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The asset- and mortgage-backed securities market in Europe

Marielle de Jong, Head of Fixed-Income Quantitative Research – Amundi
Vinh Cam Anh Nguyen, Consultant of Fixed-Income Quantitative Research – Amundi
Hubert Vannier, Senior Portfolio Manager – Amundi

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Marielle de Jong
Head of Fixed-Income Quantitative Research – Amundi
marielle.dejong@amundi.com

Vinh Cam Anh Nguyen
Fixed-Income Quantitative Research – Amundi
vinhcamanh.nguyen-ext@amundi.com

Hubert Vannier
Senior Portfolio Manager – Amundi
hubert.vannier@amundi.com

About the authors

Marielle de Jong PhD, Head of Fixed-Income Quantitative Research – Amundi

Marielle de Jong heads the fixed-income quant research team in Paris since 2011. Before that she was vice-president of the financial engineering department at Sinopia, an HSBC subsidiary, where she has 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, a Yasuda subsidiary. She is on the Editorial Board of the Journal of Asset Management.

She holds a graduate degree in econometrics from the Erasmus University in Rotterdam, an MSc in operational research from the University of Cambridge (UK) and a PhD in economics and 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.

Vinh Cam Anh Nguyen, Consultant with Fixed-Income Quantitative Research – Amundi

Vinh Cam Anh Nguyen works as a consultant in the fixed-income quant research team of Amundi since 2013. Her current research focuses on Socially Responsible Investment strategies for corporate bonds and fixed-income asset allocation.

She holds a Master degree in Economics and Financial Engineering, a major in Quantitative Finance from Paris Dauphine University. She is currently in her third year of the CFA program.

Hubert Vannier CFA, Senior ABS Portfolio Manager – Amundi

Hubert Vannier is senior asset-backed securities portfolio manager with Amundi 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.

Abstract

How do European asset- and mortgage-backed securities fare today five years after the 2008 crisis they have been incriminated in? We make an assessment of the asset class in today's renormalized market conditions.

We explore its return-to-risk profile 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 combined with other European bonds.

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

I. Introduction

What was discredited as a plague or even identified as the very symbol for the intoxication of the financial markets in 2008 and 2009, has recovered remarkably since. The asset- and mortgage-backed securities in Europe, abbreviated by ABS usually and worth one-and-a-half trillion euro in all, are back at more reasonable credit spread levels, under 3% on average, down from 9% in the heat of the financial crisis. Confidence seems restored and excessive liquidity shortfalls have ceased.

Two major structural reforms are debit to this, as Jeanniard (2011) points out. Firstly the stakeholders operating on the European ABS markets have changed since the crisis. The bulk of investors who were refinancing long-term assets with short-term positions and got caught out by the rupture in market liquidity, have given way to longer-term investors. And secondly the structure of certain instruments has been simplified making the asset class more transparent as a result. Certain safety nets embedded in the instruments have been tested for real, which has sparked the market confidence. With that the sting has been taken out of the asset class in Europe. This is not necessarily the case in the United States where unresolved issues remain, in particular in connection with the insolvency position of the nationalized loan corporations Fannie Mae and Freddie Mac. There is no equivalent for this in Europe, instead mortgage-backed securities bear the credit risk themselves through a pooling-and-tranching system very much like the American asset-backed instruments..

In this study we look at the European asset- and mortgage-backed securities market and compare their investment profile with that of Euro Area sovereign bonds. We do this in the standard mean-variance framework, both in absolute return terms and in a relative benchmark-enhancement setup. We measure by how much the investment opportunity of a bond investor is set to expand by including these assets.

II. Data and test methodology

II.1. Expected returns

Among the European ABS markets we have selected those who are best suited for a mean-variance analysis. For that matter we have retained the most senior tranches only with an

AAA rating at inception, so as to play down default risk (tail events) and bring about the more mainstream market risk. It results in a set of nine indices representing the high-quality European ABS market. Six contain residential mortgage-backed securities (RMBS), one contains commercial mortgage-backed securities (CMBS), one auto loans and one small-to-medium size enterprise collateralized loan obligations (SME CLO).

