

The ECB Collateral Policy Beyond Conventional Monetary Stimulus

Monetary Dialogue July 2018



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Abstract

The importance of collateral as an instrument for monetary policy has increased in recent years not only in the light of the changes in the ECB's collateral framework during the crisis but also due to the progressive replacement of the unsecured money market segment with the secured one in the euro area. Both aspects are set to have consequences for collateral availability and the scarcity of high-quality assets, particularly as these interact with non-standard monetary policy. In this note, we look for evidence of the ECB's Expanded Asset Purchase Programme (EAPP) effects through the quantity and quality of collateral, based on the Eurosystem Collateral Data, as well as a review of the literature.

We conclude that collateral is vital to the well-functioning of money markets, and the availability *in principle* of monetary policy beyond conventional remains an important tool to deal with the issue of potential shortages of high-quality collateral, at least in the short-term.

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CONTENTS

LIST OF ABBREVIATIONS	4
LIST OF FIGURES	5
LIST OF TABLES	5
EXECUTIVE SUMMARY	6
1. THE EVOLUTION OF THE ECB'S BALANCE SHEET AND ITS COLLATERAL POLICY	8
1.1. Evolution in the ECB's balance sheet	8
1.2. The ECB's collateral framework	11
1.3. Collateral and risk	12
2. COLLATERAL AND UNCONVENTIONAL MONETARY POLICY	15
2.1. Emergency liquidity and Banking Union	23
2.2. Collateral constraints, asset allocations and prices	23
3. CLOSING REMARKS	25
REFERENCES	26
ANNEX	29

LIST OF ABBREVIATIONS

ABSPP	Asset-Backed Securities Purchase Programme
EAPP	Expanded Asset Purchase Programme
CRD	Capital Requirements Directive
CSDR	Central Securities Depositories Regulation
CSDs	Central Securities Depositories
CBPP	Covered Bond Purchase Programme
CSPP	Corporate Sector Purchase Programme
ECAI	External Credit Assessment Institutions;
ECB	European Central Bank
Fed	Federal Reserve Bank
ICASs	National Central Banks' In-House Credit Assessment Systems
IRBs	Counterparties' Internal Ratings-Based Systems;
LTROs	Long-Term Refinancing Operations
MRTOs	Main Refinancing Operations
PSPP	Public Sector Purchase Programme
RTs	Third-Party Providers' Rating Tools
SSSs	Securities Settlement Systems

LIST OF FIGURES

Figure 1:	Share of safe (AAA-rated) euro area government debt in total	9
Figure 2:	ECB's Balance Sheet (Assets), EUR Bln	10
Figure 3:	Shares of unsecured and secured money market transactions in total	10
Figure 4:	Eligible Marketable Assets	11
Figure 5:	Use of Collateral and Outstanding Credit	12
Figure 6:	ECB shadow rate and collateral-to-eligible asset ratio	16
Figure 7:	Distribution of haircut percentages by eligible asset type	19
Figure 8:	Distribution of haircut percentages by eligible asset type	20
Figure 9:	Distribution of haircut percentages by eligible asset type	21
Figure 10:	Distribution of haircut percentages by eligible asset type	22

LIST OF TABLES

Table 1:	List of credit assessment systems accepted by the Eurosystem	13
Table 2:	Risk components addressed by haircuts	14
Table 3:	Number of eligible assets by type and issuer group	17
Table 4:	Introduction of the different set of measures part of the Expanded Asset Purchase Programme	18
Table A 1:	Deriving the haircut category by type and issuer group	29
Table A 2:	ECB's Haircut schedule for assets eligible for use as collateral in Eurosystem market operations	30

EXECUTIVE SUMMARY

- The ECB's collateral framework played an important role in defining what was considered a safe asset before the crisis. The 2008 financial crisis and the adoption by the ECB of non-standard measures led to a revision of the collateral framework, with a widening of the balance sheet of the Eurosystem, reflecting the growing amount of assets accepted as collateral.
- At the same time, some haircuts were increased to insure the ECB against the greater liquidity risk and greater price volatility of these newly admitted debt securities (see Whelan, 2014), suggesting that the riskiness of the collateral underlying the ECB's liquidity operations did not necessarily increase much during those phases. Not only had the ECB taken into account preempting measures in line with changes in the risks underlying the refinancing operations, but it had also increased its exposure against potentially larger benefits (i.e. liquidity considerations).
- Clearly, the arguments for protecting the ECB against losses via higher average haircuts, particularly during acute phases of the business cycle, exist. It is important, however, that borrowing from the central bank is not done on highly unattractive terms, or in a way in which haircuts become evidently pro-cyclical.
- The importance of collateral as an instrument for monetary policy has increased in recent years not only in the light of (i) the aforementioned changes in the collateral framework to cope with financially distressed sovereigns and banks post-2010, but also (ii) due to the progressive replacement of the unsecured money market segment with the secured one.
- Both aspects (i) and (ii) are set to have consequences for collateral availability and the scarcity of high-quality assets, particularly as these interact with non-standard monetary policy, such as the ECB's Expanded Asset Purchase Programme (EAPP).
- The availability of high-quality collateral is vital to the well-functioning of money markets.
- We look for evidence in the ECB's EAPP effects through the **quantity** of collateral, i.e. the number of eligible assets by type and issuers, and its **quality**, as captured by the distribution of the haircuts across asset types and issuers, based on the Eurosystem Collateral Data.
- The use of non-standard measures has not substantially changed the amounts of collateral in EUR billions, which have gradually decreased since 2012. The amounts of eligible assets in EUR billions have nevertheless increased, even if mainly between 2010 and 2012, and remained stable thereafter.
- After 2014, there is an observed drop in the overall number of eligible assets, mainly driven by financial institutions covered bonds.
- The eligible asset-backed securities (ABS) have more than halved between 2010 and 2017, reflecting changes in the collateral framework.
- On the public purchase side, sovereign bonds' haircuts have not returned to what observed back in 2010. The distribution has shifted slightly overall and there are some large haircuts related to particular issuers. There could be signs of a restrictive revision of the haircut policy preempting a « normalization » phase of monetary policy.
- As the result of the EAPP, the spreads of all asset classes have shrunk except for bank bonds as they are excluded from the ECB purchase program. The haircut distribution on these asset classes has continued to shift as a whole after 2014, suggesting further increases in the average haircut for this whole asset class, possibly signalling market fragmentation.

- Now that the European Central Bank has communicated its plans to wind up the bond-buying programme at the end of this year, it remains to be asked whether and how financial markets will cope with the lack of excess demand coming from the ECB's EAPP. This might release some government debt but risk creating a dual market for collateral between core and periphery. In this respect, the completion of a Banking and Capital Market Union will be of paramount importance in the medium/long term in order to avoid in the future high haircuts or the scarcity of safe assets to affect the ability of banks in the periphery to shift to secured funding.
- Governance issues may arise for the ECB/SSM as it is still unclear how the policy of collateral management, and the recourse to the ELA, in particular, will practically interact with the Banking Union's completion (resolution in particular).
- Based on a review of the theoretical literature, unconventional monetary policy remains an important tool for dealing with the issue of high-quality collateral scarcity. The availability in principle of non-conventional monetary policy, as announced by the ECB President recently, remains crucial to deal with the issue of a potential shortage of high-quality collateral, at least in the short-term.

1. THE EVOLUTION OF THE ECB'S BALANCE SHEET AND ITS COLLATERAL POLICY

1.1. Evolution in the ECB's balance sheet

When providing liquidity, the European Central Bank requires collateral or eligible assets, an action typically aimed at safeguarding its balance sheet. This means collateral is accepted as a part of the monetary policy operations at market price subject to a haircut which is applied to insure against risk or any downward corrections in the price of the asset underlying the refinancing operation.

