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# European asset and mortgage-backed securities - ten years on!

Research & Macro Strategy

# European asset and mortgage-backed securities - ten years on!

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## Abstract

How do the European asset and mortgage-backed securities fare today a decade after the financial crisis they have been incriminated in? We make an assessment of the asset class, comparing today's market conditions with those of ten years ago.

We explore the return-to-risk profile of the asset class in a standard mean-variance framework, taking the view of a long-term Euro Area bond investor. We make evident that the securities significantly reduce investment risk and in the same time improve the outlook for return, when added to a European bond portfolio.

**Keywords:** asset-backed securities (ABS), residential and commercial mortgage-backed securities (RMBS) and (CMBS), collateralized loan obligations (CLO).

# About the authors

### Marielle de Jong

Marielle heads the fixed-income quant research team in Paris since 2011. Before that she was vice-president of the financial engineering department at Sinopia (HSBC) where she worked for thirteen years. She started her career in London in 1994 as a research analyst with BARRA and an equity fund manager with Quaestor (Yasuda).

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She holds an MSc in econometrics from the Erasmus University in Rotterdam, an MSc in operations research from the University of Cambridge (UK) and a PhD in finance from the University of Aix-Marseille since 2010. She has published a series of articles on equities, currencies and on fixed-income research issues.

### Hubert Vannier

Hubert Vannier heads the asset-backed securities team of Amundi, where he works since 2008. He began his career at GAN Assurances in 1993 as a Finance Controller. He joined Credit Lyonnais Asset Management in 1995 as an assistant portfolio manager. In 1998, he joined Oddo Asset Management as portfolio manager and then as Head of arbitrage fund management.

Hubert holds a Master in Econometrics from Paris - Sorbonne University, a Master in Finance from ESCP Europe Business School, and is a graduate from the CFA Institute.

# I. Introduction

We have seen a remarkable recovery to what was discredited as a plague or even identified as the very symbol for the failure of the financial sector back in 2008. In Europe, the asset and mortgage-backed securities market (in short the ABS market) - is back. The credit spread levels that can be observed today have come down, diving under 1% for the majority of senior tranches, from 9% in the heat of the crisis. Confidence appears restored and the excessive liquidity shortfalls that disrupted the markets ten years ago seem to have ceased for good.

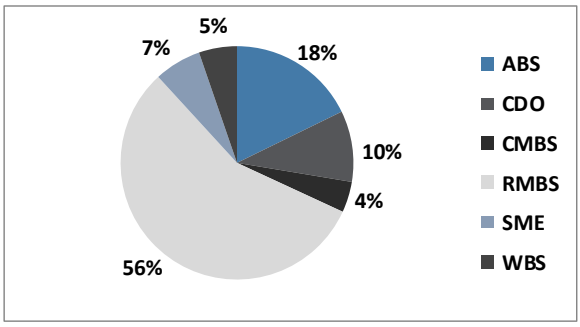
Two major structural reforms are key to this recovery, as Jeanniard (2011) points out in his investment strategy report. Firstly, the investors operating in the ABS markets have radically changed. At the time of the crisis, majority of investors were refinancing long-term assets with short-term positions in ABS. This eventually led to them becoming caught out by the rupture in market liquidity. They have since let their place to longer-term investors whom are more able to deal with potential volatility spikes. Secondly, the instruments have been improved: waterfall structures have been simplified, credit enhancement increased, the interests of investors and sellers aligned by risk retention and collateral is more homogeneous and transparent.

Moreover, certain safety nets that are embedded in the instruments have been tested in real time with success, which has given a boost of confidence to the market. In Europe, there are no loan corporations or agencies like in the US, instead the credit risks are borne by the security holders themselves. The risks are diffused into the market through the system of securitization. This system, consisting of pooling and tranching, is very similar to that used for American asset (not mortgage) backed instruments, see Jobst (2008).