We have retrieved total return series for the indices as calculated by Markit on a weekly basis over a seven-year period from January 2007 to February 2014, and we have retrieved returns for four Barclays Euro Treasury indices. The returns include coupon payments, price variation and -in the case of ABS data- the pre-empted payments of principal as well. Markit establishes ABS market prices on the basis of surveys among a set of broker houses who participates to give regular price quotes. Further documentation on the price calculations and index construction can be found on the respective web sites of the data providers.

Key data features are given in Table 1. In the first column are the number of securities in the index, in (a) the weighted average life (WAL) for the ABS which compares with the modified duration for the sovereigns, in (b) the average spreads for the ABS as calculated by JP Morgan for February 2014, which together with the euro swap rate of corresponding WAL, given in (c), add up to the yields-to-maturity (YTM), in (d). For the treasury indices the YTM are as calculated by Barclays for February 2014.

Table 1 Test bed: 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)	yield to maturity in bp (d)
EU Auto loans	26	1.0	34	38	72
EU CMBS	18	2.0	198	45	243
EU RMBS	283	5.2	59	102	161
Spanish RMBS	135	6.7	208	143	351
Spanish SME CLO	13	1.7	173	45	218
Italian RMBS	41	3.5	178	81	259
Portuguese RMBS	22	8.2	268	161	429
Dutch RMBS	74	4.0	59	81	140
UK PRMBS	31	1.3	54	38	92
French Treasuries	42	6.7			142
Spanish Treasuries	34	5.8			244
Italian Treasuries	58	6.1			255
German Treasuries	54	6.7			99

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

In the portfolio optimizations we carry out in this study, we consider the YTM as given in Table 1, to represent the expected asset returns. This makes sense for a long-term investor. If the intention is to hold the assets all along until maturity, the YTM will be exactly the investment return, that is the carry seized over the holding period. If the assets are to be held for the medium-to-long term, the yields-to-maturity are the unbiased estimates for future returns, in the sense that they give market-neutral expectations.

II.2. Expected volatility

The historical volatility levels of the ABS returns are compared with those of sovereigns in Exhibit 2. The ones given in the Table have been measured over the entire observation period, which comprises two crises: the ABS liquidity crisis in 2008-2009 and the euro sovereign debt crisis that peaked in 2010-2011. The volatility levels were thus higher than they are nowadays now that both crises have calmed down.

In Exhibit 2 the volatility levels have been measured over a one-year trailing time-window and are compared over time for three indices: the Spanish RMBS, Spanish Treasuries and German Treasuries. It can be seen that the Spanish RMBS became twice as volatile over the first crisis years and that the volatility of Spanish Treasuries sparked over the second crisis years. The other ABS indices have gone through very much the same orbit as Spanish RMBS, while among the sovereigns the divide was general between core and peripheral countries.

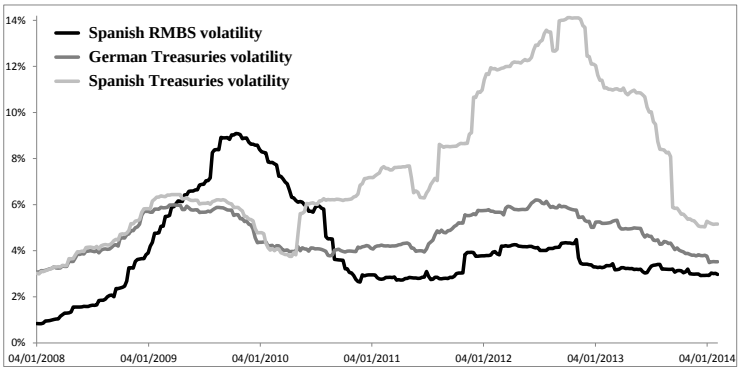
In the portfolio optimizations we have carried out, we have taken the prudent stance to retain the relatively high volatility levels measured over the entire observation period as given in Exhibit 2, as the expected volatilities. By that we incorporate the possibility of a new ABS crisis into the risk forecasts. Such scenario is conservative compared to the more realistic situation that the ABS liquidity crisis has faded and is not likely to reoccur.