While part of the « standard » functioning of the ECB in its liquidity-provision role, the evolution of the Eurosystem collateral framework has been debated over the recent years. Prior to the crisis, the framework has been criticized for not helping investors sufficiently differentiate sovereign risk, resulting in markets under-pricing country-specific risk *premia* (Buiter and Sibert, 2005). During the sovereign debt crisis, the collateral policy was further lambasted in the light of the ECB's extension to accept lower-rated assets, as the ECB moved to increase collateral availability, *inter alia*, extending the eligibility criteria by relaxing rating thresholds for certain asset classes (for a review see Pisani-Ferry and Wolff, 2012; Wolff and Leandro, 2014).¹

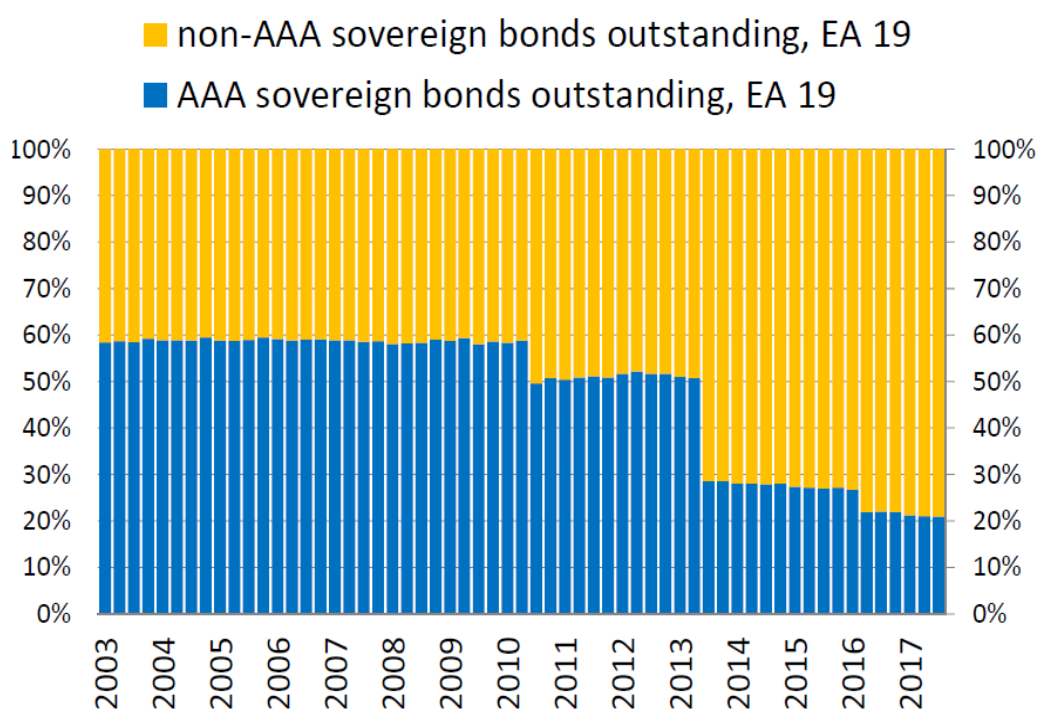
Particularly, rating downgrades of several euro area sovereigns during the crisis reduced the availability of high-quality collateral that could be used in ECB's lending. The amount of safe (AAA-rated) government debt fell from 60% of total debt outstanding in 2003 to 20% in 2017 (Figure 1). As of October 2008 and before the second three-year LTRO, the ECB's eligible collateral was expanded to include securities rated below A–.

While potentially decreasing the quality of the ECB's assets holding, this adjustment in the collateral measures arguably helped support frailer banks in financially weaker countries. The spike in the ECB's balance sheet corresponding with LTRO II in Feb 2012 in Figure 2, for instance, had Italian, Spanish, Portuguese, Irish and Greek banks as the largest uptakers of this liquidity, corresponding to 80% of ECB's liquidity Main (MRTOs) and Long-Term Refinancing Operations (LTROs) (Nyborg, 2017 ; Wolff and Leandro, 2014).²

¹ While such an extension was nevertheless necessary to provide sufficient liquidity to banks in the euro area periphery, as well as to some banks in the core, some have argued these extensions represented *de-facto* a fiscal bail-out, resulting into a slower adjustment of current accounts through consumption and investment allocation (Sinn and Wollmershäuser, 2011), or any way they did not help to limit the extent of TARGET2 imbalances (Merler and Pisani-Ferry, 2012).

² Government guarantees played an important part here as they were widely used. The usage of government guarantees strengthened the doom-loop between governments and banks. For instance, the total value of the collateral guaranteed from the Italian government to banks amounted to more than EUR 80 bln, increasing their total collateral value by around EUR 30 bln at the margin (Nyborg, 2017).

Figure 1: Share of safe (AAA-rated) euro area government debt in total



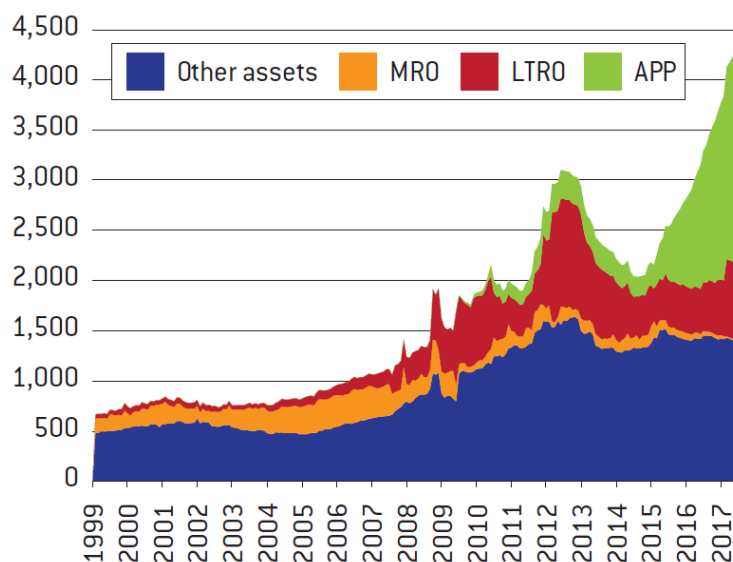
Source: De Fiore *et al.* (2018).

In addition, the majority of the haircuts were concentrated in the category of BBB+ paper or below, to insure the ECB against the greater liquidity risk and greater price volatility of the newly admitted debt securities (Whelan, 2014).³ As a result, the riskiness of the collateral underlying the ECB's liquidity operations did not increase much during those phases. From a pure-accounting point of view, **it is difficult to identify any particular mounting risks associated with the expansion in the ECB's balance sheets as a consequence of the functioning of the collateral framework during the crisis.** Practically, however, not only the ECB had taken into account preempting actions in line with an increase in the risks underlying its refinancing operations (Whelan, 2014), but it had also increased its exposure against potentially larger benefits, i.e. ensuring that banks could keep access to central bank's liquidity.

The importance of quality of collateral as an instrument for monetary policy has increased in recent years. This has to do not only with the aforementioned changes in the ECB's collateral framework to cope with financially distressed sovereigns and banks but also due to the progressive replacement of the unsecured money market segment with the secured one (Figure 3) in the euro area.

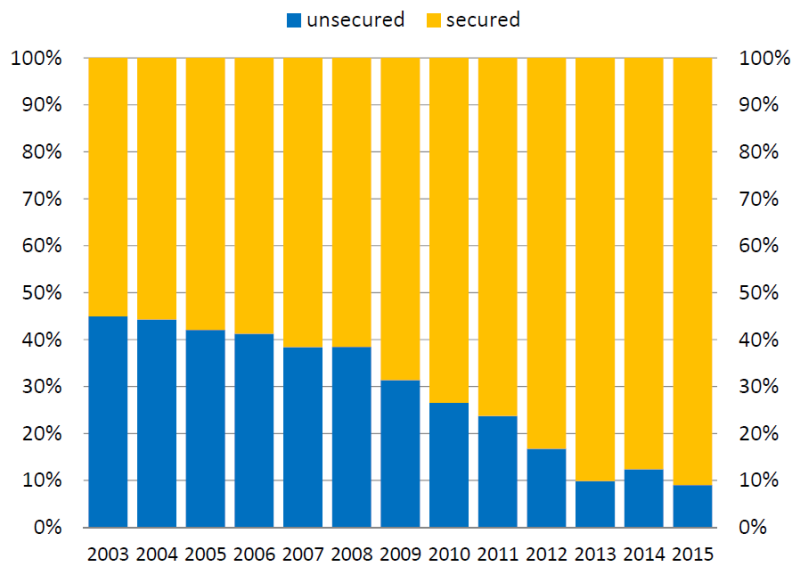
³ At the same time, however, the haircuts applied by the ECB on the same collateral were lower than private market haircuts and remained broadly more stable (see De Fiore *et al.*, 2018 ; or Clayes and Goncalves Reposo, 2018, for an alternative interpretation).

Figure 2: ECB's Balance Sheet (Assets), EUR Bln



Source: Clayes and Demertzis (2016).

Figure 3: Shares of unsecured and secured money market transactions in total



Note: Breakdown of the cumulative quarterly turnover in the euro area unsecured and secured money market segments (percentages of total), based on the Euro Area Money Market Survey 2015. The survey was conducted once a year, with each data point corresponding to the second quarter of the respective year. The panel comprised 98 euro area credit institutions. The survey was discontinued in 2015.

Source: De Fiore *et al.* (2018) based on the Euro Area Money Market Survey 2015.

