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Corporate Hybrid Bonds : Solvay Case Study

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Introduction

On October 14, 2015, BNP Billiton, (Reuters, 2015) one of the biggest mining company in the world, announced its intention to raise $6.5bn using hybrid bonds. This corporate hybrid bond issuance in multi-tranches and multi-currency was the biggest issuance ever seen on the debt capital markets, outpacing EDF (6.2bn euro-equivalent) and Total S.A. (5bn euro-equivalent).

What are the reasons for such a gigantic issuance? How can companies borrow such huge amounts on the debt capital markets without impacting their financial health? What is the incentive for choosing corporate hybrid bonds instead of classic senior corporate bonds? Why this company did not issue new shares in order to avoid over-indebtedness?

The hybrid bond market emerged since 10 years with lots of new issuances and huge amount launched on the market, especially in the last 5 years. More than a new fad, hybrid bond issuances have real advantages for companies as well as for potential investors.

The world biggest companies regularly issue hybrid bonds, essentially for M&A reasons, they have a lot of success on the primary debt capital markets, as well as on the secondary markets where massive volumes are traded daily.

To illustrate the development of hybrid bonds, this thesis will develop and analyse an issuance of Solvay S.A. dated from 2015.

However, before the analysis of the hybrid bonds markets and its specificities, a reminder of the debt market and of the classic senior corporate bond will be made.

Firstly, a summary of the debt capital markets and its two main instruments - corporate bonds and bank loans - will be done so as to have a first overview of these means also being used by companies to raise capital.

After this first general overview of the debt capital markets, some important features of the classic corporate bonds will be developed, to provide the reader with the necessary background to handle the most specific particularities of bonds. Since corporate bonds are a complex financial instrument, with lots of particularities, the theoretical parts developed in this paper aim to introduce some specific bonds' features, so that the reader will be able to compare the classic corporate bonds with the hybrid bonds.

The final theoretical part of the thesis develops the main features of hybrid bonds and provide a summary of the main characteristics of this still little known financial instrument. Coupon

structure, legal covenants, risks associated, rating agencies considerations,… are examples of the subjects that will be developed in this section.

All these theoretical presentations have the objective to provide the reader with enough knowledge to understand and analyse the case study related to Solvay's issuance in the acquisition context of Cytec.

After a general introduction of the acquisition of Cytec by Solvay as well as a description of the total funding process, this case study will go through the main features of the hybrid bonds, the rationale to justify their issuance, the terms & conditions and some corporate finance analysis of the impacts of the issuance.

This case study is a perfect example of a hybrid bond issuance in an acquisition context, made by a well-known Belgian company. Moreover, the bonds issued follow a traditional hybrid structure, it outlines all the features and the aspects present in the hybrid bonds' markets.

1. Debt Capital Market

1.1. Introduction

This part of the paper aims to present the main possibilities for companies to raise capital using debt: bank loans and corporate bonds. The main characteristics, differences, but also the advantages and disadvantages of both means of raising capital will be developed as an introduction to the subsequent sections focusing on corporate bonds. This second introduction will enable the understanding of the debt capital market as a whole, and demonstrate that there is more than one option available when a company decides to raise capital using debt. These two alternatives can furthermore be combined, in a bridge-to-bond. This process is generally used in an acquisition process, where the rapid settlement of a loan is an advantage when compared to the time-consuming process of bond issuance. Moreover, after a pre-defined period, the short term loan is reimbursed by a bond issuance.

1.2. Bank Loans

The easiest way for a company to raise capital is through bank loans. This type of debt instrument is quite advantageous for a typical company that needs quick access to capital in order to finance its activity.

The biggest advantage of bank loans is that any corporate can access this debt instrument, regardless of its size (Milos D, 2004). This is essential in a European-type economy because a lot of SMEs need capital to continue and expand its business operations. Banks therefore have a major role in supporting the economy as a whole by helping SMEs develop as they are the largest creator of employment (SdWorx, 2015). In addition, the terms of a loan are easier to negotiate with some banks than with a lot of potential investors. A company that is unknown on the market, or that has a poor reputation will prefer to stay on the bank loan market to benefit from better terms and conditions and to avoid over-pricing situation or unaffordable marketing costs.

Another advantage of bank loans is that they are easily accessible to companies located in a developing country (Milos D, 2004). Public debt requisite is very difficult to fulfil in a country where there is no stock exchange and capital market structure because there is no investment culture. This investment culture can be observed in the US for example, it has the largest debt capital market in the world. On the other hand in a developing country, the percentage of public debt requisite is nearly zero, banks thus have a supporting role in developing countries which want to develop their economies.

Finally, the companies that require bank loans need to provide less documentation than in the context of bond issuance. The main reason for this is that bonds are intended for investors who need to be more completely informed than banks (Dior, 2017).

However there are some disadvantages with banks loans, banks usually ask for much more guaranties from companies that request loan financing because the capital is lent directly from the bank's own funds. In case of default, the bank might lose its capital and suffer while with a public bond issuance, the bank only plays the role of arranger, and does not keep the loan on its balance sheet. Indeed, since the 2008 crisis (Hakansson, 1998), Basel Committee on Banking Supervision, ECB, Fed, States… settled a lot of regulations and supervision rules to avoid a new systemic crisis and the banks have been increasingly controlled. These new constraints have a real impact on the banks' balance sheet and the banks new requirements from borrowers might prevent some companies from accessing capital thereby slowing down the economic development of certain sectors (Filtman, 2009).

The last disadvantage of this debt instrument lies in its features. Even if the loan market can be tailor made in terms of type, tenor, size, prepayment, type of facilities,… the tenor of the loan market is usually limited to 5 years for senior debt, whereas in the debt capital market (corporate bonds) you can reach almost every maturities. Moreover, the reference rates are mainly floating rates (e.g. Euribor & Libor). The interest will thus vary depending on these rates.

1.3. Corporate Bonds

Firstly, bonds issuance offers diversification (Fernandez, Belen & Martinez, 2014) for companies to raise capital, but also to investors looking for a safe investment. Corporates can use this source of capital in combination with bank loans and thus have different conditions, requirements and tenors.

Moreover, bond issuance has more flexible terms of features (de Bondt & Lichtenberger, 2003). For instance, the period in which the bond reaches maturity can vary almost infinitely, from short term to perpetual bonds. Size of issuance can also be tailor made, with a minimal cost-effective amount, but with no actual maximum size. The bond market enables companies to access huge amounts that cannot be lent by banks or might be lent by them with very constrictive terms. This is due to the number of different potential investors (Insurance, asset management, pension funds…) and the very large amount available for investments on the market. For example, Volkswagen issued a €8bn multi tranches bond on March 23, 2017 (Reuters, 2017).

Additionally, there are fewer financial covenants for bonds. Financial covenants are conditions that a lender asks the borrowing company to respect in order to assess the capital. A typical financial covenant in the loan market is keeping leverage ratio (Net Debt/EBITDA) under a certain threshold. In case this limit is exceeded, additional fees are required. There are also fewer requirements in terms of negative pledge[1].

The introduction of the euro (de Bondt. & Lichtenberger, 2003) had an enormous impact on bond markets because it transformed the European market from a lot of small markets to a global one, allowing investors from all over Europe to invest in their currency in other countries. The economy as a whole was impacted by the single currency introduction, so that the European corporate bond is now, even if it is still smaller in terms of amount, as developed as American or Japanese ones. Yet, the introduction of the euro makes currency diversification more difficult for investors. The Euro bond's market expansion also implies that foreign investors are attracted to invest in European Corporate Bonds and provides massive liquidity supply, which results in a rates reduction and acts as an incentive for companies to issue.

The corporate bond market is also essential in preventing a new financial crisis. As mentioned before, the bank loans stay on the bank's balance sheet while bonds are sold to a lot of investors who invest in different companies, sectors and regions. In times of economic stress, their diversification could support the default of one issuer and compensate for it. Moreover, in times of economic crisis, the banks tighten their credit facilities and some corporations might not have as easy access to bank loans as usual. This is known as a credit crunch. For instance, in 2008, companies were not able to borrow massive capital from banks even if their ratings were good, and had to raise capital on the bond markets (e.i: AB Inbev issued a 8 years bond (£750m) with a coupon of 6.5% (Bloomberg Terminal, 2017).

In opposition to bank loans, the company that wants to access debt capital markets using corporate bonds must be a large corporation or a midcap. This is the consequence of market rules which impose a lot of expensive documentation that is unaffordable for small companies, but it is also due to the small amount that the smaller companies would want to borrow. For example, a retail bond in Belgium is generally issued starting from €50m while a US Private Placement requires at least $500m (Dior, 2017). These huge amounts & fees discourage small

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1"A negative pledge clause is a negative covenant in an indenture stating a corporation will not pledge any of its assets if doing so gives the lenders less security". (Investopedia, n.d.)

companies from raising capital using bonds. In addition to these amounts, some studies (Altunbaş, Kara, & Marques-Ibanez, 2010) showed that the cost of the process was a major argument in the choice of debt instrument. In fact, the use of public debt involves large costs, including a fixed part, which is better diluted in a larger amount.

A bond is a bullet debt instrument, the repayment to investors takes place at the maturity date, with no possibility of an extension, except for a reoffering offer, which can be seen as a new bond issuance. This might be an advantage or a disadvantage for a company, depending on their capital needs and on their financing policy. A loan repayment can either be bullet or amortizing.

To continue to potential restraint, and as mentioned before, one of the major prerequisites of an efficient bond market development is the economic and financial development of a country (Milos, 2004). In fact, a country where there is already an efficient government bond market and an equity market would be keen to also allow corporate bond markets to develop since investors are already educated to financial products and markets. In addition, the presence of institutional investors such as pension funds, asset managers, governmental central banks,… is essential because they are the main type of investors for corporate bonds. To conclude with national prerequisites, macroeconomic stability is, like for other financial markets, indispensable to support issuers and give a certain confidence to investors who might fear an financial crisis or default from companies in case of economic anxiety.

Bonds are however dependent on market conditions, and investors' intuition. The interest rates are fixed with regards to a macro-economic situation and stress can cause influence the risk-free rate which will then affect the interest that the issuer pays to the investors. On the other hand, the flexibility of bonds allow the issuer to combine fixed rates, floating rates, and inflation linked tranches or to diversify the currency of the issuance to hedge against unexpected inflation in a risk free rate.

1.4. Conclusion

We can conclude this section by stating that each of the two debt requirements presented has its own advantages and disadvantages. A company that wishes to raise capital using debt must analyse both options and decide which is the best solution, depending on its own situation, its needs and on market and economic news which have a real impact on debt raising. Most large companies uses both instruments and combine their features to improve their financing depending on the amount, the tenor, the interest rates, the currencies…

The next sections of this thesis will develop the second debt instrument, the debt capital market, with a focus on corporate bonds and hybrid bonds. A quick overview of the main features of the corporate bonds will be presented, followed by the main characteristics of hybrids bonds.

2. Corporate Bonds

2.1. Corporate bond types

The corporate bond market offers various types of bonds, depending on the corporate features, but also on its objectives in terms of maturity, amount, investors… Each type of bond has a unique structure, even if they can, to some extent, be classified.

The three main distinctions are the rating of the company, the region where it is issued and the potential investors reached.

		Rated		**Unrated**	
		Investment Grade	**Speculative Grade**	**Investment Grade**	**Speculative Grade**
Eur	**Public**	• Benchmark Bond • Retail Bond	• High Yield Bond	• Unrated Benchmark • Retail	
	Private ***(Institutional Investors)***	• Private Placement • Schuldschein	• Term Loan B	• Private Placement • Schuldschein	• Domestic Private Placement
US	**Public**	• Benchmark Bond	• High Yield Bond		
	Private ***(Institutional Investors)***	• USPP	• Term Loan B	• USPP • Schuldschein	

Figure 1 - Corporate bond types (Personal work)

The rating of the company by a rating agency (mainly S&P, Moody's and Fitch) is essential because it provides investors with an opinion of the company based on financial ratios. The credit rating plays an important role in the investors' decision because it allows the investors to accept a specific coupon and to evaluate the capacity of the company to service and repay the debt. Regarding S&P, an investment grade company might have a rating that can range from AAA to BBB- and a speculative grade below BBB-. Note that even if the company has no official rating, banks provide an assumed rating to guide investors.

Moreover, companies can issue bonds either in their own domestic market or on a foreign market, generally in another currency (Fabozzi, 2000). These choices are made based on the extent of a desire for diversification, in terms of potential investors reached (i.e. US Private

Placement bonds do not have the same investor basis as Euro Private Placement) but also on terms & conditions and on the currency.

Finally, the targeted investors are a determinant choice when a company issues. In a public transaction issuers must offer a bigger coupon and broader terms & conditions, whereas in a private transaction, everything is negotiated with only a small number of investors and provides a tailor made financing solution (Patrone, 2017). Differentiation upon investors must also be made in terms of professionalism. An issuance which targets non-professional investors must go hand in hand with particular documentation and securities to provide a safer environment. This also has an impact on the coupon rate of the transaction. (e.i. Kinepolis Retail Bond 2015: 4.75% coupon, Kinepolis PP 2015: 2.70% (Bloomberg Terminal, 2017)

The choice of the type of bond can also be done backward, by looking at the features the company needs. In fact, some types have a minimal amount required, a maturity date preference,… For example, a Private Placement is usually a smaller amount (~50m) than a Benchmark (~150/200m) bond (Patrone, 2017), also the maturities available for these bonds are a more particular; (5-12 years whereas Benchmark bond can reach all maturities). However, these features are generally linked with the public targeted at each issuance.

In addition to those categories defined in the investment banking sector and in the investor world, literature (Fabozzi, 2000) and official stock exchange websites (Euronext & Nyse) define other criteria for bond classifications.

Firstly, a distinction is made between fixed and floating rate. Fixed rate bonds have the same coupon value during their whole life, while the coupon of a floating rate bond varies over time, depending on the variation of its reference rate.

Furthermore, the call option (Fabozzi, 2000) of a bond is usually taken into account to classify bonds. Callable bonds can be redeemed by the issuer before their maturity date. Terms & Conditions of these types of bond generally include a call price at which the bond must be redeemed (Patrone, 2017).

To conclude with this section on the different characteristics of the bonds, we finish with what are known as convertible bonds. These bonds can either be held until maturity like a classic corporate bond or exchanged for a defined number of shares from the issuer.

2.2. Bond issuance process

Figure 2 - Bond Issuance Process (Personal work)

The issuer is a company that would like to issue bonds on the market in order to raise capital. To select the best option between all the types of debt instruments in the financial markets, the issuer will request to various banks (originators) to prepare a pitch of the different financing options (US Private Placement, Retail, Unrated Benchmark, Schuldschein,…). Each of these options has special features in terms of the audience that will be reached, coupon, maturity, size,… and they can be combined in order to find the best solution for the issuers.

When an issuer has chosen an option, it will contact a bank or some banks (that will act as bookrunners) to prepare the different documentation (EMTN Vs Stand-Alone) and define the financial features of the bonds.

Before the issuer decides to launch a bond on the market, it must set up a "roadshow", it is a series of meetings and presentations of the company to investors throughout Europe, US or the whole world. This presentation includes general information on the company, on its core activity, financial results, strategy,…

These roadshows have two main goals: to promote the company to potential investors for the new issuance and to receive feedbacks on their needs and desires in case the issuer decides to issue the bond (for example, if investors want long term maturity,…). Using the feedback, the originators will decide on the main features of the bond to be issued and decide on the spread (see below).

The originators ask their syndicate department for a pricing and a coupon rate based on market conditions.

After having compiled all these elements and determined a spread, the banks and the company make a "go/no go" call to check together the details of the issuance, the coupon, the amount, the maturity,… and the company decides if it launches the bond on the market or not. If the issuer confirms the bond issuance, the information becomes public and the sales team begins to collect offers from investors.

The investors who are interested in this bond will place orders which are compiled in the orderbook**.** After all the offers have been made, the bookrunner can proceed to a Market Update and modify bond pricing following the principle of supply and demand. If the bond is oversubscribed, the company will reduce the coupon rate that it offers the investors. Then, if there is still more capital than needed, the sales team must attribute the bond by weighing the different investors with regards to their demand.

2.3. Corporate bonds features

This part of the paper will be a non-exhaustive description of the different classic corporate bond features. The main features which will be developed in the following pages are essential to have the background in order to understand the following parts of the thesis, on corporate hybrid bonds.

2.3.1. Pricing of a bond: Business Practice

Theoretical pricing of bonds is studied and explained in most of Corporate Finance books and manuals, so a recall might not be relevant in this thesis. However, we will take a look at the business practices. This part reflects the thinking of a Corporate Debt Platform Syndicate of one of the major global investment bank, BNP Paribas Fortis. It allows to understand that the pricing of a bond is sometimes impacted by macro and micro economic factors. This continues to provide the reader the background of bond market and bond features.

Depending on the place of issuance, but also on the maturity, the syndicate team will set a reference rate for the bond. This rate is assumed to be a risk free-rate and will be the basis of the coupon calculation. As mentioned above, typical reference rates for short term bonds are Euribor (€), Libor (£) and US treasuries ($). For the long term, coupon calculation is generally based on US notes, mid-swap and German Bunds.

When an issuer asks an originator to prepare the price of the bond that will be issued, the originator will compute different factors to calculate the price and the coupon.

The main element in the price and the coupon determination is the calculation of the spread, which is added to the swap rate of the same maturity. We usually speak about swap + …bp.

Five components have an impact on the spread:

- The Issuer :

- The name and the reputation of the issuer play a major role in the initial price allocation, and when the company is well known by potential investors, they are already aware of how

well it performs and have a good idea of how the company will develop over the years that will follow.

A well-known company would have a lower spread, while new issuers unknown to investors would have a higher spread.

- If a company is already present in the market or has issued corporate bonds in the past, the originator can compare the new issuance to previous ones to determine a price that will be coherent with the bonds available on the market.
- If the company already has bonds on the market, a new issue premium (NIP), will be determined; it is a premium compared with similar bond. This NIP will cause the new bond to be more appealing than its pre-existing counterpart which might already be traded in the secondary market.
- The company's rating also gives a good idea of the quality of an issuer. Good ratings from rating agencies will decrease the spread while bad or no rating will increase it.
- The presence of credit default swap of the same issuer can be a useful element to help analyse the potential risk of an issuer.
- The scarcity value of the Issuer also has an impact. If there is already a high demand for one of this issuer's bonds, investors will probably be keen to buy a new bond in case of new issuances.

- Market :

The originator will also pay attention to comparable bonds already available on the market. By looking at comparable bonds issued by firms of the same industry, with the same ratings, from the same country or at bonds which have been recently issued with the same maturity, the originator can compare the spread that he wants to those of other bonds on the market to propose a spread which is in the market trend.

- Market news :

Like other financial markets, the corporate bond market is heavily impacted by macro-economic events. The spreads are indeed affected by political events, wars, terrorism,… the main objective of the originator is to analyse these factors and to advise the issuers on the best moment to issue new bonds.

- Bookrunners/Originators :

Investors and issuers are very attentive to the issuance bookrunners. Some banks offer specific features concerning certain types of bond issuances (hybrids,…) and market development (geographic regions,…).

- Secondary market :

The spread of a bond will also depend on the opportunity to sell the bonds on the secondary market. If the bond offers a lot of opportunities on the secondary market, the spread will be higher whereas if there are massive resale possibilities, the spread of the bond will be lower. Using all of these elements, the originator will determine the percent to be added to the reference rate chosen in order to calculate an interest payment, which will be rounded to the nearest 1/8 of a percent to determine the value of the coupon that investors will receive.