Note that the asset-backed securities are on the whole less volatile than sovereigns notwithstanding the two crises, which leads to higher return-to-risk ratios.

Exhibit 2 Return volatilities and Sharpe ratios

Index	volatility	Sharpe
EU Auto loans	1.2%	0.38
EU CMBS	4.3%	0.51
EU RMBS	2.4%	0.56
Spanish RMBS	4.5%	0.72
Spanish SME CLO	3.2%	0.60
Italian RMBS	3.7%	0.63
Portuguese RMBS	6.6%	0.62
Dutch RMBS	1.7%	0.68
UK PRMBS	2.8%	0.24
French Treasuries	4.9%	0.24
Spanish Treasuries	7.7%	0.28
Italian Treasuries	6.4%	0.36
German Treasuries	4.7%	0.16

*annualized return volatilities



II.3. Correlation

The return correlations measured over the entire observation period are given in Table 3. Note that the correlation between the two asset classes, in the off-diagonal blocks, is close to zero. It means that there is little price influence between ABS and sovereigns, giving much scope for risk diversification between them. We have verified that the inter-class correlation remains nil during the two crisis periods. This can be seen in the Appendix where correlation tables have been measured over two sub-periods, from 2007 to 2009 and from 2010 to 2013.

Table 3 Correlation between the assets

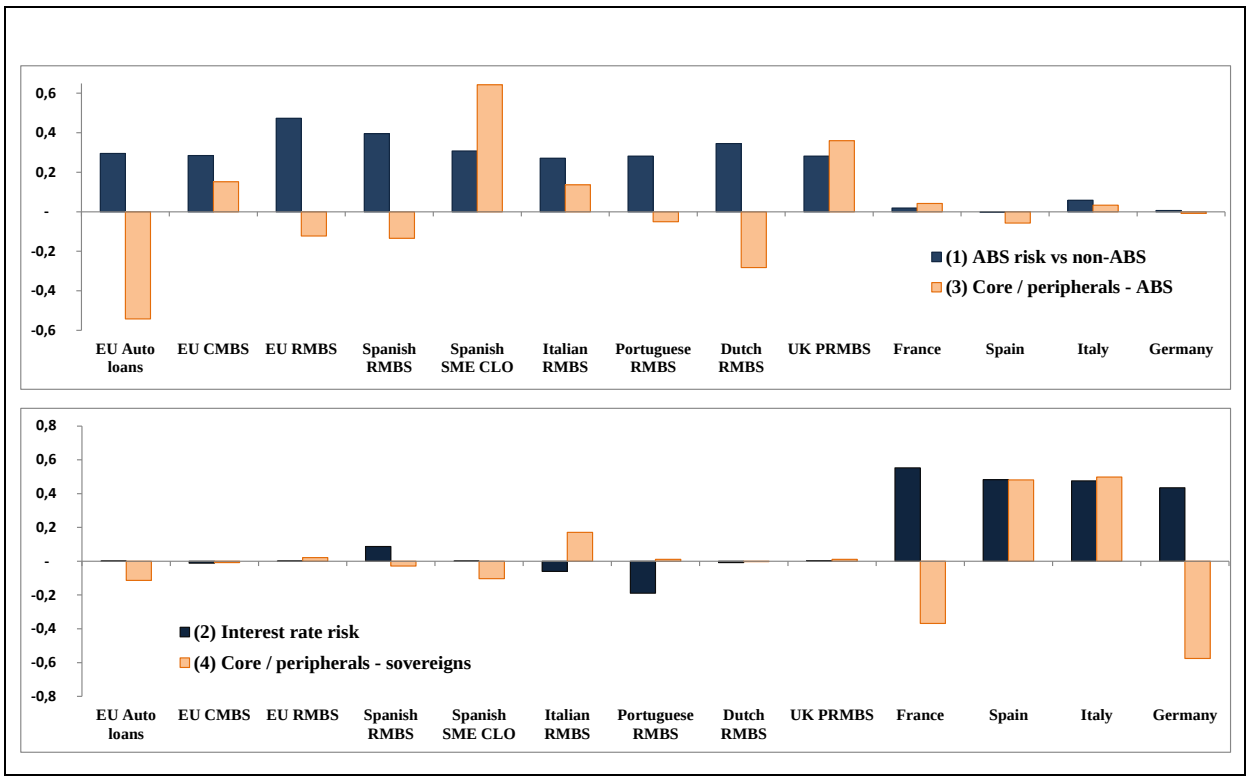
correlation 2007-2013	EU Auto loans	EU CMBS	EU RMBS	Spanish RMBS	Spanish SME CLO	Italian RMBS	Portuguese RMBS	Dutch RMBS	UK PRMBS	France	Spain	Italy	Germany
EU Auto loans	1	0,31	0,41	0,36	0,40	0,06	0,21	0,35	0,35	0,01	-0,01	0,02	0,02
EU CMBS	0,31	1	0,43	0,37	0,24	0,19	0,23	0,29	0,31	0,01	-0,01	0,04	-0,02
EU RMBS	0,41	0,43	1	0,87	0,49	0,58	0,54	0,62	0,37	0,04	-0,01	0,10	0,01
Spanish RMBS	0,36	0,37	0,87	1	0,44	0,33	0,31	0,36	0,24	0,13	0,03	0,16	0,09
Spanish SME CLO	0,40	0,24	0,49	0,44	1	0,15	0,25	0,31	0,28	0,03	-0,05	0,04	0,02
Italian RMBS	0,06	0,19	0,58	0,33	0,15	1	0,40	0,28	0,18	-0,03	-0,03	0,07	-0,09
Portuguese RMBS	0,21	0,23	0,54	0,31	0,25	0,40	1	0,24	0,19	-0,18	-0,16	-0,11	-0,08
Dutch RMBS	0,35	0,29	0,62	0,36	0,31	0,28	0,24	1	0,47	0,00	-0,01	0,04	0,00
UK PRMBS	0,35	0,31	0,37	0,24	0,28	0,18	0,19	0,47	1	0,00	0,01	0,07	-0,01
France	0,01	0,01	0,04	0,13	0,03	-0,03	-0,18	0,00	0,00	1	0,36	0,38	0,85
Spain	-0,01	-0,01	-0,01	0,03	-0,05	-0,03	-0,16	-0,01	0,01	0,36	1	0,80	0,14
Italy	0,02	0,04	0,10	0,16	0,04	0,07	-0,11	0,04	0,07	0,38	0,80	1	0,10
Germany	0,02	-0,02	0,01	0,09	0,02	-0,09	-0,08	0,00	-0,01	0,85	0,14	0,10	1