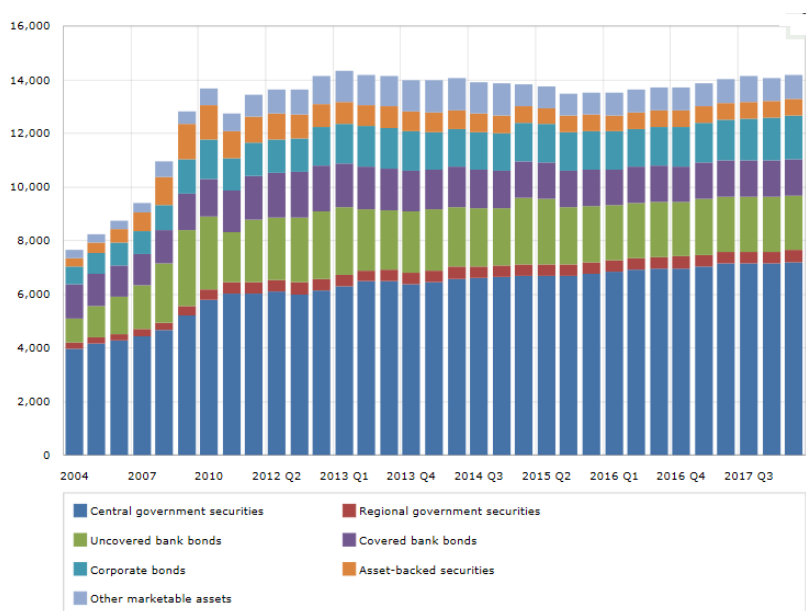
Based on the Euro Area Money Market Survey 2015, the proportion of the secured market segment over total moved from 50% in 2003, up to 90% in 2015 (which is the year the Survey is last available), with collateralized lending now representing the vast majority of money market transactions. Such an increased reliance on the secured funding shift banks' asset composition away from lending and towards assets that can be used as collateral, exposing the same banks to fluctuations in the value of collaterals themselves (De Fiore *et al.*, 2018). Both aspects are set to have

consequences for collateral availability and the scarcity of high-quality assets, particularly as these interact with non-standard monetary policy, such as the ECB's Expanded Asset Purchase Programme (EAPP).

1.2. The ECB's collateral framework

Collateral plays a key role in monetary policy, where the counterparties to the ECB are financial institutions that receive central bank's liquidity. Only when the bank is unable to repay, the ECB can use the collateral, by seizing it up, in order to prevent financial losses. The value of the collateral should, therefore, reflect the amount of liquidity given to the bank, net of risk and/or any downward corrections in the prices of the collateral.

Figure 4: Eligible Marketable Assets

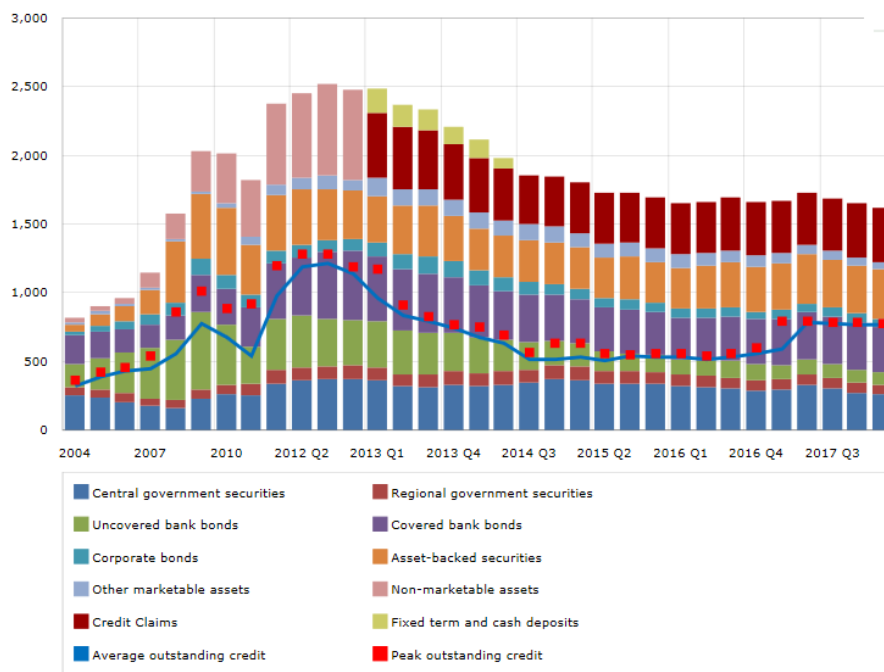


Source: Eurosystem Collateral Data. Last observation 2018Q1.

The ECB accepts a larger variety of securities compared to other central banks, consisting of 30-40,000 different asset classes, ranging from government bonds to unsecured bank bonds and ABS. Figures 4 and 5 show the availability and use of collateral in the Eurosystem until the first quarter of 2018: at the beginning of 2018, eligible assets have a value of around EUR 14 tln, having increased from a value of approx. EUR 7.7 bln in 2004. The eligible assets correspond largely to central government securities. In terms of used collateral (Figure 5), while the share of government bonds has remained broadly stable, lower quality collateral such as asset-backed-security and uncovered bank bond has been increasing between 2004 and 2018.

Different central banks use different collateral frameworks (see ECB, 2014). Compared to the US Federal Reserve, which accepts only public sector and central government bonds, in the euro area, the banking system is much wider and more heterogeneous – being the result of 19 different national systems – thus, requiring a wider array of collateral assets to be employable (see also Wolff and Leandro, 2014). Compared to the Fed, the ECB has also been much more aggressive when it comes to using its collateral framework (see ECB, 2014; De Fiore *et al.*, 2018). In Section 3, we look at the latter in the context of the EAPP.

Figure 5: Use of Collateral and Outstanding Credit



Source: Eurosystem Collateral Data. Last observation 2018Q1.

1.3. Collateral and risk

While the current approach to valuing haircuts relies on the ratings made by private credit rating agencies – the so-called external credit assessment institutions (ECAIs) – the Eurosystem credit assessment framework (ECAAF) depends on three other sources as well, such as (see Table 1):

- national central banks’ in-house credit assessment systems (ICASs);
- counterparties’ internal ratings-based (IRB) systems;
- third-party providers’ rating tools (RTs).

The Eurosystem applies measures to the assets underlying its credit operations to control counterparty risk; the mitigation of which is designed to adequately limit three kinds of risk, specifically, all of which arise if the counterparty defaults and there is a subsequent need to realise the collateral in the market (see Table 2 ; ECB, 2015) :

- the *credit* risk associated with the underlying asset accepted as collateral;
- the *market* risk of possible exogenous price swings of the aforementioned collateral between the last collateral valuation and its market realisation ;
- the *liquidity* risk of price swings of an asset caused by « an attempt on the part of the Eurosystem to liquidate a potentially large position in that asset » (ECB, 2015).

Table 1: List of credit assessment systems accepted by the Eurosystem

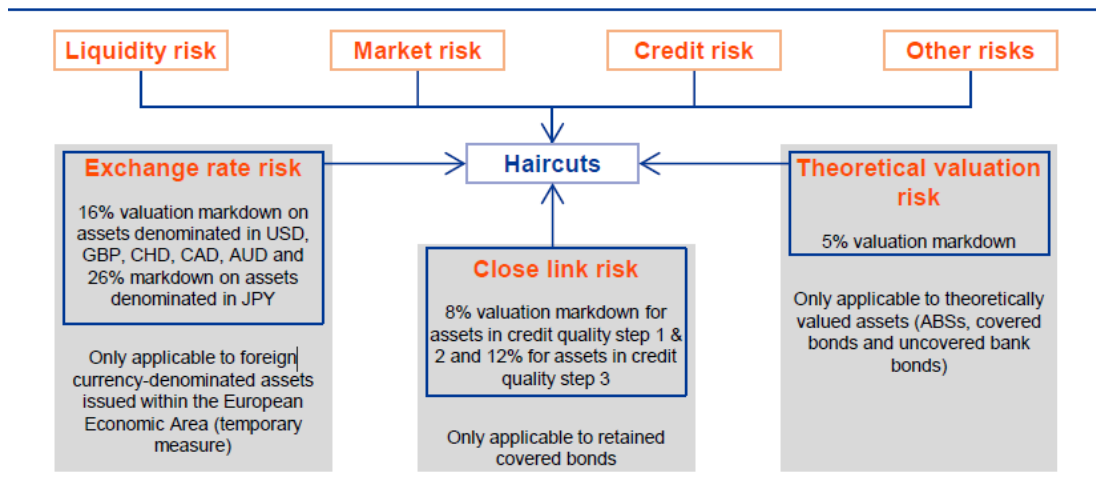
Credit assessment source	Credit assessment system / provider	Coverage
ECAI	DBRS	Eligible assets / issuers / debtors / guarantors from EEA or non-EEA G10 countries
	FitchRatings	Eligible assets / issuers / debtors / guarantors from EEA or non-EEA G10 countries
	Moody's	Eligible assets / issuers / debtors / guarantors from EEA or non-EEA G10 countries
	Standard & Poor's	Eligible assets / issuers / debtors / guarantors from EEA or non-EEA G10 countries
ICAS	Nationale Bank van België/Banque Nationale de Belgique	Belgian non-financial corporations
	Deutsche Bundesbank	German non-financial corporations
	Central Bank of Ireland	Mortgage-backed promissory notes issued by Irish credit institutions
	Banco de España	Spanish non-financial corporations
	Banque de France	French non-financial corporations
	Banca d'Italia	Italian non-financial corporations
	Oesterreichische Nationalbank	Austrian non-financial corporations
	Banco de Portugal	Portuguese non-financial corporations
	Banka Slovenije	Slovenian non-financial corporations
RT	Cerved Group	Italian non-financial corporations

Source: Eurosystem credit assessment framework.

