Department of Economics and Finance

Master Thesis in Equity Markets and Alternative Investments

Capital increases with significant dilutive effect: dynamics of trading and latest regulatory amendments in the Italian Framework

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Introduction

After the financial crisis of 2008, several companies found themselves struggling to raise capital in order to meet their necessities and finance ongoing activities. During and after its peak, financial crisis strongly affected also the European markets making always and always more difficult for companies to raise new capital to invest in their business. This phenomenon had a strong impact on Italian companies, both on financial institutions and non, that these, forced by the consistent problematic financial condition and a hostile general framework, started to deliberate capital increase offering option rights to their existing shareholders. Since the beginning, such equity issues were characterized by common features:

- A large number of newly issued shares with respect to the pre-increase's amount
- A discount price of the new shares with respect to the last market price marked before the beginning of the increase.

Given the aforesaid charactering elements, such type of equity issuance was denominated 'Capital increase with significant dilutive effect', and in order to be listed such that, Consob introduced the factor K. This coefficient, computed as the relation between Terp[1] (Theoretical ex right price) and *cum* price, measures the intensity of the dilution. Larger the dilution smaller is the value of K. Capital increases with significant dilutive effect are characterized by a value of K smaller or equal to 0,3 ($K \leq 0{,}3$).

The dilution affects the existing shareholders in two different ways:

- Economic dilution
- Percentage dilution in the ownership

In the first case, shareholders suffer for both the reduction in the price of the shares held and both for the potential reduction in the earning per share.

[1] Terp theoretical ex right price, computed as $\frac{[(P_{off}*V)+(P_{sott}*N)]}{V+N}$ where $P_{off} = offical\ price$;P_{sub}= subscription price, V= number of existing shares, N= Number of newly issued shares.

On the other hand, maybe the first consequence of such type of capital increase is the strong reduction in the ownership that may affect the existing shareholders' stock when they decide not to exercise their option rights. Whenever the shareholders do not exercise the rights, they can sell them on the market.

Now, comes out one additional problem for the shareholder. Empirical studies show that the market, where investors can sell their rights, is very illiquid, making the trades difficult. Strong of the multiplies concerns affecting the existing shareholders, companies deliberating capital increases with significant dilutive effect, are positive of an almost full participation of their investors, "forced" by the aforesaid features to exercise their rights and underwrite the equity issuance. This may be seen the main reasons for which, despite the problematic financial condition of the companies releasing such equity issues, capital increase with a significant dilutive effect are, generally, almost fully underwritten.

Moreover, Consob pointed out other facets that can influence the decision of non-sophisticated investors, generated by the misleading comparison between cum price, last market value and theoretical price. During the weeks of the subscription period, the values of option rights and shares record a large volatility, that makes their price fluctuate. Evidences show the presence of a strong bullish trend during the very first day of the subscription period, followed by a bearish trend that rebalance the values of shares to their "normal" one. A great role on this process of price rebalancing, is played by the activities of the arbitrageurs. As this regard, Consob, in the last decade, has studied different procedure that try to mitigate the strong volatility of the shares traded during the capital increase with significant dilutive effect. After some initial attempts that did not result in a concrete solution to the problem, Consob at the end of the 2016, has introduced the so-called rolling-model. Rolling model involves the presence of delivery windows at the end of each day of the subscription period, rather than at the end of the first two weeks dedicated to the trade of the option rights. Several delivery windows mean availability of the financial instruments during the whole process of subscription, making the arbitrageurs' activities faster and more efficient, resulting in a quicker rebalancing of the instruments' values.

Moreover, is presented the problem of dilution in a non-domestic framework and in particular the pre-emptive and approval rights as useful instruments for the investors to not get diluted after the capital increase.

Impact of dilution also depends on the presence of warrant. These particular type of securities, share some common features with the options, giving to the holder the right to exercise them, forcing the company to issue new shares. The price of a European warrant can be computed with

the Black-Scholes-Merton adjusted for inflation. The share price, after the warrants' holders exercise their rights, is given by:

$$(V_t + M\gamma K)/(N + M\gamma)$$

Where:

V_t= the value of the equity of the company including the warrants at time T

$M\gamma K$= company's cash inflow generated by the exercise of the rights

$V_t + M\gamma K$= new equity value

Whilst, the warrant price W can be computed using the formula of Black-Scholes[2], after some changes:

$$W = S_0 N(d_1) - Ke^{-rT} N(d_2)$$

S_0 is replaced by $S_0 + \left(\frac{M}{N}\right) W$; the whole formula is multiplied by $\frac{N\gamma}{N+M\gamma}$

It is also possible to compute the participation to the capital increase of existing shareholders, with the Gamma index[3]:

$$Gamma = \frac{\alpha_u}{\alpha_0}$$

Where α_u represent the number of the newly underwritten shares while α_0 is the number of the new shares proposed to the existing shareholders. α_u is computed as follows:

$$\alpha_u = (\alpha_1 * (1 + R) - \alpha_0)/\, R$$

Where:

$$\alpha_1 = (\alpha_0 * n + \alpha_u * m)/(n + m)$$

[2] The following formula, used to compute the actual value of the Warrant, is the formula for the computation of a call's value.

[3] Gamma index proposed by Prof. Marco Bigelli

Capital increases

2.1 a general view over capital increases

Companies need to increase their capital in order to meet their aims and to finance their ongoing activities. Capital raising is not costless and might be done in several ways which lead to different pros and cons. A first big separation is done between financing through debt and equity.

With debt capital, a company can raise capital by borrowing money with the obligation to pay it back to the lender at a specific date and with interests charged on.The most common type of debt capital are loans and bonds. In the first case companies have to approach a bank for a loan, becoming the debtor.

Alternative is that a company has to raise capital is to issue bonds, which are sold to investors. During the life of the bond, company will pay interests to the bonds' holder till the maturity date.

Very different is raising capital through equity market. It can be divided in two parts, primary and secondary market. In the primary capital market are traded newly issued securities, while in the secondary the shares are traded between investors, both retail both institutional, and not bought from the issuing company.

Companies may approach the markets for the first time through an Initial Public Offering (IPO), firms go from be private to be publicly traded.

Company can sell new shares to the market, in the form of both common both preferred shares. Common stocks give shareholders voting rights, but they are at the bottom of the ladder, meaning that in case of company's liquidation, other creditors are paid first. On the other hand, preferred stocks can be seen as hybrid assets between shares and bonds and preferred shareholders have a prior claim on company's assets if it is liquidated.

Raising equity capital has benefits and costs for a company, for example it is not required to pay interest to the lender, but company has to face negative aspects such as the payment of dividend to the shareholder and the dilution in the company ownership.

This study will focus on the main consequences of capital increases and on the dilutive effect generated by the issue of new shares, highlighting the peculiarities and possible solutions proposed to mitigate the dilution.

When dealing whit stock dilution, there are two different facets to consider:

- the economic dilution;
- Percentage dilution of the ownership

Economic dilution

Economic dilution may affect two different facets:

- earning decrease
- stocks value decrease

Despite that an increase in the company's net income may be a good sign, investors focus on their investment's return. This leads investors to be concerned about the earning per share (EPS), namely the value of earnings per share of outstanding common stock. Since dilution reduces the EPS of companies, it is common for most of them to calculate a diluted EPS.

Diluted EPS adjust the basic EPS by considering the dilution effect due to an increase of the outstanding shares. The diluted EPS is always lower than the basic one and can be expressed as:

$$Diluted\ EPS = \frac{Total\ income - Preferred\ dividends}{Outstanding\ shares + Diluted\ shares}$$

Larger is the difference between the two ratios and higher is the potential dilution for the company's shares. The dilution effect is, also, triggered when the option of the convertible securities is exercised. Convertible securities are all outstanding convertible preferred shares, convertible debentures, stock options, and warrants

Direct consequence of the increased number of outstanding stocks is, clearly, a decrease in the value of those. The greater is the supply the smaller is the demand (for big quantities) and this according to the law of Supply and Demand, reduces the stock price.

Percentage dilution

First outcome of a company's new issue of shares[4] may be the decrease of the shareholders' ownership due to an increase in the number of the new outstanding shares.

Consob published a position paper in 2010, few years after the financial crisis of 2008, in which stated the difficulties of company to go through the market condition and the issues to find new capital in the primary market and the increasing volatility characterizing the secondary market. Companies to overcome this problem, tried to "entice" their shareholders by offering them option rights on the issue of new shares, necessary to raise capital and finance the ongoing activities. This phenomenon, characterized by a large number of newly issued shares associated to the option rights offered, took the name of capital increases with significant dilutive effect and it is characterized by specific features.

Common similarity of this type of capital increases is the offering of big sizable quantities of new shares, in some case the new shares offered were as the same size as the stocks before the capital increase, at a significant discount price with the respect to the outstanding shares'.

As direct result is found an important (potential) dilution on the ownership of the shareholders and a decreased value of the securities.

To better frame the phenomenon is possible to refer to a study of Atanasov et al[5] (2007) in which the authors pointed out that dilution is present when three conditions are met.

Condition 1: A significant amount of equity is issued. If the size of the equity issue is small, shareholder wealth loss is negligible. Therefore, many anti-dilution protections have a de minimis exception.

Condition 2: Some shareholders receive a disproportionately lower (higher) stake in the new issue. If all existing shareholders receive a proportionate amount of the newly issued shares, then there will be no dilution effects and the equity issue will resemble a stock split or a stock dividend.

[4] When the company's board of director decide to go public, the number of the shares to offered are sanctioned. Now the number of the outstanding newly issued shares are referred to as the float. When the company needs additional money, it might approach a secondary offering. It may result in a stock dilution whenever the existing shareholders decide not to exercise their option rights

[5] Preemptive Rights and Anti-Dilution Protections around the World.

Condition 3: Equity is issued at a lower price than the fair value of the stock. If the new stock is issued at fair value or even above fair value, regardless of participation or issue size, existing shareholders will not suffer a wealth loss.

It is clear, that the aforesaid three conditions do refer to a worldwide background and do not consider the specific features and limitations present in each country financial system. Referring to the condition number 2, for example, in Italy companies that deliberate a capital increase offering option rights to their shareholder, must offer them a proportional number of shares in order to do not get them diluted.

2.2 When is capital increase with significant dilutive effect

Starting from 2009, several companies, already present on the Italian Market MTA, started to offer option rights on the issuing of new shares aimed to raise capital and to finance their activities in a financial context strongly stressed and influenced by the subprime mortgage crisis.

Different studies have highlighted a straight relation between the difficult market conditions, consequence of the global economic and financial crisis, and rights offering issues, characterized by common elements that will make them result in capital increases with a significant dilutive effect.

Capital increases with option rights consist in options rights offered to the shareholders in proportion to the number of shares already owned. According to art. 2441 of *Codice Civile* the shareholders should not be diluted since the existence of the proportionality.

Option rights are offered to all the company shareholders with no distinction among those who have not voting rights or the holder of convertible bonds. This is only a part of the “protection” ensured by the option offering, that is expressed through two more additional way:

- proportionality of the number of the newly issued shares offered to the shareholders
- shareholders' option to sell the right

Necessary condition for the required protection of the shareholder is, however, the actual presence of a liquid market in which it is possible to trade shares and options.[6]

Moreover, empirical studies show that the performance of those companies, that have deliberated capital increases with significant dilutive effect, are on average worser than those subject of capital increases without significant dilutive effect.

Even if companies with clean balance sheets implement such an equity raise too, what really drives companies to implement them is their critical need to meet their financial obligations. Companies tend to fall back to right offering issuance when not able to borrow money and when they need to pay down debts.

During the first two weeks of the subscription period[7] of a capital increase, option rights can be traded the same way of ordinary shares; in fact, shareholders may decide to exercise them, do not exercise, or to sell their rights. Investors will base their decision considering the "real" cost of the operation. Typically, their right will be exercised when the market price is smaller than its theoretical value; otherwise it will be not exercised when the market price is larger than theoretical value.

Now, an important concept to introduce is the Theoretical ex right price (Terp). Terp refers to the theoretical price of a stock as a consequence of a new rights issue. Since companies that decide to release a capital increase with a significant dilutive effect, try to convince their shareholders to invest more money in their business, Terp is generally lower than the pre-offering market prince.

After the first two week of subscription period, the unexercised option rights are sold on the market.

To resume, capital increases with significant dilutive effect present two main common features:

[6] The presence of a liquid market is not responsibility of the company issuing new shares, nor companies are on charge of the sale of the option at a "fair price".

[7] The subscription period lasts, generally, three weeks, where shares and options are usually traded during the first two weeks while the third week is set up for the settlement of the traded rights, even If this does not mean that shareholders cannot longer exercise their option rights. According to art. 2441, second sub-paragraph of 'Codice Civile' states that is required at least a period of 15 days in which shareholders can exercise or not their option rights.

- Prices of new shares smaller than current market *cum*[8] price
- Issue of a big number of new shares with respect to the outstanding ones.

It can be highlighted that the dilution is only potential, depending on the decision of existing shareholders to exercise or not to exercise their option rights.

Anyway, intensity of dilution is measured by factor K[9], presented by Borsa Italiana. it is inversely related to the dilution caused by the capital increase, therefore higher is the dilution, smaller is the value of factor K. It expresses the relation between the Terp and the *cum* price, the market price at the time of official disclosure of equity issues.

Factor K resumes in a single value the effects of two main effects resulting of the dilutive effect:

- The subscription price of the newly issued shares with respect to the market value of the outstanding shares
- Number of the newly issued shares with respect to the outstanding shares' number

Factor K can take value between zero and one.

Since the possibility of measuring the dilutive effect with factor K, it has been used to determine when a capital increase present a significant dilution.

Originally, were considered as significant dilutive those capital increases characterized by a factor K smaller than or equal to 0.5 ($K \leq 0.5$), later it has been decreased to 0.3, according to article 1.3 of *Regolamento dei mercati organizzati e gestiti da Borsa Italiana.*

Between 2009 and 2014, there have been 23[10] cases of capital increases with significant dilutive effect, composing 25% of total capital increases with option right and collected € 11,4 B. This tells us the relevant role of this phenomenon in the Italian financial system.

