

Is there overvaluation of fixed income? The Eurozone vs. the US*

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Abstract

This paper deals with the valuation of fixed income assets in the Eurozone and in the United States against the backdrop of different macroeconomic scenarios and monetary policy regarding investment grade bonds. By estimating the theoretical and forward interest rates curves for the two monetary unions, our findings show that the above-investment-grade fixed income is slightly undervalued in the core scenario that we present, where there is a greater likelihood of an accommodative monetary policy. Furthermore, we highlight the role played by rating in price formation between now and 2025.

Keywords:

Fixed income, IRS, Rating, Eurozone, United States.

JEL classification:

G12, G15, G23, G24.

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¿Existe sobrevaloración en la renta fija? Eurozona vs. EE.UU.

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Resumen

El presente estudio trata sobre la valoración de los activos de renta fija en la Zona Euro y en Estados Unidos bajo diferentes escenarios macroeconómicos y de política monetaria en bonos investment grade. A través de la estimación de las curvas de tipos de interés teóricas y a plazo para las dos uniones monetarias, encontramos que la renta fija por encima del investment grade se encuentra ligeramente infravalorada en el escenario central que planteamos, donde la mayor probabilidad recaerá sobre una política monetaria acomodaticia. Enfatizamos, además, el papel que juega el rating en la formación de los precios de aquí a 2025.

Palabras clave:

Renta fija, IRS, rating, Eurozona, Estados Unidos.

■ 1. Introduction

Current Central Bank monetary policy is, without a doubt, one of the exceptional components governing markets and, in general terms, the world economy. Its response to the financial crisis that was unleashed in 2007 continues along the same lines as initially expected and is on its way to becoming a shock of a more permanent nature, despite the fact that it initially showed all the hallmarks of being a transitory event.

Within the dynamics of the different Central Banks on the world stage, we focus our attention on comparing the US Central Bank (the Federal Reserve) and that of the Eurozone (the European Central Bank - ECB). In this regard, the Federal Reserve was the first monetary institution to implement a monetary expansion programme called “quantitative easing” (QE) in December 2008. It was not until 2015, that the ECB decided to follow suit implementing a similar policy based on the bulk purchasing of both public and private sector bonds.

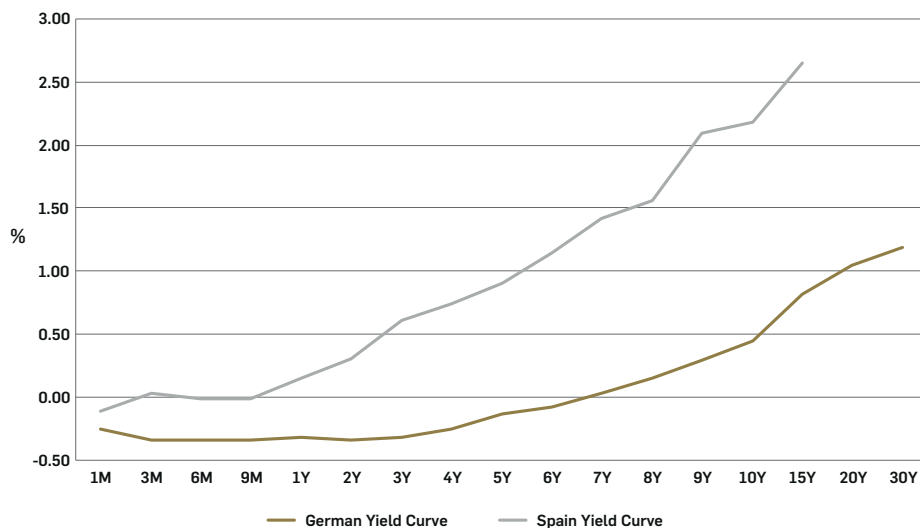
Seven years later, the monetary policy in the United States tends to have normalized through a sharp rise in interest rates, as soon as the goals of the Central Bank had been achieved: on the one hand, “full employment” (reducing the unemployment rate to below 5%) and, on the other hand, an interannual inflation rate of around 2%. The likelihood of the interest-rate rise – conditioning the current macroeconomic situation – is above the 50% mark.

Very different from the situation in the Eurozone, which leans towards monetary incentives by purchasing public and private sector assets and putting the marginal deposit facility even more in the negative. Raising the maximum levels of the asset purchasing programme to €80 billion, compared to the current ceiling of €60 billion (with a likely change in the composition of assets available for purchase), could be seen as an incentive for the rate of issuing of fixed income securities, securitizations and project bonds.

This makes us immediately think of both its short and long term effects. Far beyond the academic or professional debate as to whether Central Bank intervention is a good or bad thing, the central point of discussion is the effectiveness of the measures and the repercussions these are having on the real economy and on financing markets.