Said that, however, attenuating risk in the framework of the Eurosystem's credit operations is complex at the moment, as it relies, *inter alia*, on market evaluation. This may be particularly problematic when the evaluation of asset prices are detached from fundamentals (see De Grauwe *et al.*, 2017), in turns, requiring revisions in the collateral framework. As observed during the crisis, while protecting the Eurosystem from financial risks in its liquidity-providing operations, collateral adjustments' measures kept the general aim to avoid penalising counterparties and to allow them to use enough eligible assets (see also Whelan, 2014).

Clearly, the arguments for protecting the ECB against losses via higher average haircuts, particularly during recessions, exist (Whelan, 2014 ; see also Clayes and Goncalves Raposo, 2018). **It is important, however, that borrowing from the central bank is not done on highly unattractive terms, or in a way in which haircuts become evidently pro-cyclical** (see Whelan, 2014 ; Clayes and Goncalves Raposo, 2018). This could lead otherwise to banks deleveraging, which would have negative knock-on effects on lending and the real economy itself (Whelan, 2014). As Whelan (2014) puts it, the rationale here is that of having a collateral policy that is broader in nature, rather than having a framework that provides a « publicly-sanctioned » advantage which is limited to a smaller number of issuers.

Table 2: Risk components addressed by haircuts



Source: ECB (2015).

2. COLLATERAL AND UNCONVENTIONAL MONETARY POLICY

While low average haircuts play a role in driving up the demand for sovereign bonds *ex ante* because they translate into a larger amount of central bank funding to banks, a bank that is perceived as having a problem with low-quality collateral may risk having to pay more *ex-post*, if markets fear a government's default on their debt, as observed during the crisis. **The availability of high-quality collateral is thus vital to the well-functioning of money markets.**

Buiter and Sibert (2006) have voiced concerns on how – prior to the crisis – the additional demand for sovereign debt generated by their EU's regulatory treatment,⁴ as well as the ECB's collateralized lending procedures, were responsible for financial markets underpricing government debt. The ECB has since then announced several changes in the collateral policy, with the fixed-rate with full allotment policy for the MROs and the LTROs first, then as the result of the ECB Assets' expansion following the Public Sector Purchase Programme (PSPP) and the Corporate Sector Purchase Programme (CSPP), and lastly with the announcement of the asset-backed security (ABS) and third round of the covered bond purchase program (see Wolff and Leadro, 2014).⁵ As a part of the revision of the collateral framework, last December, the ECB further decided that unsecured subordinated bank bonds were excluded from the list of securities that can be used as collateral, phasing out its framework published in 2014 for the assessment of securities settlement systems (SSSs) and links.⁶ The ECB is also excluding commercial mortgage-backed securities (CMBSs) from collateral eligibility, owing to « their relatively complex nature ». For the future, the revised framework means that any financial institutions that hold unsecured subordinated bank debt will be unable to use them to borrow from the ECB.⁷ In this respect, the completion of the European Banking Union will be of great importance not least for the credit operations of the ECB.

In the context of the EAPP, the riskiness of the collateral underlying the ECB's loans has importantly increased overall, as the average haircut applied to collateral by the Eurosystem has risen from around 3% in 2008 to 14% in 2017. As we shall discuss later, this increase in the average haircut was driven by a few specific asset classes and issuers.

In Figure 6, the changes in the collateral policy are well visible in the collateral-to-eligible assets ratio, with a first spike in 2008 and the second one around 2011/12, the latter corresponding to the two three-year LTROs, held in December 2011 and February 2012, respectively, when banks received more than EUR 1 tln. In the graph, the collateral-eligible asset ratio is plotted against a commonly used measure for monetary policy beyond the zero lower bound (see Wu and Xia, 2016), i.e. a shadow rate below zero is understood to capture non-conventional monetary policy stimulus. It results that **the use of non-standard measures has not substantially changed the amounts of collateral used**

⁴ An additional boost in the demand of financial institutions for sovereigns was the Capital Requirements Directive (CRD), which allowed banks to exploit profitable carry trade opportunities by using low-interest ECB funding – mainly through the exceptional rounds of LTROs – and investing in higher yielding sovereign debt with a corresponding maturity. The implications of the above have nevertheless changed with the institution of the Single Supervisory Mechanism (SSM), as a first step of a European Banking Union (see Section 3).

⁵ The effect of those policies have well been documented in previous notes. See for instance, the compilation of notes on the "Effectiveness of the ECB programme of asset purchases: Where do we stand?", as a part of the Monetary Dialogue 21 June 2016 on the PSPP ([http://www.europarl.europa.eu/cmsdata/105480/IPOL_IDA\(2016\)578995_EN.pdf](http://www.europarl.europa.eu/cmsdata/105480/IPOL_IDA(2016)578995_EN.pdf)), or Macchiarelli et al. (2017) on the CSPP.

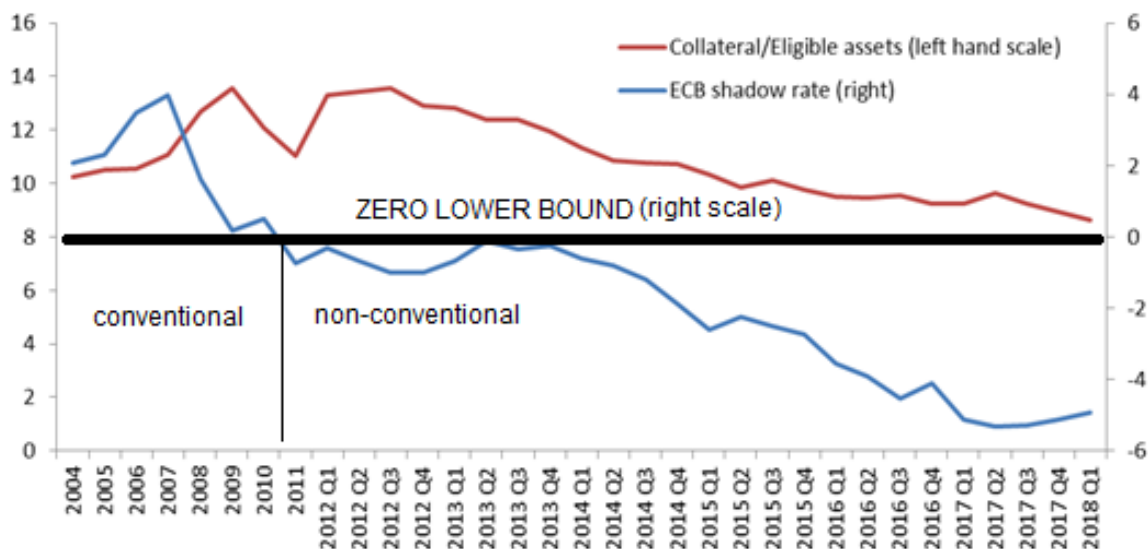
⁶ The ECB has implemented those measures in February (ECB/2018/03), changing the eligibility criteria of unsecured bank bonds, adjusting the haircuts for floating rate assets and risk control measures for retained covered bonds with extendible maturities and amending the criteria on interest payment structures for eligible credit claims.

⁷ The ECB aims to make sure it is not expose to holding such bonds on its balance sheet, because they can be bailed-in easily.

in EUR billions, which have gradually decreased since 2012. The amount of eligible assets in EUR billions has nevertheless increased, even if mainly between 2010 and 2012 (see Figure 4).

Disentangling the effects of the ECB's Expanded Asset Purchase Programme on the change in the collateral structure is not an easy exercise, owing to the multiplicity of market forces at play.

Figure 6: ECB shadow rate and collateral-to-eligible asset ratio



Source: Authors computation based on the Eurosystem Collateral Data. Last observation 2018Q1. The Wu-Xia Shadow rate is calculated as in Wu and Xia (2016) and available at <https://sites.google.com/view/jingcynthiawu/shadow-rates>.