In the following figure, proposed by Consob, it's possible to analyse the main features of the aforesaid capital increases. For each company it highlighted the maximum increase of the official price with respect to the theoretical price.

Moreover, it shows the anomalies in the price, computed as the difference between official price and theoretical value, taking into account each trading days, multiplied by the number of traded shares.

[8] For cum price, we refer to the price of the shares when these still include the option right
[9] K= Pex/Pcum. Pex is the theoretical ex right price while Pcum is the price of cum right
[10] Paper consob August,7 2014

name	year	Capital raised (Eur Mln)	Factor K	Max market price change over theoretical price	Anomalies' values (Eur Mln)	Existence of derivative instruements(Idem)
SEAT PG	2009	200	0,041	410%	57	Y
TISCALI	2009	180	0,057	579%	279	Y
PIRELLI RE	2009	400	0,151	135%	29	N
BANCA ITALEASE	2009	1.199	0,411	84%	9	N
TAS	2010	21	0,086	358%	1	N
STEFANEL	2010	50	0,115	544%	5	N
INVEST. E SVILUPPO	2010	15	0,420	69%	0	N
ZUCCHI	2011	15	0,242	124%	2	N
BPM	2011	799	0,324	1%	0	Y
EMAK	2011	58	0,325	-1%	0	N
JUVENTUS	2011	120	0,421	62%	2	N
FONDIARIA SAI	2012	1.100	0,026	334%	52	Y
INVEST. E SVILUPPO	2012	5	0,195	288%	2	N
UNIPOL	2012	1.100	0,200	32%	3	Y
MERIDIANA FLY	2012	119	0,271	116%	2	N
MONDO TV	2012	11	0,298	90%	2	N
MOVIEMAX	2012	5	0,434	44%	0	N
SINTESI	2012	5	0,095	162%	1	N
MAIRE TECNIMONT	2013	134	0,260	35%	1	N
LVENTURE GROUP	2013	5	0,277	30%	1	N
MEDIACONTECH	2014	19	0,269	71%	0	N
BMPS	2014	5.000	0,062	67%	204	Y
BANCA CARIGE	2014	800	0,409	7%	4	N
		11.360	0,234	158%	656	6 times
		Sum	Average	Average	Sum	Counting

Analysing the aforesaid 23 capital increases with significant dilutive effect emerge two main features. The larger part of the prices' anomalies is related to a small number of the capital

increases, given by SEAT PG, TISCALI, FONDIARIA SAI, BMPS, all present a K smaller than 0.1 and all of these four present derivative instruments with their shares as underlying assets.

Due to these data, it is possible to consider the big issue, related to such capital increases, of price anomalies, referred both to the value of the traded shares both to the value of the rights. Due to the two main features of capital increase with significant dilutive effect; high number of newly issued shares and discounted price; Option rights become the "depositor" of the largest part of the intrinsic value of such financial operations.[11]

In the next paragraph will be better highlighted the prices' anomalies generated by the trading of the newly issued shares and of the rights.

Are shareholders "forced" to exercise their rights?

It is made clear that the shareholders can decide what to do after they have received the option rights; they might exercise them and then decide to trust, once again, the companies or to sell their rights. Given the problematic financial conditions of the companies[12] would be "coherent" not to exercise the right and sell them in the market. Negative performances have been recorded both before both after the decision to subscribe a capital increase with significant dilutive effect, highlighting the persistent financial problems of such companies. From empirical studies[13] emerge, also, a positive relation between the dilution and the company's financial leverage but a negative relation between the percentage of dilution and return on equity (ROE) and EBITDA.

Companies are not on charge of the existence of a liquid option trading market but they, might take advantage of the difficulties that shareholders might face in the trading of their option rights, "forcing" them to exercise their rights and underwrite the capital increase.

[11] In particular, it is possible to refer to the work of Enrica Bolognesi and Angela Gallo "The ex-date effect of rights issues: evidence from the Italian stock market" *": in this framework (capital increases with significant dilutive effect), the option right assumes an extraordinary high value whenever compared to the adjusted market price of the related stock".*

[12] Empirical studies show that between 2009 and the end of 2017, all the companies, that have subscribed a capital increase with a significant dilutive effect, performed much worser than companies that have not issued such capital increases.

[13] Bank of England has shown how the significant dilutive effect of capital increases are a form of company's weakness.

2.3 Prices' anomalies

As highlighted in the previous paragraph, despite their bad financial conditions, companies deliberating equity issue with option rights offering, have succeed to get almost all their shares subscribed. Based on these results, it is reasonable to wonder what lead shareholders to trust the companies and invest more money in.

A possible solution to the aforesaid question may be found in the triggered mechanism of prices' anomalies that follows the issue of new shares.

Such type of capital increases is characterised by a big number of traded shares due to a much smaller value of "ex" shares with respect to "cum" shares.

Consob pointed out the evidence of a strong increase, during the first days of offering, in the market values of "ex" shares with respect to their theoretical price.

Several are the reasons which may explain this phenomenon and can be linked to different times of offer period and to different effects, generated both on retail investor on MTA both by use of derivative instruments related to shares offered.

One of the reasons could be found in the potential "error" of retail investors, the so-called "Effetto Ottico[14]", who might confront the market price with last *cum* price, instead of the theoretical value. This leads the retail investors to buy "ex" shares due to what they belief are "discounted price". Obviously, it is just an apparent discounted price and can mislead retail investors.

Moreover, some studies show a decrease in the trading activity of institutional investors, typically sophisticated ones, but an increase in the retail investors' trading activity.

Other aspect to consider is the strong increase in the demand that occurs when investors, exploiting the discounted price of "ex" shares, buy a big number of shares proposed to the market. This will lead to push the demand over the supply, since the number of outstanding shares is equal to the pre-offering's amount.

During process of capital increase with a significant dilutive effect, is common the presence of anomalies during the trading days with the shares traded at a higher price with respect to their theoretical one, before restoring their values once the trading period is about to be ended.

[14] It refers to the results shown in the Consob's position paper "capital increase with significant dilutive effect"

Moreover, it is possible to highlight two different and opposite trends that characterised each capital increase with significant dilutive effect.

Anomalies make the prices show a strong positive trend (with respect to last official price of the cum shares where cum refers to the presence of option right) during the first days of trading, and a negative trend during the last days, before prices will be realigned with the ones before the offer period. Let see more in details these two situations.

The bullish trend finds its reasons in:

1) Investors, due to the positive trend characterising the first days of offer of previous increases, tend to believe that this phenomenon is going to be replicated, then they will be enticed to buy shares in order to sell them when their value is increased.
2) Different mention is required for two effects that are different in their nature but, at the same time, linked due to the common connection to the financial derivative market and its instruments. First, we refer to the owners of derivative instruments and between them who have *call options.* In fact, when the bullish trend makes the prices of shares to be higher than *strike price* of *call options,* it would be convenient to exercise them. Now, who the sellers of the just exercised call options, whenever do not owe enough, are forced to approach the market and buy the required shares, pushing up over and over the bullish trend.

   Second reason is easily found when the securities of the company that starts a capital increase is part of financial indexes. In this case, owners of ETF or affine instruments could buy shares on the market in order to replicate the index or to meet the redemptions rights.

After that the bullish trend has run its course, a bearish trend is triggered during the last days of a capital increase because of arbitrageurs. The big number of traded shares during the offer period makes difficult for the securities lending market meet the arbitrageurs' needs. In fact, only the shares constituting the companies' companies are available and, given the well-known characteristic of capital increases with a significant dilutive effect, these represent a minor part with respect to the massive number of new shares offered.

Now, during the last three days of offering, shorting selling are allowed, and this makes possible for the arbitrageurs to rebalance the value of increased shares. Last days of subscription period

are, also, characterized by increase in the trading volume due to the arbitrageurs' activities of rebalancing of the prices.[15]

In conclusion, the aforesaid three last days see a strong bearish trend that push down the value of the shares offered to the market.

As said the misalignment and the intensity of the anomalies will depend on:

1) the ratio between new shares and outstanding shares;
2) and on the presence of derivative instrument where the underlying assets are the new traded shares.

Relative to point 2, Consob pointed out that shares can be traded during the process of a capital increase and, at the same time, constitute the underlying assets of financial instruments traded over the IDEM (Italian derivative market) market, this means that the use of coefficient K will be linked to the number of new shares to be issued and not to the number of outstanding shares.

Moreover, the significant price variations, make exercising the stock options of the call type profitable, due to the shares could be considered as deep in the money. The possibility to make profit by early exercising the call stocks option, leads the investors to require a big amount of the shares, traded on the MTA (mercato telematico azionario), resulting in an increase on the purchase side.

The aforesaid characteristics of capital increases with a significant dilutive effect, change the composition of the initial investment took by the investors who believed in the company and in its "financial structure".

On the first day of trading, the shareholders "receive" the option right that has been detached from the shares and this leads to a decrease in the value of the financial instruments. The option right will play a fundamental role during all the management of capital increase; thus decreased value of the shares (ex-option right) will be balanced by the value of the option right, which its theoretical value is determined between the TERP and the last value of shares before the capital increase.

[15] Referring to the work of Enrica Bolognesi and Angela Gallo "The ex-date effect of rights issues: evidence from the Italian stock market", ": *the trading volume is evaluated using a mean-adjusted method…the trading volume is defined as the percentage of outstanding shares traded on a given day: Vit = (nit * 100)/(Sit), where nit is the number of shares traded for stock I on day t and Sit is the firm's outstanding shares on day t "*

Prices' anomalies and Derivative instruments

In this previous paragraph, we have analysed the price anomalies generated during a capital increase with significant dilutive effect, considering both the bullish and bearish trend.

Now, the attention will be focused on the prince anomalies generated due the presence of derivative instruments and how Borsa Italiana has tried to mitigate their effect.

Moreover, a large fluctuation in the price of the shares may be generated by the presence of *call options* and the aforesaid bullish trend. When the price of the shares is larger than the strike price, the holders of such financial derivative instruments will find profitable exercising their rights.

On the other side, sellers of the exercised call option may struggle to find the necessary number of shares and will be forced to buy new shares in the market, increasing the bullish trend. Price of the shares will be also increased by those who have sold call option and believing in a potential exercise of the derivative will cover themselves by buying new shares.

Moreover, considering the capital increase with significant dilutive effect of another company, Seat Pg, it is possible to highlight the strong decrease in the value of the *open interest* of their call options, from 1028 to 55. This significant decrease is explained due to the early exercise of the options.[16]

Empirical studies have highlighted that suspension is useful to mitigate the bullish trend, but it cannot be a definitive solution to the strong volatility during a capital increase with significant dilutive effect, since only seven out of nineteen of these such capital increases involved the use of derivative instruments.

[16] Enrica Bolognesi and Angela Gallo "The ex-date effect of rights issues: evidence from the Italian stock market"

2.4 Structure of a capital increase

Before presenting the solutions proposed, during the last years, to mitigate the effect of dilution, in the following will be illustrated the main features of a plan to modify the capital increases, as a consequence of GEMINA capital increase.

The issues were:

- *The payment of the deriving shares is carried out between 11:00 am and 12:00 am of the last day of Option Period*[17]
- *The publication of a supplement to the prospectus entitles investors, in accordance with Article 95-bis, Paragraph 2, of the TUF,3 to withdraw the previous subscription.*[18]

To overcome issues, use of cash in the gross payment system, managed by the Bank of Italy, has been the main solutions to embrace to.

Use of a gross payment system brought several benefits. It helped to enhances the flexibility of Monte Titoli's operations[19] and allowing Monte Titoli to check for the validity of the payments, made by the intermediaries, to transmit to the issuers.

Monte Titoli with the help of a "Technical Round Table" has illustrated the main characteristics of the management of capital increases:

- *Exercise the option rights by 3.30 p.m. of the last day of the Option Period*
- *As stated previously, cash settlement in the gross payment system managed by the Bank of*
  Italy (TARGET2), between 3.30 p.m. and 4.30 p.m.
- *Crediting the shares with block, between 4.20 p.m. and 4.30 p.m.;*
- *Automatic unblocking of the shares after 6.00 p.m. and availability for the nightly settlement cycle of the following day.*[20]

The new operating model has introduced several changes finalized to overcome the emerged issues in relation to the capital increase of Gemina.

[17] Consob, position paper, 19 april 2010
[18] Consob, position paper, 19 april 2010
[19] Consob, position paper, 19 april 2010
[20] Consob, position paper, 19 april 2010

One of the main results is the more flexibility for the operations of Monte Titoli given that the payment of the shares is made only after the Option Period is closed and due to use of TARGET 2.

New operating model allows to manage the "publication of a prospectus supplement" until 3:30 pm of the last day of Option Period.

Relative to Point 1, "Period of validity of the Offer and subscription method", has been proposed the following interpretation:

The period of validity of the Offer runs from xxxx to xxxx (Option Period).

The option rights, which will make it possible to underwrite the Shares, shall be exercised, or be foregone, in the Option Period through the authorised intermediaries participating in the centralised management system who shall accordingly instruct Monte Titoli no later than 3.30 p.m.on the final day of the Option Period.

Therefore, each underwriter shall submit a subscription request in the manner and within the time his/her depositary intermediary will have notified, to assure compliance with the final deadline set out above.[21]

Decision to set the final time at 3:30 pm for the exercise of the option rights is crucial for other two points, cash settlement (point 2) and crediting of the shares (point 3).

In particular, Monte Titoli benefits from the use of gross payment system for cash settlement. In fact, Monte Titoli can, now, credit the shares without the authorisation of the issuer, making possible to credit shares between 4:20 pm and 4:30 pm.

Since all capital increase's shares are credited at the same time, there is not distinction between first and second term. When investors receive the blocked securities (last day of Option Period or the following day) is not more important and at the same time the authorisation of the issuer is not required anymore.

