

## Financial stability

# EU fund risk exposures to potential bond downgrades

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### Summary

This case study focuses on the impact of a potential credit shock on the EU fund industry. We simulate the effects of a wave of downgrades of BBB-rated corporate bonds (fallen angels) on bond funds, amid a rise in risk aversion. Overall, the direct impact would moderately affect fund performance with no significant performance-driven outflows. Similarly, asset sales from bond funds in response to the shock would only have a limited and non-systemic impact on asset prices. However, it also shows that in this scenario EU bond funds could amplify shocks coming from passive funds, especially non-EU ETFs.

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## Introduction

In a context of low interest rates, market participants have increased their exposures to riskier assets in the search for yield. This trend has allowed lower-rated corporates to issue bonds at relatively low spreads compared with historical standards and has encouraged the build-up of leverage in the corporate sector in the euro area and the United States. As a result, the HY bond market has expanded significantly, and the credit quality of the IG bond market has declined, as evidenced by the increasing share of lower-rated IG bonds (BBB) in outstanding debt.

Against this background, a stronger than expected deterioration of macroeconomic prospects could weigh on corporate earnings and reduce corporate credit quality. The risk is heightened in the case of BBB-rated companies that run the risk of being downgraded to speculative grade. A series of downgrades from BBB to high yield could thus significantly increase the supply of high-yield bonds and lead to a further widening in credit risk premiums.

The objective of this simulation is to assess the impact of a sudden deterioration of the credit quality of corporates on investment funds and on financial markets. Two main transmission channels are analysed. First, the deterioration in credit quality would lead to negative performance

and outflows from bond funds through the price channel. Second, in the case of downgrades of BBB bonds, the investment policy of some funds might force them to divest from the downgraded bonds (as they are no longer IG), which would result in further forced sales. The simulation applies the ESMA stress simulation framework for investment funds (ESMA, 2019).

## Investor exposures to BBB bonds have increased

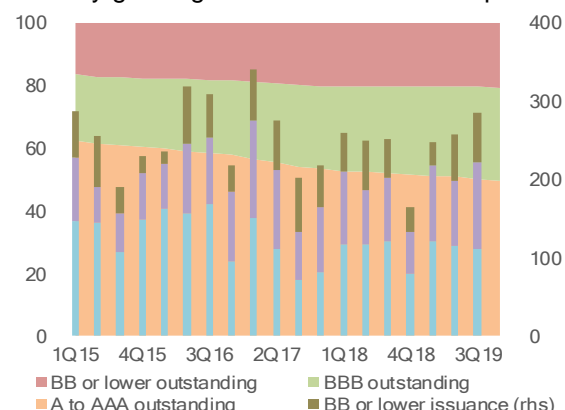
### The rise of bonds rated BBB

In recent years, sizeable issuance of bonds with a BBB rating has become the norm for both corporates and sovereigns. As a result, the share of outstanding corporate bonds in the EU that were rated BBB grew from 20% to 30% in 5 years, up to EUR 2.1tn as of 3Q19 (RA.1). For sovereigns, the growth in the share of bonds rated BBB in the EU has been even more dramatic, from only 3.5% in 3Q14 to 15% in 3Q19.

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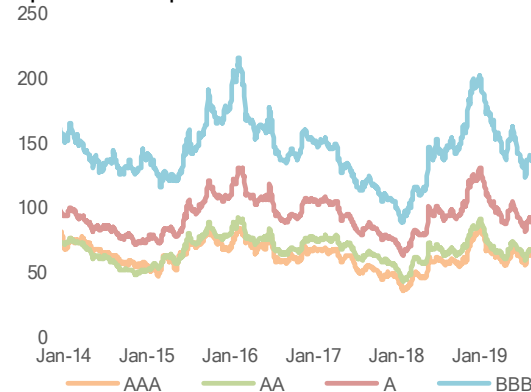
<sup>47</sup> This article has been authored by Giuliano Bianchini, Antoine Bouveret, Massimo Ferrari and Jean-Baptiste Haquin.