2.3.2. Risks

Investors who buy and sell bonds can be exposed to several risks. In fact, even if this instrument has the reputation of being safer than corporate equities, they are affected by risks that place them between equities and government bonds, also in terms of yields. These could be possible defaults, credit rating downgrades, inflation,... The difference between the expected and actual yield is called the risk premium (Kozhemiakin, 2007).

For corporate bonds the most widespread risk in financial literature is the default risk, it is the probability that an issuer does not respect its part of the debt agreement, which states that the company that issues a classic corporate bond has to repay the principal, but also to respect the different coupons at their payment date to the investors.

The second risk is the call risk, which is the risk that the issuer call the bond it has issued before the maturity date. Following Fabozzi, bonds which present this risk have 3 main disadvantages. Firstly, the coupon payments of the bonds might not be known by the investor who buys this bond. Then, the investor "is exposed to reinvestment risk" (Fabozzi, 2000, p6). This statement implies that investors who receive their capital might not be able to invest it in a product as profitable as the initial bond. Finally, a callable bond might not be as well appreciated as a non-callable bond on the market.

In addition, credit risk, which can be defined as "the risk that the perceived credit quality of an issuer will change" (Foss, 1995, p30) also affects the risk premium of a bond. This risk is linked with the default risk of the company. In fact, the rating agencies use the default risk to assess

their opinion on the rating they attribute to a company and this will affect the rating of the bonds.

The last well-known risk of corporate bonds is the liquidity risk. This risk refers to the possibility of selling the bond on the secondary market, at a good price and rapidly.

To conclude with the potential risks that a corporate bond might encounter, we could add the traditional risks of financial instruments such as the currency risk, the inflation risk, the market risk…

As mentioned at the beginning of this section, all these risks affect corporate bonds and bond markets. They are the main factors that influence the disparity between the different bond yields, from government to corporate bonds. These risks also impact the difference in the coupon rates between corporate themselves.

2.3.3. Bond ratings

Corporations that issue bonds generally ask a rating agency (S&P and Moody's being the most famous) to rate their issuance. The rating will indicate the ability of the company to meet debt commitments and its financial strength (Ross, Westerfield & Jordan, 2008).

Both Moody's and S&P publish criteria in the *Moody's Rating Methodology Handbook* and the *S&P's Corporate Finance Criteria (*Sinclair, 2003*)*. A bond which has a good rating (S&P: AAA to BBB-) is an investment grade bond and is less likely to be vulnerable to non-payment than a speculative grade bond, sometimes called junk bond, or high yield bond.

The risk related to the rating is taken into account when the Syndicate calculates the bond spread, to reward the risk taken by investors who buy speculative grade bonds.

Without being exhaustive, the bond ratings are an opinion based on the company's financial ratios, especially those including debt, cash flow generation, liquidity… but also some qualitative information such as their strategy, market analysis, market competition,… (Sinclair, 2003).

According to Sinclair (2003), rating agencies began to rate bonds because of 3 main factors. Firstly, because the financial markets became a global affair and grew to include new continents with different investment cultures. Then, because of the rapid growth of new financial products and types of bonds, including convertible, hybrids… And finally, because the competition between the top rating agencies namely S&P and Moody's, pushed them to diversify the

services they offer to investors and their client in order to increase their revenue but also improve their reputation.

Bond rating has an impact on the investor's perception of bond issue as well as on the financial strength of the issuer and its "ability to fulfil its financial obligations" (Doganay, Körs, Akta, 2012, p83). Moreover it plays a major role in hybrid bonds, as will be developed in the following sections.

This table (Sinclair, 2003) compares the ratings of S&P and Moody's and give a brief definition of the bonds that receive these ratings.

Grade	Moody's*	S&P†	S&P Definitions‡
Investment	Aaa	AAA	An obligation rated 'AAA' has the highest rating assigned by Standard & Poor's.
Investment	Aa1 Aa2 Aa3	AA + AA AA −	An obligation rated 'AA' differs from the highest rated obligations only in small degree.
Investment	A1 A2 A3	A + A A −	An obligation rated 'A' is somewhat more susceptible to the adverse effects of changes in circumstances and economic conditions than obligations in higher rated categories.
Investment	Baa1 Baa2 Baa3	BBB + BBB BBB −	An obligation rated 'BBB' exhibits adequate protection parameters. However, adverse economic conditions or changing circumstances are more likely to lead to a weakened capacity of the obligor to meet its financial commitment on the obligation.
Speculative	Ba1 Ba2 Ba3	BB + BB BB −	An obligation rated 'BB' is less vulnerable to non-payment than other speculative issues. However, it faces major ongoing uncertainties.
Speculative	B1 B2 B3	B + B B −	An obligation rated 'B' is more vulnerable to non-payment than obligations rated 'BB', but the obligor currently has the capacity to meet its financial commitment on the obligation.
Speculative	Caa	CCC + CCC CCC −	An obligation rated 'CCC' is currently vulnerable to non-payment, and is dependent upon favourable business, financial, and economic conditions.
Speculative	Ca	CC	An obligation rated 'CC' is currently highly vulnerable to nonpayment.
	C	C	A subordinated debt or preferred stock obligation rated 'C' is CURRENTLY HIGHLY VULNERABLE to nonpayment.
		D	An obligation rated 'D' is in payment default.

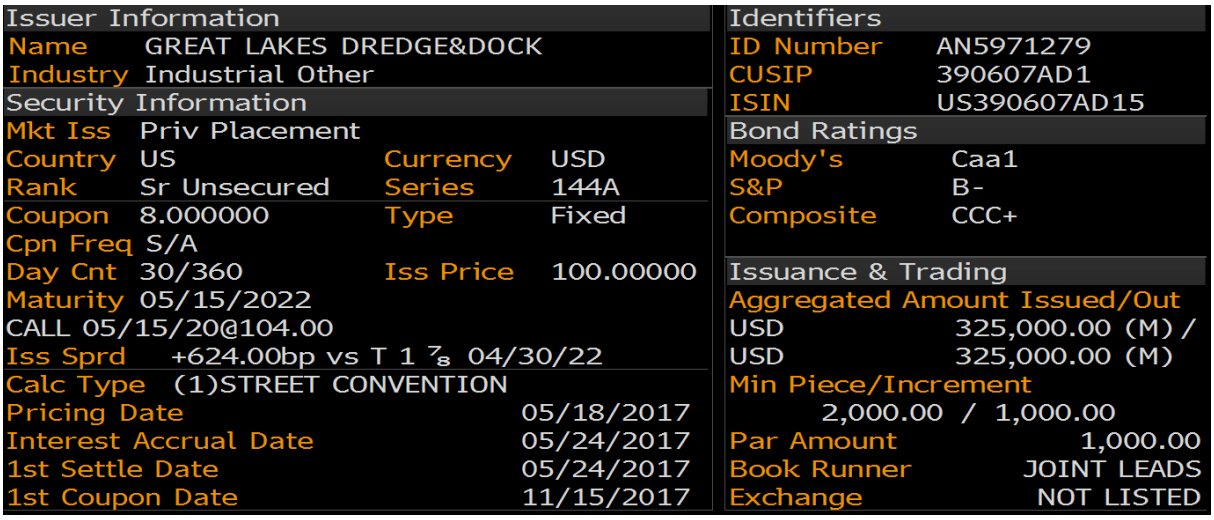
Figure 3 - S&P and Moody's Bond Classification (Sinclair, 2003)

As an example, the following screenshots from Bloomberg show ratings from two US companies that issued bonds in 2017. Coca-Cola issued an Investment Grade bond while Great Lakes Dredge & Docks issued a High Yield Bond. (Bloomberg Terminal, 2017).

Issuer Information			
Name	COCA-COLA CO/THE		
Industry	Food & Beverage		
Security Information			
Mkt Iss	Euro Non-Dollar		
Country	US	Currency	EUR
Rank	Sr Unsecured	Series	
Coupon	0.000000	Type	Floating
Formula	QUARTLY EURIBOR +25.0000		
Day Cnt	ACT/360	Iss Price	100.30000
Maturity	03/08/2019		
BULLET			
Iss Sprd			
Calc Type	(21)FLOAT RATE NOTE		
Pricing Date			02/27/2017
Interest Accrual Date			03/09/2017
1st Settle Date			03/09/2017
1st Coupon Date			06/08/2017

Identifiers	
ID Number	AM6605472
ISIN	XS1574667124
FIGI	BBG00G3N8WF5
Bond Ratings	
Moody's	Aa3
S&P	AA-
Fitch	A+
Composite	A+
Issuance & Trading	
Amt Issued/Outstanding	
EUR	1,500,000.00 (M) /
EUR	1,500,000.00 (M)
Min Piece/Increment	
	100,000.00 / 1,000.00
Par Amount	1,000.00
Book Runner	JOINT LEADS
Exchange	Multiple

Figure 4 - Coca-Cola Security Description (Bloomberg Terminal, 2017)



Issuer Information			
Name	GREAT LAKES DREDGE&DOCK		
Industry	Industrial Other		
Security Information			
Mkt Iss	Priv Placement		
Country	US	Currency	USD
Rank	Sr Unsecured	Series	144A
Coupon	8.000000	Type	Fixed
Cpn Freq	S/A		
Day Cnt	30/360	Iss Price	100.00000
Maturity	05/15/2022		
CALL 05/15/20@104.00			
Iss Sprd	+624.00bp vs T 1 ⅞ 04/30/22		
Calc Type	(1)STREET CONVENTION		
Pricing Date			05/18/2017
Interest Accrual Date			05/24/2017
1st Settle Date			05/24/2017
1st Coupon Date			11/15/2017

Identifiers	
ID Number	AN5971279
CUSIP	390607AD1
ISIN	US390607AD15
Bond Ratings	
Moody's	Caa1
S&P	B-
Composite	CCC+
Issuance & Trading	
Aggregated Amount Issued/Out	
USD	325,000.00 (M) /
USD	325,000.00 (M)
Min Piece/Increment	
	2,000.00 / 1,000.00
Par Amount	1,000.00
Book Runner	JOINT LEADS
Exchange	NOT LISTED

Figure 5 - Great Lakes Dredge&Dock Security Description (Bloomberg Terminal, 2017)

2.4. Capital Structure Theories

As mentioned previously, corporate and hybrid bonds are one of the main source of financing for companies. However, before taking any funding decisions, companies will first analyse their capital structure and their financing needs.

Some economists analyse the capital structure and define theories about the optimal way to manage a company's capital structure and to find the optimal one.

The first theory on the capital structure of a company was established by Franco Modigliani and Merton Miller in 1958, who both received the Nobel price of economy. They assumed that in an economy without taxes, bankruptcy costs and with an efficient capital market, "the value of the firm is unaffected by its capital structure". (Brealey & Myers, 2001, p429).

However, the capital structure affects the company's shareholders since they bear more risks when the company issue debt and thus increase their financial debt. Consequently, in case of financial stress, it will have less equity capital to fulfil its debt obligation and the risk will be higher for shareholders when the company borrows more capital on the debt market.

In addition to their first principle, Modigliani and Miller proposed a second principle, which states that "the expected rate of return on the common stock for a levered firm increases in proportion to the debt-equity ratio (D/E), expressed in market value" (Brealey & Myers, 2001, p431). Indeed, since a leverage firm represents higher risks for shareholders and increases the returns that they might ask, the original formula of cost of capital (r_{assets} = (r_{debt} x Debt/Firm Value) + r_{equity} x Equity/Firm Value) (Brealey & Myers, 2001) must be rearranged as follow:

$$r_{equity} = r_{assets} + \text{Debt/Equity } (r_{assets} - r_{debt})$$

However, the total expected return of the whole capital (r_{asset}) does not change, only the expected return of each parts (r_{equity} & r_{debt}) vary. This is due to the fact that even if the cost of debt increases in case of debt issuance, the amount of equity decreases and so it compensates the first effect.

Modigliani and Miller did not consider the corporate taxes in their assumption. However, corporate taxes play a major role in the capital structure of a company, and not considering this aspect would be irrelevant.

Tax treatment of debt is very different than the tax treatment of equities, since the interests companies pays to debtors are tax deductible, while interests for shareholders are not. This introduce the concept of interest tax shield, which is the "tax savings resulting from deductibility of interest payments" (Brealey & Myers, 2001, p434). Thus, the first proposition of Modigliani and Miller must be modified to include corporate taxes (Brealey & Myers, 2001):

Value of levered firm = value if all equity financed + PV of the tax shield.

This can be observed on the following graph from the Fundamentals of Corporate Finance (Brealey & Myers, 2001), where we can observe that there is a fiscal incentive for debt funding.

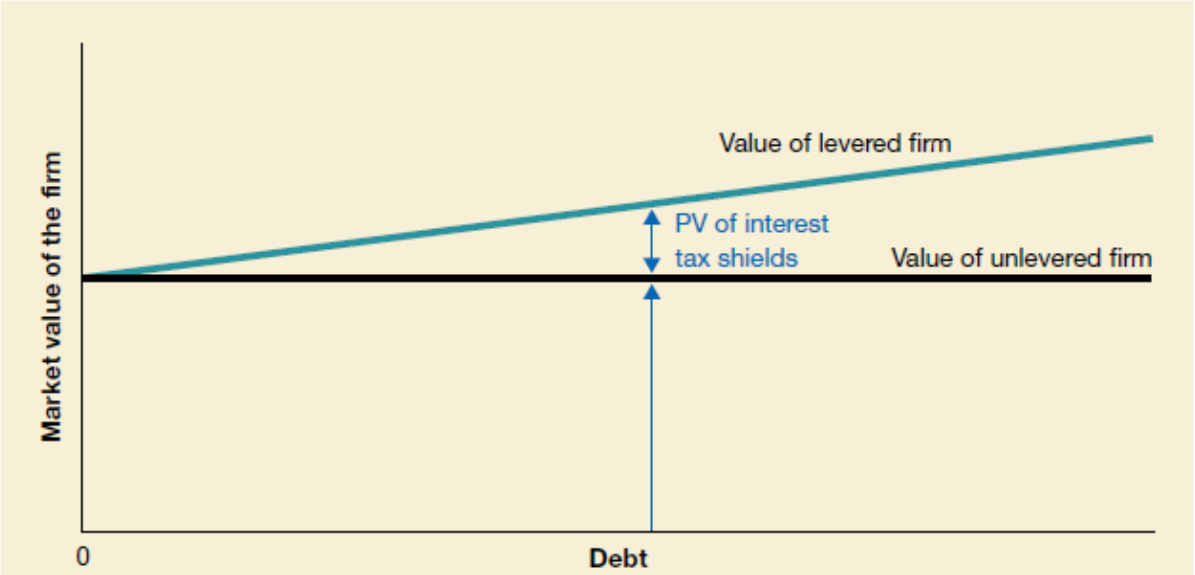


Figure 6 - MM Theory including taxes (Brealey & Myers, 2001, p436)

The weighted average cost of capital is also affected by this introduction of corporate taxes in the capital structure decision for the company. The new formula is thus:

$$WACC = (1\text{-Tax rate}) \times r_{debt} (Debt/(Debt + Equity)) + r_{equity} (Equity/(Debt + Equity))$$

This formula is a mathematical proof that if there are no taxes, the value of the firm does not depend on the capital structure. On the other hand, with the introduction of corporate taxes, debt provides an incentive for the company, which is the interest tax shield.

Even if this statement would suggest a full debt financing for corporates, there is a limit of the amount that a company can borrow on the market, fixed for economic reasons, but also by rating agencies and by bank covenants.

Two additional theories can be mentioned about the capital structure of a company. Firstly, the trade-off theory states that "managers will try to increase the debt levels to the point where the value of additional interest tax shields is exactly offset by the additional costs of financial distress." (Brealey & Myers, 2001, p439).

When the company borrows capital, its value increases due to the PV of the interest tax shields. After a certain threshold, the maximum value of the firm, the value of the firm moves off the theoretical value of the levered firm. This difference is due to the cost of financial distress, which increases as the company increases its indebtedness. This cost of financial distress is due to the probability that the company goes bankrupt and will not be able to respect its debt obligation. Investors are thus looking for a compensation for this risk.

Note that the maximum value of the firm for the trade-off theory depends on each company's own features. This explains why each company creates its own capital structure and the funding strategy.

The trade-off theory is represented in the graph below which comes from the Fundamentals of Corporate Finance (Brealey & Myers, 2001), where the optimal amount of debt is given by maximal value of the firm.

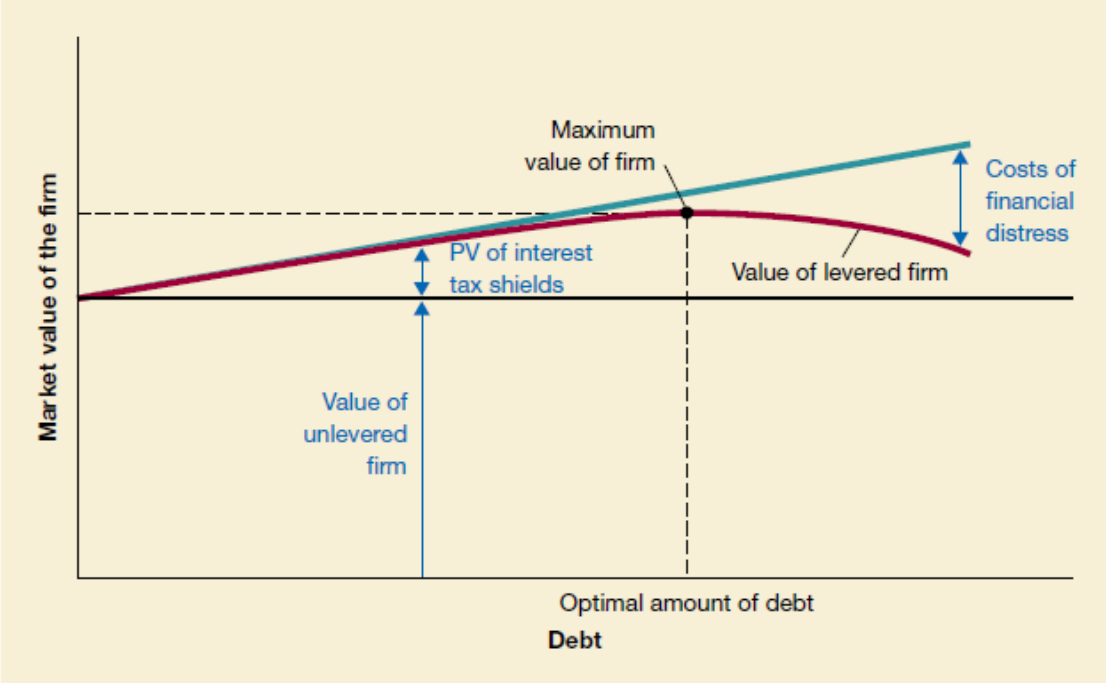


Figure 7 - Trade-off theory (Brealey & Myers, 2001, p439)

The last theory over financial structure of a company is the pecking order theory. This theory states that investors might not be completely aware of the internal information of a company, and the company market value might be over-priced or under-priced. Due to this asymmetry of information, companies would have to offer more returns for investors who buy stocks.

The pecking order theory takes into account this asymmetric information and suggests that firstly, companies prefer to finance themselves using internal funding, then "firms prefer to issue debt rather than equity if internal finance is insufficient." (Brealey & Myers, 2001, p445)

This theoretical part was a general overview of the capital structure theories for companies. The case study of Solvay financing will develop more practical details and comparisons with these theories will be made.