New shares are credited with availability block, but this automatically become void after the 6:00 pm, making the securities available for the nightly settlement cycle of the following day

[21] Consob, position paper, 19 april 2010

Solutions proposed over the last decade

In the previous chapter of this thesis, the focus was on the features that outline the capital increases with a significant dilutive effect and the prices' anomalies observed during the subscription period. The following paragraphs will focus on the different solution proposed by Consob to resolve the aforesaid issues and on the dilution in non-domestic environments, with stress on different ways to compute the dilutive effect using a modified Black-Scholes-Merton and the Bigelli's model.

3.1 Pre-rolling solutions

Consob, during the last years, has tried several ways to mitigate the negative effect of the dilution, even if consequences have not always been durable or have led to a positive solution to the highlighted problems.

Since 2009, Consob carried out supervisory activities with the aims of analysing behaviours that could have been not coherent with the principles of correctness and diligence required, with a focus on the daily market operations and deliveries of the shares.

Besides the supervisory activities, some structural solutions[22] have been proposed by Consob during the last decades.

These can be resumed in:

1) Reduction in the conversion ratio between new shares and old shares

2) Elimination of the short selling[23] prohibition

[22] The following structural solutions have been proposed by Consob in "capital increases with significant dilutive effect" (19 aprile 2010) before the introduction of the rolling model.

[23] Short selling ban had been introduced by Consob. Moreover: "*this trading restriction prevents the arbitrageurs from buying and selling the two securities (the option right and the stock) at the same time, taking advantage of the potential value difference in the two markets". The ex-date effect of right issues by Enrica Bolognesi and Angela Gallo*

3) Change of the settlement procedures during the Option Period

4) Introduction of daily delivery windows

Solution n. 1 represents a good way to reduce the potential demand for loaned securities used to cover short sales, but it is not helpful for the capital increase of those companies that have problems safeguarding going activities.

Solution n. 2 does not represent a valid solution to the noted issues, since short seller would not be able to fulfil share delivery obligations.

Solution n. 3 proposes that all the transactions carried out during the Option Period would be settled during an account period, instead of during the rolling settlement (three days).

All the solutions seen so far do not represent efficient ways to mitigate the dilution. For this reason, Consob has then proposed a variation of solution n.4, where the delivery windows are multiple and not just daily.[24]

Idea, underlying the change in the standard management of capital increases, is to rebalance the ratio between the outstanding and the newly proposed shares, giving the opportunity to the arbitragers, when the share prices is above its theoretical value, to sell the shares and deliver the sold securities, considering that the shares are promptly provided to the arbitragers.

Monte Titoli and Borsa Italiana have paved the way to two different interpretation of the above proposed solution, respectively named solution a and solution b.

Solution a)

Aim of the solution is to increase the number of delivery windows, allowing to deliver the shares at T+2[25] and not only at T+14, i.e. the last day of trading. Given the deliver at T+2, with availability for the nightly net settlement cycle of T+3, who have sold at T are able to fulfil the obligations for the delivery of the sold shares.

The choice of a delivery window at T+2 is not casual but reflects market rules and international standards. In fact, the end of the working day T+2 represent both the final term in which the

[24] The introduction of multiple delivery window reflects the main idea underlying the rolling model that will be introduced few years later by Consob.
[25] Where T is the first day of trading of the shares' ex right and rights themselves.

rights must credited, based on the existing accounting positions, and the last day of settlement of the market transactions on securities *cum* right.

In the Table 2, it is possible to analyse both the demand and the supply sides, where we find, respectively, the arbitragers and the shareholders intended to underwrite the capital increase.

Table 2

T	T+1	T+2	T+3
Sale of the shares by arbitragers		Crediting the option rights	Loan to arbitragers of securities by shareholders who exercised the option right
		Delivery of the shares with block (availability for the nightly settlement cycle of the following day) to the shareholders who exercised the option right	
Exercising of option rights by the shareholders	Exercising of option rights by the shareholders	Exercising of option rights by the shareholders	Settlement of the sales of shares

Source: Consob

Moreover, the previous setting, requires a strong securities lending market, but when it is not possible, arbitrageurs could purchase on the days preceding the option Period.The underlying idea is that the arbitrageurs believe of an increase in the share price between T-1 and T.

So, the alternative time period can be resumed in Table 3.

Table 3

Up to T-1	T	T+1	T+2	T+3
Purchase of the *cum* shares by arbitragers	Sale of the shares by arbitragers		Crediting the option rights	Settlement of the sales of shares
			Delivery of the shares with block (availability for the nightly settlement cycle of the following day) to arbitragers	
	Exercising of option rights by arbitragers	Exercising of option rights by arbitragers	Exercising of option rights by arbitragers	

Source: Consob

Solution b)

- Solution b proposes some changes to Solution a, due to make possible to set up a risk-free arbitrage, not possible in the latter setting, enabling arbitragers to obtain shares at T+2 through the exercise of the option rights purchased at time T.

Table 4

T	T+1	T+2	T+3
Sale of the shares by arbitragers	Crediting the option rights	Settlement of the purchases of the option rights	Settlement of the sales of shares
Purchase of the option rights		Delivery of the shares with block (availability for the nightly settlement cycle of the following day) to arbitragers	
Exercising of option rights by arbitragers	Exercising of option rights by arbitragers	Exercising of option rights by arbitragers	

Source: Consob

Main differences in this alternative hypothesis are:

- Crediting the rights at T+1, instead of T+2

- A two-day settlement interval limited to market transactions on the shares in question, carried out on the last trading day *cum* right (T-1);
- A two-day settlement interval of the market transactions on rights; and, lastly
- Maintaining the first delivery window at T+2

Now, T+1 becomes the settlement day of two different trading days, T-2 and T-1

Comparison between the two solutions

Both solutions have pros and cons, for example regarding the arbitrager opportunities. Solution B allows to fully exploit them, allowing risk-free arbitrager, which is not possible with solution A.

Solution b shortens the settlement interval of the last *cum* trading day from three days to two and after considering risks, a reduction in the settlement does not appear problematic.

Another alternative hypothesis considers in adding a new delivery window to solution a, beyond T+2 and T+14. With a third delivery window at T+3 arbitrageurs would have facilitation in their activities.

Table 5 presents the new mechanism.

Table no. 5

T	**T+1**	**T+2**	**T+3**	**T+4**
Purchase of option rights by arbitragers	Sale of the shares by arbitragers	Crediting the option rights	Settlement of the purchases of the option rights	Settlement of the sales of shares
			Delivery of the shares with block (availability for the nightly settlement cycle of the following day) to arbitragers	
Exercising of option rights by arbitragers	Exercising of option rights by arbitragers	Exercising of option rights by arbitragers	Exercising of option rights by arbitragers	

Source: Consob

3.2 Rolling Model

The aforesaid proposed solutions did not lead to an efficient solution of the main issues which characterized a capital increase with a significant dilutive effect, forcing Consob to study a new mechanism.

After has supervised and analysed the MTA and several capital increases over last decade, Consob has introduced the Rolling Model with the aim of mitigate the dilutive effects.

Main changes carried out by Rolling model may be resumed in the presence of several delivery windows during the Subscription Period of the securities arising from the exercise of the related option rights proposed to the existing shareholders, allowing the investors to exercise their rights, and have immediate availability, during each day of the subscription period and not only at the end of the same, as happened in the past years.

This makes the arbitrageurs' activities easier and faster.

As discussed in the previous chapter of this thesis, a bullish trend is present during the first days of the trading period, making the prices of the new shares fluctuate before being rebalanced by a bearish effect.

Rolling Model allows arbitragers, when an uptrend begins, to start a series of actions aimed to mitigate the fluctuations of the price of the new shares.

Arbitragers may:

- Buy the subscription rights
- Sell the shares, this will lead to a realignment between the market price and theoretical price
- Exercise the rights and receive the newly issued shares
- Settle the sales with the newly issued shares[26]

Empirical studies show that, when arbitragers activities are carried out, starting from the last three day of the subscription period, price anomalies are efficiently solved, and the market price matches its theoretical value.

Rolling model should be used for every class of shares (common and preferred stocks) offered during the capital increase, with the same aim of reducing the prices anomalies.

[26] Consultation paper Consob, 7 agosto 2014

Even if, rolling has been considered the best solution to mitigate the negative effect of a dilution during a capital increase, it presents some disadvantages.

Some doubts regarding the lasting of the solution proposed by rolling model, came out from the economical features characterizing the companies which have deliberated a capital increase with a significant dilutive effect.

We have seen, in the previous part of this thesis, that typically, this type of capital increase is deliberated by companies with both economic and financial issues, facing difficulties to carry out their ongoing activities.

Now, on one hand, due to the rolling model, the market price of option on new shares is close to its fair value, allowing the shareholders to sell the options without losing a good part of their value, on the other hand, investors will decide not to exercise their options when they do not consider the company as a good investment in the long run.

A problem may emerge when the shareholders try to sell their options on the market. Since the aforesaid negative conditions of the company, shareholder may find issues to sell their options to new investors at their fair value.

This will lead to a decrease in the value of the options, necessary to meet the actual demand. Once again, shareholders will have to decide to sell their options at a discount vale or to invest in a company with financial and economic issues.

Other issues are emerged after the introduction of the rolling model[27]:

- *Delivery time*
- *Delivery costs*
- *Issues with arbitragers activities during the first day of the subscription period*
- *Legal issues regarding the information of shareholders*
- *Misalignment with EU standards on corporate actions*

Let see the aforesaid issues.

Regarding the delivery costs, the implementation of the rolling model was supposed to cost to the Italian Banking system about 50 Million *una tantum* and others 7 million for maintenance plus 0.8 million for each right issue. The rolling model can only apply to those capital increases

[27] In particular, the following list of issues related the rolling model refers to the Consob's paper" Capital increases with significant dilutive effect" August 7 2014

characterized by factor K equal or smaller than 0.3, but this limitation on the use of rolling model, leads to two different procedures in place, increasing costs and risks.

Regarding the subscription period, a potential issue of the rolling model may emerge due its potential ineffectiveness on the first day of trading.

Moreover, with the rolling model, the settlement of the newly issued shares would be at T+4, and then not on time for the settlement of the sales carried out on T (first day of the subscription period).

This will lead to consider the sales at T as "naked" short selling since the impossibility to settled them on T+3. Since naked short selling is not allowed by UE n. 236/2012, the sale of the shares on T would not be lawful.

Next table resumes the aforesaid problem.

Table 6

T-1 (Fri)	T (Mon)	T+2 (Wed)	T+3 (Thu)	T+4 (Fri)
Last trading day of cum shares (ISD: Wednesday)	Start of the subscription period Price anomalies Sales of shares by arbitrageur (ISD: Thursday) Price realignment Purchases of subscription rights by arbitrageur (ISD: Thursday)	Settlement of trading activity of the last cum day Creation and crediting of subscription rights to cum shareholders	Settlement of subscription rights bought on T Exercise of subscription rights by arbitrageur and creation of newly issued shares with availability for T+4 Fails of settlement of sales carried out on T	Availability of newly issued shares Settlement of sales carried out on T using the newly issued shares

Source: Consob

Note: T is the first day of the subscription period; ISD = Intended settlement day

A potential solution to the aforesaid issue has been proposed by Monte Titoli, which would ensure the availability of the new shares on time for T+3 due to the communication to Monte Titoli of the subscription rights within 13:30 on day T+3.

Another point highlighted by Consob is the potential increased risk of litigation faced by custodian Banks in relation to the communications with their clients. Custodian banks could have not informed on time their clients making not possible to take advantage of the first window of delivery of the new shares.

Litigation risks might be avoided due to information channels such as internet and mobile banking which reduce the information asymmetries.

Dilution out of Italy

So far, it has been stressed the impact of the dilutive effect, due to a specific type of capital increase, on the Italian scenario and the related princes' anomalies generated during the option trading.

Now will be illustrated and highlighted the dilution in a worldwide background, mainly referring to US market.

4.1 US Privately- Held Companies

Expropriation in the US privately- held companies can assume different features from the definition of dilutive effect, seen so far, in the Italian background. Moreover, is generally considered as not particularly present in the US, but if this can be true for the large companies, it is different for small Privately- Held companies.

Sometimes, many examples make see that capital increases in this type of companies may be used to dilute minority shareholders because of personal conflict[28]. This phenomenon is particularly true between family companies or between shareholders who active work in the company and shareholder not active in the business[29].

Another aspect that is possible to highlight, is related to the Venture Capital backed start-ups, where anti-dilution provisions are negotiate between Venture Capitalists and entrepreneurs; with anti-dilution provisions used to dilute the entrepreneurs when, in the investment rounds, the value of the firm decline.

[28] "Preemptive Rights and Anti-Dilution Protections around the World" by Vladimir Atanasov et al. 6 february 2007

[29] F. Hodge O'Neal, *Oppression of Minority Shareholders: Protecting Minority Rights*, 35 Clev. St. L. Rev. 121 (1987)

4.2 US Publicly Traded Companies

For the US Publicly Traded companies is not so common to identify classic equity dilution, but it is possible to refer to two settings that, even if are not straight associated to equity dilution, can be identified as such.

These are the market timing and the late trading of Mutual Fund.

The issue arises because of the practice of some mutual Fund to compute their Net Asset Value (NAV) without considering the market movements of the "last" day, basing their Nav on stale prices, due to the presence of assets which are not be traded before 4 p.m, market closing time.

This leads to the opportunity to some sophisticated investors to look for funds with stale-price assets and buy undervalued shares with NAV which do not reflect the actual market price.