RA.1  
EU corporate bond ratings outstanding and issuance  
**Steadily growing share of BBB-rated corporates**



Note: Corporate bonds shares outstanding in the EU in % and quarterly EU issuance by rating in EUR bn.  
Sources: Refinitiv EIKON, ESMA.

RA.2  
Corporate bond spread compression  
**Spreads compress in 2019**



Note: ICE BofAML EA corporate bond option-adjusted spreads by rating, in bps. 5Y-MA=five-year moving average of all indices.  
Sources: Refinitiv Datastream, ESMA.

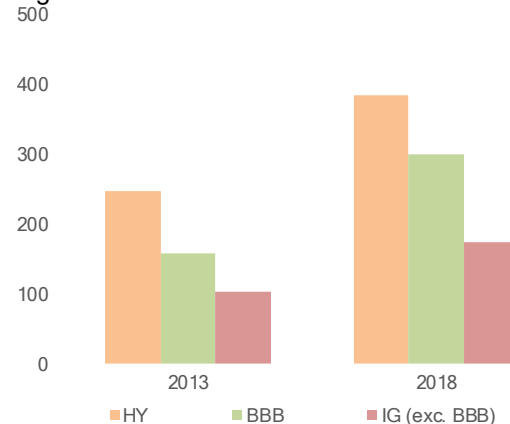
The rapid growth in BBB-rated debt in Europe mirrors trends in the United States. Between 2009 and 2019, the share of BBB-rated bonds in the US corporate debt tripled in size, reaching USD 2.8tn by July 2019 (Blackrock, 2019).

### Growing investor demand for BBB bonds

The increasing availability of BBB-rated bonds has coincided with growing investor demand for BBB-rated debt relative to less risky bonds, arguably driven by search for yield. This is visible in the extended periods of compression of spreads across bonds of different ratings over the last 5 years. And, notably, spreads have been compressing again since early 2019 (RA.2).

Investors such as banks, insurers, pension funds and investment funds are the major holders of BBB debt. In the EA, BBB holdings represent 40% of insurance corporations and pension funds' and 35% of investment funds' total bond portfolios, compared with 33% and 31% respectively at the end of 2013.<sup>48</sup> In volume, investment funds held EUR 300bn of BBB-rated corporate bonds at the end of 2018 (RA.3).

RA.3  
Holdings of BBB-rated bonds by investment funds  
**Significant increase in volume**



Note: Holdings of corporate bonds by EA funds, EUR bn.  
Source: ECB.

<sup>48</sup> See chart 4.2 (ECB, 2019).

# Simulation

## Motivation and modelling choices

### *Background*

BBB-rated bonds are the most susceptible to being downgraded to high-yield and becoming 'fallen angels'. Although the average share of BBB-rated corporate bonds downgraded to high-yield has historically been below 5% per year, it reached 15% during the financial crisis in 2009. And if BBB bonds were downgraded to high-yield, some investors could be forced to sell those securities where their mandates do not allow for high-yield bonds. Funds with an IG investment mandate would be affected most. Within this category, funds can be passive, i.e. they track an IG index (such as most ETFs), or active, i.e. their objective is to outperform an IG index.

IG funds could be incentivised to sell downgraded securities that fall out of the index (Box RA.4). Eventually, significant sales could affect bond prices beyond fundamentals and put additional pressure on funding conditions for corporates.

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#### RA.4

Investment funds' investment policies

#### **A rating downgrade would challenge funds' investment policies**

Fund managers are required to disclose their objectives and investment policy to investors. For example, UCITS managers must publish information on the main categories of eligible financial instruments that are the object of investment in the key investor information document. Funds investing in debt securities must indicate whether they are issued by corporate bodies, governments or other entities, and any minimum rating requirements.

UCITS funds referring to a benchmark or tracking an index must indicate the potential deviation from the benchmark index. They should also disclose the rebalancing frequency and its effects on the costs in the strategy. In addition to scheduled rebalancing, the index provider can carry out additional ad hoc rebalancing to the underlying index. When the underlying index is rebalanced, the fund in turn rebalances its portfolio, thus incurring transaction costs.