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

On the basis of the observed correlation we have built a risk model to estimate the structural covariance between the assets and discard spurious relations. We do this by means of principle component analysis (PCA), see Jolliffe (2002) for a general reference.

The first four components that result from running a PCA over the observation period are displayed in Figure 4. The eigenvalues corresponding to these components indicate how much of the total variance they explain when taken in proportion to the sum of eigenvalues. We report that they explain 30%, 18%, 11% and 9% of the variance respectively, which is significant. In Figure 4 the individual sensitivities of the assets to the four components are given.

Figure 4 Principal components of the correlation matrix



We give an interpretation of the PCA results.

1) The first component, to which all asset-backed securities are sensitive and sovereigns are almost insensitive, represents a binary ABS versus non-ABS risk factor.
2) The second, to which only the sovereigns are sensitive, represents the interest rate risk factor.

3) The third component makes a distinction within the ABS class; it opposes 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 the sovereign bonds; it opposes 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.

Given that the four components are statistically significant and have an intuitive interpretation we retain them as factors, denoted *F*, in a linear-factor model. The other PCA components are neither significant nor intuitive. We have retained the residual variances of the assets as well, denoted σ_i^2, that 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

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

We obtain the modelled correlations as given in Table 5. We make the assumption that this correlation structure is persistent going forward. The model fits the data well as can be seen by the resemblance with the observed correlation given in Table 3.