4.3 How to prevent dilution

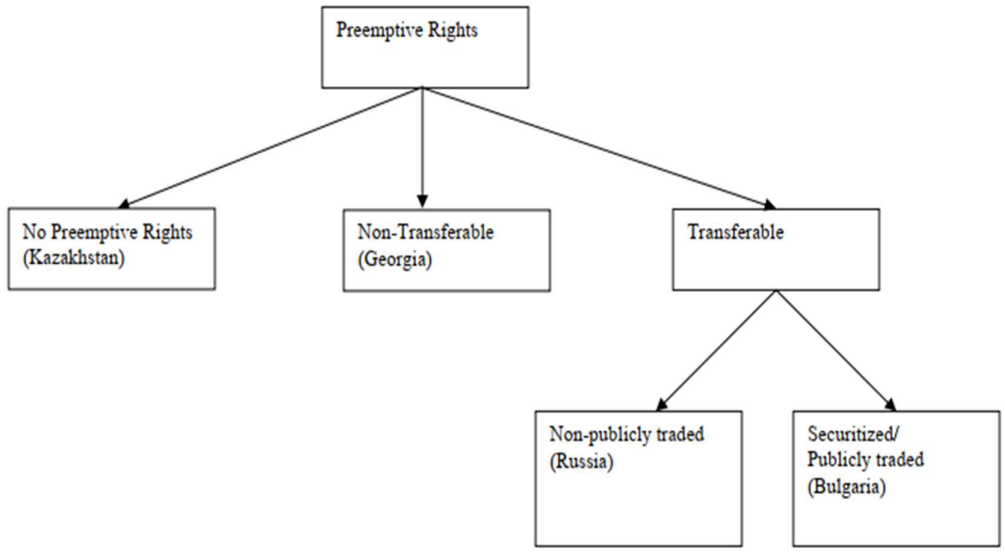
One of the most common anti-dilution mechanisms, when referring to legal status, are still the pre-emptive rights. Pre-emptive rights give the right to shareholder not to been diluted in their ownership, by buying a proportional number of shares. Even if they are generally used, pre-emptive rights are not mandatory in the U.S.

These rights present several characteristic features which allow to classify them and help to better understand when and how they work. A first big classification can be made between transferable and not transferable when they are publicly traded, with an illustration in the following figure.[30]

[30] Preemptive Rights and Anti-Dilution Protections around the World, Atanasov et al (2007)

Figure 1

A Tree Classification of Preemptive Rights



Source: Preemptive Rights and Anti-Dilution Protections around the World

Empirical studies show that pre-emptive rights are exercised by the 50% of shareholders, sold by 40%, while only 10% of shareholders decide to do nothing and get diluted.[31]

Aid for more unsophisticated investors come from the so-called Default option. Stockbrockers automatically sell the shareholders' rights when not exercised, allowing them to make a profit.

From this data, it is clear that pre-emptive rights are not an optimal solution to the dilution problem.

Beside their positive and helpful facets, pre-emptive rights do not come for free. First cost for shareholders is, obviously, the financing costs required to purchase the shares, which can be significant. Still investors can benefit of easier margin requirement needed to the purchase of the rights. Up to 75% of the rights can be bought on margin[32]. Other costs are transaction and information costs, that together with the financing costs depend on the specific features of the investor, from the ownership size to the nationality, making pre-emptive rights not always a full protection for all the types of investors.

[31] Smith 1997

[32] Preemptive Rights and Anti-Dilution Protections around the World, Atanasov et al (2007)

Another group of anti-dilution provisions refer to those which require the set of a minimum price. For example, in the French system the price of public-offering has to be higher or equal to the average price of ten successive days chosen in a 20-day window before offering[33].

According to the type of price we consider, different setting of minimum price can be distinguished. The price can be based on market price, book value per share.

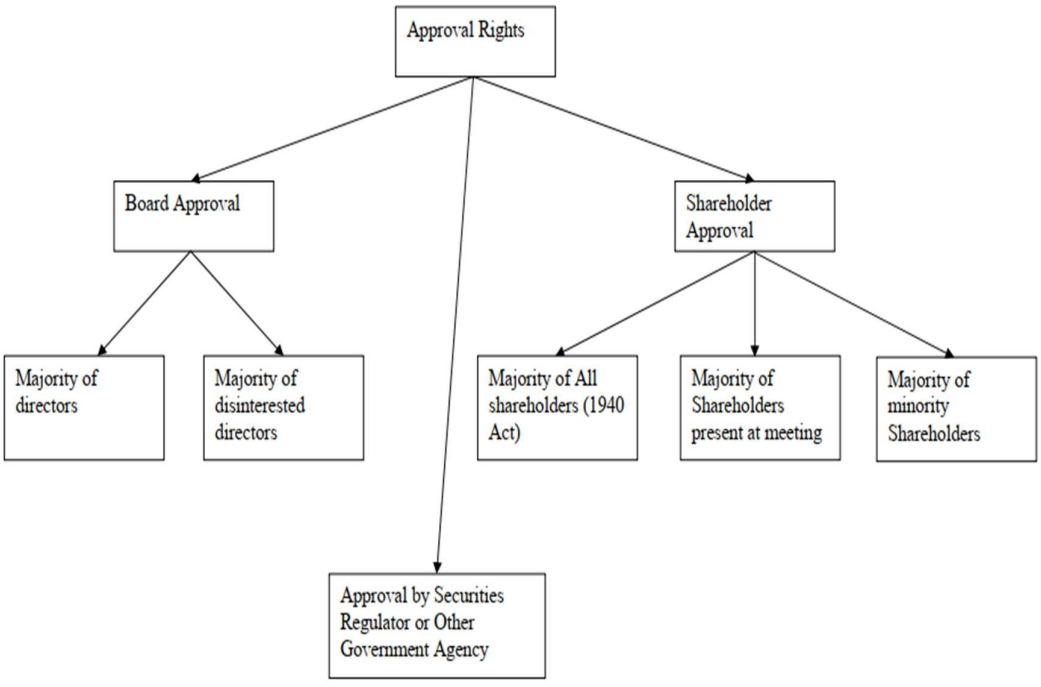
Limitations arise from the different calculations of the fair price of the shares, when it is based on market price, a potential manipulation of it in many ways, i.e wash sales, may result in the rule made ineffective.

Whether the rule is based on book value; accounting manipulation can be used to reduce the book value per share.

Third group of anti-dilution provisions are approval rights, which may be considered as substitute for the two groups seen before, pre-emptive rights and minimum price.

The following figure resumes how they are approved.

Figure 2



Source: Preemptive Rights and Anti-Dilution Protections around the World, Atanasov et al (2007)

[33] Gajewski, et al, 2003

Approval rights are then approved by different parties such as the Board of Directions or shareholders. Sometimes it may be distinguished between a required majority or supermajority needed in order to get them approved.

Another mechanism that help shareholders not to be diluted is the conversation ratio between preferred stock and common stock when the company goes through different financing rounds. Generally, the ratio, at which preferred stocks convert into common stocks, is one-for-one, but it increases when anti-dilution mechanism is triggered. This mechanism of protection takes the name of price-based anti-dilution and can be divided in two different subgroups:

- Weighted average: in this case the conversion ratio is adjusted by the amount required to offset the dilution generated by the issuance of new shares in subsequent financing rounds. The related formula may be computed in different ways, but the most common one considers the fully diluted company's capitalization.

- Full ratchet: with this type of anti-dilution mechanism, investors would buy the protected stock at the actual price paid the additional financing rounds. This leads to a conversion rate always larger than with the weighted average[34].

However, not all issuances provide anti-dilution protection. An example of such issues refers to warrants connected to credit lines.

Weighted average Formulation[35]:

$CP_2 = CP_1 * (A+B) / (A+C)$

in the above formula, the variables are:

$CP_{2=}$ refers to the conversion price of new series A[36]

[34] DLA piper accelerate "*Full ratchet anti-dilution lowers the effective purchase price of the protected stock to the actual price paid in the down round. A full ratchet provision will always result in a larger conversion rate adjustment than a weighted average provision and, for that reason, is more detrimental to founders and other common stockholders."*

[35] Andrew.cmu.edu

CP_1= Series A Conversion Price (originally conversion price)

A = Number of shares of Common Stock deemed to be outstanding immediately prior to new issue (includes all shares of outstanding common stock, preferred stock on an as-converted basis, all outstanding options on an as-exercised basis.

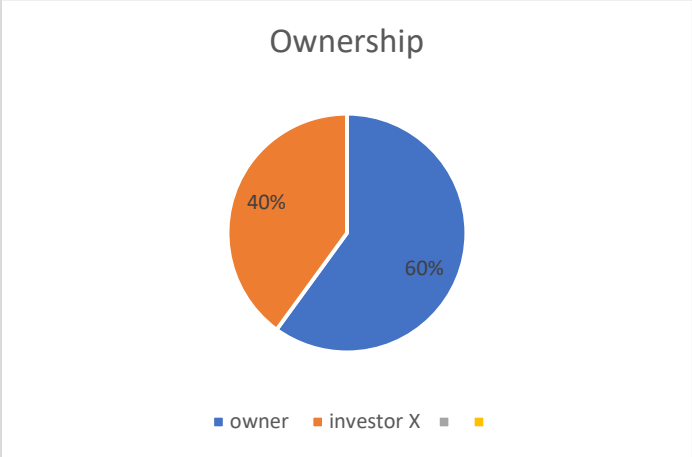
B = Aggregate consideration received by the Corporation with respect to the new issue divided by

C = Number of shares of stock issued in the capital increase

Let consider the case of company XYZ.

Suppose Company XYZ has 60'000 shares, hold by the company's owner.

Investor X wants to purchase 40% of company XYZ by investing 40'000$ for the 40% of XYZ's ownership. He is paying 1$ for 1 share. To meet the request, company has to issue new shares. After the investment the shares of XYZ go to 100'000 (60'000 + 40'000), for a total value of 100'000$.



Due to the desire of the management of XYZ to get bigger, company needs more money but because of the scepticism of the market on the financial stability of the company, it attracts new investment at a lower price for share than the first round.

A new investor wants to purchase the 50% of company XYZ for 50'000$. the total amount of outstanding shares is 100'000 (today) but it will represent only the 50% of the company after the second round of financing, resulting in a total investment of the new investor of 100'000.

[36] The term series A, generally, refers to the first round of equity issue

This will lead to share price of 0,50[37]$ for the new investor.

The dilutive effect will impact both the percentage ownership of investor X, going from 40% to 20% of the company, both the economic aspect, resulting in a worth of 20’000$.

Now, with the aforesaid computation of anti-dilution protection:

$CP_2 = CP_1 * (A+B) / (A+C)$

$CP_2 = 1\$ * (100’000 + 50’000)/ (100’000 + 100’000)$

$CP_2 = 0{,}75\$$

With the anti-dilution protection, the new conversion price is 0,75$ instead of 0,5$, and the shares of investor X will increase from 40’000 to 53’330.

[37] 50'000$ investment divided by 100'000 shares.

Warrant stock and dilution

It has been highlighted the dilutive effect generated by new equity issue and strong impact of the dilution in specific capital increases. A company can, generally, issues different types of shares, such as common shares or preferred securities. Warrant shares are a particular type of securities that entitles the holder to buy the underlying stock of a company. What differentiate warrant from common shares, is that if the holder exercises his warrant before the expiry date, he or she buys the stock at a fixed price, called exercise price. This makes Warrant more similar to option than common stocks, since warrant do not represent ownership in a company's stocks but gives the right to buy, warrant call, or the right to sell, warrant put. The presence of the exercise's right and not the obligation, distinguishes, also, warrant from futures.

When a warrant's holder exercises his right, the company will issue new share to meet the request, when the strike price is lower than the market price, existing shareholder will be diluted.

Moreover, effect of dilution is different whether the company is private or public. When a private company is going to issue warrants, due to the cost of the issuance, the price of outstanding stock will be reduced. The worth of warrant will be lower than a *call* option with same maturity and strike price *K*.

Now, when a public company is going to issue warrants, the value of the warrants will equal the value of *call* options, given the same maturity date and strike price *K*. Regarding the stock shares, their price should reflect the dilution due to the warrants issuance.

Different model can be used to measure European Warrant, one of them is the Black-Scholes-Merton (BSC) adjusted for dilution[38].

Considering the example of a company with N outstanding shares and M outstanding (European) Warrants. The holder of the warrants is entitled to purchase a number γ of shares at time T at a price of K.

The share price after the warrants' holders exercise their rights is:

[38] The following formulas are taken from "Option, Futures and other Derivatives" by Hulls

$$(V_t + M\gamma K)/(N + M\gamma)$$

Where:

V_t= the value of the equity of the company including the warrants at time T

$M\gamma K$= company's cash inflow generated by the exercise of the rights

$V_t + M\gamma K$= new equity value

So, the numerator is given by the new value of the company's equity, computed as value at time T times the warrants' cash inflow. The new value is distributed among $N + M\gamma$ shares.

Now, the payoff of the warrants' holder, considering that he or she will only exercise his/her rights when the payoff is positive, is:

$$\frac{N\gamma}{N + M\gamma}\max\left(\frac{V_t}{N} - K, 0\right)$$

The warrant's value is the value of $\frac{N\gamma}{N+M\gamma}$ regular call options on $\frac{V}{N}$, with V equals to the value of the equity of the company.

The value of V, divided by the number N of outstanding shares, at time zero, is given by:

$$\frac{V_0}{N} = S_0 + \frac{M}{N}W$$

Where S_0 and W are, respectively, the stock price and the Warrant price at time zero.

Now, it is possible to compute the warrant price W using the formula of Black-Scholes[39], after some changes:

$$W = S_0 N(d_1) - Ke^{-rT}N(d_2)$$

S_0 is replaced by $S_0 + \left(\frac{M}{N}\right)W$; the whole formula is multiplied by $\frac{N\gamma}{N+M\gamma}$

Volatility refers to the volatility of the company's equity[40]

[39] The following formula, used to compute the actual value of the Warrant, is the formula for the computation of a call's value.

[40] From Hulls "Option, Futures and other Derivatives", the volatility considered is:" *i.e, it is the volatility of the value of the shares plus the warrants, not just the shares"*

Quasi-split effect and active insiders

After having analysed the dilution and the trading activities following equity issues in a non-domestic scenario, will be presented a model designed by Professor Bigelli.

Italian capital increases implemented through the option rights offered to the existing shareholders, always resulted in a "leap of faith", with almost the whole of rights underwritten. This particular phenomenon is, also, true when two conditions are present:

- Significant stock dilution due to the capital increase
- Negative financial condition of the company deliberating the option issuance

The absence of a liquid market where shareholders can trade their rights and the potential economic loss that they might suffered, lead shareholders to fully exercise their option rights on the newly issued shares and take part to the company's capital increase.