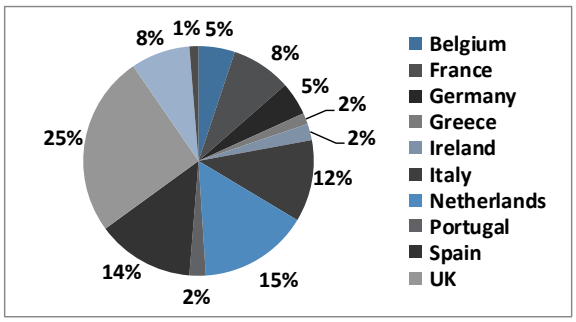
As an introduction, let us breakdown the ABS market today. In exhibit 1, panel A gives a breakdown into asset types, panel 2 into countries and panel C into credit ratings. It shows that high-quality RMBS issued in the UK, the Netherlands, Spain and Italy take up a large part of the market share. Panel D gives the total of outstanding assets per asset type over time. The total market value over the last few years has stabilized at around EUR 1.2 trillion.

**Exhibit 1 Breakdown of the European ABS market – October 2018**

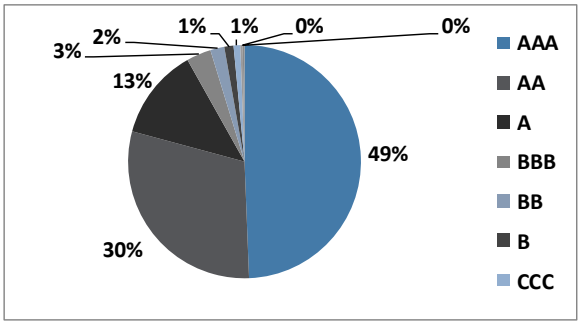
**Panel A**



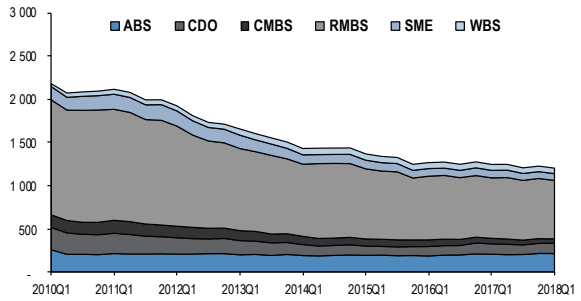

**Panel B**



**Panel C**




**Panel D**




*ABS: Asset-Backed Securities, CDO: Collateral Debt Obligation, CMBS: Commercial Mortgage-Backed Securities, RMBS: Residential Mortgage-Backed Securities, SME: Small & Medium Size loans, WBS: Wholesale Business Securitisation.*

*Source: JP Morgan International ABS & CB Research, 14/10/2018*

In this study, we compare the investment profile of European ABS with Euro Area sovereign bonds. We do this within a standard mean-variance framework, both in absolute return terms and in a relative benchmark-enhancement set-up. The intention is to measure by how much the investment opportunity of a European bond investor is set to expand by including ABS instruments.

## II. Data and test methodology

### *II.1. Return expectation*

We have selected a set of assets which we consider representative for the ABS market and We have selected a set of assets which we consider representative for the ABS market and best suited for a mean-variance analysis. For the purposes of this study, we have retained the most senior tranches with an AAA rating at inception, to play down default risk (tail events) and bring about the more mainstream market risk that can be captured by return variances. This results is a set of nine indices of high-quality instruments. We have taken floating instruments which pay out a variable coupon, which is the most common within the asset class. Six contain residential mortgage-backed securities (RMBS), one commercial mortgage-backed securities (CMBS), one auto loans and one contains small-to-medium size enterprise collateralised loan obligations (denoted SME CLO).

We have collected total return series for the nine indices as calculated by Markit on a weekly basis over a seven-year period from January 2007 to February 2014. And we have also extracted return series for four Bloomberg Barclays Euro Treasury indices and for the Bloomberg Barclays Euro ABS Floating index between January 2007 to November 2018. The returns include coupon payments, price variation and in the case of ABS data, the pre-empted

payments of principal. Markit establishes ABS market prices on the basis of surveys among a set of broker houses who participate in giving out regular price quotes.