For sake of exposition, we look for evidence in the ECB's EAPP effects through the **quantity** of collateral, i.e. the number of eligible assets by type and issuers, and its **quality**, as captured by the distribution of the haircuts across asset types and issuers, based on the individual Eurosystem Collateral Data (further explanation on the liquidity categories for the Eurosystem's marketable assets and the haircut category by type and issuer group are available in Table 1A and 2A in the Annex). Particularly, we check whether quantity and quality have substantially changed after 2014, which is when most of the recent Public sector, Corporate and Covered bond Purchase programs were implemented.

We particularly report the number of eligible assets and the haircut distribution during (i) 2010, (ii) 2014 – the latter date also corresponding to the ECB's introduction of the temporary framework – (iii) in 2017, and up until the last available observation in (iv) June 2018.

Looking at the numbers in Table 3, a few facts stand out :

- Overall, the number of eligible assets has increased up until 2014 decreased thereafter and remained broadly ever since. This reflects the fact that, **after 2014, there is an observed drop in the overall eligible assets mainly driven by financial institutions covered bonds**. This number has moved from 5347 eligible assets in 2010 to 3630 in 2018.
- **The eligible ABS have more than halved after 2014 (between 2010 and 2017), reflecting changes in the collateral framework**, as discussed by Wolff and Leandro (2014).

Table 3: Number of eligible assets by type and issuer group

		IG1	IG2	IG3/ IG11	IG4	IG5	IG6	IG7	IG8	IG9	TOTAL
		Central Bank	Sovereign	Corporate and other issuers	Credit Institution (excl agencies)	Regional/Local Govt	Supranational Issuer	Agency – non-credit inst.	Agency - credit institutions	Fin. corp. other than credit institutions	
2018 (last observation)											
AT1	Bond	122	2206	548	6339	1208	30	44	233	173	10903
AT2	Medium Term Notes	36	182	965	4907	462	327	110	455	1073	8517
AT3	T-bill / CP/ CD	260	171	1066	2885	306	62	49	89	265	5153
AT9	Jumbo Pfandbriefe-style				335						335
AT10	Traditional covered bonds				3630						3639
AT11	Other securitised assets / ABS / MBS									764	764
AT12	Multi-cédulas									20	20
AT13	Structured covered bonds				65					4	69
	TOTAL	418	2559	2579	18161	1976	419	203	786	2299	29400
2017 (end of year)											
AT1	Bond	115	2235	505	6259	1257	32	43	189	178	10813
AT2	Medium Term Notes	35	186	1002	5244	443	313	124	384	1109	8840
AT3	T-bill / CP/ CD	350	132	828	2995	272	48	53	103	212	4993
AT9	Jumbo Pfandbriefe-style				315						315
AT10	Traditional covered bonds				3639						3648
AT11	Other securitised assets / ABS / MBS									778	778
AT12	Multi-cédulas									22	22
AT13	Structured covered bonds				62					3	65
	TOTAL	500	2553	2335	18514	1972	393	220	685	2302	29474
2014 (end of year)											
AT1	Bond		1926	443	7720	1381	51	87	194	269	12071
AT2	Medium Term Notes		160	791	6865	359	238	141	296	1214	10064
AT3	T-bill / CP/ CD		195	776	3895	308	11	63		579	5827
AT9	Jumbo Pfandbriefe-style				321						321
AT10	Traditional covered bonds				4353				13		4366
AT11	Other securitised assets / ABS / MBS									915	915
AT12	Multi-cédulas									39	39
AT13	Structured covered bonds				41					2	43

TOTAL		2281	2010	23195	2048	300	291	503	3018	33646
		2010 (end of year)								
AT1	Bond	1505	341	5909	1243	48	30	267	168	9511
AT2	Medium Term Notes	104	559	5463	230	180	5	223	1484	8248
AT3	T-bill / CP/ CD	194	870	1767	233	9	1		78	3152
AT9	Jumbo Pfandbriefe-style			313						313
AT10	Traditional covered bonds			5347				41	5	5393
AT11	Other securitised assets / ABS / MBS		1						1580	1581
AT12	Multi-cédulas									
AT13	Structured covered bonds									
TOTAL		1803	1771	18799	1706	237	36	531	3315	28198

Source: Eurosystem Collateral Data. Last observation 2018Q1. Further information on ECB website <https://www.ecb.europa.eu/paym/coll/risk/liquidity/html/index.en.html>.

Table 4: Introduction of the different set of measures part of the Expanded Asset Purchase Programme

		2010	2011	2012	2013	2014	2015	2016	2017	2018	
Bonds	Supranational	Not implemented					PSPP	PSPP	PSPP	PSPP	PSPP
	Sovereigns	SMP	SMP	SMP/ OMT announ.	OMT announ.	OMT announ.	PSPP	PSPP	PSPP	PSPP	
	Municipal and local Govt	Not implemented					PSPP	PSPP	PSPP	PSPP	
	Financial Institution	Not implemented					Not implemented				
	Corporate	Not implemented					Not implemented				
	Covered	CBPP1 (since 2009)	CBPP2	CBPP2	Not implemented		CBPP3	CBPP3	CBPP3	CBPP3	CBPP3
Other securitised assets	Not implemented					ABSPP	ABSPP	ABSPP	ABSPP	ABSPP	

Legend: ■ Implemented ■ Announced ■ Not implemented

Source: Authors' elaboration based on the ECB's explanation of its Expanded Asset Purchase Programme <https://www.ecb.europa.eu/mopo/implement/omt/html/index.en.html#abspp>.

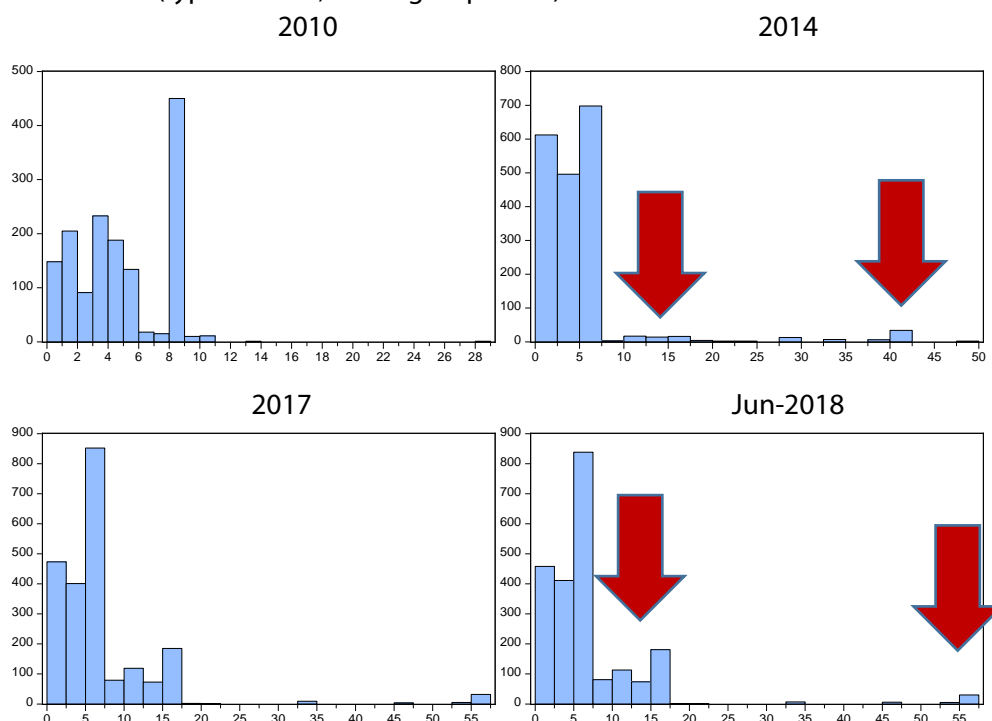
Note: The Eurosystem started to buy corporate sector bonds under the corporate sector purchase programme (CSPP) on 8 June 2016. On 9 March 2015, the Eurosystem started to buy public sector securities under the public sector purchase programme (PSPP). The asset-backed securities purchase programme (ABSPP) started on 21 November 2014. On 10 May 2010, the central banks of the Eurosystem started purchasing securities in the context of the Securities Markets Programme (SMP). Following a Governing Council decision on 6 September 2012 to initiate outright monetary transactions, the SMP was terminated. It is assumed in the Table the OMTs announcement is long-lived, owing to the permanent availability of the ECB to use it if warranted. On 2 July 2009, the Eurosystem launched its first covered bond purchase programme (CBPP1). The programme ended, as planned, on 30 June 2010 when it reached the announced nominal amount of €60 billion. In November 2011, the Eurosystem launched a second covered bond purchase programme (CBPP2). The programme ended, as planned, on 31 October 2012 when it reached a nominal amount of €16.4 billion.