Comparing the opposite reaction of the markets, between U.S and Europe, and particularly in Italy, a reason for such difference may be found in the "active[41]" facet of Italian shareholders.

The participation of existing shareholders to the capital increase through options offering, may be calculated with the Gamma index proposed by Professor. Marco Bigelli. The participation index gamma is so computed:

$$Gamma = \frac{\alpha_u}{\alpha_0}$$

Where α_u represent the number of the newly underwritten shares while α_0 is the number of the new shares proposed to the existing shareholders. α_u is computed using the information obtained after the operation, and in particular the post operation *insiders[42]' ownership*.

$$\alpha_u = (\alpha_1 * (1 + R) - \alpha_0) / R$$

[41] The differences between "active" Italian shareholders and "passive" American shareholders, has been studied by Professor Marco Bigelli, who in his study "*The quasi-split effect, active insiders and the Italian market reaction to equity rights issues" states that:" An analysis of 428 Italian rights offerings and an event study involving 82 observations in the 1980–94 period show that Italian insiders are completely 'active'".*

[42] Insiders refer to the existing shareholder who take part in the operation of the company's capital increase

Where α_1 is given by:

$$\alpha_1 = (\alpha_0 * n + \alpha_u * m)/(n + m)$$

With n and m representing, respectively, the number of the old and newly issued shares.

Gamma can take,only, non-negative values, where zero means that the existing shareholder have decided not to exercise their rights and sell them in the market, adopting a "passive" position[43]; when Gamma is equal to 1, shareholders have fully exercised their right, underwriting all the newly issued shares. Values of gamma between zero and one indicate that existing shareholder have partially exercised their option rights.

A potential decrease in the participation, and then a low value of gamma index, may be found in the approval, by Italian Parliament in 1992, of a tender-offer law, that requires to launch a public tender offer for those who wish to acquire a controlling position in a listed company[44].

[43] According to "*The quasi-split effect, active insiders and the Italian market reaction to equity rights issues" by Marco Bigelli*

[44] In this regard Marco Bigelli states:" *In fact, in February 1992 the Italian Parliament passed a tender-offer law (L. 149/1992) requiring that whoever wants to acquire control of a listed company has to launch a public tender offer (offerta pubblica di acquisto or OPA). The law also* required a public *tender offer if any shareholder wanted to buy more than 2% of the voting rights and he already owns more than one half of the current controlling shareholder' voting rights"*

Case study

Capital increases with a significant dilutive effect are characterized by a strong number of newly issued shares and relative lower value of these. In the previous paragraphs, have been highlighted the consequences of such type of capital increase; the option right issuance and the price anomalies of the newly issued shares and of the option rights offered to the existing shareholders.

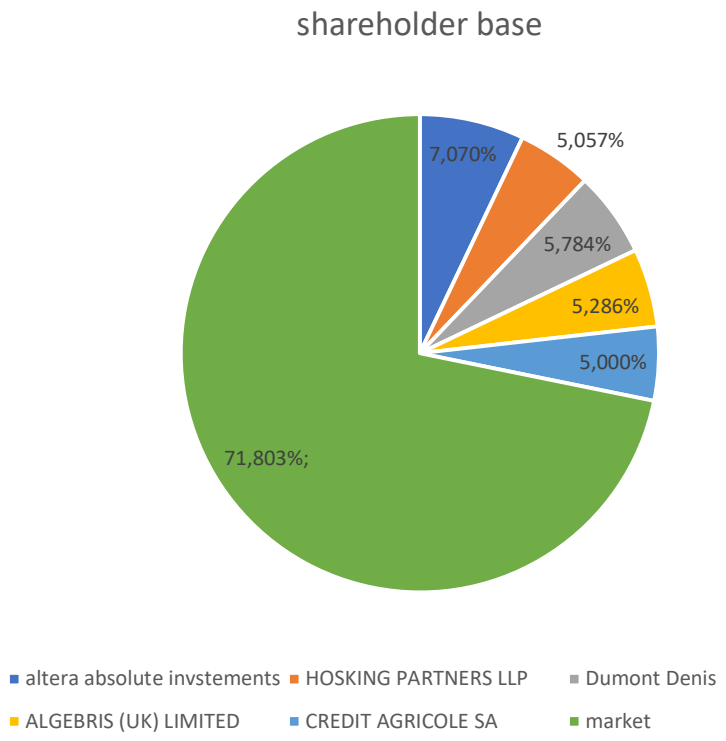
It has also been said that such Capital increases are, generally, issued by companies with an actual problematic financial condition, that strongly need new finance for the going activities and to meet financial standard.

In the following will be present two different cases of capital increases with significant dilutive effect, first one regards the Italian bank ‘Credito Valtellinese’ and its equity issue regulated with the rolling model. The second case regards the capital increase of the Italian oilfield services company, operated before the implementation of the rolling model and then regulated following the “standard” pre-rolling procedure.

7.1 Credito Valtellinese

Credito valtellinese (Creval) is an Italian bank, founded at the beginning of XIX century in the north of Italy. Creval has been a People's Bank since 2016 when it has decided to go public through an IPO.

The current shareholder base of Creval is so composed:



Source: Consob's data (august 2019)

On December 2017, the Creval's board of directors deliberated a capital increase, previously decided in the 'Piano Industriale 2018-2020' approved by Bank Creval a few earlier. Given the

significant dilutive effect of the operation, it has been done following the model of 'Rolling'[45] that requires that the issuer is on charge of making the financial instruments available at the end of each day during the whole subscription period. The subscription period has been extended from 18 February 2018 to 8 March 2018, followed by another week in which the non-exercised rights have been offered to the market. The reasons that lead financial institution to deliberate equity issue are different and change from according companies and scenarios. Creval's research for new finance falls into the strong necessity of the bank to restore its financial condition, characterised by worrying ratio such as NPL or CET 1, and at the same time the requirement to meet the request by Banca D' Italia[46] of strengthening the financial statements of the group.

Moreover, in the 'Piano Industriale 2017-2020' are illustrated, the main goal of Creval to achieve in the following years regarding increasing or decreasing specific ratios. Integral and fundamental part of the 'Piano Industriale' was clearly the deliberated capital increase, considered as main source of liquidity-providing from which Creval expected to collect almost 700 million plus an additional 100 million between expected profits[47] and costs reduction.

To resume, From the 'Piano Idustriale' clearly emerges the strong necessity of the bank to:

- reduce its risk profile (NPE Ratio)
- increase net capital of 800 Million

7.1.1 NPE RATIO

In its 'Piano Industriale' bank Creval highlight its necessity to strengthen its financial ratio due to actions marked by reduce the risk profile of the bank.

First point can be seen as part of the Bank's strategy to reduce its risk profile through operations of "de-risking". First goal is to reduce the Bank's NPE ratio. NPE stands for Non-Performing Exposure and refers to the Bank's exposure to Non-Performing Loans. This leads to consider the NPE ratio as the percentual percentage of Non-Performing Loans to total bank's credit risk.

[45] It is possible to specify that the rolling model, for operation of capital increases characterized by a significant dilutive effect, is used if investors, who prefer such model, make explicitly request to the issuer. Otherwise when the investors do not want rolling model or do not express his preference, the delivery of the financial instruments will be at the end of the subscription period, following the procedure pre-rolling.

[46] Banca D'Italia in au

[47] The data refers to the expected profit for the year 2018

NPEs have been a significant issue for banks since the financial crisis of 2008, with a peak in 2015. After that the last data show the significant reduction of NPEs for European and Italian banks, reaching an average level of 10,2 on June 2018.[48] Anyway NPEs level of Italian banks are still way higher than others European or non- European banks, and in particular with respect the so called "Significant" Banks that have registered a decrease in NPE greater than the expectations between 2016 and 2017.[49]

Following the example and the results of the SI Banks, Banca D' Italia has imposed to less significant banks (LSIs) to reduce their exposure over non-performing loans, recording an average reduction of 3 percentage point, not so far from the results obtained by SIs with a reduction of 4.1 pp.

Main reasons of the reduction in the stock of NPL are found, primarily, in the securitization, in the sales on the market and in the actions used to speed up the proceedings of foreclosure and bankruptcy[50]. Regarding the sales of NPLs, a strong impact is given by the effort of banks to change the databases underlying their portfolios, with the aim of improve the quality. Empirical studies show, in fact, that the data's quality can strongly influence the sale price. An important aspect to highlight regarding the sale of NPL is the increasing market that has emerged during the last 4-5 years, which motivated several banks to specialize in the purchase of NPLs, and at the same time saw proliferating an increasing number of non-bank intermediaries, interested in this activity. In few years, the LSIs specialized in the NPLs trading, have almost doubled the NPLs on their balance sheets and their corresponding worth. The positive results experienced lead to a specialisation by the types of NPLs subject of trading.

[48] In particular is possible to refer to "*Non-performing loans: the market, the rules and a stronger system" by Paolo Angelini*

[49]As follows Paolo Angelini in "*Non-performing loans: the market, the rules and a stronger system*" :"*For the 'significant' banks (SIs), there was a 4.1 percentage point decline in the gross NPL ratio in 2017 alone, greater than that programmed for that year in the three-year reduction plans (drawn up for the first time in 2016)."*

[50] It is possible to refer to "*Non-performing loans: the market, the rules and a stronger system" by Paolo Angelini*, and in particular when the author highlights the positive result in the real estate after some measure introduced between 2015 and 2016 *:" data taken from the Ministry of Justice, show signs of improvement, especially as regards the sale phase of real estate foreclosure proceedings."* Moreover, the author highlights that the positive effect of speeding up the recovery times is also attributable to the Italy's Consiglio Superiore Della Magistratura (CSM) and their published 'best practices'

Also between the non-bank intermediaries is shown significant increase in the number of the "servicer" and in the amount of NPLs present in their balance sheet[51].

As regards the securitization, it is possible to refer to the different tranches and ratings. In particular, most of the portfolio sold consisted of senior tranches, followed by mezzanine and junior. Fundamental is therefore the rating associated to each tranche, since it makes easier the realisation of the trading operation between the seller and the buyer, and at the same time, rating makes easier to understand the level of risk related to the operation itself. The transfer of risk is therefore object of analysis by the Banca D'Italia, that is on charge of evaluating each operation with respect to the different banks' choices regarding accounting decided by the bank.

In its "Piano Industriale" Creval declares its intention to strenghten its risk profile trhough the two operations of improving the quality of its assets and deliberating a capital increase, which results fundamental for the sustenability of the ongoing activities.

As regards, Creval shows the evolution of some ratios such as RWA, CET 1 Capital ratio and Total Capital ratio:

	31/12/2016	30/09/2017	31/12/2018 potential	31/12/2020 potential
Total RWA (IN MILLION)	14.539	13.379	13.456	14.273
CET1 CAPITAL RATIO	11,5%	9,2%	11,0%	11,6%
TOTAL CAPITAL RATIO	12,7%	11,1%	12,5%	12,7%

Source: Creval 'Registration Document'

[51]In "*Non-performing loans: the market, the rules and a stronger system" Paolo Angelini as follows : "At the end of 2017, there were 16 specialized intermediaries listed on the special register created pursuant to Article 106 of the Consolidated Law on Banking (TUB),…, ten more than the previous year…the NPLs on their balance sheet had a net value of 680 million".*

Moreover, emerges a negative impact of non-performing loans equals to -724,5[52] million out of total -803,5 million of negative impacts, that will be covered by an equal amount, made up by almost 700 million in capital increase, operating profits and disposal of non-core assets for another 100 million.

The decision of deliberating a capital increase comes out from the necessity of rebalancing the aforesaid problematic financial situation of the bank

7.1.2 Characteristics and results of the capital increase

As follows will be illustrated the main features of the equity issue of bank Creval and in particular, what makes it falls within the group of capital increase with a significant dilutive effect. As been said that such type of capital increases is characterized by specific features and in particular, they can be defined as significant dilution when the coefficient K is equal or below 0.3. From the information released by the issuer, total equity issuance did have a total worth of 699'660'551,30[53] euro, realized through the issuance of option rights offered to the existing shareholders, in proportion to the stock of shares held, as according to art. 2441 of Codice Civile. Number of the newly issued shares was of 6'996'605'613[54], resulting in a price per shares of 0,1 euro. Subscription price embedded a discount of the 16% over Terp[55].The proportion of the dilutive effect of the capital increase makes sense if considered the market capitalisation of the issuer before the equity issuance. In this case the Creval's capitalization[56] was of €134 million in the last quarter of 2017, recording a strong increase in the first quarter of 2018, after the successfully conclusion of the capital increase. The big number and the strong discount price of the newly issued shares are compatible with a capital increase with a significant dilutive effect

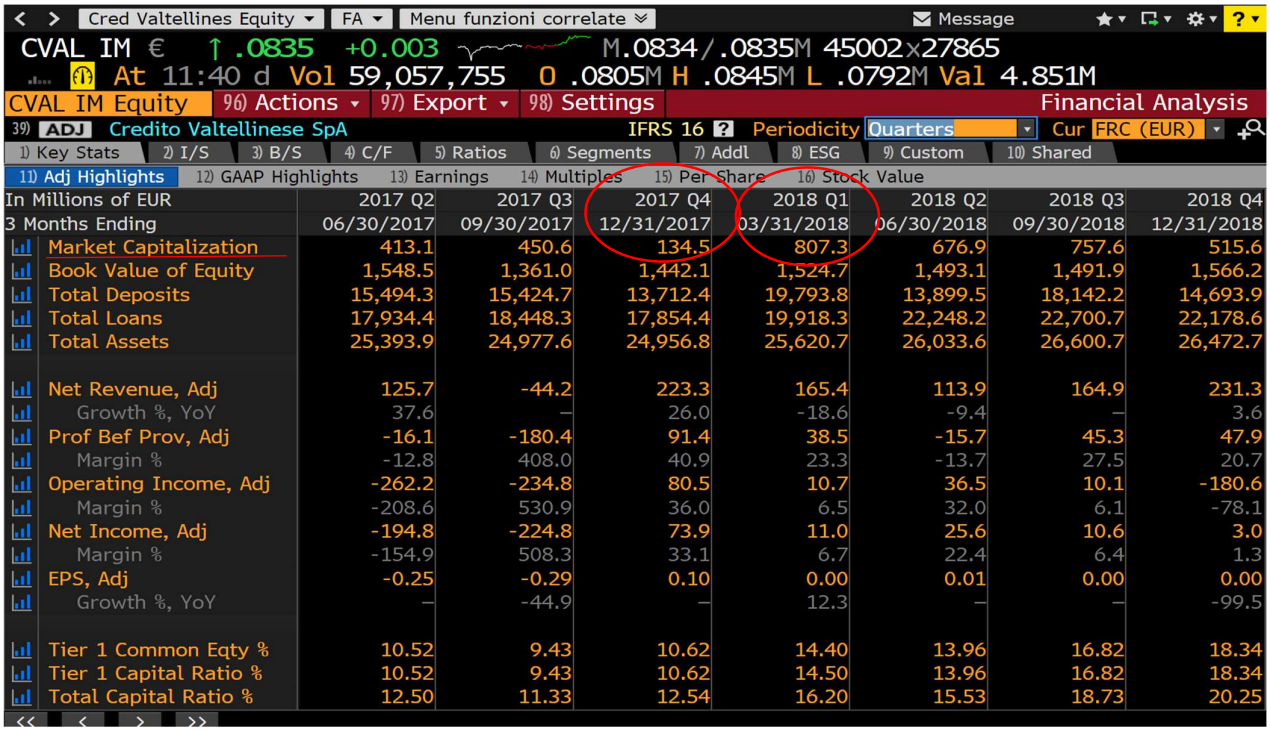
[52] It refers to the worth of non-performing loans showed, by Creval, in its "Position Paper"

[53] This amount refers to the gross total value of the operation

[54] According to the document "Information Note" released by Creval, the shares were offered without a face value.