Some key data features are given in exhibit 2 below. In the first column are the number of securities that constitute the respective indices; the second column (a) gives the weighted average life (WAL) for the ABS, which compares with the modified duration for the sovereign bonds; in (b) are the average credit spreads for the ABS as calculated by JP Morgan in November 2018, which together with the euro swap rates of the corresponding WAL, given in (c), add up to the yields-to-maturity (YTM), in (d). For the treasury indices the yields-to-maturity are calculated by Bloomberg Barclays as of November 2018. Note, the average WAL varies greatly between the indices, between 1 and 8 years which makes direct comparison difficult.

**Exhibit 2 Key features for nine European ABS indices and four Euro Treasury indices**

| Index | # issues | WAL/duration in years (a) | spread vs swap in bp (b) | euro swap in bp (c) | YTM in bp (d) |
|---|---|---|---|---|---|
| **EU senior Auto loans** | 26 | 1.0 | 22 | -14 | 8 |
| **EU senior CMBS** | 18 | 2.0 | 73 | -15 | 58 |
| **EU RMBS** | 283 | 5.2 | 36 | 29 | 65 |
| **Spanish senior RMBS** | 135 | 6.7 | 127 | 59 | 186 |
| **Spanish senior SME CLO** | 13 | 1.7 | 72 | -15 | 57 |
| **Italian senior RMBS** | 41 | 3.5 | 132 | 10 | 142 |
| **Portuguese senior RMBS** | 22 | 8.2 | 143 | 71 | 214 |
| **Dutch senior RMBS** | 74 | 4.0 | 25 | 16 | 41 |
| **UK prime RMBS in €** | 31 | 1.3 | 43 | -14 | 29 |
| | | | | | |
| **French Treasuries** | 42 | 8.2 | | | 46 |
| **Spanish Treasuries** | 34 | 7.5 | | | 118 |
| **Italian Treasuries** | 58 | 6.5 | | | 299 |
| **German Treasuries** | 54 | 7.5 | | | 11 |

*Data source: Markit iBoxx for ABS data, JP Morgan for spreads, Bloomberg for the euro swap rates and Bloomberg Barclays for the euro treasury indices.*

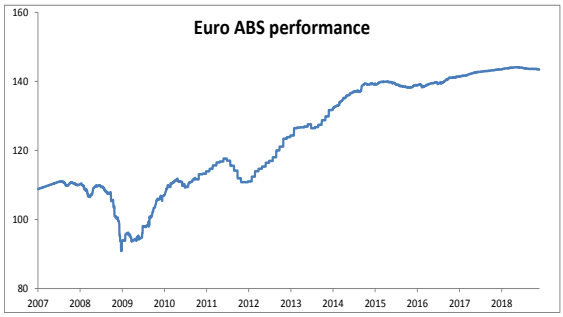
In the portfolio optimisations that we carry out in section 3, we consider the yields-to-maturity as given in Exhibit 2 to represent the expected asset returns. We argue that the assumption makes sense for a long-term investor. If the intention is to hold the assets until maturity, the yield will be the investment return (the carry seized over the holding period). If the assets were to be held for the medium-to-long term, the same yields may be regarded as unbiased estimates for future returns, in the sense that they give market-neutral expectations.

*II.2. Risk outlook*

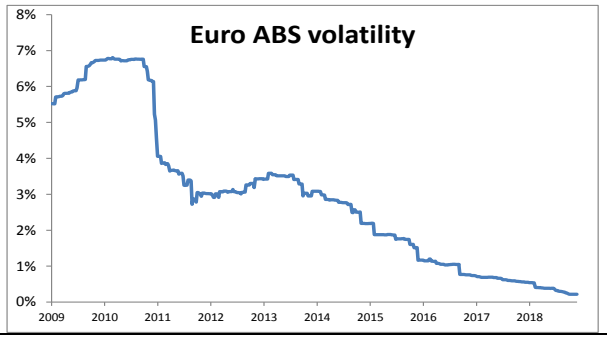
Regarding the (mainstream) risk associated to the ABS, we observe that the level of return volatility has come down significantly over the last ten years. In Exhibit 3, and in Panel A ,the performance displayed is of the ABS market as a whole. In Panel B, it is together with the annual volatility measured over a trailing two-year time-window.