2.5. Overview of Corporate Bond Market

The current very low interest rates, the different macro-economic events and the very active M&A environment provide significant reasons for the corporate bond markets to develop for the moment.

Looking at the euro-denominated investment grade bond market (Société Générale, 2016), the financial year 2016 was in the trend of the previous year, with expectation (estimated in November) of €285bn issued.

The market was impacted by both negative and positive events that affected monthly issuance size. Examples of negative situations were the oil price volatility, the geopolitical tension in the Middle-East, the Brexit… while the main positive news is the ECB's announcement to increase its quantitative easing program; it consists in buying assets on the markets, such as bonds, to support the economy.

As a result of these events, the month of March 2016 was the most productive in terms of volume issued, with around €50bn. Issuers found a respectable equilibrium between uncertainty and optimistic events.

The most active sectors in 2016 were Chemicals & Pharma (€45bn), Food & Beverage (€37bn) and Technology Media and Telecommunication (€33bn), while the biggest issuers were AB Inbev and Dailmer (Société Générale, 2016).

The USD-denominated bond market was impacted by the same macro-economic events, but was also badly affected by the ECB quantitative easing program, which reduced their attractiveness for European Issuers who preferred to remain on their domestic market. Also, the very low interest rates in the Euro-zone pushed investors looking for higher yields and to benefit from a stronger dollar to cross the Atlantic to make their investments.

By the end of November, the expectation for 2016 issuance size in USD was $775bn, with 11% of European issuers and with AB Inbev as the largest borrower, with $46bn followed by Microsoft $19.75bn (Société Générale, 2016).

The GDP-denominated investment grade bond market lived an unusual year in 2016 with only 14 trades for a volume of £5.1bn during the first semester due to the announcement of the referendum for the Brexit. The second half of the year was more prolific and the expectations for the end of the year were £18bn. Analysts (Société Générale, 2016) think that 2017 will

remain a fertile year due to decision and new monetary policies of the Bank of England to compensate the Brexit vote and procedure which took place on March 29th.

High Yield bond markets face the same events and uncertainties in 2016 but as well as for the IG markets, the investor's thirsts for higher yield on their investments was an opportunity for this kind of bonds. The estimations of the volume issued were €57.3bn (11% below 2015 primary issuances) and $220bn. (Société Générale, 2016)

3. Hybrid Bonds

Hybrid bonds are bonds that combine characteristics from both debt and equity. This type of bond shares some specificities from these two financial instruments and offers to the companies a lot of advantages such as non-dilutive financing, lower cost of capital,… All the features of this bond will be described in the following parts of this paper, with some practical examples and case study.

3.1. Types of issuers

Hybrid bonds can be issued either by corporates, or by financial institutions such as insurance companies and banks. The objectives of hybrid issuances are different depending on the type of issuers.

Financial companies will issue hybrid bonds to finance their activities without breaking all the regulations imposed by states and central banks since the financial crisis. Corporates will issue hybrid bonds mainly for rating adjustment requirements, tax treatment and anti-dilutive reasons. (Green, Humphreys & Jenning-Mares, 2012). The complexity of financial institutions bond issuance, and moreover of hybrid bond issuance made them not relevant in this paper, so no more details on these hybrid bonds will be exposed. The following parts will thus focus on corporate hybrid bonds only.

3.2. Format

Some particular types of stocks and debt securities are included into hybrid capital. Even if these financial instruments are not corporate hybrid bonds, financial literature (Green, Humphreys & Jenning-Mares, 2012), (Natixis Asset Management, 2014), consider them as hybrids. A non-exhaustive list of the different existing format is exposed in the article "Hybrid securities: an overview" of the Association of Corporate Counsel:

- Certain classes of Preferred Stocks;
- Trust preferred Securities;
- Convertible securities;
- Debt Securities with principal write down-features;
- Mandatorily convertible instrument.

In the following parts of this paper, most of the features of the hybrid bond will be developed, with its specificities and with the potential similarities or differences with classic corporate bond, accounted as 100% debt.

3.3. Coupon structure

A typical hybrid bond structure is composed of different coupon rates and step-ups.

Firstly, when the bond is issued, there is a period (generally of 5 to 10 years) during which the bond cannot be called. This is named the non-callable period. This can be seen in the denomination of a bond when it is issued. For example: Viacom NC5 means that the hybrid bond issued by Viacom in February 2017 (Bloomberg terminal, 2017), (Viacom Bond Prospectus, 2017), is a bond, which cannot be called during its 5 first years. This first call date will thus be on February 2022.

Then, the first call date is the beginning of a new rate basis for the bond coupon calculation. This rate is composed of the mid-swap rate, to which an initial spread is added, depending of the company profile. According to business practice, usually the rate of the Mid-Swap is the 5yr Mid-Swap. This method is similar to the classic corporate bonds. Starting from the call date, the issuer can call the bond at a defined coupon payment date.

The third important date during the life of a corporate hybrid bond is its first step-up date. At this date, the coupon interest will be the sum of the previous coupon interest rate (Mid-Swap + spread) plus 0.25%.

The effective maturity is the second step-up date, date at which we add 0.75% to the coupon interest rate. This effective maturity is the maturity according to S&P (S&P Global, 2008).

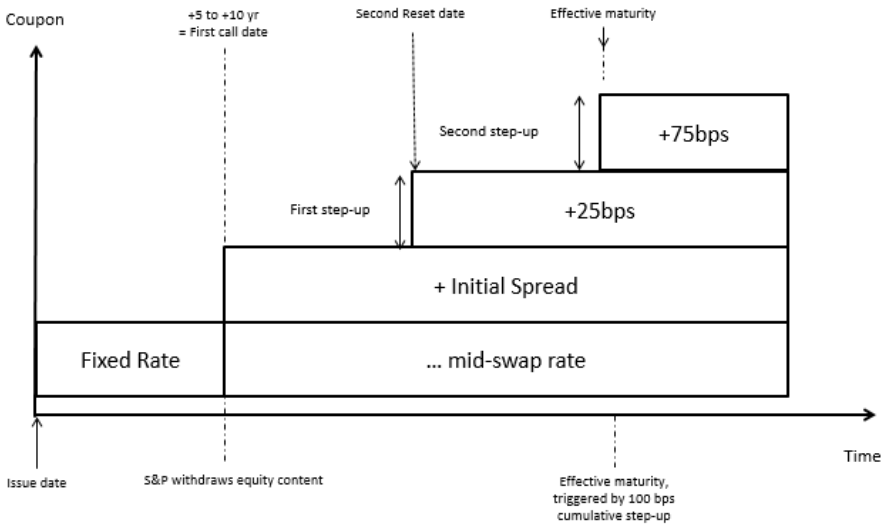


Figure 8 - Hybrid bond coupon structure (Danske Bank Markets, 2015)

Note that a total step up of 100 bps (+1%) is a requirement of the rating agencies. Issuers generally apply these 2 step up to reach 1% but there can be exceptions such as the hybrid bond

issued by Voestalpine, which had a step up of 100bps after 11.5 years (Bloomberg terminal, 2017), (Voestalpine Annual Report, 2016).

3.4. Perpetuity or very long dated financial instruments

Corporate hybrid bonds have either a very long maturity (60 years), or are perpetual. These features of the bond come from an equity characteristic. However, this long maturity is theoretical because in practice, issuers have an incentive to redeem the bonds earlier due to different call dates and step-ups.

The real tenor of hybrid bonds is given by S&P in their publication (S&P Global, 2008), which was updated several times since its issuance. S&P calls the tenor at which issuers have the more advantages to redeem the principal of the bond the effective maturity, and it is the day of the second step up of the coupon, generally 20 years after the call date. This assumption of effective maturity date is based on the fact that the issuer will redeem the bond in order to avoid paying additional interest to investors.

However, during the financial crisis, some issuers surprised the market since they decided to not to redeem the bond, because other capital funding costs were higher than paying interest on their hybrids, even with the step up. This decision was also encouraged by authorities (Green, Humphreys & Jenning-Mares, 2012).

3.5. Coupon deferability

As mentioned in the typical coupon structure of a hybrid bond, the coupon has a more complex form than in a simple corporate bond. In fact, the combination of the fixed and/or floating rates, but also the step-ups make this structure unique in the financial market.

The coupon is also a central element in the corporate hybrid structure due to the possibility that the issuer does have to not pay a coupon interest. This specificity is called coupon deferability, and is the issuer option (Natixis Asset Management, 2014). However, the coupon might be paid when the issuer redeem the principal to investors, this is called cumulative coupon.

Recent hybrid bonds also include dividend pusher clause (Danske Bank Markets, 2015), which states that if the issuer decides to pay dividend to common shares, it has the obligation to pay investors who did not received their hybrid bond coupon due to a coupon deferability. The opposite is called a dividend stopper, and states that if the issuer does not pay coupon on senior debt, it will not pay interest on all subordinated debt and equities.

3.6. Subordination

Another main feature of the hybrid bonds is the subordination. When we look at the capital structure of a company, the different types of liabilities are not pari passu in case of bankruptcy.

In fact, in case of bankruptcy, the company must first reimburse banks and senior lender. Hybrid capital is only junior to equities, and subordinated to all other debt in the company's financial structure. (Danske Bank Markets, 2015).

Figure 9 - Subordination level (Personal work)

3.7. Replacement Capital

Some hybrids have a replacement capital covenant. This covenant is an obligation for the issuer to replace the hybrid bond that is redeemed or called by another hybrid bond with at least the same rating quality or equities.

3.8. Hybrid Bond Rating

3.8.1. Introduction

When a hybrid bond is issued by a corporate, it can ask to the rating agency/ies to assess the equity content to the hybrid. Depending on the rating agency, there are 3 or 5 possible categories to which a hybrid bond can belong, depending on its features. These ratings are not influenced by the company's rating, also assessed by the same rating agencies.

The category to which the hybrid bond belongs will determine the accounting and financial considerations of the size of the issuance. As an example, if €1.75bn hybrid capital is issued by Total (Bloomberg terminal, 2017) and it receives a 50% equity content, only €875m will impact the debt ratios, and €875m the equity-ratios. Consequences of this classification on the ratios will be developed in the following chapters of this paper, concerning the advantages and disadvantages of hybrids.

The following parts of this section will describe the criteria's for hybrid bond classification, depending on the different rating agencies: Standard & Poor's, Moody's and Fitch Ratings.

3.8.2. Standard & Poor's

Standard and Poor's classifies hybrid bonds into 3 categories (S&P Global, 2008), regarding their equity content: "High", "Intermediate" and "Minimal".

Hybrid bonds eligible for "High" equity content are financial instruments that act as equities in a time of financial stress of the company and which have all the following equity-like characteristics (S&P Global, 2013):

- Subordination to all other debt;
- No stated maturity;
- No redemption or cancellation possibility by the issuer during a period of 10 years following the bond issuance;
- No step-up or other incentive for the issuer to redeem the bond;
- A common dividend-stopper.

The "Intermediate" content is achieved by hybrid bonds that have equity-like features in times of financial stress, but that also have some debt-like aspects, such as a dividend/interest policy this gives investors' confidence about their payments.

In fact, investors of companies that issue intermediate hybrid will expect to be paid, and the company will not disappoint the investors' expectations in order to keep a market overall good impression.

Even if many recent corporate hybrids have been issued with financial artifices that incentive the issuer to redeem the bond (step-ups, call date,…), the bonds with a call date with at least five years from the initial issuance date can be qualified as "intermediate" equity content as per the S&P criteria (S&P Global, 2008).

The "minimal" S&P's classification of hybrid bonds refers to bonds that have either fewer than 20 years remaining until their maturity date or bonds for which the coupon cannot be deferred more than 5 years. These hybrid bonds act as debt and share more of its features. The most relevant criteria for this category is the coupon deferability that must be restricted as much as possible.

Following the corporate methodology of S&P (S&P Global, 2008), hybrids are treated regarding their classification in the financial ratios used to assess the rating of the company. If an issuance receives an "Intermediate" equity content, half of the amount will be accounted as debt, and thus impact the debt-ratios, whereas the other half will impact the equity-ratios. However, rating assessment of a company is generally based on its debt-ratios.

To conclude with the S&P's methodology, we can note that during the life of the hybrid bond, its classification might change depending on the corporate events such as a rating downgrade,

or on the bond's own features, like the approach of the maturity date. S&P therefore publishes updates of hybrid ratings (Standard & Poor's rating services, 2015). As an example, the hybrid bonds of Dong Energy, Vattengall, Alliander, Telefonica,... have been revised to "Minimal" equity content in 2015, from an "Intermediate" equity content. However, these downgrades did not impact the rating of the companies.

3.8.3. Moody's

Moody's (Moody's investors service, 2017) classifies hybrid bond within 5 different baskets, from 0% of equity content and 100% of debt, to 100% equity and 0% of debt, which correspond respectively to baskets A and basket E.

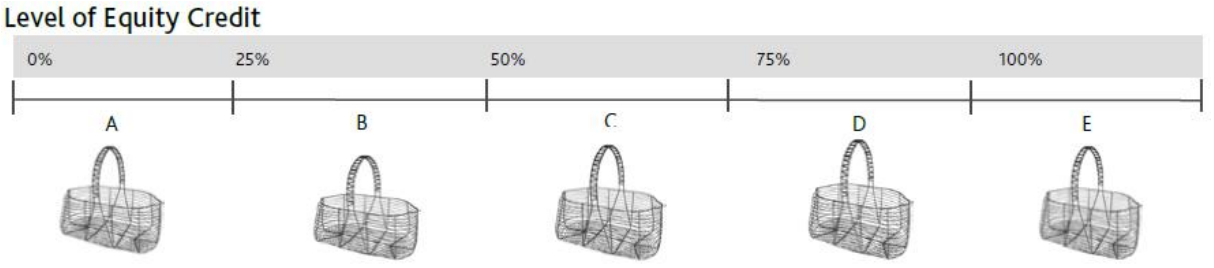


Figure 10 - Moody's categories for hybrid capital (Moody's investors service, 2017)

Moody's uses 2 methods to determine to which basket an Investment Grade hybrid bond belongs. Firstly, it asks 3 questions to determine the equity credit:

1. *Does the hybrid absorb losses or provides financial protection for a « going » concern?*
2. *Does the hybrid absorb losses for a gone concern?*
3. *Will the loss-absorbing hybrid be there when needed?*

(Moody's investors service, 2017, p2.)

Following the answers to these questions, Moody's will have a first opinion of the equity credit of the hybrid.

A first interpretation will tell us that more equity credit is assigned to a hybrid bond that can absorb losses or provide financial protection. On the other hand, less equity credit is given to a hybrid which cannot absorb losses and provide temporary protection for the company.

The second part of the method is based on the hybrid features. Indeed, depending on the coupon deferability, the settlement, the ranking and the maturity of the hybrid bond, Moody's will place

the hybrid bond in a particular basket. The following table that comes from official Hybrid Equity Credit Methodology (2017) summarizes the different subcategories for each features.

We can observe that hybrids of the basket A share the features of a senior corporate bond.

Application of Equity Credit Methodology for Non-convertible Hybrids Issued by Investment-grade Non-banks

	Column Numbers	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12
Coupon skip	Mandatory Weak[1]		X										
	Restricted Optional[2]			X							X		
	Optional	X			X	X		X	X			X	
	Optional & Mandatory Strong[3]						X			X			X[4]
Settle-ment	Cumulative	X	X	X	X	X	X	X		X			
	Non-cumulative								X		X	X	X
Ranking	Subordinated	X	X	X	X	X	X						
	Preferred							X	X	X	X	X	X
	Equity												
Maturity	< 30 years	X											
	30 – 59 years				X				X				
	>= 60 years		X	X		X	X	X		X	X	X	X
	Irredeemable												
Basket for Non-Banks		A	B	B	B	B	B	C	C	C	C	C	D

Figure 11 - Moody's methodology for hybrid bonds rating (Moody's investors service, 2017)

During the last years, the typical structure of hybrids issued by corporate in Europe has belong to the basket C, 50% equity and 50% debt. The most typical structure is an optional coupon deferability, cumulative, subordinated to other debt and with a maturity of more than 60 years. (Moody's investors service, 2015).

Speculative-grade issuers do not have the same capital structure and default probability than IG issuers. This has an impact on the rating Moody's attribute to their hybrid bond issuances. Their approach is to "closely follow the legal treatment they expect these securities would receive in a bankruptcy scenario" (Moody's investor service, 2017, p9). The approach is more direct and only provides two options:

1) Equity instrument with no debt claims are considered as 100% equities.
2) Hybrid with debt claims are considered as 100% debt. The only exception to this paragraph is shareholders loan[2].

[2] "A loan made to a company from an individual shareholder or partnership that exchanges money for interest payments." (InvestorsWords, n.d.)

The general Moody's methodology is thus different depending on the issuer's rating, reflecting his probability of default.

In the case of an issuer downgrade to speculative grade, the equity credit that was assigned by Moody's could change depending on the hybrid bond characteristics. This credit will be assigned as explained above, with the two options of a full debt or full equity assignment.

3.8.4. Fitch Ratings

Fitch classifies hybrid bonds into 3 categories: 100% equity, 50% debt and 50% equity or 100% debt. Their decision to have only 3 different categories reflects their view on hybrid and on the fact that it is only an approximation, without having precise criteria of classification.

Following Non-Financial Corporate Hybrids Treatment and Notching Criteria, (FitchRatings, 2017) the main features of a hybrid bond observed by Fitch when it attributes a rating on an issuance are:

- Deep subordination:

  The Hybrid Bond must be subordinated to all senior creditors and is only senior to common equity.
- Inability to Trigger a Default:

  100% equity credit is generally attributed to securities that do not have any event of default except bankruptcy and some specific exceptions.
- Absence of Material Covenants and Change of Control Clauses:

  Material covenants can lead to a 0% equity credit attribution by Fitch. On the other hand, some change of control clauses does not affect the equity credit of a bond.
- Effective Maturity of More Than Five Years or Conversion to Equity;

  The hybrid bond must be perpetual (no maturity) or have an effective maturity (implied maturity due to coupon step-ups) of minimum 5 years to receive a 100% equity credit. However, when the effective maturity date reaches 5 years, the equity content of the bond must be reconsidered.
- Permanence;

  The capital structure must be permanent to receive an equity credit. Replacement languages covenants allow the issuer to redeem the bond if he replaces it by a new issuance; this enables to satisfy the permanence criteria.

- Unconstrained Deferability for at Least Five Years;

  To achieve a 100% equity credit, the issuer must have the possibility either to pay or to defer the coupon payment for a period of at least 5 years.

Fitch then applies notching, meaning a modification of the rating relative to the issuer default rating. If Fitch considers that risks threats the issuer it could modify the rating attributed to the equity content of the hybrid. These modifications can also be applied during the life of the hybrid bond, depending on the market and on the company results.

Fitch rating assignments can be summarized by their two official decision trees, explained in their Non-Financial Corporate Hybrids Treatment and Notching Criteria report (FitchRatings, 2017), available on their website and presented in the annexes (Annexe 1) of this paper.

3.9. Accounting treatment

The accounting treatment of hybrid bonds is very important due to the huge amount of the issuances, it could have very significant impact on a firm balance sheet and financial ratios.

Observing the International Accounting Standards over financial instrument (IAS 32, 2012), hybrids bonds received an equity treatment even if it has some characteristics of debt. Two paragraphs of the IAS qualify the hybrid classification into equities.

Firstly, the paragraph 16 of the IAS 32 states that an equity instrument "include no contractual obligation to deliver cash of other financial asset than equity (…)" (IAS 32, 2012, p.4). This is the case for hybrid securities, with the coupon deferability process, which allows to skip coupon payments to investors.