In the case of a credit rating downgrade, fund managers may have to rebalance their portfolio to comply with their investment policy. This is the case if their mandate only allows for investment grade securities or, in the case of index trackers, if the security falls out of the reference index. However, the legislation does not impose a period within which to conform with the investment policy and in principle managers can take the time to rebalance their portfolio in the interest of the shareholders. Funds tracking a

benchmark may nevertheless be incentivised to adjust their portfolios rapidly, as keeping the downgraded security exposes them to additional tracking error risk.

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In most cases, fire sale events are unlikely to happen for active funds because their mandate allows enough time for portfolio rebalancing. Usually, investment policies include a provision that, in the event of downgrades, the fund may continue to hold downgraded bonds for a certain period of time to avoid distressed sales. However, there can be a risk from first-mover advantage during stressed events. In contrast, passive funds have incentives to rebalance portfolios immediately (e.g. to minimise tracking error). As a result, active funds may – anticipating these actions – also be incentivised to sell downgraded assets to avoid further deterioration in their performance (Goldstein et al., 2017), exerting further downward pressure on bond prices.

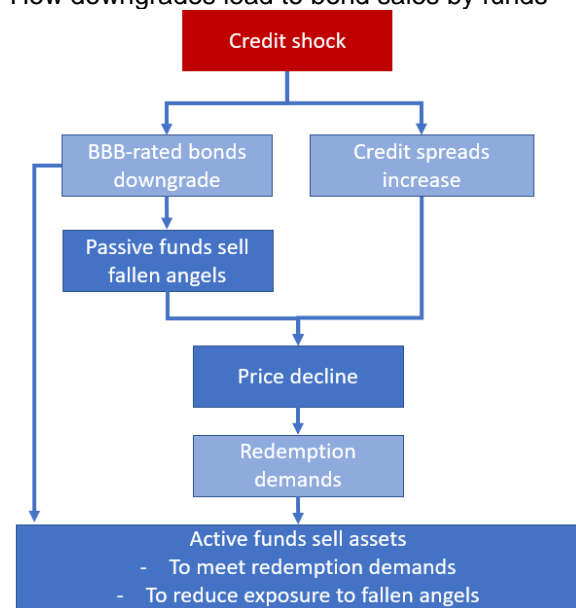
### *Modelling post-credit-shock sales by funds*

The scenario we model is an unexpected increase in credit risk that results in a wave of downgrades of BBB-rated corporate bonds by credit rating agencies (CRAs). Following the downgrades, the price of fallen angel bonds falls, reflecting higher credit risk. This initial shock leads to forced sales from passive funds.

At this stage, active funds (which have not sold bonds yet) face redemptions due to negative returns that reflect mark-to-market losses due to the initial credit shock and the forced sales of passive funds. Active funds need to liquidate part of their portfolio (i) to meet investors' redemptions and (ii) to realign their exposures to be consistent with their investment policies (RA.5).

RA.5

How downgrades lead to bond sales by funds



Design of the scenario

The initial credit shock is characterised by:

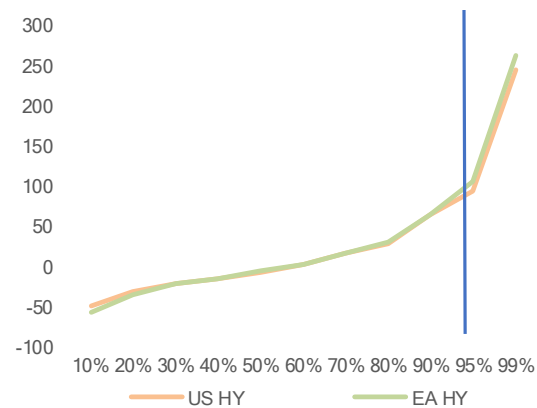
- an increase in credit spreads that negatively affects the value of bond funds’ portfolios and their returns;
- a wave of rating downgrades that leads to portfolio rebalancing, asset sales and further impacts on the value of the downgraded assets.