**Exhibit 3 Euro ABS floating index**

**Panel A**




**Panel B**




*Data source: Bloomberg Barclays Euro ABS floating index*

A remarkably stable price has become the new normal for European ABS over the last few years, and we expect this trend to continue. ABS prices are not driven by interest rate movements, which is today considered to be a main source of bond risk. Since the coupon payments are floating depending on the level of interest, this source of price variance is effectively eliminated. ABS securities provide protection of capital in the event of an interest-rate rise and are currently in demand because of this reason. Market participants report that today it is more difficult to acquire an ABS than to sell one.

The (small) variation in ABS prices stem, in principal from the solvency positions of the loan- and mortgage holders underlying the assets - so from credit risk. Thanks to the restructuring of the ABS market over the last few years, and the support of regulators and major Central Banks (see the joint report by the Bank of England and the ECB (2014)) this concern appears to be largely under control. The sharp drop in volatility also confirms this.

Another factor that may affect prices is market liquidity. It goes beyond the scope of this paper to make estimates on liquidity risk, but for investors this risk is limited as their position is favourable, for it is easier to sell than to buy ABS.

The volatility drop is such that it has become cumbersome, and perhaps even unreliable, to estimate the covariance structure between the asset groups. In any event, we no longer have access to the data to do so. Instead, we estimate the covariance structure over the post-crisis period from January 2010 to February 2014, and adjust it to today's volatility levels.

In Exhibit 4, the volatility levels are given of the assets under the study. Column (a) is the volatility measures and (b) is the extrapolation towards today's levels. The current risk-adjusted returns (Sharpe) are displayed in (c).

**Exhibit 4 Return volatilities and Sharpe ratios**

| Index | volatility 2010 2014 | volatility 2018 | Sharpe |
|---|---|---|---|
| **EU Auto** | 0,6% | 0,3% | 0,28 |
| **EU CMBS** | 2,9% | 1,5% | 0,40 |
| **EU RMBS** | 2,0% | 1,0% | 0,65 |
| **Spain RMBS** | 3,5% | 1,7% | 1,07 |
| **Spain SME CLO** | 2,3% | 1,1% | 0,50 |
| **ITL RMBS** | 3,6% | 1,8% | 0,79 |
| **PTE RMBS** | 7,7% | 3,9% | 0,56 |
| **Dutch RMBS** | 0,9% | 0,5% | 0,88 |
| **UK PRMBS** | 0,8% | 0,4% | 0,69 |
| **France** | 5,0% | 4,2% | 0,11 |
| **Spain** | 9,3% | 4,5% | 0,26 |
| **Italy** | 7,4% | 5,7% | 0,52 |
| **Germany** | 4,8% | 4,0% | 0,03 |

*Authors calculations*

*II.3. Correlation*

The correlation levels, measured over January 2010 to February 2014, are displayed in exhibit 5. Most interesting, are the near-zero correlations between the ABS and the sovereigns. The low numbers are due to interest rate risk which is absent in ABS and predominant for sovereigns. Near-zero correlation gives ample scope for risk diversification, as we shall see in the next section.