> When an issuer applies the definitions in paragraph 11 to determine whether a financial instrument is an equity instrument rather than a financial liability, the instrument is an equity instrument if, and only if, both conditions (a) and (b) below are met.
>
> (a) The instrument includes no contractual obligation:
>
> (i) to deliver cash or another financial asset to another entity; or
>
> (ii) to exchange financial assets or financial liabilities with another entity under conditions that are potentially unfavourable to the issuer.
>
> (b) (…)

(IAS 32, 2012, §16)

The second criteria which define equity accounting of a financial instrument can be found in the paragraph 18 of the same IAS document. It states that perpetuity or very long dated instruments, such as hybrid bonds, are accounted as equity.

> (…) The existence of an option for the holder to put the instrument back to the issuer for cash or another financial asset means that the puttable instrument meets the definition of a financial liability (…)

(IAS 32, 2012, §18)

Following IAS 32, paragraph 25, subordination is not determinant in the classification of a financial instrument; the hybrid can thus be junior or senior without impacting their accounting classification.

The principal objective of this equity classification is that the whole hybrid capital is not taken into account when calculating financial ratios such as the leverage ratio (for banks and rating agencies: Net Debt/EBITDA) or the coverage ratio (measure "ability of the company to meet its financial obligation" (Investopedia, n.d.)). These ratios are decisive when a rating agency attributes a rating to a company and for a company to respect its financial covenants imposed by banks (Van Langendonck, 2017). However, this classification dilutes equity linked ratios such as RoE.

3.10. Tax Treatment

Firstly, following Wood (1999), the investors who invest in debt/equity instrument are looking for tailor made financial instruments in terms of yields, maturities, risks… but also tax treatment. In his article (Wood, 1999), he mentions that the OECD is in favour of debt financing, because the debt-interest payments are deductible from the tax base. On the other hand, shares dividends are generally not deductible.

Wood (1999) suggests 3 methods to tax hybrid bonds:

- The Debt and Equity Characteristics approach:

This approach recommends to consider some particular features of the hybrid and to match them with either debt or equity characteristics. Then, the instrument shall be analysed and matched with either debt or equity, depending on its likelihood with the category. However, due to the complexity of some hybrid bond structure, the tax authority will take case-by-case

decision, which is not optimal. Moreover, some minor changes in the structure of hybrid bonds could create major changes in the tax treatment of these bonds.

- Tax Hybrid as debt or as equity:

This approach is much more robust than the first. It defines exactly which are the characteristics of debt capital, and states that debt interests should be tax-deductible. If the hybrid does not correspond to the definition given by the authorities, it should be treated as an equity instrument, and the interest should thus not be deductible. The main disadvantage of this method is that it does not consider financial and economic realities of hybrid bonds, which are a combination of both equity and debt.

- The Dual Bifurcation Approach:

This approach refers to the term bifurcation, meaning splitting into two parts. This method splits the interest that is deductible from debt and the dividend that is not deductible from equities. The most important part is therefore the classification of the different cash flows depending on their type (equity/debt).

The taxation of hybrids depends on the country's tax law where the bond was issued. However, the general trend of the hybrid's tax treatment is that the coupons are tax deductible.

As tax deductible, coupons payments reduce the profit before tax, and thus the tax liabilities.

In addition, the IAS 32 mentions the tax treatment of interest and dividends as follow:

> Interests, dividends, losses and gains relating to a financial instrument or a component that is a financial liability shall be recognised as income or expense in profit or loss. Distributions to holders of an equity instrument shall be debited by the entity directly to equity, net of any related income tax benefit.

(IAS 32, 2012, §35.)

Issuing hybrid bonds might therefore be very attractive to some companies that, in addition to the other hybrid aspects, want to benefit from this type of tax treatments, as compared to full-debt capital. For example, companies under financial pressure might benefit from this tax treatment to raise fund at a relatively low cost.

3.11. Case study: Total S.A. Hybrid Issuance

The main characteristics of corporate hybrid bonds will be presented through real practical data taken from an issuance of hybrid of Total S.A. In May 2016, the company issued hybrid bond with the settlement date on the 18th May (Bloomberg terminal, 2017). The bond's characteristics are presented in the table below. This kind of table gives a quick overview of the terms and conditions of the prospectus (Total Hybrid Bond Prospectus, 2016). Note that from 2015, Total S.A has been the biggest corporate hybrid bond issuer (Reuters, 2017)

Issuer	Total S.A.
Amount	€1.75bn
Coupon	3.875%
Maturity	Perpetual
Structure	Perp NC6
Ratings	A2/A-/Au
Equity content	50/50
Ranking	Junior Subordinated
Issuer call option	2022
Interest rate reset	At first call date and every 5 years after
Interest	MS 5yr + 421bp
Step-up	+25bps in May 2027 +100bps in May 2042
Denomination	€100,000/1,000€

The same information of the above table is presented by Bloomberg, according to the image below. This information is available to all Bloomberg users. When the deal becomes public, this information can also be found on the company's website or in financial newspapers.

Issuer Information			
Name	TOTAL SA		
Industry	Integrated Oils		
Security Information			
Mkt Iss	Euro MTN	Hybrid	
Country	FR	Currency	EUR
Rank	Jr Subordinated	Series	EMTN
Coupon	3.875000	Type	Variable
Cpn Freq	Annual		
Day Cnt	ACT/ACT	Iss Price	100.00000
Maturity	PERPETUAL		
PERPETUAL CALL 05/18/22@100.00			
Iss Sprd	+421.00bp vs DBR 2 01/04/22		
Calc Type	(1469)FIX-TO-VARIABLE BD		
Pricing Date			05/11/2016
Interest Accrual Date			05/18/2016
1st Settle Date			05/18/2016
1st Coupon Date			05/18/2017

Identifiers	
ID Number	LW0680196
ISIN	XS1413581205
FIGI	BBG00CW1PF04
Bond Ratings	
Moody's	A2
S&P	A-
Fitch	Au
Composite	A-
Issuance & Trading	
Amt Issued/Outstanding	
EUR	1,750,000.00 (M) /
EUR	1,750,000.00 (M)
Min Piece/Increment	
	100,000.00 / 1,000.00
Par Amount	1,000.00
Book Runner	JOINT LEADS
Exchange	Multiple

Figure 12 - Total Security Description (Bloomberg Terminal, 2017)

With this general overview of a specific hybrid bond, the last screenshot of Bloomberg indicates the secondary market offer and bid price of the bond. These prices vary depending supply and demand of the bond, exactly like a classic corporate bond. Note that this screenshot was made on May 19th 2017 and since the price varies at each second, it might not be relevant for a long period of time.

03:26:13 ALLX Mode Overlay Axes Split Bid/Offer 94) Switch 95) Buy 96) Sell

Spreads vs DBR 2 01/04/22 Corp 111.326 / 111.359 -.423 / -.429 288.1 / 278.8

Filter By All 93) Legend

PCS	Firm Name	Bid Px / Ask Px	Bid Yld / Ask Yld	BSz(M) x ASz(M)	Time↑
20) CBBT	FIT COMPOSITE	106.573 / 107.056	2.458 / 2.358	x	03:26
21) BVAL	BVAL (Score 9)	106.450 / 106.840	2.484 / 2.403	x	02:00
22) EXCH	EXCHANGE TRADED	106.290 /	2.517 /	100 x	02:59
23) MZLN	MIZUHO INTERNATIONAL	106.250 / 107.150	2.525 / 2.339	1000 x 1000	03:26
24) BGN	BLOOMBERG GENERIC	106.526 / 107.002	2.468 / 2.369	x	03:26
25) ODDO	ODDO	106.500 / 106.890	2.473 / 2.393	500 x 500	03:25
26) LBBW	LBBW STUTTGART	106.385 / 106.875	2.497 / 2.396	500 x 500	03:25
27) QTX	Quotrix Exchange	106.755 / 107.105	2.420 / 2.348	100 x 100	03:25
28) HVBT	UniCredit Bank AG	106.534 / 106.909	2.466 / 2.389	1000 x 1000	03:21
29) BAAD	Baader Bank AG	106.755 / 107.100	2.420 / 2.349	100 x 100	03:18
30) GETX	GETTEX	106.755 / 107.100	2.420 / 2.349	100 x 100	03:18
31) GERM	GERMAN EXCHANGE	106.650 / 107.030	2.442 / 2.364	500 x 500	03:08
32) BRLN	BERLIN EXCHANGE	106.700 / 107.025	2.432 / 2.365	100 x 100	03:08
33) DUSS	DUSSELDORF EXCH	106.650 / 106.970	2.442 / 2.376	500 x 500	03:07
34) FRNK	FRANKFURT EXCH	106.670 / 107.040	2.438 / 2.362	100 x 100	03:07
35) HNVR	HANOVER EXCHANGE	106.680 / 107.030	2.436 / 2.364	100 x 100	03:00
36) PSE	PARIS STOCK EXCHANGE	106.290 /	2.517 /	100 x	02:59
37) MNCH	MUNICH EXCHANGE	106.700 / 107.025	2.432 / 2.365	100 x 100	02:40
38) HMBG	HAMBURG EXCHANGE	106.670 / 107.030	2.438 / 2.364	100 x 100	02:39
39) STGT	STUTTGART EXCHANGE	106.680 / 107.030	2.436 / 2.364	500 x 500	01:59
40) DEKA	DEKABANK	100.450 / 100.850	3.774 / 3.685	100 x 100	5/18

Figure 13 - Total hybrid bond: secondary market performance (Bloomberg terminal, 2017)

The bond was issued at its face value price of 100% on May 18th 2016. The market price of the same bond one year later is much higher (around 106%); this demonstrates the good performance of this bond on the secondary market.

3.12. Risks

Hybrid bonds carry more risks than classic corporate bonds. According to Danske Bank (Danske Bank Markets, 2015), four main risks affect hybrid bonds:

- Subordination risk:

  Risk due to the status of the bond compared to senior debts. "Their characteristics place them just ahead of equity in a company capital structure" (Danske Bank Markets, 2015, p.1). In case of liquidation or bankruptcy from the issuer, all the senior debt towards banks or other senior lenders will be reimburse before investors who possess hybrid bonds.

- Permanence risk:

  Corporate bonds are very long dated (over 60 years) or perpetual. Even if in specific structure of a hybrid bond there is an incentive for the issuer to redeem the bond using step-ups and call dates, the risk that the company do not call the bonds subsists. Investors will thus be in a position of an equity-like financial product holder instead of a bond holder, which implies normally a principal repayment.

  As mentioned above in the part speaking of perpetuity of hybrid bonds, during financial crisis, some issuers decided to not call the bonds for cost-savings reasons.

- Coupon deferability risk:

  With the issuance of a hybrid bond, the issuer has the option to avoid paying coupon. This alternative as already mentioned previously is called coupon deferability. This risk might generally happen when the issuer is in economic or financial difficulty. So it must be taken into account when an investor decides to buy a corporate hybrid bond instead of a classic bond.

  Covenants like dividend pushers, reduce this risk by forcing the company to pay the hybrid coupon if it decides to pay common share dividend.

  As an example, Erste Group Bank AG, an Austrian bank, decided not to pay the dividends on some of its financial instruments, including its hybrid bonds in 2014, in accordance to the documentation of the bonds. (Erste Group Press Release, 2014)

- Event risk:

  Hybrid bond documentation often includes events that triggers a call option from the issuer of the bond at the par value (100% of the issuance price) or at 101%. These events can be a change of control of the company, a tax event (change in tax-treatment of hybrid bonds), a rating event (change in the rating of the bond – example: Dong, Vattenfal,

> Alliander,.. suffered from a change of rating methodology from S&P, that changes the equity credit from 50% to 0%, and they were forced to call its hybrid bonds. (Bowman, 2015)… To prevent these event risks, hybrid bond documentations generally include high step up to oblige the issuer to redeem the bond to investors. (Van Langendonck, 2017)

All these risks to which classic corporate bond are not confronted, imply a higher coupon for investors, who then accept the additional risks relative to this particular type of debt instrument.

A perfect example of this difference of coupon rate to compensate these risks is given by comparing hybrid and classic bonds of the same company. A classic bond from Lufthansa issued in 2014 (€500m) has a coupon of 1.125% and their hybrid bond (60years, NC5.5) for the same amount issued in 2015 has a coupon of 5.125%. (Bloomberg terminal, 2017).

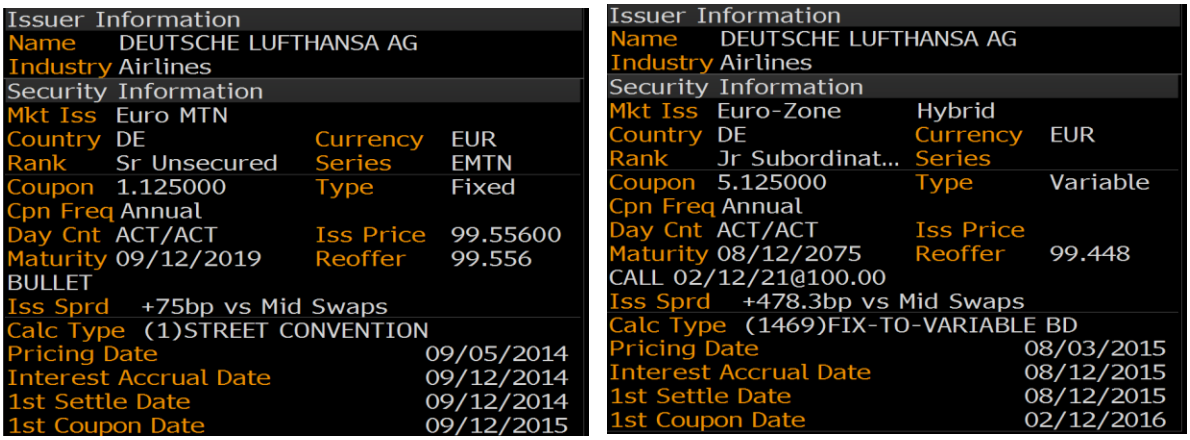


Figure 14 - Lufthansa bond comparison (Bloomberg terminal, 2017)

4. Advantages and disadvantages for issuers and investors

This section will discuss the advantages and disadvantages for issuers and investors of hybrid bonds compared to classic bonds on one hand and to equities on the other hand. As explained previously, the hybrid bond lies in between these two types of capital increase.

4.1. Advantages for issuers

- Non-dilutive

Hybrid capital allows the company to issue financial instrument that has the characteristics of equities, but without diluting the ownership of the company. The bondholders will in fact be in a debt relation with the company, whereas the shareholders own part of the company's capital. The control will thus not change while large amount of capital will be raised, without the constraints of debt-like capital.

This is crucial when a company has one or more reference shareholder(s) who do not want to have their ownership diluted into common shareholders in order to keep control on the company's main decisions. This is also important in companies owned by the employees.

- Tax Deductible

As mentioned previously, companies that issue hybrid bonds can benefit from tax deductibility, like a full debt financial instrument, even if the rating of the issuance classifies it in a 50% or 100% equity credit content. Coupon paid to investors will reduce the taxable basis. Even if this is not the main reason for a hybrid issuance, it can provide a financial incentive that might cover the costs of the required documentation and rating consideration for a hybrid bond issuance.

- Coupon deferability

Coupon deferability is considered as an advantage for hybrid capital issuers since it allows them to cancel the obligation to pay interests to investors without being considered on default. In case of financial stress of the company, it could avoid to worsen the financial health of the company.

The degree of deferability will also play an important role for companies. At the issuance, an equilibrium must be found between rating agencies considerations and company's coupon payment strategy. The degree of deferability is in fact one of the major determinant of the equity content of the bond.

- Subordination

The subordination of hybrid capital is an advantage for issuers in case the company faces financial difficulties. The company has indeed less senior creditor to reimburse when it goes bankrupt and could thus have more capital to redeem those senior creditors such as banks or classic corporate bond holders. For other sources of funding, such as bank loans, this subordination plays a major role because it provides confidence to potential lender who would rank more senior than Hybrids. It provides a capital buffer in case of liquidity or solvency problems.

- Financial ratios

Financial ratios are essential when a rating agency determines the rating of a company. Moreover, non-rated companies generally have an implied rating, stated by banks, which work with the same methodology of rating agencies to assess the risks of default of the companies requesting for capital as a loan. This rating is not published and is not official, but is a good proxy of the official ratings.

The most used ratios in the financial literature and in the rating assessment are the coverage and leverage ratio. These ratios provide a first view of the financial health of the company, and are an important component of the company's rating and thus in the different interest rates that has to be paid to investors and banks.

When assessing a rating to companies, S&P for example looks at the company's business risk profile and financial risk profile (Standard & Poor's rating services, 2013) and then combine these two.

The main advantage of hybrid as related to financial ratios depends on their own issuance ratings. A company that issues a hybrid bond of €1bn with an intermediate equity content according to the S&P methodology will only account half of this amount in its financial ratios using debt, which will have a positive impact on the rating of the company.

This advantage is the main factor for issuers to issue hybrid bonds instead of other types of bonds or bank's loans. In the financial world, most of the recent acquisitions were funded using hybrid bonds due to the large costs of the acquisition.

- Stable source of long term financing

Hybrid bonds are considered as a stable source of funding for corporate due to their theoretical perpetuity nature (or more than 60 years maturity). However, the various call dates and interest rate step-ups create an effective maturity date which could be shorter.

Hybrids also have a stable nature for institutional investors such pension funds, private bankers, insurance groups… These investors are more stable than equities investors. This is a particularity of bonds and also hybrid bonds.

- Reduction of the cost of capital

As mentioned in the section describing the features of hybrid bonds, hybrid issuances enable to reduce the cost of capital when they have an intermediary equity content, due to the lower cost of debt than the cost of equity.

The reduction of the cost of capital can therefore also be a financial incentive for issuing hybrid capital for corporates, especially if their cost of debt is high.

4.2. Disadvantages for issuers

- Higher coupon

Hybrid bonds bear more risks than classic bonds. These risks as mentioned previously are subordination risk, permanence risk, coupon deferability risk and event risk.

Financial practices state that investors need an additional return for financial instrument that bear additional risk than a risk free financial instrument, such as sovereign bonds (German Bunds, US notes, French OAT). Depending on the level of risk above these risk free bonds, the return required by investors could be higher.

Coupon of hybrid bonds will thus be higher than coupon of classic corporate bonds issued by the same entities. This results in additional funding costs for corporate issuing hybrids.

- Not really perpetual

As mentioned earlier in the advantages for corporate to issue hybrid bonds, these bonds are not really perpetual, due to coupon step-up and call date. Companies should thus take into account that they might have to redeem the bonds to investors before the real maturity of hybrids.

- Risk of rating downgrade

Even if the rating perspective are one of the most motivated factor for the issuance of corporate hybrid bonds, hybrid capital is still partly accounted as debt (depending on its equity content), and thus has a bigger impact on financial ratios than equity issuance on the equity capital market. However, equity issuance will have other disadvantages such as ownership dilution.

- "Fake" coupon deferability

Even if coupon deferability is allowed for companies that issue hybrids, it remains a false advantage for corporate. For companies that are well known and that issue a lot of bonds and equities on the financial markets, coupon payment policy is decisive when an investor looks at the company. Coupon skip can be seen as a signal of bad financial or economic situation of the company and thus be followed by a loss of confidence from investors.

4.3. Advantages for investors

- High yield

Hybrid bonds carry more risks than classic bonds resulting in the payment of a higher coupon for investors.

This higher coupon can be very attractive for investors in times of low interest rates, because it provides higher yields than classic corporate bonds and other bank accounts.