The increase in bond spreads is calibrated using the 95<sup>th</sup> percentile monthly increase observed during the 2004-2018 period. This calibrates the credit shock to the largest historically observed monthly increase in spreads that occurs with 5% probability. The chart below shows the distribution of monthly spread changes for US and EA HY bond indices (RA.6). The 95<sup>th</sup> percentile is 112bps for EA HY bonds and 93bps for US HY bonds. So, overall, we assume a 100bps increase in spreads for HY bonds and EM bonds, and a 20bps increase for IG bonds.

RA.6

Corporate bond spreads

Historical distribution of changes in HY spreads



Note: Percentiles of monthly changes in option-adjusted spreads on Bank of America Merrill Lynch bond indices, in basis points. Sources: Refinitiv Datastream, ESMA.

For rating downgrades, the calibration focuses on fallen angels, i.e. IG corporates that are downgraded to HY. We calibrate the fallen angel rate to 11% of BBB notional globally, based on historical data reported by CRAs for European, US and other corporates for the first half of 2009,<sup>49</sup> considered as a reference period for credit stress (RA.7).

RA.7

Transition matrix

Stressed corporate rating migration (%)

CQS	1	2	3	4	5	6	W
1	81%	15%	1%	0%	0%	0%	3%
2	0%	87%	8%	2%	0%	0%	3%
3	0%	1%	89%	5%	1%	0%	5%
4	0%	0%	1%	82%	9%	2%	6%
5	0%	0%	0%	2%	77%	16%	6%
6	0%	0%	0%	0%	1%	57%	42%

NB: Aggregated transition matrix of long-term corporate ratings for the period 1H2009. CQS refers to credit quality step, CQS1 to AAA to AA ratings, CQS2 to A ratings, CQS3 to BBB ratings, CQS4 to CQS6 to ratings below BBB-. W refers to withdrawal. The table reads as follows: 89% of corporates rated CQS 3 at the beginning of the reporting period (left column) were still rated CQS 3 at the end of the reporting period (top row). Sources: CEREP, ESMA.

The downgrades would apply to around USD 520bn globally, including USD 330bn for US corporates and USD 110bn for European corporates based on Bank of America Merrill Lynch global corporate bond indices.

<sup>49</sup> ESMA’s central repository (CEREP) for rating activity

statistics and rating performance statistics of CRAs.

### Sample of funds

For this simulation, the focus is on EU active and passive bond funds that invest in corporate bonds. The table below provides an overview of the sample used (RA.8). Overall, the sample accounts for around 90% of the EU bond industry and close to 95% of EU mixed funds covered by Morningstar. For active funds, the final sample includes close to 6,600 UCITS with an aggregate NAV of EUR 2,490bn at the end of 2018. Some funds were excluded because of data gaps regarding flows, NAV or portfolio composition (for a detailed discussion of the sample see ESMA, 2019). European passive funds amount to EUR 100bn in NAV, and non-European passive funds to EUR 625bn.

RA.8

Sample of funds

#### Main features

Fund type	Database coverage		Sample		
	NAV (bn EUR)	Number of funds	NAV (bn EUR)	% of NAV	Number of funds
HY	196	424	174	89	297
EM	243	500	229	94	439
Euro FI	800	2,363	734	92	2,030
Global FI	529	1,124	420	79	592
Mixed	993	3,855	933	94	3,240
<b>Total</b>					
active	2,761	8,266	2,490	90	6,598
Passive funds (ETFs)	100	142	100	100	142
<i>Memo items</i>				NAV	
<i>UCITS bond funds</i>				2,536	
<i>UCITS mixed funds</i>				1,728	

Sources: Morningstar, European Fund and Asset Management Association, ESMA.

### Calibration of the redemption shock

The shock is calibrated in two stages. First, for each active corporate bond fund, the impact of the shock on returns is estimated using the duration,  $D$ , of the portfolio and the size of the yield increase due to the spread shock:

$$\Delta \text{Return} = D \times \text{spread shock}$$

The increase in spreads translates into negative returns, which can be estimated using the duration of the bond funds. For bond funds for which the duration of the portfolio is not available, the duration is assumed to be equal to the duration of the corresponding corporate bond benchmark index. Antoniewicz and Duvall (2018) show that, for US bond funds, the duration of bond funds is very close to the duration of major corporate bond indices.