**Exhibit 5 Correlation between the assets**

| correlation 01/2010 02/2014 | EU Auto loans | EU CMBS | EU RMBS | Spanish RMBS | Spanish SME CLO | Italian RMBS | Portuguese RMBS | Dutch RMBS | UK PRMBS | France | Spain | Italy | Germany |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EU Auto loans | 1 | 0,25 | 0,07 | 0,03 | 0,07 | -0,09 | 0,06 | 0,17 | 0,24 | -0,03 | 0,02 | 0,02 | 0,00 |
| EU CMBS | 0,25 | 1 | 0,33 | 0,25 | 0,12 | 0,22 | 0,20 | 0,21 | 0,37 | 0,08 | 0,03 | 0,09 | -0,01 |
| EU RMBS | 0,07 | 0,33 | 1 | 0,86 | 0,50 | 0,62 | 0,58 | 0,34 | 0,29 | 0,04 | -0,05 | 0,10 | -0,01 |
| Spanish RMBS | 0,03 | 0,25 | 0,86 | 1 | 0,46 | 0,41 | 0,36 | 0,16 | 0,18 | 0,12 | -0,01 | 0,15 | 0,04 |
| Spanish SME CLO | 0,07 | 0,12 | 0,50 | 0,46 | 1 | 0,22 | 0,23 | 0,23 | -0,05 | 0,02 | -0,09 | -0,02 | 0,00 |
| Italian RMBS | -0,09 | 0,22 | 0,62 | 0,41 | 0,22 | 1 | 0,34 | 0,16 | 0,11 | 0,03 | -0,01 | 0,11 | -0,03 |
| Portuguese RMBS | 0,06 | 0,20 | 0,58 | 0,36 | 0,23 | 0,34 | 1 | 0,12 | 0,18 | -0,18 | -0,15 | -0,08 | -0,04 |
| Dutch RMBS | 0,17 | 0,21 | 0,34 | 0,16 | 0,23 | 0,16 | 0,12 | 1 | 0,27 | 0,04 | -0,06 | 0,03 | 0,05 |
| UK PRMBS | 0,24 | 0,37 | 0,29 | 0,18 | -0,05 | 0,11 | 0,18 | 0,27 | 1 | 0,04 | 0,07 | 0,11 | 0,02 |
| France | -0,03 | 0,08 | 0,04 | 0,12 | 0,02 | 0,03 | -0,18 | 0,04 | 0,04 | 1 | 0,18 | 0,18 | 0,76 |
| Spain | 0,02 | 0,03 | -0,05 | -0,01 | -0,09 | -0,01 | -0,15 | -0,06 | 0,07 | 0,18 | 1 | 0,79 | -0,13 |
| Italy | 0,02 | 0,09 | 0,10 | 0,15 | -0,02 | 0,11 | -0,08 | 0,03 | 0,11 | 0,18 | 0,79 | 1 | -0,20 |
| Germany | 0,00 | -0,01 | -0,01 | 0,04 | 0,00 | -0,03 | -0,04 | 0,05 | 0,02 | 0,76 | -0,13 | -0,20 | 1 |

*Data source : Markit and Barclays. Calculations made by the authors.*

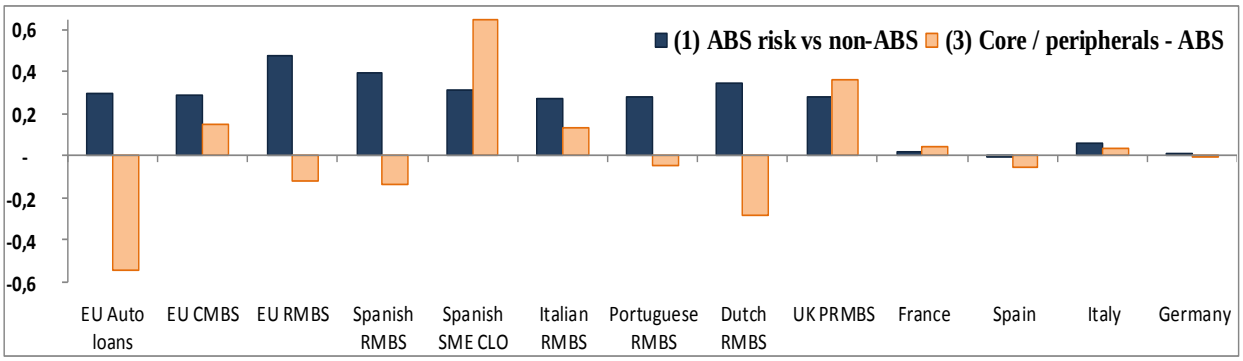
On the basis of the observed correlations, we built a risk model to estimate the structural correlation between the assets and discard spurious relations. We take a statistical approach making use of principle component analysis (PCA); see Jolliffe (2002) for a general reference. The first four components we obtain are displayed in exhibit 6 and the sensitivities of the asset groups to the first and third components are given in panel A, and to the second and fourth in panel B. The eigenvalues corresponding to these components, which indicate how much of the total variance they explain, are 30%, 18%, 11% and 9% respectively - which are significant numbers.