Table 5 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	0,40	0,36	0,31	0,57	-0,13	0,05	0,62	0,63	0,08	-0,12	-0,09	0,12
EU CMBS	0,40	1	0,36	0,27	0,34	0,11	0,12	0,42	0,36	-0,02	-0,02	0,01	-0,02
EU RMBS	0,36	0,36	1	0,60	0,45	0,54	0,38	0,62	0,36	0,02	0,01	0,08	0,00
Spanish RMBS	0,31	0,27	0,60	1	0,36	0,34	0,21	0,47	0,28	0,22	0,11	0,16	0,19
Spanish SME CLO	0,57	0,34	0,45	0,36	1	0,07	0,14	0,54	0,46	0,09	-0,11	-0,08	0,13
Italian RMBS	-0,13	0,11	0,54	0,34	0,07	1	0,37	0,22	-0,03	-0,20	0,04	0,09	-0,25
Portuguese RMBS	0,05	0,12	0,38	0,21	0,14	0,37	1	0,22	0,05	-0,27	-0,25	-0,22	-0,21
Dutch RMBS	0,62	0,42	0,62	0,47	0,54	0,22	0,22	1	0,57	-0,02	-0,01	0,03	-0,03
UK PRMBS	0,63	0,36	0,36	0,28	0,46	-0,03	0,05	0,57	1	-0,03	0,04	0,07	-0,06
France	0,08	-0,02	0,02	0,22	0,09	-0,20	-0,27	-0,02	-0,03	1	0,39	0,38	0,91
Spain	-0,12	-0,02	0,01	0,11	-0,11	0,04	-0,25	-0,01	0,04	0,39	1	0,85	0,12
Italy	-0,09	0,01	0,08	0,16	-0,08	0,09	-0,22	0,03	0,07	0,38	0,85	1	0,10
Germany	0,12	-0,02	0,00	0,19	0,13	-0,25	-0,21	-0,03	-0,06	0,91	0,12	0,10	1

II.4. Markowitz optimization

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

All variables are based on estimations which may be erroneous. The precautions we make to avoid this are stipulated in this section. For the expected returns in particular we make note that they are based on the current yields-to-maturity and as such represent expected carry performance only. A possible tightening or loosening of the credit spreads is not considered.

The asset returns are assumed to be normally distributed. Based on the stable price behaviour of the ABS over the last five years we make the projection that this will continue going forward. The selection of senior, Triple A tranches has been made deliberately to favour this situation.

Practical issues in particular market liquidity is not taken into account. There are the two sides to consider. The sell side is since the easing of the crisis in 2009 no longer an obstacle. The majority of ABS sales take place through bids-wanted-in-competition vehicles (BWIC) which are fluid. The buy side for ABS has become slow, since the securities are in majority held by long-term investors. The risk related to this situation is to miss investment opportunity, which is not the same severity of risk five years ago when investors got caught out by the sudden market drought.

III. Portfolio optimisation

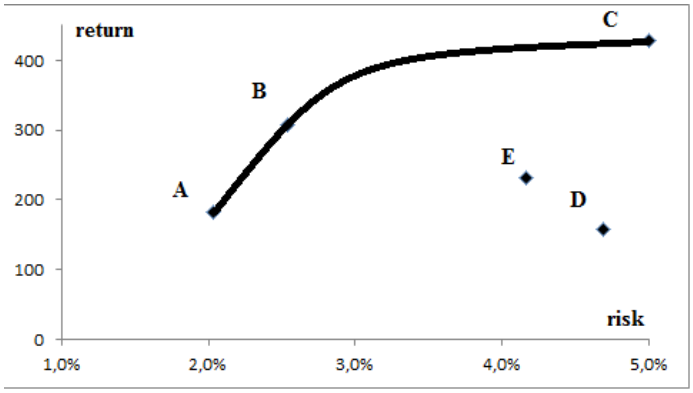
III.1. Absolute risk and return optimization

In order to evaluate the absolute benefit of mixing ABS and sovereigns in an investment portfolio, we carry out absolute risk/return optimizations given the return potential of the assets (in Table 1), their volatility levels (in Table 2) and the covariance structure (in Table 5). We build long-only and fully-invested portfolios while varying the aversion to risk and by that trace the efficient frontier. The resulting portfolios are given in Figure 6.