- Senior to equities

Investors looking for some security in their portfolios can also decide to invest in hybrids. In fact, due to their seniority level compared to equities, it could be advantageous in case of financial stress. However, it is still senior to classic corporate bonds, which rank on the top of the pyramid in term of seniority.

4.4. Disadvantages for investors

The main disadvantage for investors is the seniority level: Investors prefer to be as senior as possible. In fact, the low potential recovery of junior debt compared to senior debt is one of the three major risks of hybrid bonds for investors.

In addition to this disadvantage, the long term horizon of hybrid bond could scare investors who want to have liquidity in the short term and continue to invest on opportunities when they appear, without being locked in a long term debt contract and the potential non-payment of the coupon.

4.5. Conclusion

The objective of this section was to present briefly the main advantages and disadvantages of corporate hybrids bonds comparing to other types of funding available for companies.

In the real live, we observe that companies always try to diversify between bank loans, classic corporate bonds, hybrid bonds and equities, to combine advantages of each type of bonds.

In the next section, the hybrid bond market will be presented with the main recent issuances and the trends that can be observed since the financial crisis of 2008.

5. General overview of Hybrid bonds market

During the last decade, the hybrid bond market was not as homogeneous as before, with 3 exceptional years and some historical transactions that contrast with some calm years according to the number of issuances and to the amount issued on the debt capital market.

In fact, when we look 4 years in the past, we can observe that years 2013, 2014 and 2015 were exceptional, with around €40bn (BNP Paribas, 2017) issued each year and with the largest intraday hybrid transaction with the company BHP Billiton. The world largest mining company issued a multi-currency ~$6.5bn equivalent on October 2015 (Reuters, 2015).

The following table is an overview of the last year's issuances in euro equivalent, provided by BNP Paribas and based on Bloomberg database, as of the 4th April 2017.

	2013	**2014**	**2015**	**2016**
Total issuance	€41bn	€43bn	€41bn	€15 bn
Number of issues	21	19	20	13

Figure 15 - Hybrid issuance overview (BNP Paribas, 2017)

2016 was marked by a considerable drop in corporate hybrid bond issuance comparing the volumes and the number of issuances of previous years. According to BNP Paribas (2017) and Société Générale (2016), this decrease was mainly due to volatile market conditions reflecting macro-economic risks, lower financing need, less M&A activities, but also was correlated with previous exceptional years. Yet, the historically low-rate could contribute to further issuances in the following years, motivated by investors interest.

2016 was also marked by the redemption of all hybrids that had their call date during this financial year (Société Générale, 2016), with no replacement of the capital, even if it is a major element in the equity content assessment by rating agencies.

On April 2017, €10 bn were already issued by companies such as Telia, SSE, TenneT, Suez, Viacom… for a total of 17 issuances (BNP Paribas, 2017). However, the recent updates about the permanence criteria of hybrids in S&P methodology to assess equity content to new issuance create uncertainty on the corporate hybrid market which scare companies.

To conclude with financial year 2017, banks forecast that the M&A activities could drive some new issuances, while issuers that will call their existing hybrid during the year (EnBW, RWE,…) could issue a new hybrid as a replacement capital.

Note that 2017 also saw the first green hybrid corporate bond from TenneT (€1bn) (Bloomberg terminal, 2017). This bond has the same features of a classic corporate hybrid bond, while its use of proceeds must be related to green project, such as environmental transition of the company, energy savings program…

The hybrid market is thus really different from the classic corporate bond market in terms of number of issuances and of size. The following table from BNP Paribas using Bloomberg information gives an overview of the 10 largest corporate hybrid deals (as of April 2017).

1	BHP Billiton	October 2015	5.67bn
2	Total	February 2015	5.00bn
3	EDF	January 2013	3.99bn
4	Bayer	June 2014	3.25bn
5	Orange	September 2014	3.00bn
6	Volkswagen	March 2014	3.00bn
7	EDF	January 2014	2.90bn
8	Total	September 2016	2.50bn
9	Volkswagen	March 2015	2.50bn
10	National Grid	March 2013	2.40bn

Figure 16 - 10 largest corporate hybrid deals (Bloomberg Terminal, 2017)

Note that the amount of the table above are in Euro equivalent.

As of April 4, 2017

6. Case Study: Solvay's issuances of 2013 & 2015.

6.1. Introduction

This case study presents the issuance of senior classic bonds and corporate hybrid bonds of Solvay in 2015. During this year, Solvay undertook to acquire Cytec for an amount approximating $6.4bn. To finance this acquisition, Solvay required capital from the Debt Capital Market as well as from the Equity Capital Market.

The reasons for choosing Solvay instead of another company were mainly that this is a well-known Belgian company, very active on the Debt Capital Market, especially in issuing hybrid bonds, with a strong track record of dividend payments and an Investment Grade rating. In addition to this, BNP Paribas was one of the originators of the issuance, and the Corporate Debt Platform of Brussels provided me a lot of documentation about the transaction and the hybrid features. To conclude with the reason for the selection of this issuance, the bonds follow a classic form, with Terms & Conditions widespread on the market.

After a brief presentation of Solvay and of the acquisition, the funding of the acquisition will be described, as well as the features of the hybrid bonds issued by the company and the rationale of the issuance. Some corporate finance as WACC analysis, yield curves movements and the capital structure will also be analysed. To complete this part, a comparison with existing hybrid bonds issued by Solvay in 2013 will be presented.

6.2. Solvay's business overview

Solvay (Solvay SA, Annual report, 2016) is a Belgian quoted company (Euronext), it is the world leader in the chemical industry. For FY2016, it made €11.4 bn net in sales, with 90% coming from activities that stands in the top 3 ranking of its sector.

The company was created by Ernest Solvay in 1863, and has developed internationally; it is present in 53 countries all around the world. It employs 30.900 employees in more than 140 industrial sites.

Solvay's main businesses are:

- Automotive and aeronautics;
- Building and construction;
- Agro, feed and food;
- Energy and environment;
- Industrial applications.

Solvay's business strategy is currently the diversification of its activities to face new economic challenges. To overcome these challenges, Solvay is very active in M&A. During last years, it has acquired Rhodia, Chemlogics, Ryton,…

6.3. Cytec acquisition

To keep its world leader position in chemicals, Solvay undertakes a diversification strategy in business and geography to hedge against potential crises or events in a particular industry or region. The various M&A made by Solvay during the last decade respond to this business strategy. The acquisition of Cytec, for example, was a good business opportunity for Solvay since it has enabled the group to become the second largest player in aerospace composites worldwide.

Moreover, the acquisition of Cytec allowed Solvay to achieve revenue synergies and cost reductions. Both companies were already doing business together prior to this. However the acquisition reinforced this partnership with the increase of cross selling. Moreover it allows Solvay to enter a new market and thereby increase its long term revenue. Referring to costs savings, the acquisition allows the reduction in the general costs of the group with synergies in procurements, simplifications in processes and technological improvements,… With this acquisition the whole group will benefit from structural growth in the long term.

6.4. Acquisition's funding

On 29th July 2015, Solvay announced a public offer of 75.25$ per share for the acquisition of 100% of Cytec, which represented a premium of 28.9% of the share price at the end of July. The enterprise value of Cytec was estimated around $6.4bn, 14.7x EBIDA excluding synergies (Bloomberg terminal, 2017).

Solvay decided to use a diversified financing structure for the acquisition by using a bridge to bond and equity, in order to benefit from this amount in the short term and allow the company to finance it in the long term.

So, the structure of this acquisition was made of bonds and equities issuances:

- €1bn Hybrid Bonds
- €2.25bn Senior Bonds
- $1.6bn Senior Bonds
- €1.5bn Rights Issue

- €1bn Hybrid Bonds

Firstly, to start with the financing of Cytec acquisition, Solvay Finance issued two deeply subordinated hybrid bonds for a total amount of €1bn on November 25th 2015.

The issuance was announced at 08:52 GMT with an initial price thought, and then the coupon was reduced with a first guidance and finally priced the bonds at 13:12 GMT. In fact, due to a high quality orderbook reaching more than €5bn over the two tranches, Solvay was able to decrease the coupon it offers, following the supply and demand principle. Finally, the orderbooks stood at €6bn from over 600 investors, so it was oversubscribed. The settlement date was on the following week, on the 2nd December 2015.

The following table summarizes the coupon adjustments during the pricing day (25/11/2015). Information comes from Bloomberg terminal (2017), using company news function.

Hybrid Bond	**Timing *(GMT)***	**PerpNC5.5**	**PerpNC8.5**
Initial Price Thought	08:52	5.375% Area	6.125% Area
Guidance	11:33	5.125%/5.250%	5.875%/6%
Pricing	13:12	5.125%* (5.118%)	5.875%* (5.869%)

**Those coupon rates are rounded.*

The following table gives the main features of the two hybrid bonds, with their amount, first call date, coupon rate and call option dates. The information was also provided by Bloomberg terminal (2017) and by the issuance's prospectus (Solvay Bond Prospectus, 2015).

HYBRID BOND	PerpNC5.5	PerpNC8.5
Amount	€500m	€500m
First call date	June 2021	June 2024
Coupon	5.118%	5.869%
Issuer call option	Every 5 years.	Every 5 years.

Note that both of them received an intermediate equity content by Moody's and S&P. Moreover, S&P would adjust its assessment after the first call date to 100% equity.

The following graphs, inspired from a Danske Bank paper (Danske Bank Markets, 2015) concerning hybrid's coupon, outline the different coupon's rates for both PerpNC5.5 and

PerpNC8.5. We observe that both hybrid bonds issued by Solvay follow a classic hybrid structure, with at first a fixed coupon, then a floating rate coupon raised by two step-ups, totalling 100bps.

In addition to that, the effective maturity is 20 years after the first call date, and is triggered by a cumulative step-up of 100bps, to meet rating agencies requirements for an intermediate equity content.

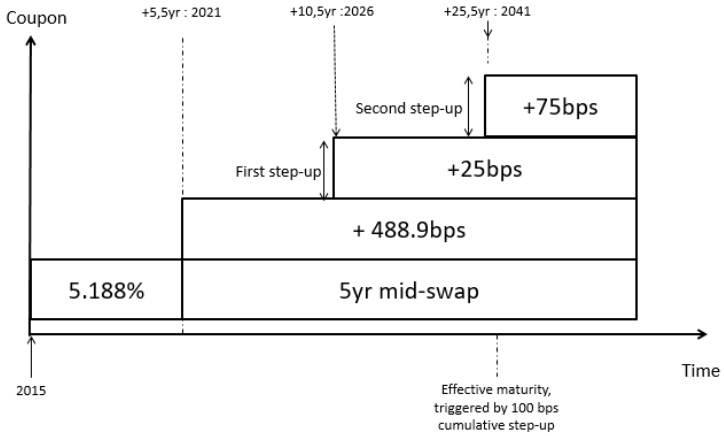


Figure 17 - PerpNC5.5 bond coupon structure (Danske Bank Markets, 2015)

Issuer Information				Identifiers	
Name	SOLVAY FINANCE			ID Number	QJ9378531
Industry	Chemicals			ISIN	XS1323897485
Security Information				FIGI	BBG00BKL7CJ2
Mkt Iss	Euro-Zone	Hybrid		Bond Ratings	
Country	FR	Currency	EUR	Moody's	Ba1
Rank	Jr Subordinated	Series		S&P	BB+
Coupon	5.118000	Type	Variable	Fitch	BB+u
Cpn Freq	Annual			Composite	BB+
Day Cnt	ACT/ACT	Iss Price	100.00000	Issuance & Trading	
Maturity	PERPETUAL			Amt Issued/Outstanding	
PERPETUAL CALL 06/02/21@100.00				EUR	500,000.00 (M) /
Iss Sprd				EUR	500,000.00 (M)
Calc Type	(1469)FIX-TO-VARIABLE BD			Min Piece/Increment	
Pricing Date		11/25/2015		100,000.00 / 1,000.00	
Interest Accrual Date		12/02/2015		Par Amount	1,000.00
1st Settle Date		12/02/2015		Book Runner	JOINT LEADS
1st Coupon Date		06/02/2016		Exchange	Multiple

Figure 18 - Solvay PerpNC5.5 Security Description (Bloomberg Terminal, 2017)

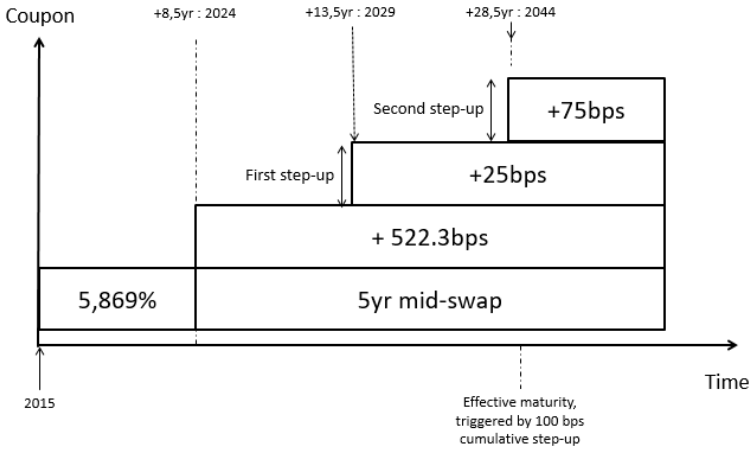
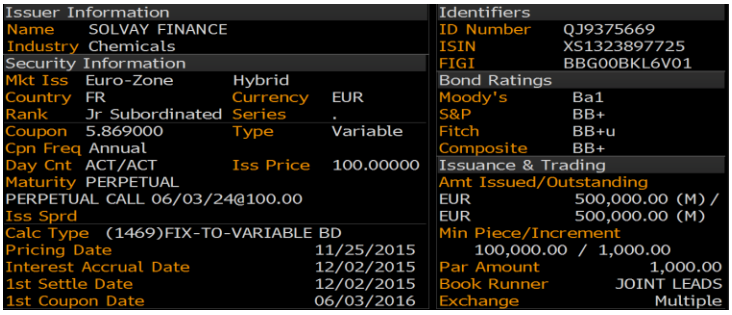


Figure 19 - PerpNC8.5 bond coupon structure (Danske Bank Markets, 2015)



Issuer Information			
Name	SOLVAY FINANCE		
Industry	Chemicals		
Security Information			
Mkt Iss	Euro-Zone	Hybrid	
Country	FR	Currency	EUR
Rank	Jr Subordinated	Series	.
Coupon	5.869000	Type	Variable
Cpn Freq	Annual		
Day Cnt	ACT/ACT	Iss Price	100.00000
Maturity	PERPETUAL		
PERPETUAL CALL 06/03/24@100.00			
Iss Sprd			
Calc Type	(1469)FIX-TO-VARIABLE BD		
Pricing Date		11/25/2015	
Interest Accrual Date		12/02/2015	
1st Settle Date		12/02/2015	
1st Coupon Date		06/03/2016	

Identifiers	
ID Number	QJ9375669
ISIN	XS1323897725
FIGI	BBG00BKL6V01
Bond Ratings	
Moody's	Ba1
S&P	BB+
Fitch	BB+u
Composite	BB+
Issuance & Trading	
Amt Issued/Outstanding	
EUR	500,000.00 (M) /
EUR	500,000.00 (M)
Min Piece/Increment	
100,000.00 / 1,000.00	
Par Amount	1,000.00
Book Runner	JOINT LEADS
Exchange	Multiple

Figure 20 - Solvay PerpNC8.5 Security Description (Bloomberg Terminal, 2017)

Note: these hybrid bonds were issued by Solvay Finance.

The investor's repartition for these issuances is similar whatever the non-callable period. Most of the investors for both bonds were asset managers; they represent more than 50% the bondholders. Moreover, the geographical repartition is also comparable, with UK and Germany accounting for more than 50%. (Bloomberg terminal, 2017)

These bonds are also traded on the secondary market, where investors exchange them at a varying price depending on the supply and demand.

The first screenshot below from Bloomberg shows the evolution of the price of the PerpNC5.5 since its issuance at 100% of its face value and the second shows the secondary market data for the exchange of the bond on 7 June 2017. The second screenshot might not be relevant for a long period since the prices vary according to supply and demand; however it shows that this bond is traded around 110% of its issuance price on secondary market. The same presentation can be made for the PerpNC8.5 but it would be repetitive since the general price evolution is comparable to the PerpNC5.5. The only difference is that, on the same day, the PerpNC8.5 was traded around 116% of its face value. The graph and screenshot for PerpNC8.5 are available in the annexes (Annexe 2).

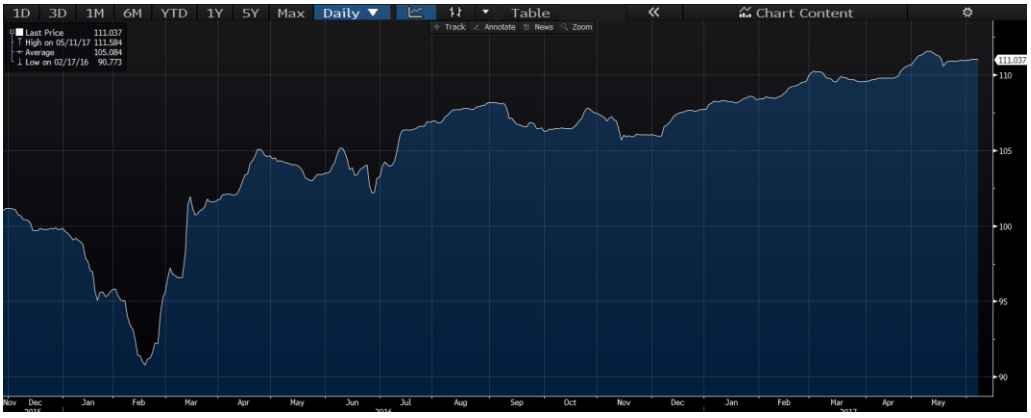


Figure 21 - PerpNC5.5 price evolution on the secondary market (Bloomberg terminal, 2017)

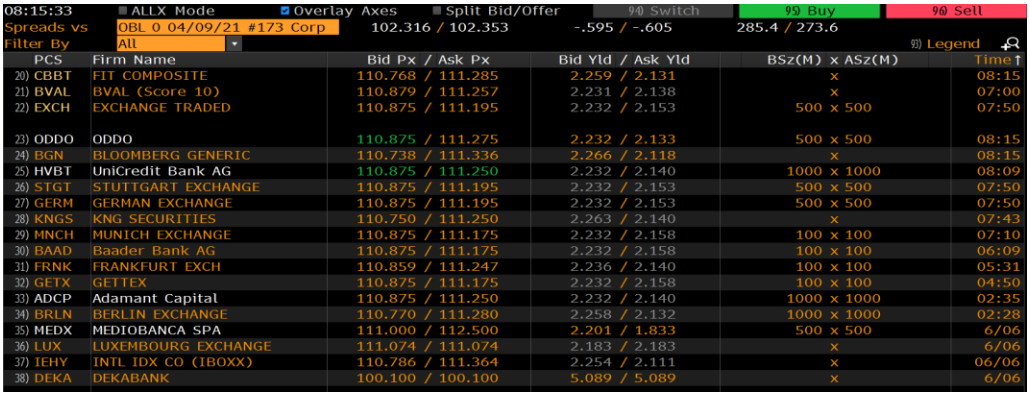


Figure 22 - Total hybrid bond: secondary market performance (Bloomberg terminal, 2017)

- €2.25bn Senior Bonds

On November 26, 2015 Solvay launched a 3 tranches senior bond (Solvay Press Release, 2015) in Euro for a total amount of €2.25 bn. The uses of proceeds of these bonds were to refinance Cytec acquisition, but also to refinance short and long term debt.