Below is an interpretation of our statistical analysis results:

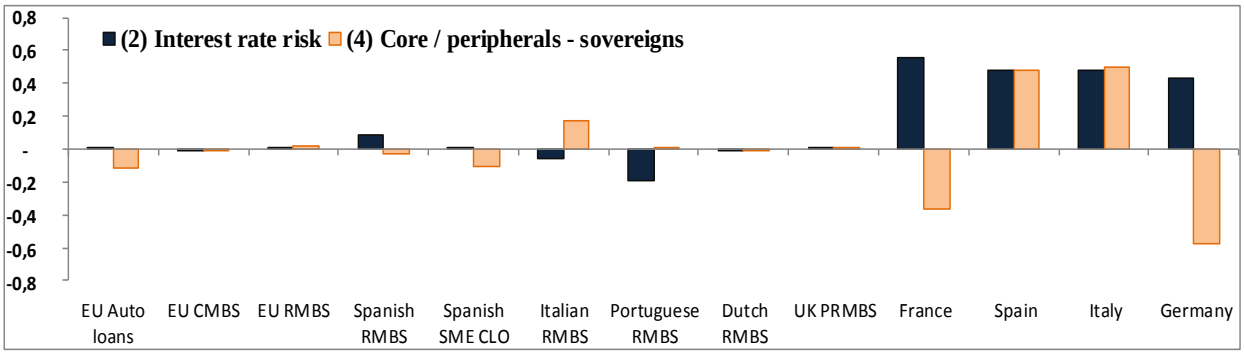
1) The first component - where all asset-backed securities are sensitive and the sovereigns are quasi-insensitive, represents a binary ABS versus non-ABS risk factor.
2) The second component - to which only the sovereigns are sensitive, can be interpreted as an interest rate risk factor.
3) The third component makes a distinction within the ABS asset class, opposing the peripheral countries to the core countries within the Eurozone, with the exception of Spanish small-sized collateral loans.
4) The fourth factor does the same for sovereign bonds, opposing Spain and Italy to Germany and France. This factor has emerged since the sovereign debt crisis. It is interesting to note, that this factor seems to have had a knock-on effect on the asset-backed securities.

**Exhibit 6 Principle components of the correlation matrix**

**Panel A**




**Panel B**




*Authors calculations.*

Given that the four components are statistically significant and have an intuitive interpretation, we retain all four as factors, denoted *F*, in a linear-factor model. The remaining nine PCA components are neither significant nor intuitive. We have retained the residual variances of the assets as well, denoted $\sigma_i^2$, which remain after subtracting the common factor returns. Formally, we specify the return *R* of asset *i* over time *t* as:

$$R_{it} = \alpha_i + \sum_{k=1}^{k=4} \beta_i^k \cdot F_t^k + \varepsilon_{it} \qquad (1)$$

so that the covariance between two assets is specified by:

$$\text{cov}(i,j) = \begin{cases} \sum_{k=1}^{k=4} \beta_i^k \cdot \sigma_{F_k}^2 \cdot \beta_j^k & \text{if } i \neq j \\ \sum_{k=1}^{k=4} \beta_i^k \cdot \sigma_{F_k}^2 \cdot \beta_i^k + \sigma_i^2 & \text{if } i = j \end{cases} \qquad (2)$$

By applying the model we obtain the structural correlation matrix given in exhibit 7. We make the assumption that this correlation structure is the same going forward. The model fits the data well as can be seen by the resemblance with the observed correlation given in exhibit 5.