The likelihood of this alone has resulted in the majority of the bonds issued by European treasuries having a substantial part of their interest rate curves in the negative. This is the case in Germany, where the interest rate curve is negative up to the six-year mark, while Spain also has negative interest rates up to two years, as can be seen in Figure 1.

Figure 1. Interest rate curves for Spain and Germany (October 2015)



SOURCE: THE AUTHORS. BLOOMBERG

The so-called “core” countries of Central Europe – Germany, Holland, Belgium, Austria and France – currently have their interest rate curve in the negative up to the five-year mark (Germany up to six years) while bail-out countries or that are to some degree or another under the tutelage of EU authorities (such as Greece and Portugal) have their whole curve in the positive. The exceptions are Spain and Ireland, with a negative medium-term curve (Ireland with a maturity of two years).

This paper pays close attention to a very specific market: the fixed income market. It is, without a shadow of a doubt, one of the most complicated segments to manage these days with interest rates practically negligible, inflation rates close to zero and with weak economic growth the world over. With fixed income – as opposed to variable income – managing interest rate differentials is the key when it comes to generating value, while around the world the scales are tipping towards variable income.

The combination of these three elements – low growth, negligible inflation and interest rates hovering around zero – is the challenge faced by income managers at the moment who therefore ask themselves these same questions: is fixed income overvalued, irrespective of the rating it has? Up to which point in the market are they giving the correct price signals? These same questions are the ones we will respond to in this predominantly empirical study.

Is there overvaluation of fixed income? The Eurozone vs. the US. Bernd Aloriso, M.A. and Santacruz Cano, J. AESTIMATIO, THE IEB INTERNATIONAL JOURNAL OF FINANCE, 2015, 11: 202-221

■ 2. Estimating implied yield curves

In keeping with the tools that are routinely used to calculate both theoretical and forward interest rates¹, the real and nominal interest rates for the first two years appear in Tables 1 and 2:

● **Table 1. Real and Taylor-rule nominal interest rates. United States, 2015-2016**

	Real interest rate	Nominal interest rate
2015	0.24	0.3
2016	1.05	2.2

SOURCE: THE AUTHORS

● **Table 2. Real and Taylor-rule nominal interest rates. Eurozone, 2015-2016**

	Real interest rate	Nominal interest rate
2015	0.54	0.73
2016	1.22	2.24

SOURCE: THE AUTHORS

It can be seen, in both the United States and in the Eurozone, that there is a tendency for real interest rates to converge at around the 1% mark. This year, 2015, with inflation practically negligible, the difference between real interest rates in Europe and the United States stands at around the three-tenths mark.

Once the interest rates are calculated for the first two years using the Taylor Rule, for the following years (3 years, 5 years and 10 years) the implied forward yield curve is calculated using the standard formula² (Tables 3 and 4, respectively):

● **Table 3. Implied forward yield curve. United States, 2017, 2020 and 2025**

	Implied Rates
2017	2.28
2020	2.86
2025	3.52

SOURCE: THE AUTHORS

¹ See *Appendix: Methodology*

² See also *Methodology*

● **Table 4. Implied forward yield curve. Eurozone, 2017, 2020 and 2025**

	Implied Rates
2017	2.87
2020	3.33
2025	4.04

SOURCE: THE AUTHORS

Lastly, we calculate the zero coupon yield curve as a composition of the first two years and the implied rates for the following years (3 years, 5 years and 10 years), Tables 5 and 6.

● **Table 5. Zero coupon yield curve. United States, 2017, 2020 and 2025**

	Zero coupon yield rates
2017	1.70
2020	2.13
2025	2.62

SOURCE: THE AUTHORS

● **Table 6. Zero coupon yield curve. Eurozone, 2017, 2020 and 2025**

	Zero coupon yield rates
2017	4.70
2020	5.44
2025	6.61

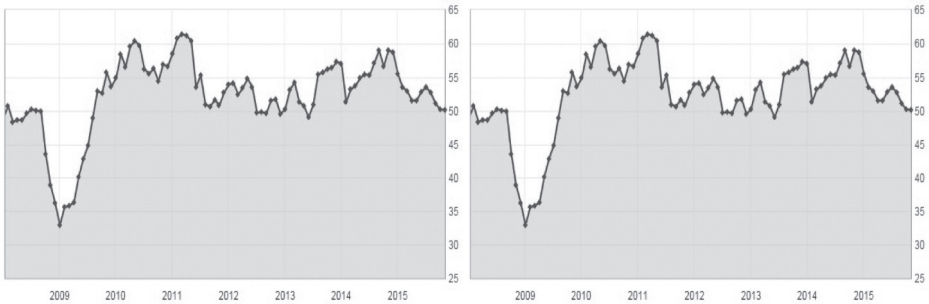
SOURCE: THE AUTHORS

■ 3. The macroeconomic situation and the hypothesis of the overvaluation of fixed income