The portfolios on the efficient frontier, among which the minimum-risk portfolio A, the maximum-Sharpe portfolio B, and the maximum-return portfolio C, are heavily invested in ABS, as can be seen in the Table. This is not surprising given the favourable features of asset-backed securities: their relatively low return volatilities, their significant return potential combined with the low correlation levels with sovereigns.

In the Figure the efficient frontier is compared with a basis portfolio that is 100% invested in sovereigns, denoted D. The Figure shows by how much ABS could hypothetically add value to such a portfolio in absolute terms, that is without taking into account any investment constraints. Of course these portfolios are not realistic options for a large investor who faces implementation constraints.

Figure 6 Added value of ABS to a portfolio invested in sovereigns – in absolute term

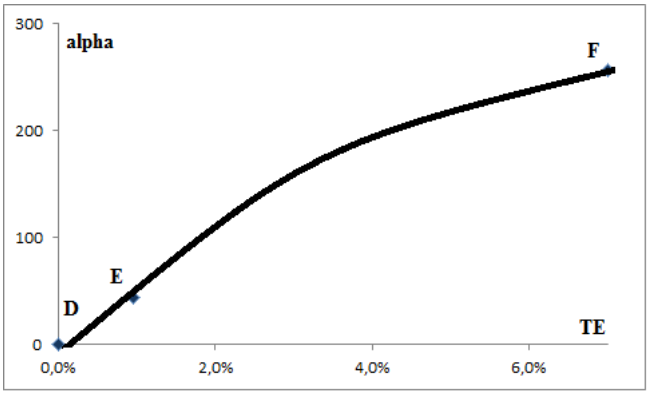


	min. risk A	max. Sharpe B	max. return C	only sovereigns D
%ABS	80%	82%	100%	0%
%sovereigns	20%	18%	0%	100%
return	183	307	429	158
risk	2.0%	2.5%	5.0%	4.7%

III.2. Benchmark-enhanced investment optimization

Considering a more realistic situation where the investments are being compared with a given benchmark, we take the case of an investor whose performance is compared with the Euro Treasuries bond index. Hence, the portfolio risk, defined as the tracking error (TE), is nil when holding the index positions and increases as more active positions are being added to the portfolio. In the same way the portfolio return is measured to the extent that it can beat the benchmark (add alpha). In this setting we do the same exercise as is done above, we vary the risk aversion while optimizing the alpha with respect to the tracking error and by that trace the efficient frontier of optimal portfolios. The results are in Figure 7.

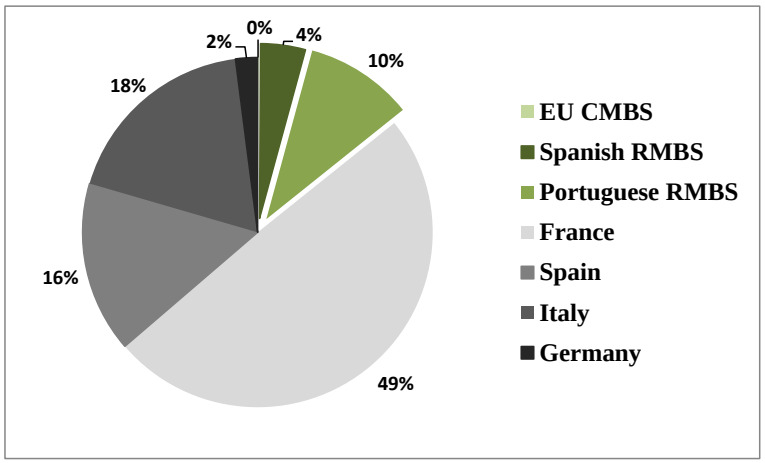
Figure 7 Added value of ABS to a portfolio invested in sovereigns – in relative terms



	min. risk D	max. IR E	max. alpha F
%ABS	0%	14%	100%
%sovereigns	100%	86%	0%
alpha	0	44	257
TE	0%	1.0%	7,0%

The minimum-risk portfolio D is the benchmark, and the maximum-return portfolio F is the same as portfolio C. Portfolio E maximizes the relative return-to risk profile, the Information Ratio (IR). It is plotted onto the absolute return and risk axes in Figure 6 and is displayed in Figure 8. The portfolio beats the benchmark both in terms of risk and return. By adding 14% of ABS to a sovereign-invested portfolio the overall risk reduces from 4.7% to 4.2%, while the return potential increases from 158 to 216 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 0.30 to 0.48.