**Exhibit 7 Modelled correlation between the assets**

| modelled correlation | EU Auto loans | EU CMBS | EU RMBS | Spanish RMBS | Spanish SME CLO | Italian RMBS | Portuguese RMBS | Dutch RMBS | UK PRMBS | France | Spain | Italy | Germany |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EU Auto loans | 1 | 0,44 | 0,41 | 0,32 | 0,56 | 0,02 | 0,10 | 0,65 | 0,68 | 0 | 0 | 0 | 0 |
| EU CMBS | 0,44 | 1 | 0,39 | 0,29 | 0,37 | 0,16 | 0,15 | 0,44 | 0,40 | 0 | 0 | 0 | 0 |
| EU RMBS | 0,41 | 0,39 | 1 | 0,58 | 0,49 | 0,59 | 0,41 | 0,62 | 0,39 | 0 | 0 | 0 | 0 |
| Spanish RMBS | 0,32 | 0,29 | 0,58 | 1 | 0,37 | 0,41 | 0,29 | 0,46 | 0,31 | 0 | 0 | 0 | 0 |
| Spanish SME CLO | 0,56 | 0,37 | 0,49 | 0,37 | 1 | 0,19 | 0,18 | 0,56 | 0,51 | 0 | 0 | 0 | 0 |
| Italian RMBS | 0,02 | 0,16 | 0,59 | 0,41 | 0,19 | 1 | 0,36 | 0,27 | 0,03 | 0 | 0 | 0 | 0 |
| Portuguese RMBS | 0,10 | 0,15 | 0,41 | 0,29 | 0,18 | 0,36 | 1 | 0,24 | 0,10 | 0 | 0 | 0 | 0 |
| Dutch RMBS | 0,65 | 0,44 | 0,62 | 0,46 | 0,56 | 0,27 | 0,24 | 1 | 0,60 | 0 | 0 | 0 | 0 |
| UK PRMBS | 0,68 | 0,40 | 0,39 | 0,31 | 0,51 | 0,03 | 0,10 | 0,60 | 1 | 0 | 0 | 0 | 0 |
| France | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0,40 | 0,39 | 0,92 |
| Spain | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,40 | 1 | 0,85 | 0,17 |
| Italy | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,39 | 0,85 | 1 | 0,15 |
| Germany | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,92 | 0,17 | 0,15 | 1 |

*Authors calculations.*

## *II.4. Test methodology*

In the next section we carry out Markowitz (1952) optimization analyses in the traditional Capital Asset Pricing Model framework (Sharpe, 1964). This established analysis technique has its known limitations, which we discuss briefly in the case for asset-backed securities.

All variables are based on estimations which may be erroneous. The precautions we take to avoid this are stipulated in this section. For the expected returns in particular, they are based on the current yields-to-maturity and as such represent expected carry performance only. A possible tightening or loosening of credit spreads is not considered. The asset returns are assumed to be normally distributed. Based on the stabilised price behaviour of ABS over the last ten years, we make the projection that this will continue going forward. Senior and triple A tranches have been selected deliberately to favour this situation.

Practical issues, and in particular market liquidity, has not been taken into account and there are two sides to consider – buy and sell sides. The easing of the financial crisis no longer an obstacle therefore majority of ABS sales will take place through bids-wanted-in-competition vehicles (BWIC) which are fluid. The buy side for ABS has become slow since securities are primarily held by specialised long-term investors. The risk related to this situation, is to miss an investment opportunity, which is not the same severity of risk felt ten years ago when investors were caught out by the sudden market drought.

We optimise portfolios with respect to a benchmark, thus in active mode and without being in total mode. We use the asset return expectations given in exhibit 2, the volatility levels that are given in the second column of exhibit 4, and the correlation structure that is displayed in exhibit 7. We build fully-invested portfolios with long only positions (no short-selling allowed).