In addition to the current dramatic liquidity conditions, to be able to provide a comprehensive picture of the situation, the macroeconomic performance of both the United States and the Eurozone should be added into the equation. The latest estimations, therefore, to be carried out by the International Monetary Fund point to an obvious slow-down in economic activity around the world following the fall in growth rates in China and the economic standstill in emerging economies, with the

exception of India. These prospects appear to be fully appropriate if we take into account the leading indicators from the world's foremost economies such as the *Purchase Manager Index*, PMI (Figures 2 and 3). We should bear in mind that these indicators are used as advanced notice or predictions of growth trends for the subsequent three – nine months, moving around the 50 points range, or even lower, and as such attesting to the downturn, with a tendency towards economic slowdown as predicted in the IMF report.

■ **Figures 2 and 3. Evolution of the PMIs for the United States and the Eurozone**



SOURCE: MARKIT ECONOMICS

Faced with this situation, monetary policy can go one of three ways, replicating as such the behaviour over the past 10 years. First of all, an *accommodative* monetary policy, characterised by extreme interest rate flexibility enabling public and private sector discount mechanisms as a guarantee to provide more credit and the purchasing of assets through plans such as those of the Central European Bank (CEB). For this scenario, we assign a likelihood of 55% based on remarks made by the respective Presidents of the Central Banks.

Secondly, there could be a new round of *expansive* monetary policy similar to those implemented by the Federal Reserve, the Bank of England or the Bank of Japan. But this will depend on the discussions held within the US Federal Reserve, between the advocates of not raising interest rates and those who believe that the price of the dollar should be raised. This scenario, therefore, could be characterised by the 2008-2010 period when drastic measures were taken to reduce interest rates through the bulk purchasing of financial assets. Likelihood allocated to this scenario is 40%.

Even within this scenario, we cannot rule out that they will not be accompanied by fiscal policy measures, however, one must keep in mind that high levels of private and public sector leverage of practically all the countries would not provide any great relief. In any case, we believe that in this particular scenario, more imaginative policies might come to the forefront, along the lines of the Juncker Plan, where for each public sector

contribution of €1, they hope to receive an additional €15 from the private sector; in simple terms a €16 billion contribution to the European Strategic Investment Fund in turn mobilizing investment to the tune of €315 billion, in addition to an additional €5 billion of funding from the European Investment Bank targeting SMEs.

Lastly, we come to the restrictive or orthodox monetary policy scenario that was implemented between 2004 and 2007. After the bursting of the dot.com bubble and the financial problems stemming from 9/11 attacks, the Central Banks returned to an orthodox approach implementing a number of interest rates increases after which the economy experienced its highest growth rates for the past two decades.

Accordingly, estimated likelihood stands at 5% not only because of the attitude of the Central Banks but also because of the notable difference in the macroeconomic situations between the 2004-2007 period and the current one. Back then, the economy was expanding following a crisis that was not as harsh as the one currently being experienced.

We believe that this is very illustrative of the low probability that we ascribe to the latest moves made by the Fed. The American Central Bank has been trying to raise interest rates for the best part of the year, and all hopes were hanging on the meeting in October, nevertheless issues with the emerging countries, the controlled devaluation of the Chinese yuan, as well as a somewhat less buoyant labour market than the country's unemployment figures might first suggest, has resulted in there being no raise at all. It would appear that any possible raise is being delayed with many investment houses and analysts predicting that it will not happen until well into 2016.

With this in mind, we compare the situation that is marked by theoretical interest rates with respect to the current forward interest rates for each of the above scenarios. Accordingly, we can see that American fixed income is undervalued, as is the European fixed income, in two of the scenarios (accommodative and restrictive monetary policy) given that the interest rates on the long term parts of the curve are higher than the theoretical yields according to Taylor and the implied forward yield curves.

Nevertheless, the above-investment-grade fixed income is slightly overvalued if we look at the expansive monetary policy scenario, with a negative yield albeit slight as can be seen in both the United States and the Eurozone. This situation responds to a greater market expectation of new rounds of monetary incentives aimed at the purchasing of assets, especially public debt.

The likelihood of this scenario being implemented complementarily to the likelihood of there being a rise in interest rates between 2015 and 2016 is conditional upon an

improvement to the macroeconomic situation. Accordingly, the likelihood of a rise in interest rates has fallen considerably in recent months due to the new risks, notably events in China and the emerging market countries.

a) Accommodative monetary policy scenario

Table 7. Comparison table of theoretical and forward interest rates.