Figure 8 The maximum-IR portfolio (E)



III.3. Stress test

In a last experiment we run a stress test, by which we measure what would happen to the optimized portfolio E in case a new ABS crisis would reoccur. If the crisis would manifest in the same magnitude as in 2007-2009, the correlation within the ABS class would double, their volatility levels would double as well yet there would be little to no contagion to the sovereign bonds (see Appendix). In that situation the volatility of the optimized portfolio would rise. The risk with respect to the benchmark, the tracking error, would increase from 0.9% to 1.1%. The increase is limited due to the fact that the ABS pocket is relatively small and that there is no contagion.

IV. Conclusion

We make the observation that five 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 interest of our paper. It comes to no surprise that with those favourable features the ABS take a predominant position in the return-to-risk optimal portfolio.

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Appendix

In the Table below are the correlations that have been measured over two sub-periods: one from 2007 to 2009 over the ABS crisis and one from 2010 to 2013 which includes the sovereign debt crisis.

It is relevant to note that

i. the correlation structure remains stable over the entire period, in particular the correlations between the two asset classes remain close to zero in both sub-periods.

ii. the correlation within the ABS class doubles in the ABS crisis period,

iii. the average correlation between the sovereign bonds falls sharply during the sovereign debt crisis (between core and peripheral countries),

Ad Table 3 Correlation measured over two sub-periods

During the ABS liquidity crisis

correlation 2007-2009	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	0,37	0,55	0,48	0,50	0,14	0,48	0,39	0,37	0,03	-0,05	0,03	0,04
EU CMBS	0,37	1	0,46	0,41	0,29	0,19	0,36	0,33	0,33	-0,04	-0,08	-0,02	-0,02
EU RMBS	0,55	0,46	1	0,88	0,48	0,55	0,61	0,74	0,42	0,05	0,05	0,12	0,03
Spanish RMBS	0,48	0,41	0,88	1	0,43	0,28	0,32	0,45	0,28	0,15	0,12	0,20	0,13
Spanish SME CLO	0,50	0,29	0,48	0,43	1	0,10	0,36	0,34	0,35	0,04	0,00	0,13	0,04
Italian RMBS	0,14	0,19	0,55	0,28	0,10	1	0,57	0,37	0,25	-0,12	-0,08	-0,01	-0,16
Portuguese RMBS	0,48	0,36	0,61	0,32	0,36	0,57	1	0,49	0,34	-0,20	-0,18	-0,20	-0,17
Dutch RMBS	0,39	0,33	0,74	0,45	0,34	0,37	0,49	1	0,50	-0,01	0,04	0,07	-0,03
UK PRMBS	0,37	0,33	0,42	0,28	0,35	0,25	0,34	0,50	1	-0,01	-0,01	0,11	-0,02
France	0,03	-0,04	0,05	0,15	0,04	-0,12	-0,20	-0,01	-0,01	1	0,94	0,85	0,98
Spain	-0,05	-0,08	0,05	0,12	0,00	-0,08	-0,18	0,04	-0,01	0,94	1	0,87	0,91
Italy	0,03	-0,02	0,12	0,20	0,13	-0,01	-0,20	0,07	0,11	0,85	0,87	1	0,77
Germany	0,04	-0,02	0,03	0,13	0,04	-0,16	-0,17	-0,03	-0,02	0,98	0,91	0,77	1

During the sovereign debt crisis

correlation 2010-2013	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

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Chief Editors:

Pascal Blanqué
Deputy Chief Executive Officer
Head of Institutional Investors and Third Party Distributors
Group Chief Investment Officer

Philippe Ithurbide
Global Head of Research, Strategy and Analysis

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