Minenna (2017).

The concrete risk in the case of huge increase in sovereign bonds yield (Minenna, 2017) for sovereign bonds of peripheral countries is to be downgraded rapidly to “junk” bonds with deeply negative consequences. De Grauwe (2018) also agreed on this topic. He argued that during a crisis the existence of ESBies may upset the functioning of national bond markets. In fact, he said, large part of the financial markets in the eurozone would depend on the perceived safety and liquidity of the ESBies construction. During a crisis, the safety of these securities could be questioned, giving rise to financial instability and subsequently raising sovereign borrowing costs<sup>41</sup>.

#### *WOULD BANKS BUY ESBies?*

Another concern is that whether banks are willing to buy low-yield ESBies. For Jean Dermine (2018), ESBies are unlikely to attract investments by banks, especially in peripheral countries. The reason is that in these countries, banks are subjected to low credit rating by agencies which implies high borrowing costs. These banks are not likely to invest in ESBies, because their estimated return is lower than their borrowing cost, and this could hurt their profitability. The same situation was

<sup>41</sup> These criticisms by Minenna (2017) and De Grauwe (2018) were strongly debated by Zettelmeyer (2018), saying that ESBies would not subordinate national debts, and so borrowing costs would not increase.

observed during the 2011 crisis: in peripheral countries, the reduction in bank loans was accompanied by an increased holding of domestic sovereign bonds (Altavilla et al., 2016). Minenna (2017) argued the same. Peripheral banks rely in huge amount of domestic sovereign bonds with high yield to increase their profits, and in the case of ESBies were introduced they would be looking for a high-yield in other activities instead of investing in low-yield ESBies. Moreover, they could be attracted by the profitability of the junior tranche and so they could buy them from the holders of EJBies.

#### *WOULD POLICYMAKERS ACCEPT ESBies*

Exception for European Commission (Claeys, 2018), which supported ERBS in their High-Level Task Force on safe assets, there have not been many “political” positions against ESBies during the years.

The most conflicting position was taken by Jörg Rocholl, adviser to the German finance ministry (Khan, 2018), saying that ESBies would be the “Eurobonds introduced through the back door”. According to this position, Claeys (2018) argued that ESBies would give more incentive to sovereign to default. In fact, since the first loss would be borne by the junior tranche (held outside banking system), banks would not bear any loss (since they would hold only the senior tranche): sovereign default would not imply any recapitalization cost for a country. This could be considered as an incentive to make a default.

The last political argument was given by Gabor and Vestergaard (2018) saying that Germany would not be willing to adopt a “structured Eurobonds”, because in doing so they would lose their Bund’s privileged position in the Eurozone financial architecture.

## CONCLUSION

The creation of a low-risk common safe asset is crucial for the future of Eurozone and its financial system. ESBies seem to be an appropriate instrument with this purpose.

The paper provides some important results about these securities.

First, ESBies designed with a senior tranche a junior tranche would be a safe asset. In fact, the senior tranche five-year expected loss would be lower (both in benchmark scenario and adverse scenario) than the five-year expected loss of German Bund (i.e. the safest sovereign asset of Eurozone).

Second, the creation of ESBies would also provide a huge enlargement of safe asset supply inside the Eurozone: the volume of safe asset supply would be more than double with respect to the status quo.

Third, ESBies, unlike the other proposals for a safe asset, entail no joint and several guarantees for the participants. For this reason, in addition, its introduction would not require changes in treaties.

Fourth, ESBies need to be accompanied with other reforms of financial system. If the cited reforms would not be implemented, banks (especially those of peripheral countries) would continue to invest in high-yield risky assets instead of ESBies, because the former would ensure higher return. If they do so, there would not mitigate the problem with the “diabolic loop”.

In sum, ESBies have the potential to become the common safe asset for which Eurozone have looked for in the last decade. However, although they would weaken financial crises, acting in the banking sector, they are not the solution to all the economic and financial fragilities inside the Eurozone. Therefore, the creation of European Safe Bonds would only be a further “step” within the Eurozone integration process, but it should not be the only one.

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