The ECB's EAPP purchases have dominated prices in credit markets in the euro zone, from public debt to covered bonds, **having an important effect chiefly on the quality of the collateral. It is indeed by looking at the distribution of haircuts before and after 2014 that we get more insights into the interactions between the EAPP and the collateral framework.** In Table 4, we summarize the different sets of measures implemented (or announced, as in the case of the Outright Monetary Transactions – OMTs) as part of the broader EAPP. In the Table, we report the asset classes mainly (but not exclusively) purchased under each program.

On the public debt side, it is well documented that the ECB's purchases had – among the others – the objective of bringing sovereigns' yields closer together, attenuating investors' perception of country-specific risks (see, e.g., more recently, De Santis, 2016). In terms of the distribution of haircuts, however, it emerged that high average haircuts in 2014 were the result of some issuers experiencing haircuts as high as 50%, which, in turn, affected the use of these assets as collateral. Those do not represent the vast majority, however, as it can be seen from Figure 7. In 2017 (and 2018), the distribution for **sovereign bonds' haircuts has not returned to what observed back in 2010**, with haircuts at around 10-15% having increased, and some haircuts getting as high as 55%.

Figure 7: Distribution of haircut percentages by eligible asset type

SOVEREIGNS BONDS (type = AT01 ; issuer group = IG2)



Source: Authors' calculations based on the Eurosystem Collateral Data

<https://www.ecb.europa.eu/paym/coll/assets/html/list-MID.en.html>. Last observation 2018Q1.

With the ECB's APP and the previous OMT announcement, it seems the compression of sovereign bond yields would have helped banks to borrow. In fact, looking at the distribution of the haircut in the light of the above, the mass of the **haircut distribution on sovereign debt has generally moved not so strongly towards the right**, again **with the exception of some notable cases above 20%**; all of which becomes more evident in 2017/2018. On this market, all the above could be read as

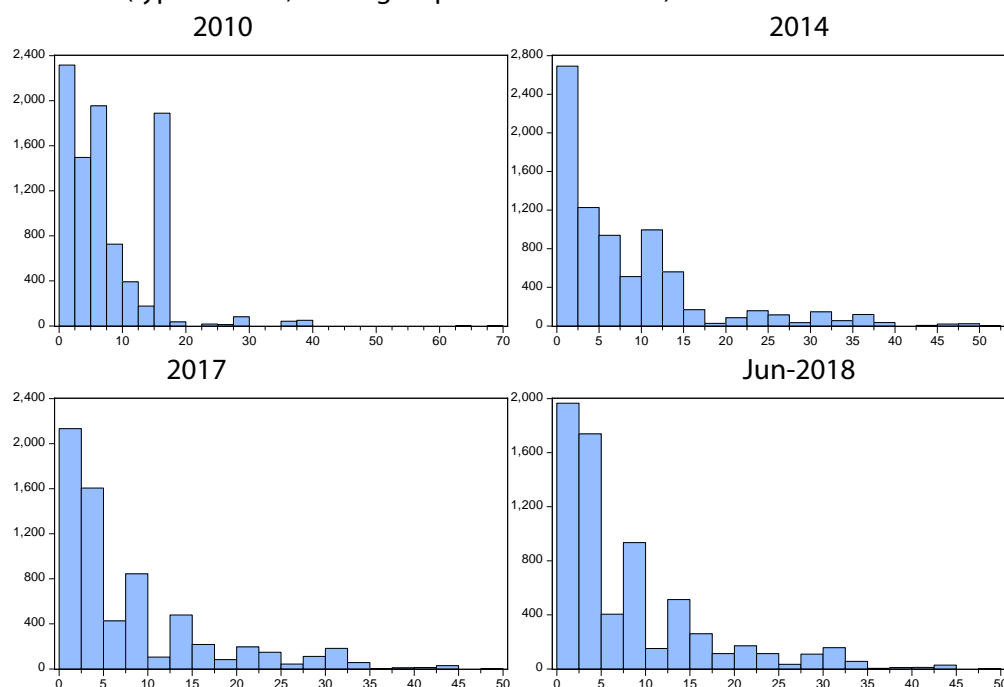
preliminary **signs of a restrictive revision of the haircut policy preempting a « normalization » phase of monetary policy.**

It should be noted that one of the most significant effects created from the buying of government bonds also had an effect in the **repo market**, where government securities are used as collateral for short-term, collateral-backed, interest-bearing repurchase agreements (*de facto*, loans) between banks, investors and other market participants. Tensions in the repo market were particularly acute in 2016, but not at the moment. In fact, the liquidity created by the unconventional policies adopted by the ECB has reduced the reliance of banks onto the interbank lending market.

It should also be mentioned that, because the ECB has bulk bought government bonds, the scarcity of government debt as collateral has increased; something we underlined in a previous note, particularly as far as the scarcity of German bunds was concerned (Gerba and Macchiarelli, 2016). This has coincided with rising demand for collateral, due in part to regulatory requirements for banks. Still, as evinced from Table 3, the number of eligible assets has not changed much after 2014, whereas it has increased before, owing to eligibility criteria. **The ECB launched a programme in December to lend out the government bonds it bought. However, the number of eligible debt assets has remained broadly stable, as the APP purchases continue.**

Figure 8: Distribution of haircut percentages by eligible asset type

COVERED BONDS (type = AT10 ; issuer group = IG4 & IG8 & IG9)

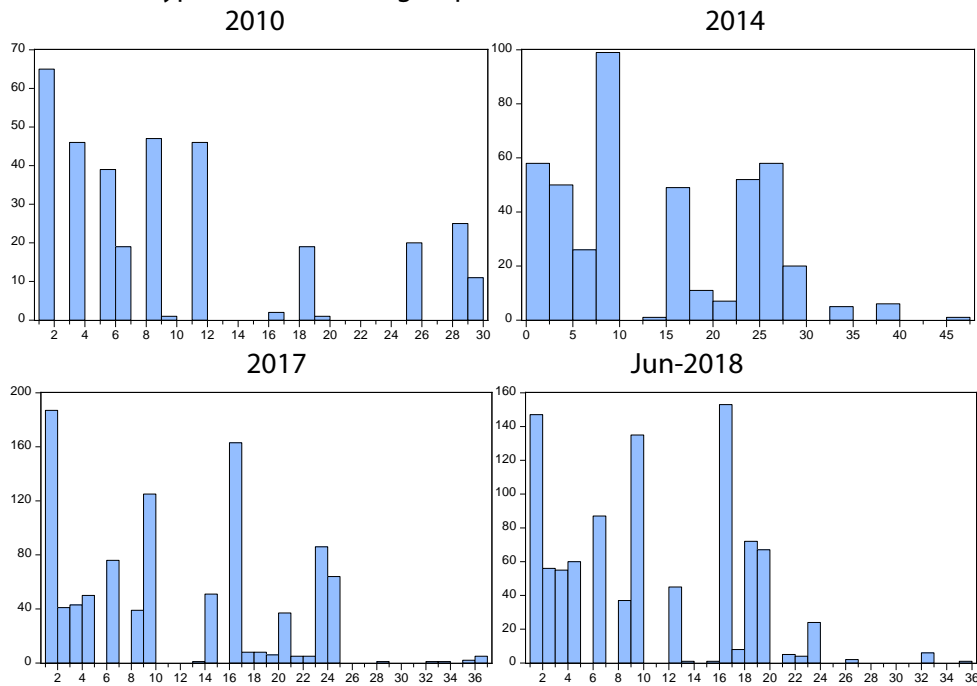


Source: Authors' calculations based on the Eurosystem Collateral Data <https://www.ecb.europa.eu/paym/coll/assets/html/list-MID.en.html>. Last observation 2018Q1.

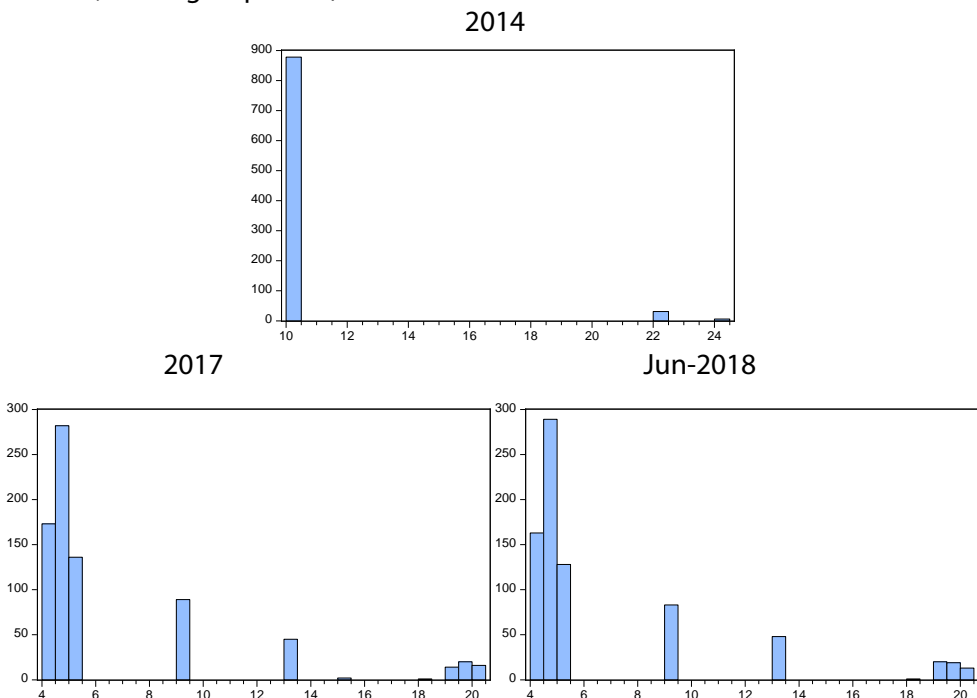
In terms of covered bonds, the ECB first announced it would buy covered bonds in 2009. At the time, the motive was to stabilise European banks in need of funding. Two programmes followed, with the most recent in 2014 (Table 4).