Then, based on the flow–return relationship, fund flows are estimated for each fund within corporate bond fund styles.

### Impact on markets

The sale of assets in response to the initial credit shock happens in two ways:

- First, IG passive funds are assumed to sell all of their fallen angels immediately. (with any additional redemption requests assumed not to result in the sale of fallen angels);
- IG active bond funds sell assets to meet redemption requests caused by the price decline. They also sell some of their fallen angels to avoid further deterioration of their performance in the short run and to maintain the credit profile of their portfolio.

In order to quantify the selling pressure due to outflows, we use a slicing approach, whereby funds liquidate assets in proportion to their weight in the portfolio (for a discussion of liquidation strategies see ESMA, 2019).

The additional forced sales due to downgrades are estimated by assuming that active funds must divest a portion of the fallen angels quickly to comply with their mandate and risk management policy. We follow Aramonte and Eren (2019) by assuming a third of downgraded bonds must be offloaded very quickly.

The price impact of asset sales depends on the volumes of sales and market depth:

$$MD(\tau) = c \frac{ADV}{\sigma} \sqrt{\tau}$$

The market depth over a time horizon,  $\tau$ , is a function of a scaling factor,  $c$ , times the ratio between the average daily trading volumes and the asset volatility, multiplied by the square root of the time horizon. The price impact is therefore lower when the time horizon is longer. The parameters are similar to those of ESMA (2019): the sale of EUR 1bn of bonds has a negative price impact of around 12bps for HY bonds. The calibration is meant to be conservative: in a stress scenario, the market depth is likely to be affected by dealer willingness to increase inventories (Baranova et al., 2019).

### Results

Following the initial credit shock, passive funds sell EUR 27bn of fallen angels (including EUR 4.5bn from EU passive funds), resulting in an additional price decline of 338bps.

Active funds experience outflows ranging from less than 0.5% of NAV for EM, global and mixed funds to 1.4% for HY bond funds, reflecting the deterioration of their performance due to the initial credit shock and the immediate sales of passive funds (RA.9).

RA.9

Credit risk shock

Estimates of outflows by fund style

Fund style	Redemption shock (% of NAV)
HY	1.4
Euro FI	1.3
EM	0.3
Global FI	0.3
Mixed	0.0

NB: Size of redemption shock in% of NAV by fund style. EM = emerging market, FI = fixed income, HY= high yield.

Source: ESMA.

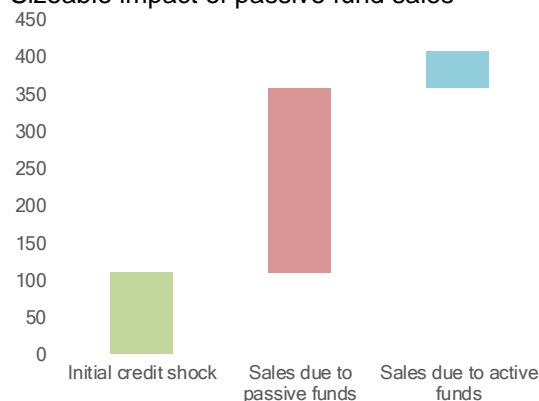
Active funds sell assets to meet redemption requests and to divest from fallen angels. Sales of bonds lead to additional price falls of 54bps for HY bonds, and 25bps for IG bonds.

RA.10 shows the corresponding impact of the shock on the HY market, which amounts to a cumulative increase of 410bps. Yields in the IG market would increase by 45bps (including a 25bps increase due to sales by active funds).

RA.10

High-yield bonds

Sizeable impact of passive fund sales



Note: Increase in HY bond yields.

Source: ESMA.

Overall, bond funds would not have a systemic impact on the HY market but instead would have a small additional effect (+50bps) on top of the more significant shock caused by passive funds, (+248bps), caused mainly by sales of non-EU ETFs (+208bps). On the other hand, the impact stemming from active fund sales may be underestimated here, as the expected size of shock creates the conditions for the first-mover advantage described earlier. Therefore, active funds may well sell more than a third of their fallen angels if they anticipate significant sales from other investors.

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