United States

	Theoretical interest rate	Forward interest rates
1 year	0.54	0.73
2 years	2.2	1.54
3 years	2.28	2.77
5 years	2.86	3.35
10 years	3.52	4.01

SOURCE: THE AUTHORS

Figure 4. Comparison chart of theoretical and forward interest rates.

United States

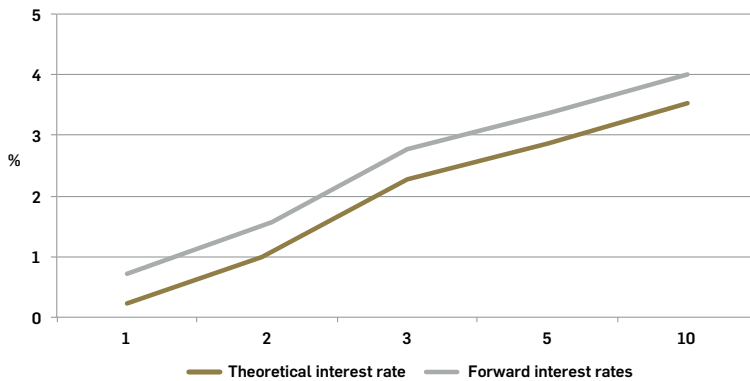
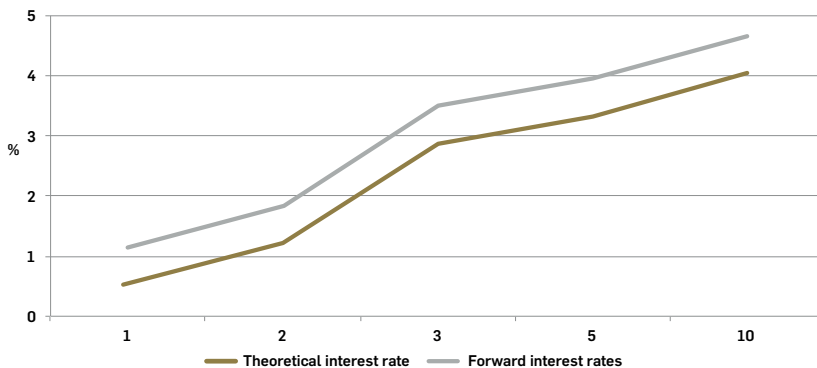


Table 8. Comparison table of theoretical and forward interest rates. Eurozone

	Theoretical interest rate	Forward interest rates
1 year	0.73	1.15
2 years	2.24	1.83
3 years	2.87	3.49
5 years	3.33	3.94
10 years	4.04	4.65

SOURCE: THE AUTHORS

Figure 5. Comparison chart of theoretical and forward interest rates. Eurozone



b) Expansive monetary policy scenario

Table 9. Comparison table of theoretical and forward interest rates.

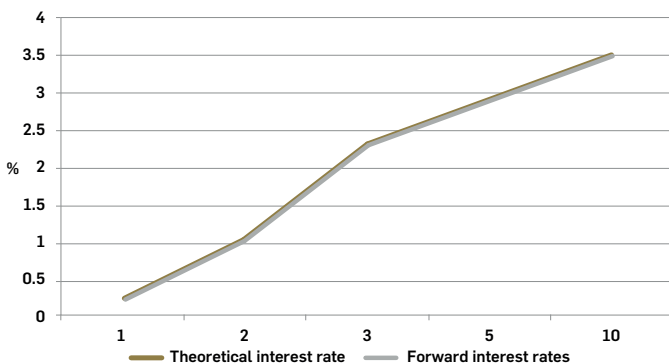
United States

	Theoretical interest rate	Forward interest rates
1 year	0.3	0.20
2 years	2.2	1.01
3 years	2.28	2.24
5 years	2.86	2.82
10 years	3.52	3.48

SOURCE: THE AUTHORS

Figure 6. Comparison chart of theoretical and forward interest rates.