[55] Terp theoretical ex right price, computed as $\frac{[(P_{off}*V)+(P_{sub}*N)]}{V+N}$ where $P_{off} = offical\ price; P_{sub}$= subscription price, V= number of existing shares, N= Number of newly issued shares

[56] Market capitalization computed as outstanding shares * price



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11) Adj Highlights | 12) GAAP Highlights | 13) Earnings | 14) Multiples | 15) Per Share | 16) Stock Value

In Millions of EUR	2017 Q2	2017 Q3	2017 Q4	2018 Q1	2018 Q2	2018 Q3	2018 Q4
3 Months Ending	06/30/2017	09/30/2017	12/31/2017	03/31/2018	06/30/2018	09/30/2018	12/31/2018
Market Capitalization	413.1	450.6	134.5	807.3	676.9	757.6	515.6
Book Value of Equity	1,548.5	1,361.0	1,442.1	1,524.7	1,493.1	1,491.9	1,566.2
Total Deposits	15,494.3	15,424.7	13,712.4	19,793.8	13,899.5	18,142.2	14,693.9
Total Loans	17,934.4	18,448.3	17,854.4	19,918.3	22,248.2	22,700.7	22,178.6
Total Assets	25,393.9	24,977.6	24,956.8	25,620.7	26,033.6	26,600.7	26,472.7
Net Revenue, Adj	125.7	-44.2	223.3	165.4	113.9	164.9	231.3
Growth %, YoY	37.6	–	26.0	-18.6	-9.4	–	3.6
Prof Bef Prov, Adj	-16.1	-180.4	91.4	38.5	-15.7	45.3	47.9
Margin %	-12.8	408.0	40.9	23.3	-13.7	27.5	20.7
Operating Income, Adj	-262.2	-234.8	80.5	10.7	36.5	10.1	-180.6
Margin %	-208.6	530.9	36.0	6.5	32.0	6.1	-78.1
Net Income, Adj	-194.8	-224.8	73.9	11.0	25.6	10.6	3.0
Margin %	-154.9	508.3	33.1	6.7	22.4	6.4	1.3
EPS, Adj	-0.25	-0.29	0.10	0.00	0.01	0.00	0.00
Growth %, YoY	–	-44.9	–	12.3	–	–	-99.5
Tier 1 Common Eqty %	10.52	9.43	10.62	14.40	13.96	16.82	18.34
Tier 1 Capital Ratio %	10.52	9.43	10.62	14.50	13.96	16.82	18.34
Total Capital Ratio %	12.50	11.33	12.54	16.20	15.53	18.73	20.25

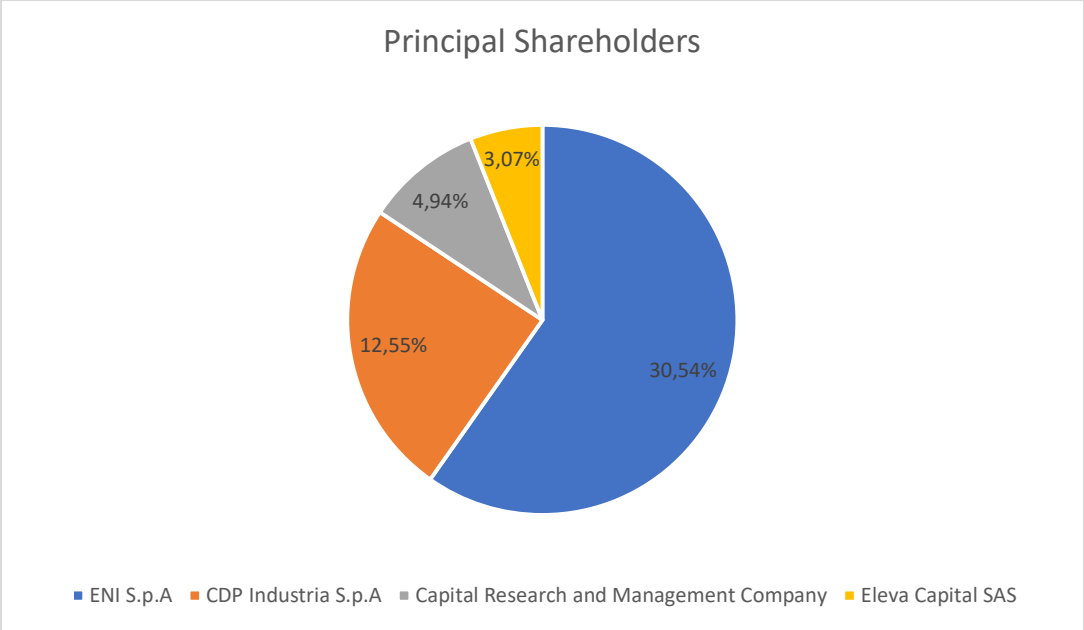
The equity issue has been enthusiastically welcomed by the market that makes the price of share increase.

As regards the results, at the end of the subscription period, on 8 March 2018, the capital increase has been underwritten for almost the 85% thanks to the exercise of 9.217.200 option rights offered to the market. This results in 5.816.053.200 newly underwritten shares out of almost 7 billion proposed. Despite the problematic financial condition of Bank Creval and the significant dilutive effect of its capital increase, it turned out be successful and almost whole underwritten. This is supporting for the tendency of this type of capital increases to be (almost) fully underwritten. Once again, the reason that lead to this phenomenon may be found in the absence of a liquid market where existing shareholders can effectively trade their rights offered from the ban

7.2 Saipem S.p.A

Saipem S.p.A. is an Italian oilfield services company founded in 1957. Its main shareholder is ENI S.p.A that used to be Saipem's holding until 2016.

On December 2, 2015 the extraordinary meeting of shareholders deliberated a capital increase for a total value of €3.5 billion composed by almost 10 billion of new shares offered in option to the existing shareholders. After the equity issue, there are 5 shareholders who hold more than 3% of the Saipem's stock.



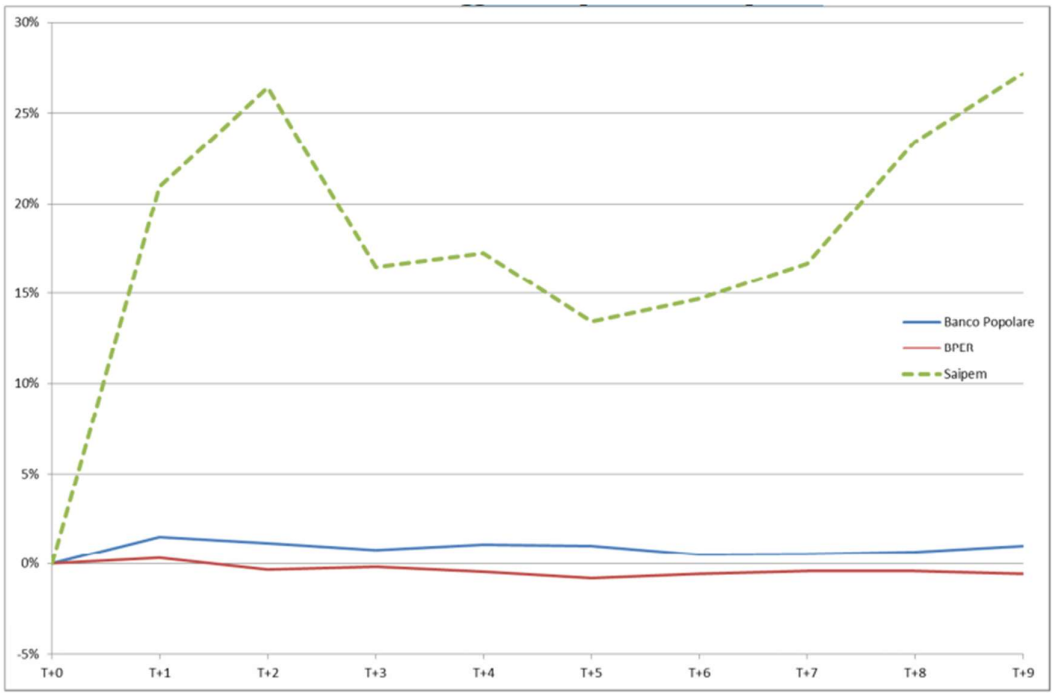
7.2.1 Reasons of the capital increase

In the previous example, analysing the reasons that pushed Creval to deliberate a capital increase, turned out be significant dilutive, it has been highlighted the strong necessity of the bank to strengthen its financial condition, and in particular, to reduce its NPE ratio. In the case of Saipem S.p.A, is possible to identify different reasons that pushed the company to release the equity issue. As stated in the prospectus, emerges the will of Saipem to strengthen the ratio between its net worth and its net financial position, in order to get financial autonomy from Eni. In this framework the capital increase of Saipem can be seen as an attempt to repay its debt to Eni. Secondly, another reason of the equity issuance is the necessity of the confirmation of the 'provisional public rating investment grade' released by the rating agencies "Moody's" and "Standard and Poor's". Differences are not only limited to the reasons but can also be found in the ways in which the two equity operations have been carried out. In fact, in case of the capital increase of Saipem, although it presented the features of an equity issue with significant dilutive effect, was not used the model "Rolling", implemented by Consob only at the end of the 2016.

The capital increase followed, then, the "standard" procedure pre-rolling model, with the delivery window only at the end of the subscription period, instead of at the ending of each trading day. Standard procedure to carry out an equity issue are characterized by a strong prices' anomalies, generated by the fluctuation of both the option price both share price, consequence of a bullish trend followed by a bearish one. It has been highlighted that the activity of arbitragers rebalances the price to their "normal value" but since the delivery window is only at the end of the subscription price, this happens slower than with the rolling model.

Moreover, the capital increase of Saipem S.p.A is characterized not only by the significant dilutive effect but also by the presence of financial derivatives that have as underlying the Saipem's shares. In this regard, Borsa Italiana had decided to suspend, during the subscription period, the early exercise of the options that present Saipem's shares as underlying asset, in order to try to mitigate the expected fluctuation of the securities' volatility. During the subscription period, SAIPEM's shares price has been larger than its TERP, with the option rights traded at a discount prince. This led to a big potential arbitrage's premium, computed as the percentual difference between the price of the share and the theoretical price of the newly issued shares.

In the following figure, will be compared the arbitrage's premium during the Saipem's capital increase with significant dilutive effect, with the arbitrage's premia of two capital increases without significant dilution (BPER and Banco Popolare).



Source: Consob

7.2.2 Characteristics and results of the capital increase

After the decision of deliberating the capital increase on January 21, 2016, the subscription period extended between January 22 and February 11, saw the issuance of total 493.271.068 option rights resulting in number 9.668.363.496 newly issued shares. According to the article 2441 of Codice Civile, the new shares have been proposed to the existing shareholders observing the proportionality test of number 22 of new securities for each share held.

The whole stock of newly (potential) issued shares resulted in a total value of €3.5 billion, with a price of €0,362. The price of the newly issued shares was discounted by 37% with respect to TERP[57], computed considering the closing price on January 21,2016, €5,26.

The subscription period of Saipem's equity issue ended on February 11 with a positive result for the company.

The following table shows the volume trading during the subscription period, confirming that the maxima are reached at the beginning and at the end of the period.

Source: Borsa Italiana

Number 385.871.894 of option rights have been exercised meaning that the shareholders exercised the 87,5% of the total option rights offered. This resulted in a 3.073 Million of total equity raising out of a potential maximum of 3.500 Million.

Moreover, it is possible to highlight the strong decrease in the price of the option rights during the whole subscription period and, in particular, at the last day when they have been sold at significant discount of more than 90%. Considered the ban on the early exercise of the options (American Options), the aforesaid strong volatility of the option rights might be found more in the problematic financial condition of the issuer, rather than in the anomalies of the market. This let wonder that the introduction of the rolling model, aimed to mitigate the market's anomalies,

[57] Terp theoretical ex right price, computed as $\frac{[(P_{off}*V)+(P_{sott}*N)]}{V+N}$ where $P_{off} = offical\ price; P_{sub}$= subscription price, V= number of existing shares, N= Number of newly issued shares

would have not been very helpful in the case of the capital increase with significant dilutive effect of Saipem S.p.A.