## III. Test results

We created portfolios by pursuing the following three different optimisation objectives: (i) minimise total risk, (ii) maximise total return over total risk, i.e. maximise the Sharpe ratio and (iii) maximise active return over active risk, i.e. maximise the Information Ratio (IR). By doing this we get an idea of what ABS can contribute in absolute and relative terms.

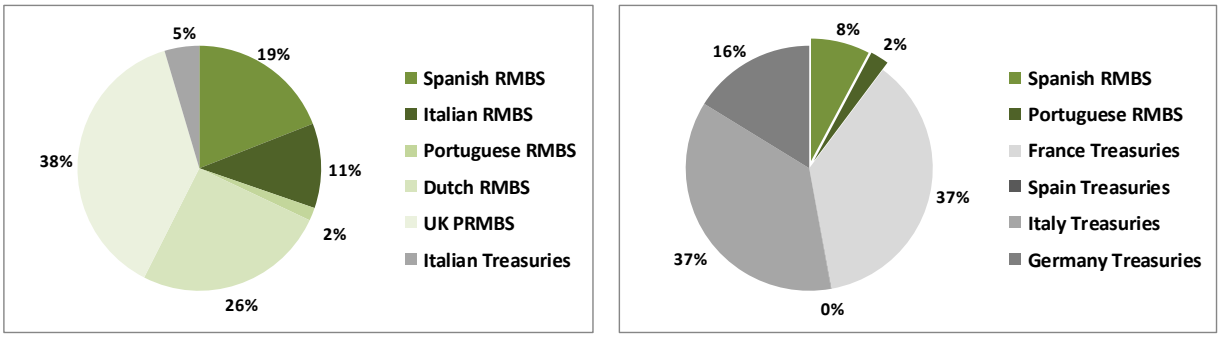
Unsurprisingly, the minimum-risk portfolio is entirely invested in asset and mortgage-backed securities. The price volatility of these instruments has become so low that no other fixed-income security can compete. This basic test result confirms the main observation we make in this study, namely that the price volatility of ABS has become extremely low. The portfolio we obtain when maximising the Sharpe ratio is depicted in panel A of exhibit 8 below. This portfolio is also heavily invested in ABS. This result shows that the return-to-risk ratios of the ABS are favourable compared to those of sovereign bonds, despite the significant contraction of their spreads over the last ten years.

The third portfolio, depicted in panel B of the exhibit, has been optimised with respect to a benchmark consisting of Euro Treasuries. One should realise that sovereign bonds are given a considerable head start in this way. Interestingly, ABS can still compete and has take-up of as much as 10% of the IR-optimised portfolio.

More precisely, Spanish treasuries have been replaced by Spanish and Portuguese residential mortgage-backed securities. It tells us that ABS are effective instruments for enhancing an index-tracking fund. The portfolio beats the benchmark both in terms of risk and return. By adding 10% of ABS to a sovereign-invested portfolio the overall risk reduces from 3.53% to 3.47%, while the return potential increases from 101 to 143 basis points. As a result, under the hypothesis of a risk-free return at -0.15% (the 1-year German sovereign yield), the Sharpe ratio increases from 0.33 to 0.46.

**Exhibit 8 Optimal portfolios of European ABS and sovereigns**

**Panel A maximum Sharpe** **Panel B maximum IR**




*Authors calculations*

When we carried out the same study a few years ago in 2015, we obtained very similar optimisation results. The Sharpe ratio of the Euro Treasuries benchmark was at 0.30 at the time and increased to 0.48 by adding 14% of mortgage-backed securities. We expect this situation to continue. We believe that ABS will continue to add value to European fixed-income portfolios.

## IV. Conclusion

We make the observation that ten years after the financial crisis, the asset and mortgage-backed securities in Europe compared to euro sovereigns (i) yield higher, (ii) are less volatile and (iii) are less correlated, both between themselves and with respect to sovereigns. This is the focus of our paper and it comes as no surprise that with these favourable features, ABS are difficult to avoid in an optimal return-to-risk portfolio.

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