United States

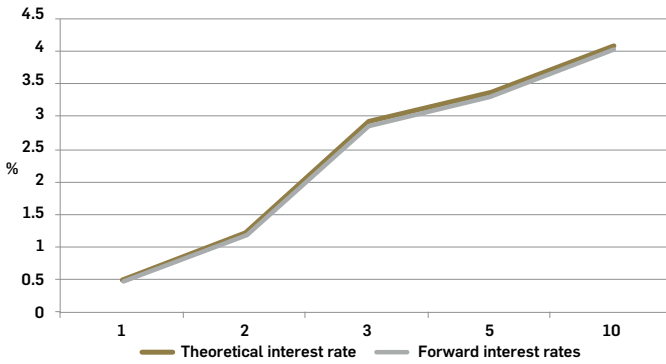


● **Table 10. Comparison table of theoretical and forward interest rates.**

Eurozone

	Theoretical interest rate	Forward interest rates
1 year	0.73	0.50
2 years	2.24	1.18
3 years	2.87	2.83
5 years	3.33	3.29
10 years	4.04	4.00

■ **Figure 7. Comparison chart of theoretical and forward interest rates. Eurozone**



c) Contractive monetary policy scenario

● **Table 11. Comparison table of theoretical and forward interest rates.**

United States

	Theoretical interest rate	Forward interest rates
1 year	0.3	3.66
2 years	2.2	4.47
3 years	2.28	5.70
5 years	2.86	6.28
10 years	3.52	6.94

SOURCE: THE AUTHORS

Figure 8. Comparison chart of theoretical and forward interest rates.

United States

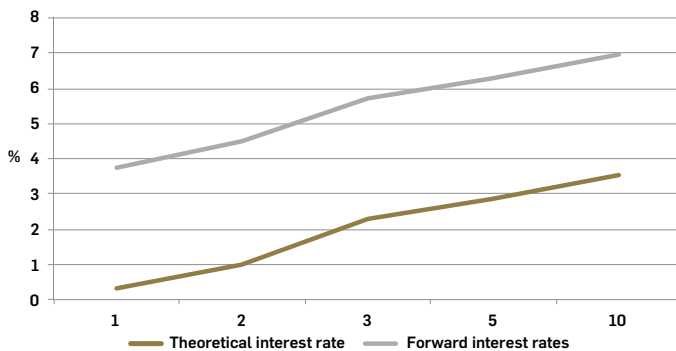


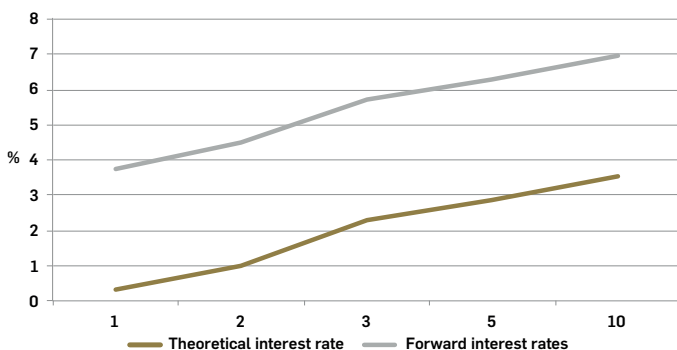
Table 12. Comparison table of theoretical and forward interest rates.

Eurozone

	Theoretical interest rate	Forward interest rates
1 year	0.73	2.98
2 years	2.24	3.66
3 years	2.87	5.32
5 years	3.33	5.77
10 years	4.04	6.48

Figure 9. Comparison chart of theoretical and forward interest rates.

Eurozone



SOURCE: THE AUTHORS

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d) Core scenario of this study

From the results for each of the above scenarios, we assign their corresponding likelihood of being included as part of the core scenario presented in this study.

● **Table 13. Comparison table of theoretical and forward interest rates.**

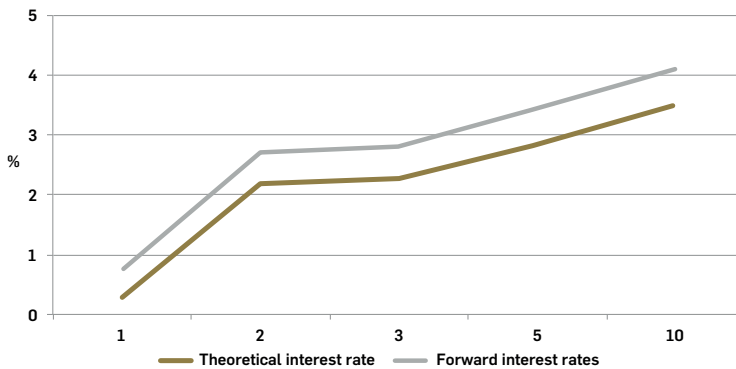
United States

	Theoretical interest rate	Forward interest rates
1 year	0.3	0.73
2 years	2.2	2.73
3 years	2.28	2.82
5 years	2.86	3.43
10 years	3.52	4.12