The following table summarizes the different tenors, maturities, amounts and rates of the issuances, while the screenshots from Bloomberg showing the main features of these bonds can be found in the annexes.

The information from Bloomberg also give information about Terms & Conditions of the bonds. As an example, a step up of 125bps (+1.25%) would be applied in case the rating agencies decide to downgrade Solvay to a speculative rating from the investment grade rating it had at the time of the issuance. This rating consideration will be developed in the next part of the paper.

SENIOR BOND	2 years	7 years	12 years
Amount	€1bn	€750m	€500m
Coupon payment	Quarterly	Annual	Annual
Coupon	Floating rate : 3 month EURIBOR + 82bp.	1.625%.	2.75%.
Tenor	December 2017	December 2022	December 2027

To avoid unnecessary screenshots from Bloomberg, the information on securities descriptions will be presented in the annexes (Annexe 3).

- $1.6bn Senior Bonds

To complete the acquisition of Cytec, Solvay also issued a two tranches bond in dollar, via its subsidiary in the US, Solvay Finance, for a total amount of $1.6bn. With this issuance Solvay was able to reach potential investors interested by dollar-denominated bonds.

SENIOR BOND	5 years	10 years
Amount	$800m	$800m
Coupon payment	Semi-Annually	Semi-Annually
Coupon	3.40%	4.45%
Tenor	December 2020	December 2025

In addition from the currency used, we also notice that the main differences of this issuance are the issuer (Solvay Finance, a subsidiary of Solvay, active in debt issuance (Bloomberg terminal, 2017), the kind of bond (Private Placement) and the coupon payment frequency that is semi-annually. This is a typical practice for issuers in US and Japan (Fabozzi, 2008).

Screenshots presenting the security description are also available in the annexes (Annexe 4).

- €1.5bn Right Issue

On December 3, 2015, Solvay announced (Solvay Press release, 2015) the issuance of 21,175,283 new shares amounting to €1.5bn to complete the funding of Cytec acquisition. The subscription price was 70.83€ per share, with a ratio of 1 new share for 4 rights.

> Bloomberg News (BN) Date: Dec 3 2015 1:12:44 Solvay Begins $1.6 Billion Rights Offering for Cytec Acquisition
>
> Solvay has started a 1.5 billion-euro ($1.6 billion) rights offering, the last test of investor confidence in its planned $5.5 billion acquisition of composites maker Cytec.
>
> The Belgian chemical maker is offering 21.2 million new shares at a subscription price of 70.83 euros a shares, with existing investors having a preferential offer of 1 new share for 4 rights, Solvay said in a statement on Thursday.

Bloomberg Company News, retrieved from a Bloomberg terminal.

This new share issuance was completed on December 17, 2015.

> Brussels, December 17, 2015, 08:30 --- Solvay announces today it has finalized the financing of its acquisition of U.S.-based Cytec.
>
> (…) its € 1.5 billion rights issue has been subscribed at € 70.83 per share. As a result, 100% of the rights issue has now been subscribed.

Bloomberg Company News, retrieved from a Bloomberg terminal.

6.5. Features of the PerpNC5.5 & PerpNC8.5

In addition to the coupon rate calculation and the step-up's characteristics presented above, the hybrid bonds issued in 2015 have some special features related to Solvay but also to the context of the issuance. This part of the paper will present the main specificities, namely the deferability of interests and the redemption options.

The information was taken from the official hybrid issuance prospectus. This same information is also available either on Bloomberg or on the company website in the publications available for the investors.

- Deferability of Interests

As mentioned in the issuance prospectus (Solvay Hybrid bond Prospectus, 2015) (4. Interest and Deferral of Interest, paragraph g), the bonds issued by Solvay are subject to coupon deferability. The decision of not paying the coupon to bondholders is an issuer's option and must be agreed by the board of directors. The non-payment of coupon will not be considered as a default payment, as compared to classic corporate bonds.

The deferred interests are considered as "Outstanding Amounts", which shall be redeemed to hybrid bondholders' before any other interests are paid to other hybrid bondholders or shareholders.

- Optional Redemption and Early Redemption

Both hybrid bonds issued by Solvay are perpetual bonds, with no fixed maturity on which the issuer must redeem them.

However, there are some call options for the issuer in the Terms & Conditions of the bonds (5. Redemption And Purchase, paragraph b).

In the first place, the bonds can be called by the issuer either on the first call date, or on the second reset date as well as on each interest payment date thereafter. In this case, if the issuer decides to repurchase all the bonds, at their principal value, he must pay all the outstanding amounts to the bondholders. This is the most widespread redemption option for hybrid bonds.

However, some events during the life of the bond or on the company might force the issuer to call the bond and pay the outstanding amounts. These redemptions are usually for rating reasons (change in the rating of the bond or of the company), accounting reasons, acquisition reasons, change of control of the company and taxation reasons (change in the fiscal treatment of hybrids and coupons).

6.6. Hybrid issuance rationale

The hybrid issuance of Solvay was part of the funding of Cytec Acquisition by the company that needed a total amount around $6.4bn. As developed previously, the company decided to diversify its financing need to the various funding alternatives available in the financial markets.

The Hybrid issuance was part of this diversification strategy in order to benefit from the advantages of hybrid bonds while keeping also the traditional financial structure using classic corporate bonds and shares issuance.

The main reasons for the hybrid bonds issuance decision are mentioned in this part. They were briefly presented in the Acquisition Roadshow on November 2015. (Solvay S.A., 2015). The objective of the Roadshow is to describe the acquisition and the hybrid bond features to potential investors.

- Keep the Investment Grade Rating

The first reason to issue €1bn of hybrid bonds instead of using other funding means was the rating consideration for Solvay. In fact, before the acquisition, Solvay benefited of an Investment grade rating of BBB+/Baa2. However, due to the large amount already borrowed in 2013 for another acquisition (Chemlogics) and to the debt structure of Solvay in 2015, the company was threatened by a rating downgrade.

Since 2005, Solvay faced several rating downgrades in particular due to its intense activity on the M&A markets.

The following table summarizes the S&P rating's evolution before the acquisition. Note that since the issuance of the classic corporate and hybrid bonds, Solvay was upgraded to BBB (08/05/2017) according to S&P classification.

BBB+	07/09/2011
A-	24/08/2010
A	06/06/2001

Bloomberg, company presentation, rating.

A potential rating downgrade was mentioned by the two main rating agencies on Bloomberg, namely Moody's and S&P by the end of July 2015, when Solvay announced the acquisition.

> Moody's Investor (BMP) Date: Jul 30 2015 8:57:05
>
> Moody's affirms Solvay's Baa2 rating; changes outlook to negative
>
> London, 30 July 2015 -- Moody's Investors Service, ("Moody's") has today affirmed the Baa2 senior unsecured rating (…) assigned to Solvay SA (Solvay) and its guaranteed subsidiaries Solvay Finance and Solvay Finance (America), LLC. (…). Concurrently, Moody's has changed the outlook on all ratings to negative from stable.
>
> This follows the announcement by Solvay that it has agreed to acquire 100% of the share capital of Cytec Industries Inc. (Cytec, Baa2 stable prior to the announcement) for an enterprise value of $6.4 billion, including a total cash consideration of $5.5 billion. (…)

Bloomberg Terminal, company news.

> Wire: Bloomberg First Word (BFW) Date: Jul 29 2015 5:09:53
>
> MORE: S&P Puts Solvay 'BBB+/A-2' Ratings on Watch Negative
>
> By Deborah L Hyde -- (Bloomberg) -- Expects to downgrade Solvay to BBB-; says financing for Cytec to lead to credit metrics fall.

Bloomberg Terminal, company news.

This change of rating's outlook from stable to negative reflects the rating agencies assessments of the acquisition of Cytec on Solvay's debt.

The potential rating downgrade is very important for the company because the company lies at the limit between the High Yield corporate category and the Investment Grade. A lot of

financial repercussions such as higher interests rates on its bank's loans, 125bps step-ups on its classic corporate bonds (Bloomberg terminal, 2017) would derive from this downgrade to High Yield category.

The issuance of hybrid capital in addition to the issuance of classic corporate bonds enables the company to reduce the impact of the total indebtedness of the acquisition on the ratios that determine the company's rating. Moody's states in its rating update that: "This funding mix will help contain the increase in Solvay's financial leverage following the completion of this large cash-funded deal."(Moody's investors services, 2015, p1).

Yet, the funding still had an impact on the rating with the negative outlook stated above and a downgrade on December, 11 2015 to BBB-. However, this rating is still in the Investment Grade rating category.

BBB-	11/12/2015
BBB+ (Negative Outlook)	29/07/2015

Bloomberg Terminal, company presentation, rating.

- Maintain a strong liquidity post acquisition

The diversification strategy in the funding strategy for the acquisition also has a liquidity position reason. In fact, both companies already have a maturity profile with large amounts to redeem in the following years.

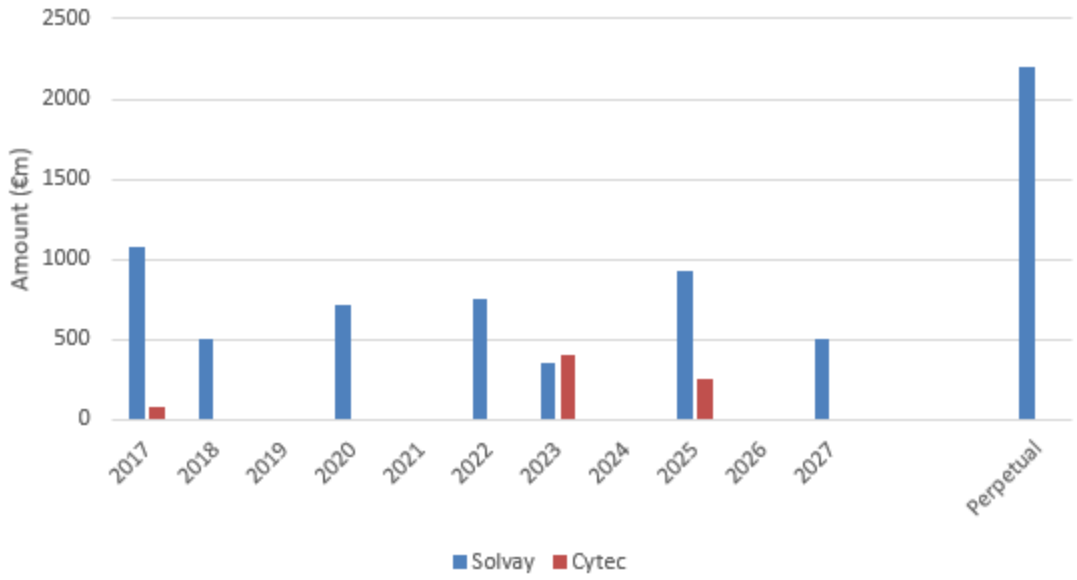


Figure 23 - Solvay & Cytec maturity profiles (Personal work, source: Bloomberg Debt Repartition)

Issuing corporate hybrid bonds and new shares can help the company to face these redemption dates. In case of liquidity difficulties, the company may defer its coupon for the hybrid bonds.

However since Solvay has the reputation to have a strong coupon and dividend payment policy, coupon deferability could be seen as an alarm signal by the market.

In addition, the perpetual character of the hybrid bonds and shares do not add a defined redemption date for the issuers.

However, the business practice and the analysis of recent bond issuances show that all hybrid bonds have been redeemed on their first call date (Cheslin, 2017).

- Maintain a sustainable capital structure

The acquisition deeply impacted the capital structure of Solvay, firstly by adding the impact of the acquisition, but also by adding the existing debt and cash of Cytec to the new consolidated capital structure.

This graph copied from the Acquisition Roadshow (Solvay S.A., 2015) presents both structures.

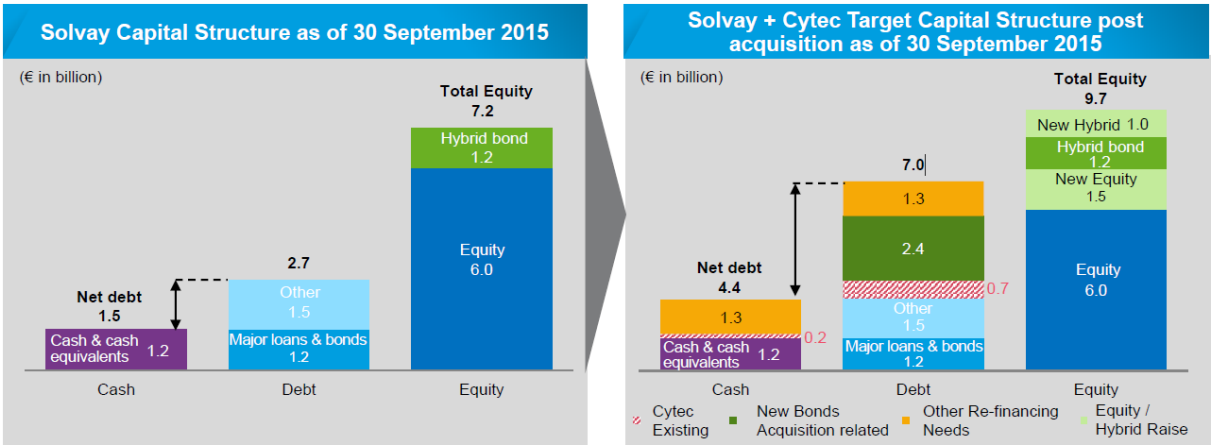


Figure 24 - Solvay capital structure before and after the acquisition (Solvay S.A., 2015)

The accounting treatment of the hybrids as equity capital allows the company to obtain capital without impacting too heavily its debt. The net debt (debt – cash) is thus lower than if the hybrid amount was issued as a classic corporate debt.

This is essential for the ratios using net debt such as the gearing ratio (net debt/equity) and the leverage ratio (net debt/EBIDA). These ratios are used by the rating agencies (Standard & Poor's rating services, 2013) to assess the rating of a company. Therefore Solvay through the issuance of hybrid bonds, manages to maintain an Investment Grade rating.

Although the impact on these ratios is only limited, the large amount issued as senior debt (corporate bond) do impact the ratios. As an example, the leverage ratio of Solvay change from 0.81x before the acquisition, to 1.90x after, assuming 100% equity content, and to 2.85x assuming 100% debt content. (Bloomberg Terminal, 2017 & Solvay S.A., 2015)

6.7. Rating agencies considerations

6.7.1. Introduction

This part of the case study is an application of the rating agencies assessments in defining the equity content of the hybrid bonds issued by Solvay. The theory presented earlier will be adapted to the features of both PerpNC5.5 and PerpNC8.5.

The documentation available for these two bonds states that they received 50% equity content from both S&P and Moody's, however a deeper analysis of the reasons why this equity content was given will be made.

6.7.2. Standard & Poor's

As mentioned in the theoretical presentation of the rating methodologies, S&P only has 3 categories for the equity content: "High", "Intermediate" and "Minimal". To belong to one of these categories, the bonds must meet specific requirements.

The hybrid bonds issued by Solvay on November 25th 2015 are not eligible for the "High" equity content category, because they do not match with two of the following conditions. Firstly, they have a coupon step-up that incentives the issuer to redeem the bond before their maturity date (0.25bps & 75bps). (Solvay Hybrid bond Prospectus, 2015). Secondly, the redemption is possible within 5.5 and 8.5 years, whereas the criteria for high equity content for S&P is 10 years without redemption option.

In addition, the bonds do not meet the "Minimal" equity content, because their maturity (perpetual) is too far in the future and coupon deferability options do exist.

To conclude, we can affirm that both bonds belong to intermediate equity content, because they possess features that incentive the issuer to redeem the bonds and their call date is at least 5 years from their issuance. Moreover, in case of financial stress, the bonds will act as a buffer to absorb part of potential liquidation or bankruptcy costs.

The equity content assigned by S&P is the 50% equity and 50% debt.

6.7.3. Moody's

Moody's methodology presented previously in the theoretical part of this paper can be applied to the hybrids issued by Solvay since the information needed to use Moody's method is also available in the issuance prospectus.

Firstly, the methodology speaks about the coupon deferability as "coupon skip". The coupon deferability is at the issuer's option for both hybrid bonds, namely the PerpNC5.5 and the Perp NC8.5. (Solvay Hybrid bond Prospectus, 2015).

> (…) On each Interest Payment Date (other than an Interest Payment Date falling on the date of redemption of the Bonds), the Issuer may, at its option, elect not to pay interest in respect of the Bonds (…)

Solvay Hybrid bond Prospectus, p44.

Moreover, the coupons that have not been paid are cumulative and compounding; meaning that in case of coupon payment, all the coupons that have been skipped must be paid to bondholders.

> "Outstanding Amounts" will bear interest at the Prevailing Rate from and including the Interest Payment Date on which such Outstanding Amounts were deferred (…) such interest shall accrue and be calculated (…)

Solvay Hybrid bond Prospectus, p45.

The hybrid bonds issued by Solvay are deeply subordinated and only senior to ordinary shares in case of liquidation or of bankruptcy. For these reasons, the hybrid bonds correspond to the category "preferred" following the Moody's methodology, it means hybrids are only senior to equities.

> The obligations of the Issuer under the Bonds rank in priority only to Junior Securities and Share Capital Securities (as defined in the Terms and Conditions of the Bonds) of the Issuer.

Solvay Hybrid bond Prospectus, p25.

Finally, the maturity of both hybrid bonds issued in 2015 is perpetual, so both belong to the category that includes bonds with more than 60 years maturity bonds.

The table below presents the synthesis of all the features described above, with the red rectangles representing the features of the two hybrid bonds. Note that since their features are the same, the documentation was taken into the Perp5.5 prospectus, however the same task can be done with the PerpNC8.5.

Application of Equity Credit Methodology for Non-convertible Hybrids Issued by Investment-grade Non-banks

	Column Numbers	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12
Coupon skip	Mandatory Weak[1]		X										
	Restricted Optional[2]			X							X		
	Optional	X			X	X		X	X			X	
	Optional & Mandatory Strong[3]						X			X			X[4]
Settle-ment	Cumulative	X	X	X	X	X	X	X		X			
	Non-cumulative								X		X	X	X
Ranking	Subordinated	X	X	X	X	X	X						
	Preferred							X	X	X	X	X	X
	Equity												
Maturity	< 30 years	X											
	30 – 59 years				X				X				
	>= 60 years		X	X		X	X	X		X	X	X	X
	Irredeemable												
Basket for Non-Banks		A	B	B	B	B	B	C	C	C	C	C	D

Figure 25 - Moody's methodology for Solvay's hybrid bonds (Moody's investors service, 2017)

The synthesis of all the features indicates that the bonds belong to the column 7, corresponding to basket C for Moody's, which categorizes the hybrid bond with 50% of equity content.

6.7.4. Fitch Rating

Fitch does not give enough publicly available documentation on their website to determine their real criteria for assessing intermediate equity content. The only information allows to determine full equity content from minimal equity content.

Based on the fact that S&P and Moody's assess an intermediate equity, Fitch criteria would have given the same results if it had assessed the bonds issued by Solvay. However, Fitch being the smallest rating agency of these 3, it is most common to see only S&P and Moody's.

6.7.5. Conclusion

The objective of this part of the paper was to have a deeper analysis of some specific features of the hybrid bonds and look at them from the rating agencies' perspective. This exercise enables to understand the criteria for the classification, as well to compare the different rating agencies methodology.