Figure 9: Distribution of haircut percentages by eligible asset type

CORPORATE BONDS (type = AT01 ; issuer group = IG3/IG11)



ABS (type = AT11 ; issuer group = IG9)



Source: Authors' calculations based on the Eurosystem Collateral Data. Last observation 2018Q1. Too few data points are available for ABS in 2010.

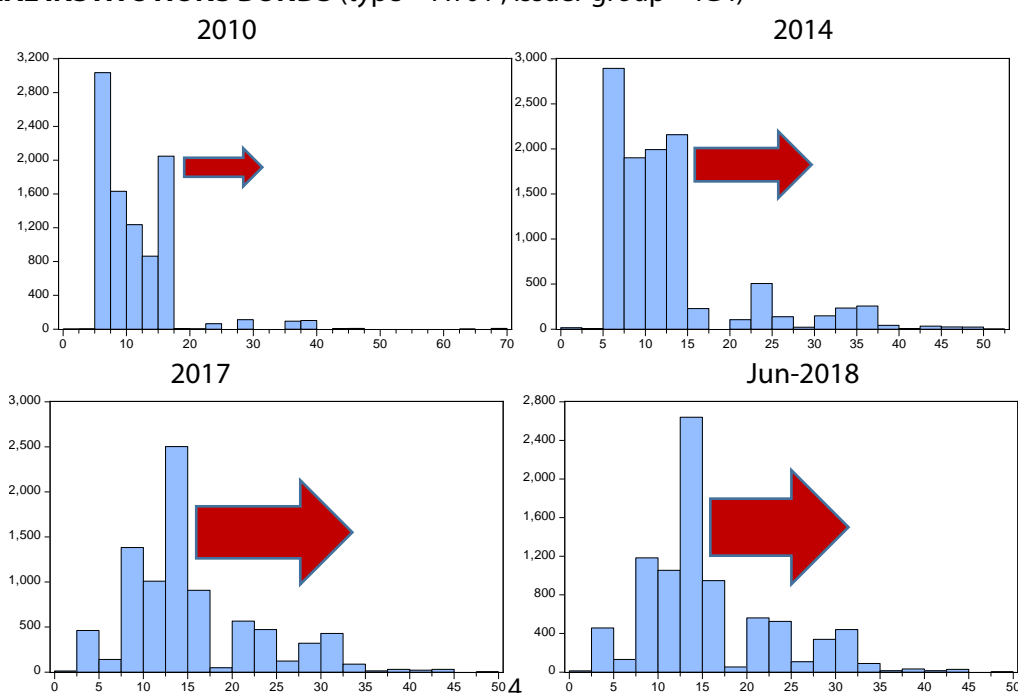
As in the case of the sovereigns, the distribution in Figure 8 started to skew towards the right, suggesting larger average haircuts driven by a number of issuers; again not the vast majority. In other words, **for covered bonds, there are signs of a right-shift in the distribution of the haircuts**

overall, even if less than what observed for sovereign bonds. The ECB increased the haircut for some covered bond categories (so-called own-used covered bonds) used as collateral for refinancing repo transactions and excluded conditional pass-through (CPT) covered bonds from their use as collateral. These securities were used in particular by non-investment grade banks in Italy, Spain, Greece and Portugal.

Equally, the ECB buying in the corporate bond and ABS market has had an effect on the distribution of haircuts on the eligible assets (Figure 9), as well as markets' perception. The distribution of haircuts equally suggests an increase in the heterogeneity in 2014, both as the result of a greater number of eligible assets (e.g. in 2014 the ECB introduced for the ABS a broader eligibility rating from AAA to A-), as well as different credit assessment thresholds.

Figure 10: Distribution of haircut percentages by eligible asset type

FINANCIAL INSTITUTIONS BONDS (type = AT01 ; issuer group = IG4)



Source: Authors' calculations based on the Eurosystem Collateral Data

<https://www.ecb.europa.eu/paym/coll/assets/html/list-MID.en.html>. Last observation 2018Q1.

We also note that **the spreads of all asset classes have shrunk except for bank bonds as they are excluded from ECB purchases under the EAPP** (Table 4). Obviously, senior and unsecured bank bonds are used today as collateral with ratings up to BBB- and represent 6% of the total collateral.⁸ As we can gauge from Figure 10, **the haircut distribution on these asset classes has continued to shift – a pattern which has continued after 2014, suggesting further increases in the average haircut, possibly (but not necessarily) signalling continued market fragmentation.**

⁸ At the beginning of the year, the ECB announced that German bank bonds would no longer be eligible, as of December 2018. This is because all bank bonds with a subordinated structure are now excluded (in Germany subordinated senior bonds represent the majority; not so for other European countries).

Now that the European Central Bank has signalled its plans to wind up the bond-buying programme at the end of this year, subject to data confirming the ECB's medium-term outlook for inflation, it remains to be asked whether and how financial markets will cope with the lack of excess demand coming from the ECB's EAPP and the PSPP in particular. The end of the PSPP might release some government debt but it risks creating a dual market for collateral between core and periphery. In this respect, the **completion of a Banking and Capital Market Union will be of paramount importance in the medium/long run in order to avoid in the future high haircuts or the scarcity of safe assets to affect the ability of banks in the periphery to shift to secured funding.**

2.1. Emergency liquidity and Banking Union

One of the key issues that have been identified by the previous contributions on the same collateral issue was how to deal with banks which need loans but do not have available quality collateral. Many have then pointed to a potential trade-off between emergency liquidity provision – i.e. the so-called Emergency Liquidity Assistance (ELA) – and accepting below-the-bar collateral.⁹ The experience of the Eurosystem's provision of ELA in recent years has not necessarily been positive, with a number of controversies having arisen in countries such as Ireland, Cyprus and Greece (see Whelan, 2014). With the ECB being entrusted with the role of euro area banks' common Supervisor as of 2014, however, most of the previous arguments for the current system of ELA provision are less binding (see also Whelan, 2014; Huertas, 2013). In fact, while an NCBs extends ELA by their own account and any potential losses from the ELA remain to that national central bank, it may be up for debate whether this will not affect the ECB and its role as Single Supervisor in the context of the European Banking Union. In other words, one could ask which effect a bank's failure will have (even, in the event of an entire country's banking sector being stressed), should a country not be granted recourse to ELA and whether, in the latter case, a « too-big-to-fail » issue would arise, both for monetary policy (e.g., forcing the ECB to deviate from its inflation target) and financial stability purposes (see also European Parliament, 2017).

While the issue is much broader than what it could be covered here, as it stands, the risk for the SSM/ECB a fiscal dominance dilemma is clear, whereby the ECB, in its role of lender of last resort for banks, could have incentives, *ex-ante*, to minimize liquidity operations that constitute a risk to its balance sheet, hence increasing haircuts or anyway the incentives to recur to the ELA. In its SSM role, on the contrary, the central bank may want to advocate for larger European Stability Mechanism interventions *ex-post*, and in a much larger scale « than what a "neutral" supervisor would do » (see Gerba and Macchiarelli, 2015). At this point, it is still unclear how the policy of collateral management, and the recourse to the ELA, in particular, will practically interact with the Banking Union's completion and common resolution.

2.2. Collateral constraints, asset allocations and prices

Since the financial crises, many papers have started to emphasize the role of banks' balance sheet and leverage constraints for the provision of credit to the real economy and for the transmission of conventional and non-conventional monetary policies (see Curdia and Woodford, 2011 ; Gertler and Karadi, 2011 ; Gertler and Kiyotaki, 2011; 2015). A smaller literature discusses the issue of collateral constraints, asset allocations and prices for the euro area as well.

⁹ Or, a trade-off between short to medium term efficiency of unconventional monetary policy, as Belke (2016) puts it.