SOURCE: THE AUTHORS

■ **Figure 10. Comparison chart of theoretical and forward interest rates.**

United States



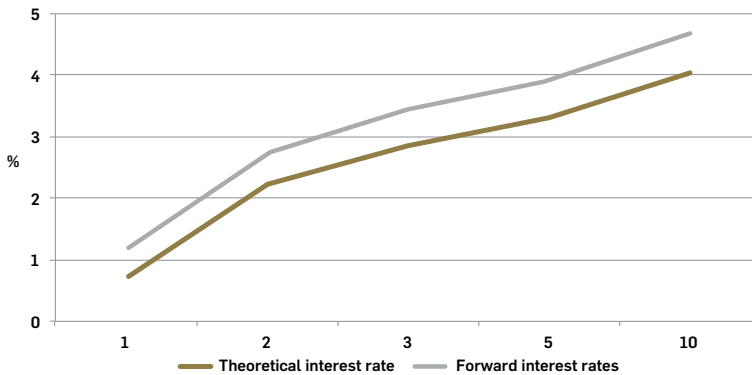
● **Table 14. Comparison table of theoretical and forward interest rates.**

Eurozone

	Theoretical interest rate	Forward interest rates
1 year	0.73	1.20
2 years	2.24	2.79
3 years	2.87	3.46
5 years	3.33	3.94
10 years	4.04	4.68

Figure 11. Comparison chart of theoretical and forward interest rates.

Eurozone



SOURCE: THE AUTHORS

4. The situation of the below “investment grade” debt market

Another of the markets that is directly affected by the monetary measures taken by the Central Banks is the fixed income securities market that finds itself below “investment grade”, particularly the five-year issue.

Within this market, there are trading corporations that are subject to high volatility such as petroleum companies specializing in *fracking* or those from other sectors such as biotechnology and transport. In 2014, the Spanish market was witness to the issuing of more than €5 billion in debt from these types of national companies, reaching historic new heights, with a 61% rise compared to the figure for 2013.

It should be stressed that once the process of diversification of the sources of financing by SMEs has begun, divesting themselves, to a certain degree, from bank credit and redirecting their sources of financing towards the capital markets, the issuing process will be a continually recurring process. This is why deliberations about whether a bubble exists in this particular type of bond are so interesting.

For investors, these securities represent a window of opportunity given the low interest rates, while for the companies themselves, the issuing of debt becomes a plausible alternative to financing through the banks and, therefore, for the sake of avoiding the credit crunch that has been experienced in recent years during this severe economic crisis.

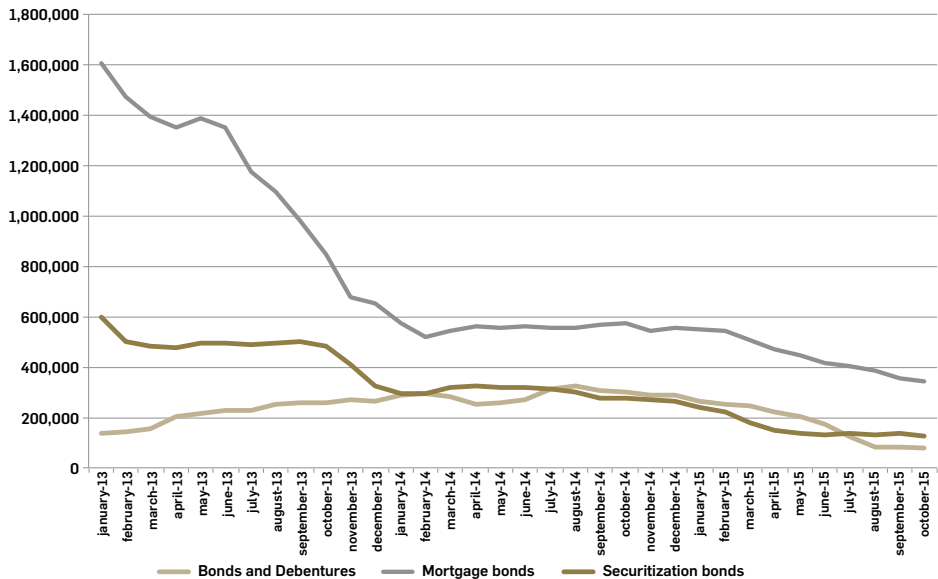
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Accordingly, of particular note is the role that, as mentioned earlier, the Alternative Fixed Income Market (MARF) is playing in Spain, where after a hesitant start, the market is beginning to stretch its legs, not only dealing with bond issues of Spanish companies, but rather the market shelters the emission of promissory notes – short term financing – as seen very recently with the issuing and listing in this market of debt from a Portuguese company.

We hope that these new developments give a boost to this market, which is essential for SMEs to be able to diversify their source of financing; accordingly, we believe that we will soon see the first admission to trading of some securitization, which will undoubtedly mark further development with great potential.