6.8. Capital Structure Theories application

This part of the case study aims to find theoretical justification of the proportion of debt and equity for the Cytec acquisition. These justifications might be affected by internal and economic reasons but a theoretical approach using the capital structure theories developed in the literature and presented previously in this document might be interesting.

Firstly, the theory of Modigliani and Miller stating that the capital structure of a company do not impact its value might be used carefully because they did not take into account the corporate taxes. Nevertheless, Solvay, as a Belgian registered company, must pay taxes on its earnings and can benefit from tax arrangements.

The introduction of taxes in the Modigliani and Miller theory incentives the debt funding for corporates compared to the equity funding, due to the tax shield that increase the market value of the company.

This tax treatment of debt interest could partially justify why the major part of the funding of the acquisition was made issuing bonds, whereas only a minor part of the funding was generated by new shares issuance.

The large debt financing proportion of the acquisition's funding can also be reinforced by the pecking order theory. This theory justifies the financing of firms using debt capital instead of equity capital due to information asymmetry that could impact the market value of the company, and thus over or under evaluate the share price. Solvay's management would thus prefer to finance via either internal funds or debt, which do not have a significant effect on the share price, to protect its shareholders.

On the other hand, one of the capital structure most important theory states that Solvay cannot finance its acquisition only with debt funding. The trade-off theory proofs that the company will finance itself using debt until a certain threshold, after which it has to use other sources of funding, such as equities issuance. For this reason, and in addition to bank covenants and ratio calculation reasons, the acquisition was also funded with new shares.

To conclude with this application of the main capital structure theories, we can observe that the major part of the funding was made using debt capital, which is supported by Modigliani and Miller's, tax introduction and pecking order theory, while the equity capital part of the funding is supported by the trade-off theory.

6.9. WACC analysis

The massive amount of money borrowed on the debt capital market and issued on the equity capital market had an impact on the WACC of Solvay. The weighted cost of capital is a measure of the "rate of return that the providers of a company's capital require, weighted according to the proportion each element bears to the total pool of capital" (Bloomberg Terminal, 2017, Help Function WACC).

The capital structure of Solvay was deeply impacted by the issuance of euro-denominated, dollar-denominated and hybrid bonds, as well as by the issuance of the new shares.

The following table displays the semi-annual evolution of the WACC since December 2014. The information comes from a Bloomberg Terminal, retrieved on July 27, 2017.

	WACC
December 2014	7.78%
June 2015	7.32%
December 2015	5.86%
June 2016	5.58%
December 2016	7.10%

This part of the paper has the objective to analyse how the acquisition of Cytec during the second semester of 2015 impacted the WACC of Solvay and its main components namely the cost of equity, cost of debt, and the amount of debt compared to equity in the capital structure of Solvay.

Firstly, the following table presents the main components of the WACC. In order to be coherent with the previous table, the data are also collected semi-annually, also from Bloomberg.

	Cost of Equity	**Weight of Equity**	**Cost of Debt** *(After tax)*	**Weight of Debt**
December 2014	9.55%	80.28%	0.57%	19.72%
June 2015	9.00%	79.79%	0.70%	20.21%
December 2015	8.73%	61.52%	1.28%	38.48%
June 2016	8.97%	59.48%	0.62%	40.52%
December 2016	11.40%	60.76%	0.61%	27.96%

- Cost of Equity

The first main component of the WACC is the cost of equity; it is the expected return that shareholders require. This cost of equity is relatively stable for Solvay, even if we can note a decrease in the second semester of 2015.

We observe that the cost of equity has decreased whereas it should have increased following the issuance of €1.5bn new shares. According to the financial theories, share issuance should increase the cost of equity (Investopedia, n.d.).

A justification for the decrease of the cost of equity of Solvay can be found in its components, namely the risk free rate and the equity risk premium.

The risk free rate of Belgium decreased from 1.70 in December 2014 to 0.97 in December 2015 (Bloomberg terminal, 2017).

The second element that composes the cost of equity is the equity risk premium. "It represents the added compensation investors' demand for investing in the riskier equity markets." (Bloomberg Terminal, 2017, Help Function, Equity Risk Premium). During 2015, it also decrease to 7.76, while it stood at 8.72 at the end of 2014.

The combination of these two previous results on the components of the cost of equity, might explain the slight decrease in the cost of equity of Solvay, and thus compensate the new shares issuance.

- Cost of Debt

The cost of debt is the second major element of the formula of the WACC. It is impacted by the risk free rate, the tax rate and by the credit spread.

The substantial amount of debt that Solvay issued using different types of bonds, the rating agencies downgrades and negative outlooks (S&P downgrades Solvay to BBB- on December 11, 2015) had an impact on the credit spread of Solvay.

The evolution of the credit spread can be observed on the following graph found on Bloomberg (2017), where the green line represents the share price and the white one other the evolution of the credit spread. The doted-line begins at the date of the announcement of Cytec acquisition, and its upward trend represents the increase of credit spread, and thus an increase in the cost of debt.

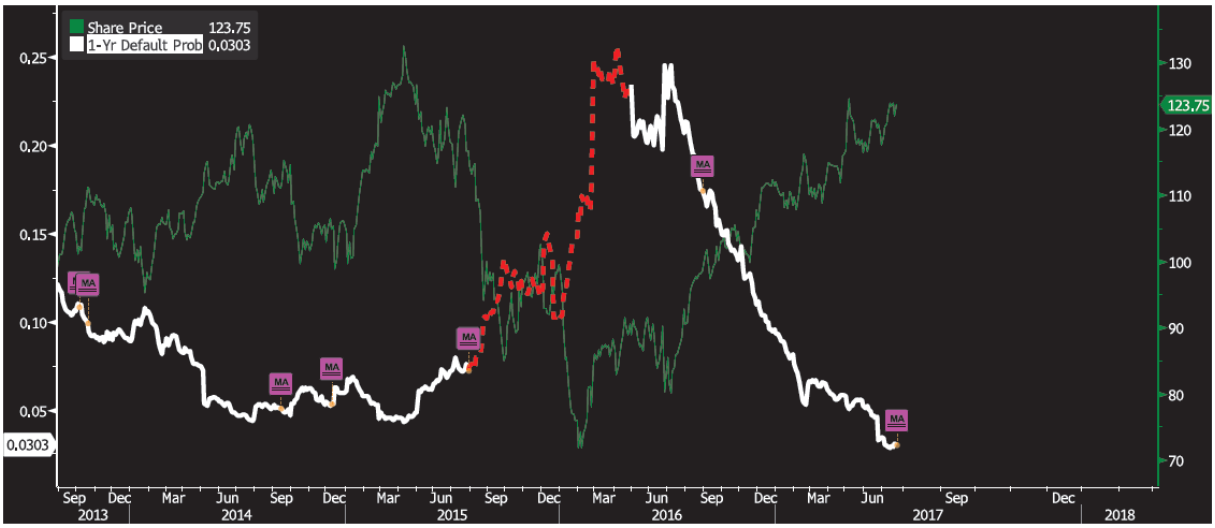


Figure 26 - Evolution of the credit spread (Bloomberg Terminal, 2017)

- Proportion of Debt & of Equity in the capital structure

The weight of equity and the weight of debt can be analysed as follow: the total amount of these two must account for 100%, excepted for the second semester of 2016, where Solvay issued some preferred shares that have their own cost. However, as the preferred share issuance occurs one year after the acquisition of Cytec, it is not important to explain this part of the WACC in this thesis.

Obviously, the second semester of 2015 was marked by an important increase of the percentage of debt in the capital structure, due to the different bond issuances during this part of the year. The weighted average cost of capital was deeply impacted by this acquisition. Indeed, the WACC decreased due to the lower cost of debt comparing to cost of equity, combined to the higher amount of debt for Solvay.

6.10. Yield curve analysis

The acquisition of Cytec also had an effect on the yield curves of Solvay. The massive amount issued via hybrid and senior corporate bonds impacted the interest rates of Solvay.

As a reminder, a yield curve plots the interest rate for a company or a country for each maturity, at a precise point in the time (Investopedia, n.d.). Curves vary at each moment depending on the corporate situation, but also of the macro-economic environment.

This part of the paper aims to analyse the impact of the €1bn issuance of hybrid bonds that took place on November 25, 2015. In order to analyse this impact, the following graph, retrieved

from Bloomberg, presents the Solvay's yield curves one week before - on the 18/11/2015 - (the yellow curves) and one week after - on the 02/12/2015 - (the green curves) the issuance.

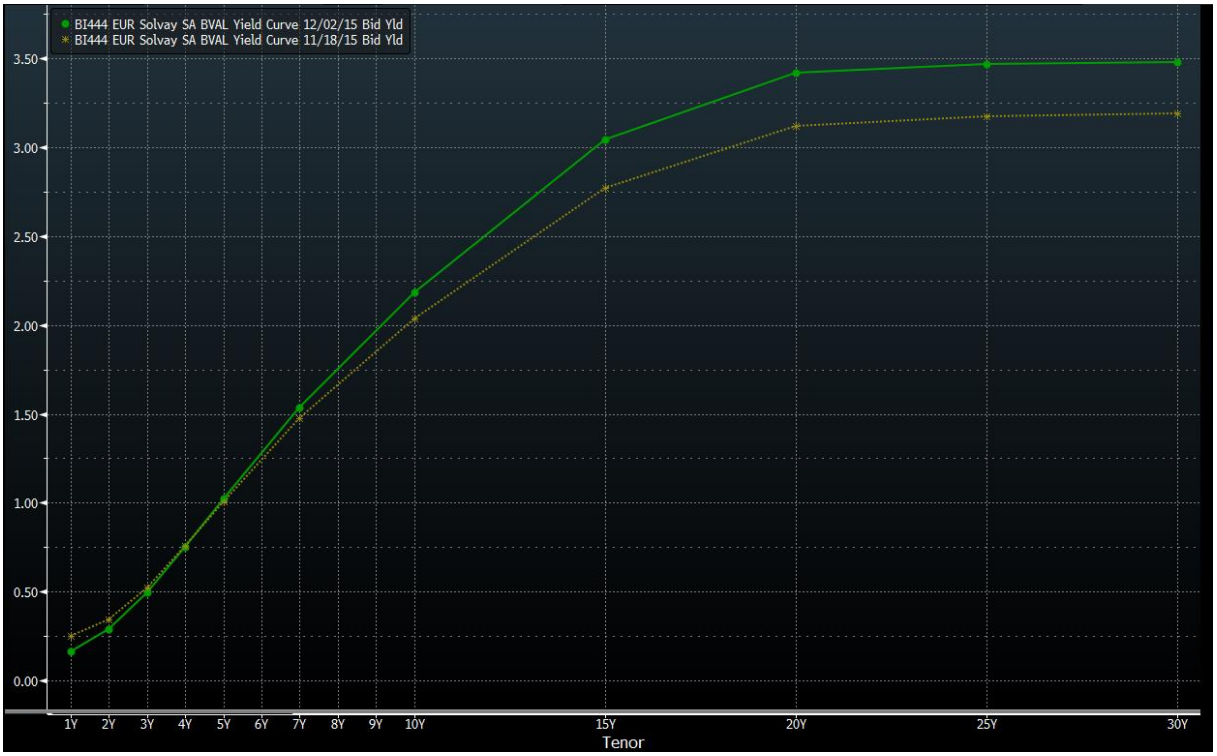


Figure 27 - Solvay's yield curves (Bloomberg Terminal, 2017)

This graph depicts the fact that both yield curves follow the normal trend of yield curves that is having an upward slope. This is a general principle in a well-being economy, where the short-term yield is lower than the long term yield, which compensates the risks of a long-horizon time.

According to financial literature, and especially to an article from the Federal Reserve Bank of San Francisco (FRBSF, 2003), there are three types of movements for a yield curve: level, slope and curvature.

The Solvay's yield curve made a "level" movement following the hybrid issuance. The green yield curve, representing the curve one week after the issuance, moved in parallel, standing above the curve dated one week before the issuance. These moves inform that for the same maturity, the yield is higher than it was two weeks earlier.

Note that for the short term, especially for the one to three years-maturity, the yellow curve is still above the green one.

The higher yields for similar maturities in the long term horizon reflect the fact that Solvay saw its credit spread increase due to the growth of its total debt funding proportion while it also had to face a rating downgrade from the rating agencies.

6.11. Comparison with the 2013 hybrid issuance

During the year 2013, Solvay already required the debt capital market to raise funds. In fact, in 2013, Solvay issued 1.2 billion € worth of hybrid bonds in order to acquire Chemlogics for 1.345 million USD.

It was issued in two different tranches with the following features:

HYBRID BOND 2013	**PerpNC6.5**	**PerpNC10**
Amount	€700m	€500m
First call date	May 2019	November 2023
Coupon	4.19%	5.425%
Reset	Every 5 years.	Every 5 years.

The main differences between this issuance and the issuance of 2015 are the inclusion of a change of control call option and the introduction of redemption for acquisition reasons. (Solvay Hybrid bond Prospectus, 2015), (Solvay Hybrid bond Prospectus, 2013).

First, the 2013's issuance does not include any change of control redemption option.

> "Change of Control means any person or group of persons acting in concert, other than the Existing Reference Shareholder or a holding company (…) acquiring direct or indirect ownership of more than 50% of the share capital with voting rights or similar rights of ownership of the Guarantor or the power to direct the management and the policies of the Guarantor (…)"

(Solvay Hybrid bond Prospectus, 2015, p.38).

In case of change of control of Solvay, the 2015 hybrid bond prospectus stipulates that the issuer may call the bond at par if a change of control occurs in combination with a rating downgrade. However, if Solvay does not decide to call the bonds, a step-up of 500bps will be added to the coupon rate.

This large step-up is a strong incentive for Solvay to redeem the bonds and a protection to bondholders in case of strategic or business changes due to the change of control.

The second difference with the 2013 bonds is the introduction of an Acquisition call option. This clause allows Solvay to call the bonds during the first six months of their life if the acquisition of Cytec is not completed. This new condition is related to the use of proceeds of the bond, which is the financing of the acquisition and will protect Solvay in case of setback of the acquisition since it will not need this capital

6.12. Secondary Market price analysis

The following graph presents the price's evolution of both hybrid bonds issued by Solvay on November 25, 2015. Both hybrid bonds were issued at 100% of their face value and their prices have varied similarly from the issuance date, with only a diverging trend since the beginning of 2017, from which the increase of the price for the PerpNC8.5 (white line) is faster than the PerpNC5.5 (yellow line).

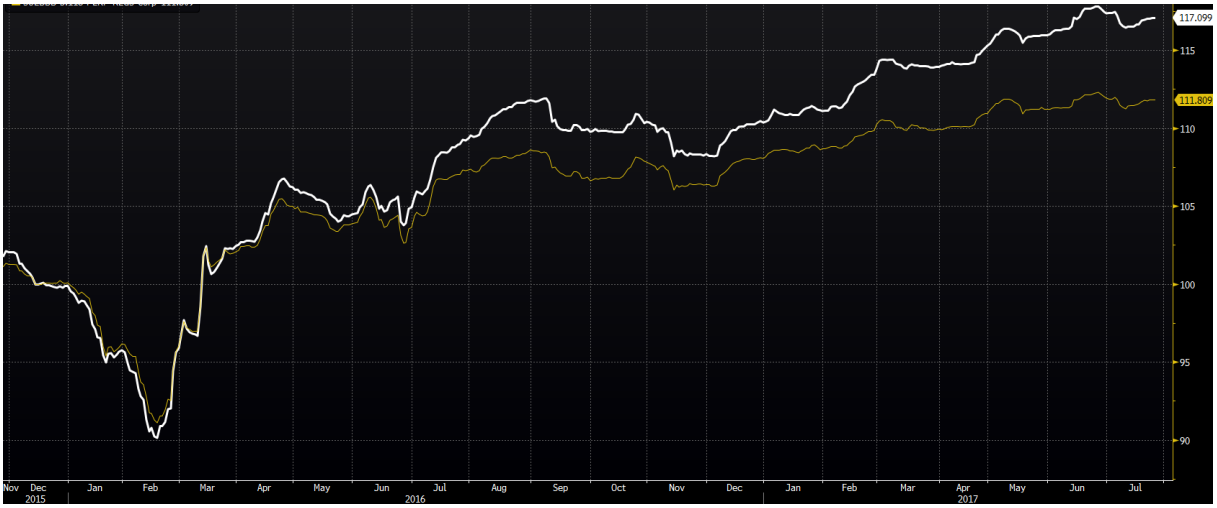


Figure 28 – Hybrid bonds price evolution (Bloomberg Terminal, 2017)

The changes in the bonds' prices were influenced by the share price and the economic situation of Solvay. The second semester of 2015 and the beginning of 2016 were tumultuous years for the company; it had to face several news that send bad signals to the market.

Firstly, investors were scared of Solvay's sales proportion (45%) in emerging markets (Boitte, 2016), such as China and Brazil, countries considered as not always economically and politically stable. Then, the acquisition of Cytec was considered too expensive and a bad investment by the investors (Goldwasser Exchange, 2016), who fear a rating downgrade from the investment grade category to the high yield, which would go along with step up of 125bps.

Finally, brokers evaluate the short term return of the shares as too low when compared to other corporates, even if the long term perspectives were more optimistic.

All these negative events increased the different risks that the company faces, and thus impacted the yield required by investors for the different funding means of Solvay. As the price of a bond moves in the opposite direction than the yield (Investopedia, n.d.), a decrease in both bond prices was observed.

After this crisis, the economic situation of Solvay improved, with better results and bigger synergies with Cytec than expected (Solvay Annual Report 2016) and the yield decreased, which pushed the bond price upward as depicted in the graph above.

6.13. Case Study's Conclusion

This case study is representative of a typical hybrid issuance by an European company, with two hybrid bonds that have the most usual features regarding their structure and their terms and conditions. It also demonstrates the main reasons of this kind of issuance. Additionally, Solvay has an excellent reputation on hybrid bond market and on the bond market in general.

The rationale of Solvay was in this case rating agencies considerations, liquidity reasons and minimizing the impact of the issuance on the financial ratios while keeping control of the company.

Moreover, the hybrid issuance takes place for an acquisition, which has been the most widespread context for hybrid issuance for last decades (Cheslin, 2017).

Nevertheless, each hybrid issuance is different and possesses its own features depending on the company, on the market, on the context, but also on the moment at which hybrid bonds are issued. A general format is thus very difficult to create and rating agencies and market requirements will continue to change in the future.

Finally, the availability of information and the presence of BNP Paribas Fortis in the issuance process allowed me to reach a lot of documentation to analyse all the aspects of this issuance.

Conclusion

The objective of this thesis is to introduce the main aspects of corporate hybrids bonds, as well as their advantages and disadvantages for issuers and investors. This presentation of the hybrid bonds guided us thought an analysis of Solvay issuance in 2015 to illustrate the theoretical elements as well as to give examples of the topics presented in the first part of the paper.

Since 2013 the interest for corporate hybrid bonds has grown rapidly and has become a well-established source of financing for corporates. On one hand, it is a very attractive financing alternative used by large multinational corporates in need of huge amounts of financing. The issuance of hybrid bonds is usually combined with other sources of financing such as classic seniors corporate bonds and new share issuance in order to reach huge amount, generally in an acquisition context. An example of this type of issuance was developed in this thesis. On the other hand, it is also appealing to institutional investors since these bonds are issued by well-known and financially sound corporates, and the interests' payments are higher than in traditional sources of financing due to the fact that these hybrid bonds bear more risks than classic corporate bonds, like subordination risk, permanence risk, coupon deferability risk and event risk while being safer than equities.