Coming back to the reasons that lead existing shareholders to exercise their option rights, might be said that, given the large number of newly issued shares, in case of non-exercise of their rights and, at the same time, of fully underwritten of the capital increase, the percentual dilution would strongly affect the stock of existing shareholders, who would have suffered a reduction of their percentual ownership up to 96%.

Conclusions

Capital increases with significant dilutive effect are consequences of the deep crisis of 2007-2008 that affected the financial system with detrimental effects on banking institutions of all over the world and companies all. Indeed, such type of equity issuance are, generally, released by companies with concrete financial issues, struggling to meet their aims or repay their debts and that try to strengthen their balance sheets. The introduction of the rolling model helped to mitigate the strong fluctuations of the shares' prices during the period of subscription, yet does not eliminate the problem. A strong volatility is still present especially during the first days of the offer period with the maximum volume trading recorded at the beginning and the end of subscription period. Moreover, the fluctuation of the prices is attributable to the negative financial conditions of the issuers, rather than to the anomalies in the market. For this reason rolling model, or any other proposed solutions, cannot eliminate the strong volatility that affect the shares of a company subject of a capital increase with significant dilutive effect.

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Introduction

After the financial crisis of 2008, several companies found themselves struggling to raise capital in order to meet their necessities and finance ongoing activities. This phenomenon had a strong impact on Italian companies and banks,that these, forced by the consistent problematic financial condition and a hostile general framework, started to deliberate capital increase offering option rights to their existing shareholders. Since the beginning, such equity issues were characterized by common features:

- A large number of newly issued shares with respect to the pre-increase's amount
- A discount price of the new shares with respect to the last market price marked before the beginning of the increase.

Given the aforesaid charactering elements, such type of equity issuance was denominated 'Capital increase with significant dilutive effect', and in order to be listed such that, Consob introduced the factor K. This coefficient, computed as the relation between Terp[58] (Theoretical ex right price) and *cum* price, measures the intensity of the dilution. Larger the dilution smaller is the value of K. Capital increases with significant dilutive effect are characterized by a value of K smaller or equal to 0,3 ($K \leq 0{,}3$). The dilution affects the existing shareholders in two different ways:

- Economic dilution
- Percentage dilution in the ownership

Whenever the shareholders do not exercise the rights, they can sell them on the market. Now, comes out one additional problem for the shareholder. Empirical studies show that the market, where investors can sell their rights, is very illiquid, making the trades difficult. This together with the misleading that can influence the less sophisticated investors may be seen as the main reasons for which such capital increases are generally almost fully underwritten, despite the bad financial condition of the issuer.

[58] Terp theoretical ex right price, computed as $\frac{[(P_{off}*V)+(P_{sott}*N)]}{V+N}$ where $P_{off} = offical\ price; P_{sub}$= subscription price, V= number of existing shares, N= Number of newly issued shares.

Consob at the end of the 2016, has introduced the so-called rolling-model. Rolling model involves the presence of delivery windows at the end of each day of the subscription period, rather than at the end of the first two weeks dedicated to the trade of the option rights.

Impact of dilution also depends on the presence of warrant. The price of a European warrant can be computed with the Black-Scholes-Merton adjusted for inflation. It is also possible to compute the participation to the capital increase of existing shareholders, with the Gamma index.

Capital increases

Companies need to increase their capital in order to meet their aims and to finance their ongoing activities. A first big separation is done between financing through debt and equity. With debt capital, a company can raise capital by borrowing money with the obligation to pay it back to the lender at a specific date and with interests charged on.

Very different is raising capital through equity market. It can be divided in two parts, primary and secondary market. Companies may approach the markets for the first time through an Initial Public Offering (IPO), firms go from be private to be publicly traded. When dealing whit stock dilution, there are two different facets to consider:

- the economic dilution;
- Percentage dilution of the ownership

Economic dilution may affect two different facets:

- earning decrease
- stocks value decrease

investors focus on their investment's return. This leads investors to be concerned about the earning per share (EPS), namely the value of earnings per share of outstanding common stock. Since dilution reduces the EPS of companies, it is common for most of them to calculate a diluted EPS. Diluted EPS adjust the basic EPS by considering the dilution effect due to an increase of the outstanding shares.

$$Diluted\ EPS = \frac{Total\ income - Preferred\ dividends}{Outstanding\ shares + Diluted\ shares}$$

Given the difficulties of company to go through the market condition and the issues to find new capital in the primary market and the increasing volatility characterizing the secondary market. Companies to overcome this problem, tried to "entice" their shareholders by offering them

option rights on the issue of new shares. Equity issue characterized by a large number of newly issued shares and a significant discount price with the respect to the outstanding shares', take the name of capital increase with significant dilutive effect.

Capital increases with option rights consist in options offered to the shareholders in proportion to the number of shares already owned, according to art. 2441 of *Codice Civile.* Option rights are offered to all the company shareholders with no distinction among those who have not voting rights or the holder of convertible bonds. First protection against the dilution are therefore the proportionality of the rights offered and the possibility to sell the rights on the market, even if this is, generally, illiquid, making the trades difficult to happen.

During the first two weeks of the subscription period[59] of a capital increase, option rights can be traded the same way of ordinary shares; in fact, shareholders may decide to exercise them, do not exercise, or to sell their rights. Investors will base their decision considering the "real" cost of the operation. Typically, their right will be exercised when the market price is smaller than its theoretical value; otherwise it will be not exercised when the market price is larger than theoretical value.

Intensity of dilution is measured by factor K[60], presented by Borsa Italiana. it is inversely related to the dilution caused by the capital increase, therefore higher is the dilution, smaller is the value of factor K. It expresses the relation between the Terp[61], theoretical ex right price, and the *cum* price, the market price at the time of official disclosure of equity issues. Values of K smaller or equal to 0.3 ($K \leq 0.3$) define the capital increases with significant dilutive effect. According to a paper Consob of August 7, 2014, between 2009 and 2014, there have been 23 cases of capital increase with significant dilutive effect, composing 25% of total capital increases with option right and collected over € 11,4 Billion. Out of these, the larger part of the prices' anomalies is related to a small number of capital increases, given by SEAT PG, TISCALI, FONDIARIA

[59] The subscription period lasts, generally, three weeks, where shares and options are usually traded during the first two weeks while the third week is set up for the settlement of the traded rights, even If this does not mean that shareholders cannot longer exercise their option rights. According to art. 2441, second sub-paragraph of 'Codice Civile' states that is required at least a period of 15 days in which shareholders can exercise or not their option rights.

[60] K= Pex/Pcum. Pex is the theoretical ex right price while Pcum is the price of cum right

[61] Terp theoretical ex right price, computed as $\frac{[(P_{off}*V)+(P_{sott}*N)]}{V+N}$ where $P_{off} = offical\ price; P_{sub}$= subscription price, V= number of existing shares, N= Number of newly issued shares.

SAI, BMPS, all present a K smaller than 0.1 and the presence of derivative instruments with their shares as underlying assets.

PRICES' ANOMALIES

Consob pointed out the evidence of a strong increase, during the first days of offering, in the market values of "ex" shares with respect to their theoretical price. Several are the reasons which may explain this phenomenon and can be linked to different times of offer period and to different effects, generated both on retail investor on MTA both by use of derivative instruments related to shares offered.

One of the reasons could be found in the potential "error" of retail investors, the so-called "Optical Effect[62]", who might confront the market price with last *cum* price, instead of the theoretical value. This leads the retail investors to buy "ex" shares due to what they belief are "discounted price". Obviously, it is just an apparent discounted price and can mislead retail investors. Moreover, some studies show a decrease in the trading activity of institutional investors, typically sophisticated ones, but an increase in the retail investors' trading activity.

Moreover, it is possible to highlight two different and opposite trends that characterised each capital increase with significant dilutive effect. Anomalies make the prices show a strong positive trend, during the very first days of trading, and a negative trend during the last days. The bullish trend finds its reasons in:

3) Some investors believe that the positive trend of the first day will keep pushing up the price, resulting convenient to buy shares when their price is low
4) connection to the financial derivative market and its instruments. Holders of call options will exercise their rights when the shares' price is higher than the strike price. Now the sellers of just exercised call options, when do not have the availability, will buy new shares on the market, contributing to the increase in the securities' price. Other reason might be found in the owners of ETF or affine instruments could buy shares on the market in order to replicate the index or to meet the redemptions rights.

After that the bullish trend has run its course, a bearish trend is triggered by the activities of arbitrageurs, that, exploiting the possibility of the use of short selling during the last three days of the subscription period, rebalance the shares' prices. Last days of subscription period are, also,

[62] It refers to the results shown in the Consob's position paper "capital increase with significant dilutive effect"

characterized by increase in the trading volume due to the arbitrageurs' activities of rebalancing of the prices.[63]

Moreover, a suspension in the trading of derivatives resulted in a mitigation of the bullish trend.

Solution proposed over the last decade

Pre-rolling solutions

Since 2009, Consob carried out supervisory activities with the aims of analysing behaviours that could have been not coherent with the principles of correctness and diligence required, with a focus on the daily market operations and deliveries of the shares. Besides the supervisory activities, some structural solutions[64] have been proposed by Consob during the last decades.

These can be resumed in:

5) Reduction in the conversion ratio between new shares and old shares

6) Elimination of the short selling[65] prohibition

7) Change of the settlement procedures during the Option Period

8) Introduction of daily delivery windows

Among the 4 solutions, the most efficient, resulted to be a variation of n.4 where the delivery windows are multiple and not just daily.[66]

Monte Titoli and Borsa Italiana have paved the way to two different interpretation of the above proposed solution, respectively named solution a and solution b.

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[63] Referring to the work of Enrica Bolognesi and Angela Gallo "The ex-date effect of rights issues: evidence from the Italian stock market", ": *the trading volume is evaluated using a mean-adjusted method…the trading volume is defined as the percentage of outstanding shares traded on a given day: Vit = (nit * 100)/(Sit), where nit is the number of shares traded for stock I on day t and Sit is the firm's outstanding shares on day t "*

[64] The following structural solutions have been proposed by Consob in "capital increases with significant dilutive effect" (19 aprile 2010) before the introduction of the rolling model.

[65] Short selling ban had been introduced by Consob. Moreover: "*this trading restriction prevents the arbitrageurs from buying and selling the two securities (the option right and the stock) at the same time, taking advantage of the potential value difference in the two markets". The ex-date effect of right issues by Enrica Bolognesi and Angela Gallo*

[66] The introduction of multiple delivery window reflects the main idea underlying the rolling model that will be introduced few years later by Consob.

Solution a)

Aim of the solution is to increase the number of delivery windows, allowing to deliver the shares at T+2[67] and not only at T+14, i.e. the last day of trading. The choice of a delivery window at T+2 is not casual but reflects market rules and international standards. In fact, the end of the working day T+2 represent both the final term in which the rights must credited, based on the existing accounting positions, and the last day of settlement of the market transactions on securities *cum* right. In the following table, the activities of demand and supply sides:

T	T+1	T+2	T+3
Sale of the shares by arbitragers		Crediting the option rights	Loan to arbitragers of securities by shareholders who exercised the option right
		Delivery of the shares with block (availability for the nightly settlement cycle of the following day) to the shareholders who exercised the option right	
Exercising of option rights by the shareholders	Exercising of option rights by the shareholders	Exercising of option rights by the shareholders	Settlement of the sales of shares

Source: Consob

This setting requires a strong securities lending market, when it is not present, an alternative time period can be resumed as follows:

Up to T-1	T	T+1	T+2	T+3
Purchase of the *cum* shares by arbitragers	Sale of the shares by arbitragers		Crediting the option rights	Settlement of the sales of shares
			Delivery of the shares with block (availability for the nightly settlement cycle of the following day) to arbitragers	
	Exercising of option rights by arbitragers	Exercising of option rights by arbitragers	Exercising of option rights by arbitragers	

Source: Consob

[67] Where T is the first day of trading of the shares' ex right and rights themselves.

Solution b)

- Solution b proposes some changes to Solution a, due to make possible to set up a risk-free arbitrage, not possible in the latter setting, enabling arbitragers to obtain shares at T+2 through the exercise of the option rights purchased at time T.

T	T+1	T+2	T+3
Sale of the shares by arbitragers	Crediting the option rights	Settlement of the purchases of the option rights	Settlement of the sales of shares
Purchase of the option rights		Delivery of the shares with block (availability for the nightly settlement cycle of the following day) to arbitragers	
Exercising of option rights by arbitragers	Exercising of option rights by arbitragers	Exercising of option rights by arbitragers	

Source: Consob

Main differences in this alternative hypothesis are:

- Crediting the rights at T+1, instead of T+2
- A two-day settlement interval limited to market transactions on the shares in question, carried out on the last trading day *cum* right (T-1);
- A two-day settlement interval of the market transactions on rights; and, lastly
- Maintaining the first delivery window at T+2

Now, T+1 becomes the settlement day of two different trading days, T-2 and T-1

Comparison between the two solutions

Solution B allows to fully exploit arbitrager's opportunities, allowing risk-free arbitrager, which is not possible with solution A.

Solution b shortens the settlement interval of the last *cum* trading day from three days to two and after considering risks, a reduction in the settlement does not appear problematic.

Rolling Model

Consob introduced rolling model at the end of 2016, with the aim of mitigating the strong volatility of the prices during a capital increase with significant dilutive effect. Main changes carried out by Rolling model may be resumed in the presence of several delivery windows during the subscription Period of the securities arising from the exercise of the option rights proposed to the existing shareholders, allowing the investors to exercise the option rights, and have immediate availability, during each day of the subscription period and not only at the end of the same, as happened in the past years. This makes the arbitrageurs' activities easier and faster. Rolling Model allows arbitragers, when an uptrend begins, to start a series of actions aimed to mitigate the fluctuations of the price of the new shares.

Arbitragers may:

- Buy the subscription rights
- Sell the shares, this will lead to a realignment between the market price and theoretical price
- Exercise the rights and receive the newly issued shares
- Settle the sales with the newly issued shares[68]

Rolling model is not free from issues, such that: costs, potential ineffectiveness of the rolling model during the first tree days of the subscription period. Moreover, with the rolling model, the settlement of the newly issued shares would be at T+4, and then not on time for the settlement of the sales carried out on T (first day of the subscription period).