It is precisely for this reason that the invigorating of the private sector fixed income market is absolutely essential in the structuring of an effective financing alternative to the bank. In recent years, we have witnessed a sharp fall in trading (in terms of value) of the traditional fixed income instruments in the AIAF market: securities, bonds or debentures and mortgage bonds, as can be seen in the following diagram:

Figure 12. Trading in the AIAF market - 12-month rolling average



SOURCE: THE AUTHORS. AIAF IN MILLIONS OF CURRENT EUROS.

● **Table 15. Primary non-financial emitters in the AIAF (updated 2015)**

ENERGY & WATER	REAL ESTATE
CANAL DE ISABEL II GESTIÓN, S.A.	MELIÁ HOTELS INTERNATIONAL, S.A.
ENAGAS, S.A.	NH HOTELES, S.A.
MINICENTRALES DOS, S.COM.P.A	SACYR, S.A.
UNION FENOSA FINANCIAL SERVICES USA,LLC	TRANSPORT & COMMUNICATION
ZINKIA ENTERTAINMENT S.A.	ABERTIS INFRAESTRUCTURAS, S.A.
OIL & PETROLEUM	ADIF – ALTA VELOCIDAD
CORP DE RESERVAS ESTRATÉGICAS DE PROD PETROLÍFEROS	AUTOPISTA CONCESIONARIA ASTUR-LEONESA, S.A.
METAL & MECHANICAL	AUTOPISTAS DEL ATLÁNTICO, S.A.
ACERINOX, S.A	AUTOVÍA DE LOS VIÑEDOS, S.C. DE LA J.C.
FAGOR ELECTRODOMÉSTICOS, S. COOP. EN LIQUIDACIÓN	C-LA MANCHA
FOODSTUFFS	TELEFÓNICA, S.A.
EROSKI SOCIEDAD COOPERATIVA	

SOURCE: BME.RF

A situation that is quite different from that experienced by the MARF, where the trading of fixed income securities has grown significantly in recent years and where the door has been opened to more companies that had previously been subject to bank credits. Such is the case for Pikolín, Ortiz de Construcciones, Audax and MasMovil.

● **Table 16. Main non-financial emitters in the MARF (as of close September 2015)**

ENERGY & WATER	SOCIEDAD CONCESIONARIA AUTOVÍA DE LA PLATA, S.A.
AUDAX ENERGÍA, S.A.	VIARIO A31, S.A.
METAL & MECHANICAL	FINANCING ENTITIES
ELECNOR, S.A.	IM AURIGA PYMES EUR 1, F.T.A
TUBACEX	IM FORTIA 1, FONDO DE TITULIZACIÓN
CONSTRUCTION	COMMERCE AND OTHER SERVICES
ORTIZ CONSTRUCCIONES Y PROYECTOS, S.A	ESTACIONAMIENTOS Y SERVICIOS, S.A.U.
SOCIEDAD ANÓNIMA DE OBRAS Y SERVICIOS COPASA	GRUPOPIKOLIN, S.L.
REAL ESTATE	SIDECU, S.A.
BARCELÓ CORPORACIÓN EMPRESARIAL, S.A.	NEW TECHNOLOGIES
TRANSPORT & COMMUNICATION	TECNOCOM, TELECOMUNICACIONES Y ENERGÍA, S.A.
MASMÓVIL IBERCOM, S.A.	ZELTIA. S.A.

SOURCE: BME.RF

Nevertheless, one of the recurring worries in the market and by fixed income managers is that if this type of debt is overvalued, and there has even be word of a price “bubble”. Accordingly, the method of carrying out an empirical valuation of this potential circumstance is based on the earlier calculations and applying them to the interest rate curve of the debt of this type of bond issue. Incidentally, as mentioned earlier, the possible overvaluation might result in a narrowing of the market, consequently increasing illiquidity, which as we will see is of particular note.

The curve is obtained using inter-annual returns from the *Bank of America-Merrill Lynch High Yield Master II* index that records operations of the Federal Reserve in St. Louis in both dollars and euros. These are used to compare the theoretical interest rate calculated using the risk premium and the five-year forward interest rates of these bonds.

In the three monetary policy scenarios, in the case of the United States, we see that the below “investment grade” fixed income is abundantly overvalued over five years, while in the case of the Eurozone, overvaluation is lower (the theoretical interest rate is higher than the current five-year forward interest rates).