Finally these bonds play a major role when the rating agencies assess the rating to corporates because their accounting treatment allows the companies to avoid accounting the whole amount as debt, and their debt-ratio will thus be lower than if the issuance was only made using classic corporate bonds. This allows companies that borrow large amounts to keep their rating or at least to minimize the downgrade on their ratings.

Through the case study, developed in this thesis, related to the hybrid bonds issuances totalling €1bn realized by Solvay SA in 2015 for the acquisition of a US-based chemical company, Cytec, we explained why hybrid bonds issuance used in combination with other sources of financing, bonds and equity, has benefited the company.

Since hybrid bonds are partially considered as equity; this means that they could strengthen the credit profile of the company or at least maintain its rating as in the case of Solvay. Examples of such equity characteristics are perpetual maturity (or at least very long), coupon deferability, junior subordination,…

The hybrid bonds also hold some typical debt-like characteristics such as regular coupon payments, seniority to equity, no shareholding dilution… Moreover, since coupon payments

are treated as debt payments, they are tax deductible. This is a major advantage of this type of funding which borrows features from equity for the accounting treatment and from debt for taxing considerations.

In 2015 Solvay issued hybrid bonds as well as classic corporate bonds to finance the acquisition of Cytec. All these issuances also had an impact on the financial health and on the capital structure of the company; the major one being the movement of the yield curve after the issuance resulting of higher yields for the same given maturities.

The WACC of Solvay was also affected by the issuance, since the amount of debt compared to the total equity of the company was much bigger after the issuance. The cost of debt and cost of equity also varied due to both issuances and market conditions.

The outcome of the presentation of this case study has shown that issuing corporate hybrid bonds was beneficial to Solvay. This is due to the fact that corporate hybrid bonds share some equity like and debt like characteristics. As it was demonstrated in the case study, with this issuance, Solvay was able to keep its investment grade rating, maintain a strong liquidity position and a sustainable capital structure. The same benefits usually applies to corporates that issues hybrid bonds.

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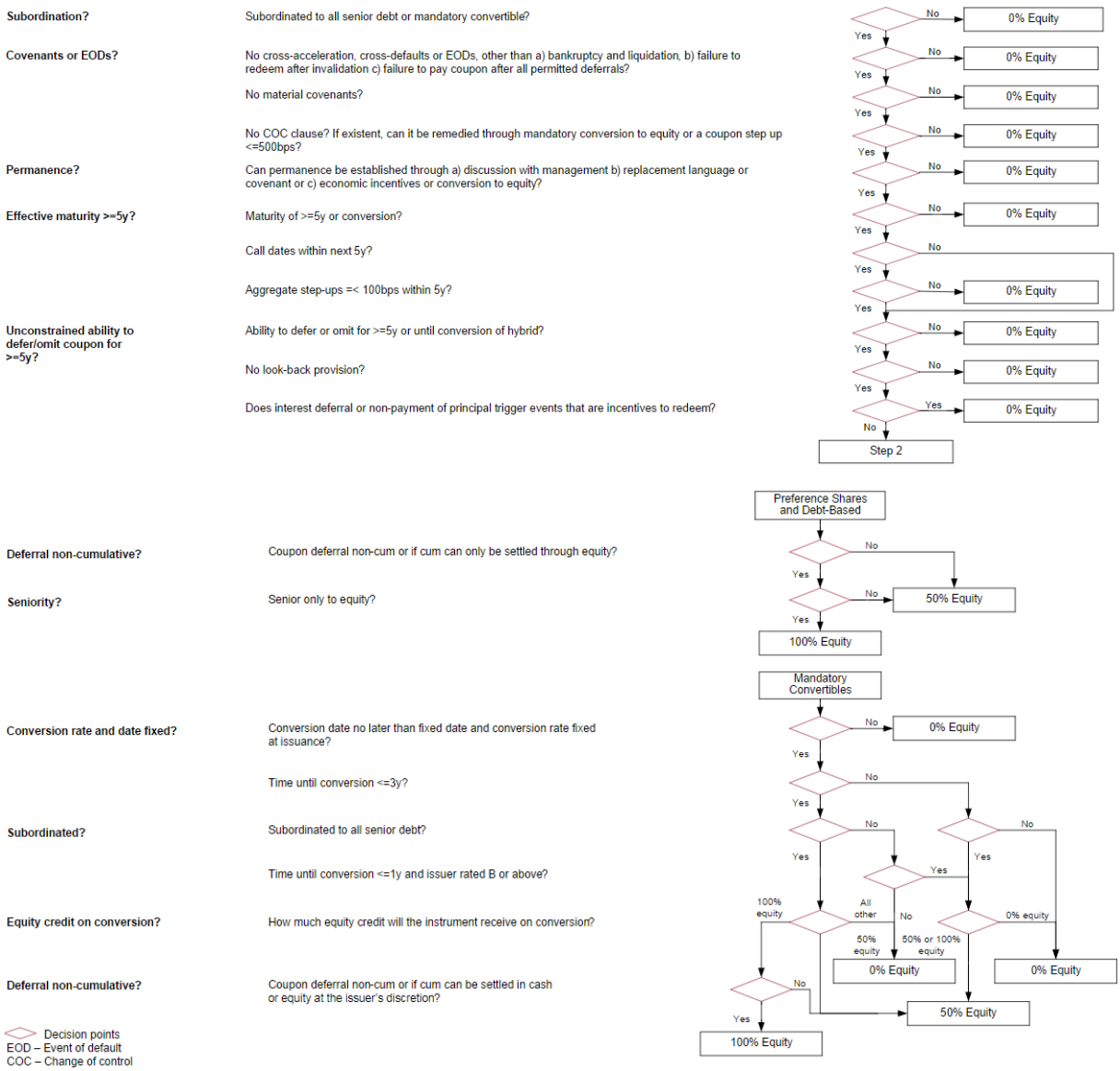
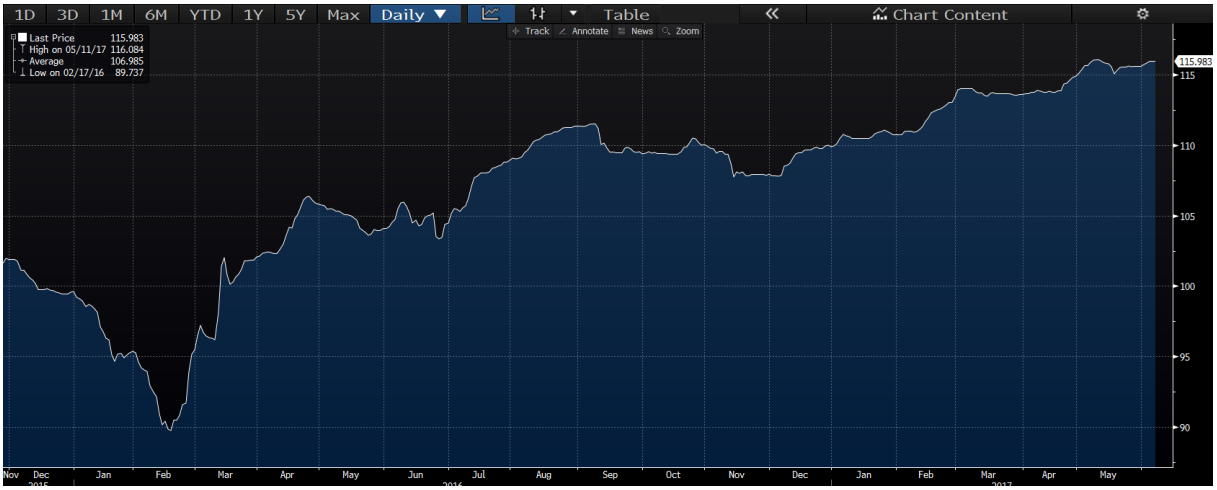
Annexes

- Annexe 1 : Fitch decision trees to assess equity content (FitchRatings, 2017)



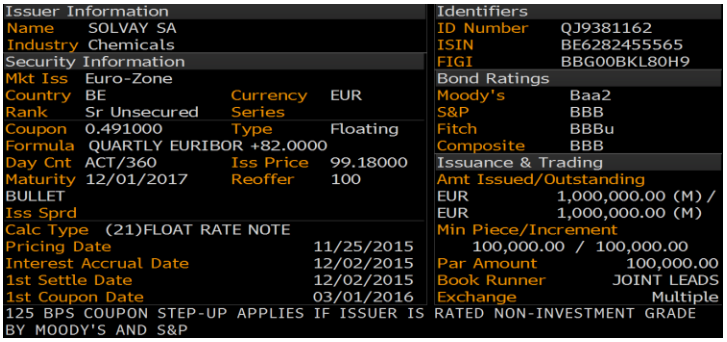
- Annexe 2 : Solvay Hybrid PerpNC8.5 ALLQ & evolution of face value (Bloomberg terminal, 2017)



08:16:47 ALLX Mode Overlay Axes Split Bid/Offer 94) Switch 95) Buy 96) Sell
Spreads vs DBR 1 ½ 02/15/23 Corp 110.531 / 110.575 -.331 / -.338 365.4 / 356.5
Filter By All 93) Legend

	PCS	Firm Name	Bid Px / Ask Px	Bid Yld / Ask Yld	BSz(M) x ASz(M)	Time
20)	CBBT	FIT COMPOSITE	115.639 / 116.287	3.323 / 3.227	x	08:16
21)	BVAL	BVAL (Score 10)	115.700 / 116.158	3.314 / 3.246	x	07:00
22)	EXCH	EXCHANGE TRADED	115.770 / 116.240	3.303 / 3.234	100 x 100	07:10
23)	MZLN	MIZUHO INTERNATIONAL	115.350 / 116.100	3.366 / 3.254	1000 x 1000	08:16
24)	ODDO	ODDO	115.500 / 116.300	3.343 / 3.225	500 x 100	08:16
25)	KBC	KBC BANK NV.	115.639 / 116.220	3.323 / 3.237	x	08:16
26)	BGN	BLOOMBERG GENERIC	115.637 / 116.332	3.323 / 3.220	x	08:16
27)	BAAD	Baader Bank AG	115.770 / 116.235	3.303 / 3.234	100 x 100	08:12
28)	GETX	GETTEX	115.770 / 116.235	3.303 / 3.234	100 x 100	08:12
29)	HVBT	UniCredit Bank AG	116.000 / 116.375	3.269 / 3.214	1000 x 1000	08:09
30)	STGT	STUTTGART EXCHANGE	115.770 / 116.240	3.303 / 3.234	500 x 500	07:50
31)	GERM	GERMAN EXCHANGE	115.770 / 116.240	3.303 / 3.234	500 x 500	07:50
32)	KNGS	KNG SECURITIES	115.625 / 116.125	3.325 / 3.251	x	07:43
33)	ODSB	ODDOSEYDLER BANK AG	115.742 / 116.348	3.307 / 3.218	100 x 100	07:25
34)	MNCH	MUNICH EXCHANGE	115.770 / 116.240	3.303 / 3.234	100 x 100	07:10
35)	ADCP	Adamant Capital	115.875 / 116.250	3.288 / 3.232	1000 x 1000	03:38
36)	DUSS	DUSSELDORF EXCH	115.640 / 116.280	3.323 / 3.228	250 x 250	03:11
37)	BRLN	BERLIN EXCHANGE	115.640 / 116.280	3.323 / 3.228	100 x 100	02:28
38)	FRNK	FRANKFURT EXCH	115.742 / 116.348	3.307 / 3.218	100 x 100	02:16
39)	LUX	LUXEMBOURG EXCHANGE	116.016 / 116.016	3.267 / 3.267	x	6/06
40)	IEHY	INTL IDX CO (IBOXX)	115.682 / 116.334	3.316 / 3.220	x	06/06
41)	DEKA	DEKABANK	100.100 / 100.100	5.851 / 5.851	x	6/06

- Annexe 3 : Screenshots Bloomberg 2.25bn€ senior bonds Solvay (Bloomberg terminal, 2017)



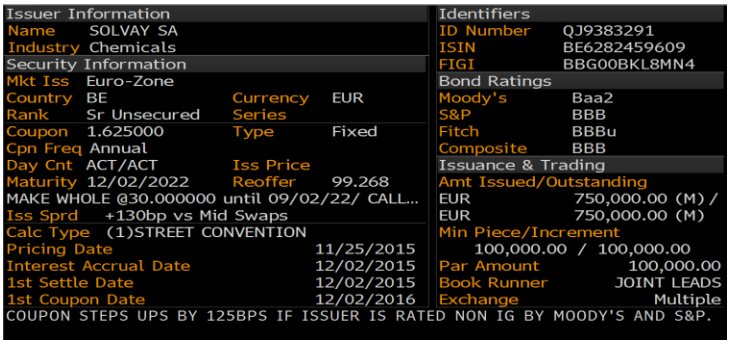
Issuer Information
Name SOLVAY SA
Industry Chemicals

Security Information
Mkt Iss Euro-Zone
Country BE Currency EUR
Rank Sr Unsecured Series
Coupon 0.491000 Type Floating
Formula QUARTLY EURIBOR +82.0000
Day Cnt ACT/360 Iss Price 99.18000
Maturity 12/01/2017 Reoffer 100
BULLET
Iss Sprd
Calc Type (21)FLOAT RATE NOTE
Pricing Date 11/25/2015
Interest Accrual Date 12/02/2015
1st Settle Date 12/02/2015
1st Coupon Date 03/01/2016
125 BPS COUPON STEP-UP APPLIES IF ISSUER IS RATED NON-INVESTMENT GRADE BY MOODY'S AND S&P

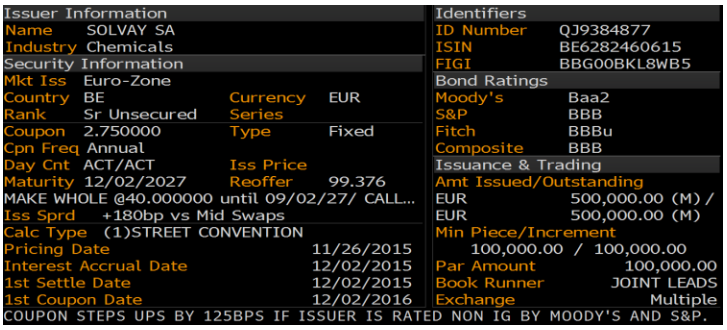
Identifiers
ID Number QJ9381162
ISIN BE6282455565
FIGI BBG00BKL80H9

Bond Ratings
Moody's Baa2
S&P BBB
Fitch BBBu
Composite BBB

Issuance & Trading
Amt Issued/Outstanding
EUR 1,000,000.00 (M) /
EUR 1,000,000.00 (M)
Min Piece/Increment
100,000.00 / 100,000.00
Par Amount 100,000.00
Book Runner JOINT LEADS
Exchange Multiple

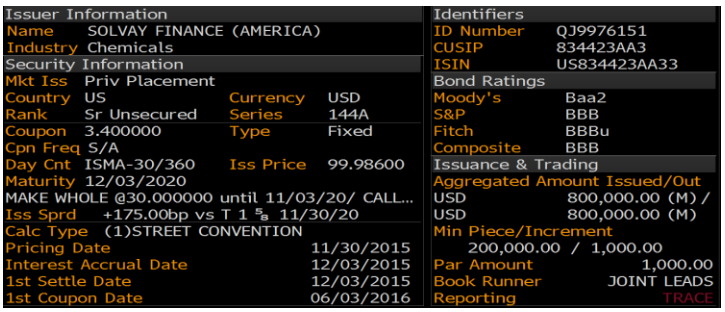


Issuer Information				Identifiers	
Name	SOLVAY SA			ID Number	QJ9383291
Industry	Chemicals			ISIN	BE6282459609
Security Information				FIGI	BBG00BKL8MN4
Mkt Iss	Euro-Zone			Bond Ratings	
Country	BE	Currency	EUR	Moody's	Baa2
Rank	Sr Unsecured	Series		S&P	BBB
Coupon	1.625000	Type	Fixed	Fitch	BBBu
Cpn Freq	Annual			Composite	BBB
Day Cnt	ACT/ACT	Iss Price		Issuance & Trading	
Maturity	12/02/2022	Reoffer	99.268	Amt Issued/Outstanding	
MAKE WHOLE @30.000000 until 09/02/22/ CALL...				EUR	750,000.00 (M) /
Iss Sprd	+130bp vs Mid Swaps			EUR	750,000.00 (M)
Calc Type	(1)STREET CONVENTION			Min Piece/Increment	
Pricing Date			11/25/2015	100,000.00 / 100,000.00	
Interest Accrual Date			12/02/2015	Par Amount	100,000.00
1st Settle Date			12/02/2015	Book Runner	JOINT LEADS
1st Coupon Date			12/02/2016	Exchange	Multiple
COUPON STEPS UPS BY 125BPS IF ISSUER IS RATED NON IG BY MOODY'S AND S&P.					



Issuer Information				Identifiers	
Name	SOLVAY SA			ID Number	QJ9384877
Industry	Chemicals			ISIN	BE6282460615
Security Information				FIGI	BBG00BKL8WB5
Mkt Iss	Euro-Zone			Bond Ratings	
Country	BE	Currency	EUR	Moody's	Baa2
Rank	Sr Unsecured	Series		S&P	BBB
Coupon	2.750000	Type	Fixed	Fitch	BBBu
Cpn Freq	Annual			Composite	BBB
Day Cnt	ACT/ACT	Iss Price		Issuance & Trading	
Maturity	12/02/2027	Reoffer	99.376	Amt Issued/Outstanding	
MAKE WHOLE @40.000000 until 09/02/27/ CALL...				EUR	500,000.00 (M) /
Iss Sprd	+180bp vs Mid Swaps			EUR	500,000.00 (M)
Calc Type	(1)STREET CONVENTION			Min Piece/Increment	
Pricing Date			11/26/2015	100,000.00 / 100,000.00	
Interest Accrual Date			12/02/2015	Par Amount	100,000.00
1st Settle Date			12/02/2015	Book Runner	JOINT LEADS
1st Coupon Date			12/02/2016	Exchange	Multiple
COUPON STEPS UPS BY 125BPS IF ISSUER IS RATED NON IG BY MOODY'S AND S&P.					

- Annexe 4 : Screenshots Bloomberg 1.6bn$ Senior Bond (Bloomberg Terminal, 2017)



Issuer Information				Identifiers	
Name	SOLVAY FINANCE (AMERICA)			ID Number	QJ9976151
Industry	Chemicals			CUSIP	834423AA3
Security Information				ISIN	US834423AA33
Mkt Iss	Priv Placement			Bond Ratings	
Country	US	Currency	USD	Moody's	Baa2
Rank	Sr Unsecured	Series	144A	S&P	BBB
Coupon	3.400000	Type	Fixed	Fitch	BBBu
Cpn Freq	S/A			Composite	BBB
Day Cnt	ISMA-30/360	Iss Price	99.98600	Issuance & Trading	
Maturity	12/03/2020			Aggregated Amount Issued/Out	
MAKE WHOLE @30.000000 until 11/03/20/ CALL...				USD	800,000.00 (M) /
Iss Sprd	+175.00bp vs T 1 5/8 11/30/20			USD	800,000.00 (M)
Calc Type	(1)STREET CONVENTION			Min Piece/Increment	
Pricing Date			11/30/2015	200,000.00 / 1,000.00	
Interest Accrual Date			12/03/2015	Par Amount	1,000.00
1st Settle Date			12/03/2015	Book Runner	JOINT LEADS
1st Coupon Date			06/03/2016	Reporting	TRACE

Place des Doyens, 1 bte L2.01.01, 1348 Louvain-la-Neuve, Belgique **www.uclouvain.be/lsm**