This will lead to consider the sales at T as "naked" short selling since the impossibility to settled them on T+3. Since naked short selling is not allowed by UE n. 236/2012, the sale of the shares on T would not be lawful. A potential solution to the aforesaid issue has been proposed by Monte Titoli, which would ensure the availability of the new shares on time for T+3 due to the communication to Monte Titoli of the subscription rights within 13:30 on day T+3.

Dilution out of Italy

US Privately- Held Companies

[68] Consultation paper Consob, 7 agosto 2014

Although, dilutive effect's problem is not particularly present in the US large companies, it is more common among small Privately- Held companies. Sometimes it arises due to dilute minority shareholders in consequence of personal conflict[69].

US Publicly Traded Companies

Dilution may be result of computing of Net Asset Value (NAV) without considering the market movements of the "last" day, basing their Nav on stale prices, due to the presence of assets which are not be traded before 4 p.m, market closing time.

How to prevent dilution

One of the most common anti-dilution mechanisms, when referring to legal status, are still the pre-emptive rights. Pre-emptive rights give the right to shareholder not to been diluted in their ownership, by buying a proportional number of shares. Even if they are generally used, pre-emptive rights are not mandatory in the U.S. Empirical studies show that pre-emptive rights are exercised by the 50% of shareholders, sold by 40%, while only 10% of shareholders decide to do nothing and get diluted.[70]

Another group of anti-dilution provisions refer to those that require the set of a minimum price. The price can be based on market price, book value per share. Limitations arise from the different calculations of the fair price of the shares, when it is based on market price, a potential manipulation of it in many ways, i.e wash sales, may result in the rule made ineffective. Whether the rule is based on book value; accounting manipulation can be used to reduce the book value per share.

Third group of anti-dilution provisions are approval rights.

Another mechanism that help shareholders not to be diluted is the conversation ratio between preferred stock and common stock when the company goes through different financing rounds. This mechanism of protection takes the name of price-based anti-dilution and can be divided in two different subgroups:

- Weighted average: in this case the conversion ratio is adjusted by the amount required to offset the dilution generated by the issuance of new shares in subsequent financing rounds.

[69] "Preemptive Rights and Anti-Dilution Protections around the World" by Vladimir Atanasov et al. 6 february 2007
[70] Smith 1997

- Full ratchet: with this type of anti-dilution mechanism, investors would buy the protected stock at the actual price paid the additional financing rounds. This leads to a conversion rate always larger than with the weighted average[71].

Warrant stock and dilution

Warrant shares are a particular type of securities that entitles the holder to buy or to sell the underlying stock of a company. They are more similar to options than common shares. When a warrant's holder exercises his right, the company will issue new share to meet the request, when the strike price is lower than the market price, existing shareholder will be diluted. Different model can be used to measure European Warrant, one of them is the Black-Scholes-Merton (BSC) adjusted for dilution[72]. The holder of the warrants is entitled to purchase a number γ of shares at time T at a price of K.The share price after the warrants' holders exercise their rights is:

$$(V_t + M\gamma K)/(N + M\gamma)$$

N outstanding shares and M outstanding (European) Warrants. V_t= the value of the equity of the company including the warrants at time T ;$M\gamma K$= company's cash inflow generated by the exercise of the rights; $V_t + M\gamma K$= new equity value. the payoff of the warrants' holder, considering that he or she will only exercise his/her rights when the payoff is positive, is:

$$\frac{N\gamma}{N + M\gamma}\max\left(\frac{V_t}{N} - K, 0\right)$$

The warrant's value is the value of $\frac{N\gamma}{N+M}$ regular call options on $\frac{V}{N}$, with V equals to the value of the equity of the company. The value of V, divided by the number N of outstanding shares, at time zero, is given by:

$$\frac{V_0}{N} = S_0 + \frac{M}{N}W$$

Where S_0 and W are, respectively, the stock price and the Warrant price at time zero.

[71] DLA piper accelerate "*Full ratchet anti-dilution lowers the effective purchase price of the protected stock to the actual price paid in the down round. A full ratchet provision will always result in a larger conversion rate adjustment than a weighted average provision and, for that reason, is more detrimental to founders and other common stockholders."*

[72] The following formulas are taken from "Option, Futures and other Derivatives" by Hulls

Now, it is possible to compute the warrant price W using the formula of Black-Scholes[73], after some changes:

$$W = S_0 N(d_1) - Ke^{-rT} N(d_2)$$

S_0 is replaced by $S_0 + \left(\frac{M}{N}\right) W$; the whole formula is multiplied by $\frac{N\gamma}{N+M\gamma}$

Volatility refers to the volatility of the company's equity.

Quasi-split effect and active insiders

Comparing the opposite reaction of the markets, between U.S and Europe, and particularly in Italy, a reason for such difference may be found in the "active[74]" facet of Italian shareholders.

The participation of existing shareholders to the capital increase through options offering, may be calculated with the Gamma index proposed by Professor. Marco Bigelli. The participation index gamma is so computed:

$$Gamma = \frac{\alpha_u}{\alpha_0}$$

Where α_u represent the number of the newly underwritten shares while α_0 is the number of the new shares proposed to the existing shareholders.

$$\alpha_u = (\alpha_1 * (1 + R) - \alpha_0) / R$$

Where α_1 is given by:

$$\alpha_1 = (\alpha_0 * n + \alpha_u * m)/(n + m)$$

Gamma can take,only, non-negative values, where zero means that the existing shareholder have decided not to exercise their rights and sell them in the market, adopting a "passive" position[75]; when Gamma is equal to 1, shareholders have fully exercised their right, underwriting all the newly issued shares.

[73] The following formula, used to compute the actual value of the Warrant, is also the formula for the computation of a call's value.

[74] The differences between "active" Italian shareholders and "passive" American shareholders, has been studied by Professor Marco Bigelli, who in his study "*The quasi-split effect, active insiders and the Italian market reaction to equity rights issues" states that:" An analysis of 428 Italian rights offerings and an event study involving 82 observations in the 1980–94 period show that Italian insiders are completely 'active'".*

[75] According to "*The quasi-split effect, active insiders and the Italian market reaction to equity rights issues" by Marco Bigelli*

Case study

In the following will be present two different cases of capital increases with significant dilutive effect, first one regards the Italian bank 'Credito Valtellinese' and its equity issue regulated with the rolling model. The second case regards the capital increase of the Italian oilfield services company, operated before the implementation of the rolling model and then regulated following the "standard" pre-rolling procedure.

7.1 Credito Valtellinese

On December 2017, the Creval's board of directors deliberated a capital increase, previously decided in the 'Piano Industriale 2018-2020' approved by Bank Creval a few earlier. The subscription period has been extended from 18 February 2018 to 8 March 2018, followed by another week in which the non-exercised rights have been offered to the market. Creval's research for new finance falls into the strong necessity of the bank to restore its financial condition, characterised by worrying ratio such as NPL or CET 1, and at the same time the requirement to meet the request by Banca D' Italia[76] of strengthening the financial statements of the group. Integral and fundamental part of the 'Piano Industriale' was clearly the deliberated capital increase, considered as main source of liquidity-providing from which Creval expected to collect almost 700 million plus an additional 100 million between expected profits[77] and costs reduction. To resume, From the 'Piano Idustriale' clearly emerges the strong necessity of the bank to:

- reduce its risk profile (NPE Ratio)
- increase net capital of 800 Million

NPE RATIO

First goal is to reduce the Bank's NPE ratio. NPE stands for Non-Performing Exposure and refers to the Bank's exposure to Non-Performing Loans. This leads to consider the NPE ratio as the percentual percentage of Non-Performing Loans to total bank's credit risk. NPEs have been a significant issue for banks since the financial crisis of 2008, with a peak in 2015. After the positive results of the SI Banks, Banca D' Italia has imposed to less significant banks (LSIs) to reduce their exposure over non-performing loans, recording an average reduction of 3 percentage point. Main reasons of the reduction in the stock of NPL are found, primarily, in the

[76] Banca D'Italia in au
[77] The data refers to the expected profit for the year 2018

securitization, in the sales on the market and in the actions used to speed up the proceedings of foreclosure and bankruptcy[78].

Characteristics of the capital increase

From the information released by the issuer, total equity issuance did have a total worth of 699'660'551,30[79] euro, realized through the issuance of option rights offered to the existing shareholders, in proportion to the stock of shares held, as according to art. 2441 of Codice Civile. Number of the newly issued shares was of 6'996'605'613[80], resulting in a price per shares of 0,1 euro. Subscription price embedded a discount of the 16% over Terp[81]. Creval's capitalization[82] was of €134 million in the last quarter of 2017, recording a strong increase in the first quarter of 2018, after the successfully conclusion of the capital increase.

Reaction of the market and results of the capital increase

At the end of the subscription period, on 8 March 2018, the capital increase has been underwritten for almost the 85% thanks to the exercise of 9.217.200 option rights offered to the market. This results in 5.816.053.200 newly underwritten shares out of almost 7 billion proposed. This is supporting for the tendency of this type of capital increases to be (almost) fully underwritten.

[78] It is possible to refer to "*Non-performing loans: the market, the rules and a stronger system" by Paolo Angelini*, and in particular when the author highlights the positive result in the real estate after some measure introduced between 2015 and 2016 *:" data taken from the Ministry of Justice***,** *show signs of improvement, especially as regards the sale phase of real estate foreclosure proceedings."* Moreover, the author highlights that the positive effect of speeding up the recovery times is also attributable to the Italy's Consiglio Superiore Della Magistratura (CSM) and their published 'best practices'

[79] This amount refers to the gross total value of the operation

[80] According to the document "Nota Informativa" released by Creval, the shares were offered without a face value.

[81] Terp theoretical ex right price, computed as $\frac{[(P_{off}*V)+(P_{sub}*N)]}{V+N}$ where $P_{off} = offical\ price; P_{sub}$= subscription price, V= number of existing shares, N= Number of newly issued shares

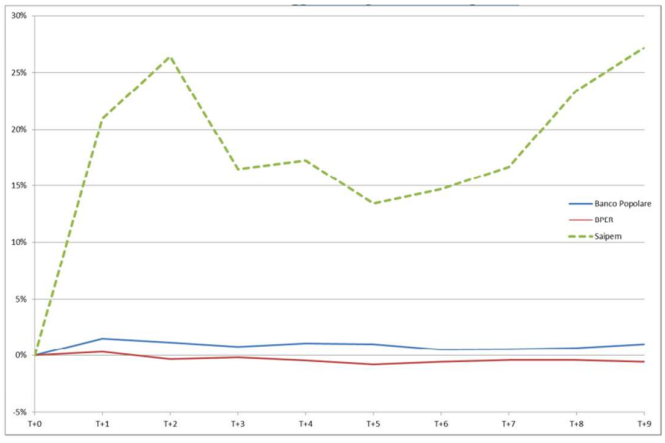
[82] Market capitalization computed as outstanding shares * price

Saipem

Saipem S.p.A. is an Italian oilfield services company founded in 1957. On December 2, 2015 the extraordinary meeting of shareholders deliberated a capital increase for a total value of €3.5 billion composed by almost 10 billion of new shares offered in option to the existing shareholders.

Reasons of the capital increase

As stated in the prospectus, emerges the will of Saipem to strengthen the ratio between its net worth and its net financial position, in order to get financial autonomy from Eni. In this framework the capital increase of Saipem can be seen as an attempt to repay its debt to Eni. although it presented the features of an equity issue with significant dilutive effect, was not used the model "Rolling", implemented by Consob only at the end of the 2016. The capital increase of Saipem S.p.A is characterized not only by the significant dilutive effect but also by the presence of financial derivatives that have as underlying the Saipem's shares. In this regard, Borsa Italiana had decided to suspend, during the subscription period, the exercise of the options that present Saipem's shares as underlying asset. During the subscription period, SAIPEM's shares price has been larger than its TERP, with the option rights traded at a discount prince. This led to a big potential arbitrage's premium, computed as the percentual difference between the price of the share and the theoretical price of the newly issued shares. In the following figure, the arbitrage' premium of Saipem S.p.A is compared with the premia of the capital increase without significant dilution of BPER and Banco Popolare.



Characteristics and results of the capital increase

After the decision of deliberating the capital increase on January 21, 2016, the subscription period extended between January 22 and February 11, saw the issuance of total 493.271.068 option rights resulting in number 9.668.363.496 newly issued shares. According to the article 2441 of Codice Civile, the new shares have been proposed to the existing shareholders observing the proportionality test of number 22 of new securities for each share held. The whole stock of newly (potential) issued shares resulted in a total value of €3.5 billion, with a price of €0,362. The price of the newly issued shares was discounted by 37% with respect to TERP[83], computed considering the closing price on January 21,2016, €5,26. Number 385.871.894 of option rights have been exercised meaning that the shareholders exercised the 87,5% of the total option rights offered. This resulted in a 3.073 Million of total equity raising out of a potential maximum of 3.500 Million. Moreover, during the last day of the subscription period the option rights were sold at a discount equal to more than 90%. Given the ban on the early exercise of the American options, the aforesaid strong volatility of the option rights might be found more in the problematic financial condition of the issuer, rather than in the anomalies of the market. This let wonder that the introduction of the rolling model, aimed to mitigate the market's anomalies, would have not been very helpful in the case of the capital increase with significant dilutive effect of Saipem S.p.A.

Conclusion

Capital increases with significant dilutive effect are consequences of the deep crisis of 2007-2008 that affected the financial system with detrimental effects on banking institutions of all over the world and companies all. The introduction of the rolling model helped to mitigate the strong fluctuations of the shares' prices during the period of subscription, yet does not eliminate the problem. Indeed, the fluctuation of the shares' price is attributable to the negative financial conditions of the issuers, rather than to the anomalies in the market.

[83] Terp theoretical ex right price, computed as $\frac{[(P_{off}*V)+(P_{sott}*N)]}{V+N}$ where $P_{off} = offical\ price; P_{sub}$= subscription price, V= number of existing shares, N= Number of newly issued shares