● **Table 17. Expected yield from sub “investment grade” five-year bonds compared to the theoretical interest rate. United States and the Eurozone**

	Accommodative		Expansive		Contractive	
	US	EUR	US	EUR	US	EUR
Theoretical interest rate	10.95	9.94	10.42	9.29	6.28	5.77
Yield	7.6	6	7.6	6	7.6	6

SOURCE: THE AUTHORS

In the above Table with the calculations made, it can be seen, as far as we understand, that there would be an overvaluation in two of the scenarios examined, the accommodative and the expansive scenarios. In both cases, there are differences in the rates, currently 7.6 in the United States and 6 in Europe, in approximately 300 basic points in each economy. There are obviously different causes, but there is no question of a doubt that “quantitative easing” is the cause behind this, given that it manages to substantially lower the yield of investment grade bonds to very low nominal rates.

The potential investor in these assets, faced with such low yields, is looking to assets that provide a greater return, namely assets with a greater risk. Accordingly, the entry of below “investment grade” bonds, together with investment in equity, is becoming a general tendency. Furthermore, the entry into low credit-rating bonds is also attested to by the low levels of default that is being registered at this time, given the large amount of printed money, especially by the Fed.

We anticipate, in any case, a certain increase in the aversion to risk, especially for bonds issued by the governments and corporations from emerging market countries, something which is already happening and is epitomized by the fall in rating of major countries, such as Brazil.

But in our analysis, we do not see any overvaluation in the contractive monetary policy scenario, which you will remember was allocated a likelihood of 45%. Should this happen, there would even be a certain undervaluation in the American economy, which would be practically the same for the European economy.

■ 5. Concluding remarks

To conclude, it is precisely the case of Europe where we would like to point out the likelihood already announced by the Governor of the Central Bank, Mario Draghi, of increasing the intensity and the scheduling of “quantitative easing, will further lower the nominal interest rates of investment grade bond issues.”

This move, provided default rates in Europe do not rise, could make investors more risk-averse when looking for higher nominal rates of return, as was the case in the United States, and could benefit from the arrival of investment flows and push up prices.

In any case, it is just a possibility; that is why with the present prices such as they are, we believe that only if there is contractive monetary policy scenario, as mentioned above, would we find ourselves at the current time with a certain undervaluation, which would be somewhat more pronounced in the American markets.

■ Appendix: Methodology

The study of fixed income markets stems from several decades of correlation between official interest rates and both the short-term and long-term interest rates (Taylor, 1993). Within this conceptual framework, the so-called “Taylor Rule” shows itself to be one of the most effective mechanisms for understanding the trajectory of short-term interest rates (between one and two years).

Conversely, long-term interest rates (understood to be a term of between five and 10 years) are determined using “rational expectation” mechanisms following a temporary structural model of the interest rates (Mascareñas, 2013). Accordingly, determining them is carried out using the implied forward interest rates curve.

First of all, the Taylor Rule is an extension of the Fisher equation, whereby the real interest rate is roughly equal to nominal interest rate minus the forecast inflation rate.

$$r_t \cong i_t - \pi_t^e \quad (1)$$

Taylor noticed an empirical consistency in the monetary policy of the United States: the difference between the real effective interest rate (r_t) and the equilibrium real interest rate (r^*), could be explained by the composition of two different components: on one hand, the output gap, or the difference between current GDP and potential (expressed as a percentage of potential GDP) and, on the other hand, the difference between the current inflation rate and the target inflation rate set by the Central Bank:

$$r_t = r^* + \alpha \left(\frac{PIB_t - PIB_{potencial}}{PIB_{potencial}} \right) + \beta (\pi_t - \pi_{target}) \quad (2)$$

This formula can be used to calculate the real interest rates for the first two periods (2015 and 2016) using data from the International Monetary Fund, the Central European Bank and the US Federal Reserve in St. Louis for two major economic blocs: the United States and the Eurozone.

Calculation of these two interest rates is carried out under the following assumptions:

- a) The equilibrium real interest rate for the American economy stands at 2% (Justiniano and Primiceri, 2010) while the equilibrium real interest rate for the Eurozone stands at 2.5% (Garnier and Wilhelmsen, 2005).
- b) The weighting allocated to both the output gap and the inflation differential (α and β) are equal to 0.5. Accordingly, the American and European Central Banks place an equal amount of importance on achieving their inflation goals and the maximum potential economic growth (which could be interpreted in other words as achieving full employment).
- c) The inflation target for both the United States and the Eurozone is 2%.
- d) Inflation and output gap estimations for 2015 and 2016 are sourced from the International Monetary Fund in their latest review of the world economies and most significant economic zones (WEO, 2015).

Calculation of forward interest rates based on the term structure of current interest rates.

$$(1+i_{m,n})^{m-n} = \frac{(1+i_m)^m}{(1+i_n)^n} \quad (3)$$

Data published by the US Treasury Department and the EU Statistical Office (Eurostat), are used to calculate implied forward yields for the United States and the Eurozone.

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