The basic idea is that the collateral framework does not alter prices. Geanakoplos and Zame (2007), in a general equilibrium model, and Brumm *et al.* (2013) show however that the availability of collateral in an economy with default possibilities affects prices as well as assets' allocation. Chapman *et al.* (2011) develop a general framework for central bank haircut policy and argue that, during sustained crises, the central bank should optimally lower haircuts in order to cut down the shortage of liquidity.

There is also a literature on the role of frictions in the interbank markets in banks' liquidity management. Starting from Bhattacharya and Gale (1987 ; 1994), several papers have studied the role of frictions preventing interbank markets from functioning effectively: these frictions include asymmetric information about banks' assets (e.g., Freixas and Jorge, 2008; Heider and Holthausen, 2015), banks' free-riding on central bank's liquidity provision (Repullo, 2005), imperfect crossborder information (Freixas and Holthausen, 2005).

Some other papers analysed frictions in the unsecured money markets and their interaction with monetary policy. Equally, some papers studied frictions in the secured markets during the recent crisis, including increases in haircuts for some asset classes. For instance, Ranaldo, Rupperecht and Wrampelmeyer (2016) show that fragility in collateralized markets can spill-over into the uncollateralized market and study which central bank's, as well as regulatory policies, can reduce such a fragility.

Bianchi and Bigio (2017) build a model where banks are exposed to liquidity risk but they can hold reserves. They show that monetary policy affects lending by supplying reserves and thus by changing the banks' trade-off between lending and coping with larger liquidity risk. In a general equilibrium model with searching features similar to Bianchi and Bigio (2017), Arce *et al.* (2017) show that a policy of large central bank balance sheet that uses interest rate policy to react to shocks achieves stabilization properties similar to a balance sheet policy where QE is occasionally used when the interest rate hits the zero-lower bound. De Fiore *et al.* (2018), in a model in which banks can fund themselves through deposits or through collateralized central bank loans, show how unconventional policy that exchanges reserves for lower quality collateral can be beneficial when high-quality collateral is scarce. In such a modelling framework, this seems far more effective than a policy mimicking the ECB's standard fixed rate with full-allotment.

The emergence of a shortage of safe assets has been documented and analyzed also in Andolfatto and Williamson (2015); Caballero *et al.*, (2017). Caballero *et al.* Analyze, in particular, a situation of a deflationary trap suggesting that policies of helicopter money, public debt issuances, swaps of private risky assets for safe public bonds, or increases in the inflation target, as possible ways to mitigate the negative impact of scarcity of safe assets.

All the above suggests that unconventional monetary policy remains an important tool for dealing with the issue of high-quality collateral scarcity. **Short term, the possibility for the ECB to extend policies beyond conventional if warranted, as announced by the ECB President recently (Draghi, 2018), will thus be crucial.**

3. CLOSING REMARKS

In this note, we looked at how collateral may have interacted with the ECB's Expanded Asset Purchase Program (EAPP). The importance of collateral as an instrument for monetary policy has increased in recent years not only in the light of the changes in the ECB's collateral framework during the crisis but also due to the progressive replacement of the unsecured money market segment with the secured one in the euro area. Both aspects are set to have consequences for collateral availability and the scarcity of high-quality assets, particularly as these interact with non-standard monetary policy. In this note, we look for evidence of the ECB's EAPP effects through the *quantity* and *quality* of collateral, based on the detailed Eurosystem Collateral Data, as well as a review of the literature.

On the public purchase side, sovereign bonds' haircuts have not returned to what observed back in 2010 and there could be signs of a restrictive revision of the haircut policy preempting a « normalization » phase of monetary policy.

As the result of the EAPP, the spreads of all asset classes have shrunk except for bank bonds as they are excluded from ECB purchases. The haircut distribution on these asset classes has continued to shift after 2014, suggesting further increases in the average haircut, possibly (but not necessarily) signalling continued market fragmentation on this market.

Now that the European Central Bank has signalled its plans to wind up the bond-buying programme at the end of this year, we believe the completion of a Banking and Capital Market Union will be of paramount importance in the medium/long term. Short term, the possibility for the ECB to extend monetary policy beyond conventional, if warranted, will nevertheless be crucial.

KEY QUESTIONS

Market operators, as well as data, suggest there are some preliminary signs of a restrictive revision of the haircut policy preempting a « normalization » of monetary policy. Is there any explicit provision to tighten the collateral framework after December 2018?

The spreads of all asset classes have shrunk except for bank bonds as they are excluded from the ECB purchases under the EAPP. Is the Governing Council concerned about the development in the market for banks' bonds?

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ANNEX

Table A 1: Deriving the haircut category by type and issuer group

		IG1	IG2	IG3/ IG11	IG4	IG5	IG6	IG7	IG8	IG9
		Central Bank	Sovereign	Corporate and other issuers	Credit Institution (excl agencies)	Regional/Local govt	Supranational Issuer	Agency – non-credit inst.	Agency - credit instit.	Fin. corp. other than credit institutions
AT1	Bond	I	I	III	IV	II	II	II	II	IV
AT2	Medium Term Notes	I	I	III	IV	II	II	II	II	IV
AT3	T-bill / CP/ CD	I	I	III	IV	II	II	II	II	IV
AT9	Jumbo Pfandbriefe-style	N/A	N/A	N/A	II	N/A	N/A	N/A	II	N/A
AT10	Traditional covered bonds	N/A	N/A	N/A	III	N/A	N/A	N/A	II	N/A
AT11	Other securitised assets / ABS / MBS	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	V
AT12	Multi-cédulas	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	III
AT13	Structured covered bonds	N/A	N/A	N/A	III	N/A	N/A	N/A	II	III

Source: ECB website <https://www.ecb.europa.eu/paym/coll/risk/liquidity/html/index.en.html>.

Table A 2: ECB’s Haircut schedule for assets eligible for use as collateral in Eurosystem market operations

Levels of valuation haircuts applied to eligible marketable assets										
Credit quality	Residual maturity (years)	Liquidity categories								Category V
		Category I		Category II		Category III		Category IV		
		fixed coupon	zero coupon	fixed coupon	zero coupon	fixed coupon	zero coupon	fixed coupon	zero coupon	
Steps and (AAA to A-)	1 0-1	0.5	0.5	1.0	1.0	1.5	1.5	6.5	6.5	16
	2 1-3	1.5	1.5	2.5	2.5	3.0	3.0	8.5	9.0	
	3-5	2.5	3.0	3.5	4.0	5.0	5.5	11.0	11.5	
	5-7	3.0	3.5	4.5	5.0	6.5	7.5	12.5	13.5	
	7-10	4.0	4.5	5.5	6.5	8.5	9.5	14.0	15.5	
	>10	5.5	8.5	7.5	12.0	11.0	16.5	17.0	22.5	
Liquidity categories										
Credit quality	Residual maturity (years)	Liquidity categories								Category V
		Category I		Category II		Category III		Category IV		
		fixed coupon	zero coupon	fixed coupon	zero coupon	fixed coupon	zero coupon	fixed coupon	zero coupon	
Step 3 (BBB+ to BBB-)	0-1	5.5	5.5	6.0	6.0	8.0	8.0	15.0	15.0	Not eligible
	1-3	6.5	6.5	10.5	11.5	18.0	19.5	27.5	29.5	
	3-5	7.5	8.0	15.5	17.0	25.5	28.0	36.5	39.5	
	5-7	8.0	8.5	18.0	20.5	28.0	31.5	38.5	43.0	
	7-10	9.0	9.5	19.5	22.5	29.0	33.5	39.0	44.5	
	>10	10.5	13.5	20.0	29.0	29.5	38.0	39.5	46.0	

Definition of the liquidity categories:

Category I: Central government debt instruments and debt instruments issued by central banks¹

Category II: Local and regional government debt instruments, Jumbo covered bonds, agency debt instruments² and supranational debt instruments

Category III: Traditional covered bank bonds, structured covered bank bonds, multi-cédulas and debt instruments issued by corporate and other issuers.

Category IV: Credit institution debt instruments (uncovered)

Category V: Asset-backed securities

Source: http://www.ecb.europa.eu/press/pr/date/2010/html/sp090728_1annex.en.pdf.

The importance of collateral as an instrument for monetary policy has increased in recent years not only in the light of the changes in the ECB's collateral framework during the crisis but also due to the progressive replacement of the unsecured money market segment with the secured one in the euro area. Both aspects are set to have consequences for collateral availability and the scarcity of high-quality assets, particularly as these interact with non-standard monetary policy. In this note, we look for evidence of the ECB's Expanded Asset Purchase Programme (EAPP) effects through the quantity and quality of collateral, based on the Eurosystem Collateral Data, as well as a review of the literature.

We conclude that collateral is vital to the well-functioning of money markets, and the availability in principle of monetary policy beyond conventional remains an important tool to deal with the issue of potential shortages of high-quality collateral, at least in the short-term.

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