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The use of derivatives contracts by Italian local authorities

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Introduction

In the last 40 years, the derivatives market sustained a considerable increase in both its dimension and complexity. Nowadays we reach the point that the use of derivatives is no more limited to only private companies, but even public administrations use them for hedging purposes. However, cases such as the *Orange County* or the *London Borough of Hammersmith and Fulham* raise public debate on the utility of the use of derivatives by local authorities. Moreover, the development of instruments such as CDS and CDO, due to their role in the 2007 financial crisis, further increase the public attention on the use of derivatives contracts and the risks connected to their use.

In Italy derivatives contracts were used extensively by local governments since 2002 and were described by the media as *"…useful instruments because they protect you from the risk of floating interest rate, but also opaque and complex and can be used to commit abuse against who does not have the suitable knowledge"*[1]. This "bad reputation" is because most of the Italian local authorities' attempts to use derivatives to reduce their cost of debt were unsuccessful and caused an increase in their overall cost of debt.

In our thesis, we will verify if derivatives contracts deserve such bad reputation and if, therefore, Italian local authorities should avoid using them.

In the first chapter, we will describe the main derivatives instruments exchanged both in exchange markets and in over the counter markets, concentrating in particular on the various typology of swaps.

In the second, chapter we will analyse the evolution of the Italian public finance from a "centralized finance" to the so-called "fiscal federalism". We will also indicate the main issues of Italian public administrations and how these issues affected the local authorities.

In the third chapter, we will analyse how Italian local governments used derivatives contracts. Specifically, we will discuss the evolution of the legal framework that ended with the 2013 permanent prohibition over the use of derivatives contracts and the main controversial that convince the legislator to forbid their use.

[1] http://www.report.rai.it/dl/Report/puntata/ContentItem-1835da4a-0467-441b-804d-37587996534d.html

In chapter four, we will discuss two case studies regarding the use of derivatives by the city of Milan and Venice. The case of Milan will further analyse some of the legal controversies presented in chapter three that emerged during the process of fraud against the four arrangers bank. The case of Venice will analyse the impact that the four derivatives contracts subscribed by the city had on its overall debt, and we will evaluate one of the contract to understand if the decision of the city to subscribe it was reasonable.

Chapter 1: Derivatives Instruments

1.1 The Main Financial Derivatives

If we consider, as truthful, the definition provided by the U.S. treasury department then a derivative contract is: "… *a financial instrument whose price is derived from the value of one or more underlying assets, liabilities or indices"*. However, this simple definition is unable to presents all the variety and complexity that the derivatives market has showed in the last 40 years and in the following pages we will try to provide some useful information to make clearer the subject treated in this dissertation. The first major distinction about the derivatives instruments is in which type of market they are exchanged.

- In *Exchange Traded Markets*, individuals exchange standardized derivatives contracts, they are subjected to a margin account policy, and they are price takers in the sense that the price of the contracts is determined by the market and a central clearing house is present. In these markets, trades occur with electronic platforms and are typically exchanged Futures and Options agreements. Good examples of exchange-traded markets are the *Chicago Board of Trade* (CBOT) and the *Chicago Board Options Exchange* (CBOE).

- In the *Over the Counter Markets* (OTC), individuals exchange tailored derivatives contracts, they are not subject to any margin account, they are market makers in the sense that the price is determined by the dealers and there is no clearing house. In these markets, the trades occur by recorded telephone agreements and are typically exchanged Forwards and Swaps agreements. The lack of regulation in the OTC markets is considered as one the main reasons for the 2007-2009 financial crisis.

Therefore, the main types of derivatives contracts are Future, Forward, Options, and Swaps. In our work, we will not describe in detail Futures, Forwards, and Options, giving just a brief definition of them. Instead, we will provide more precise and exhaustive explanation about the functioning of Swaps with attention on Interest Rate Swaps (IRS), Currency Rate Swaps (CRS) and, Credit Default Swaps (CDS). The Futures and Forward contracts are very similar types of derivatives agreements in which one party agrees to buy or sell, at a certain time for a prearranged price, an asset. The party that agrees to buy the asset is said to hold a *Long Position*,

while the party that agrees to sell is said to hold a *Short Position*. The main difference between Forwards and Futures is that Forwards are exchanged in OTC markets, so they don't have any initial cost, while the Futures are exchanged in Exchange Traded markets, so they require a margin deposit. The Options are traded both on the exchange-traded and OTC markets, and they are agreements on which one party "buys" the right to buy or sell a certain asset at a certain time for a predetermined price called *Strike Price*. An Option that gives the right to buy an asset is called Call Option. The party that enters in a long position on a call option is buying the option, obtaining the right to buy the underlying asset at the strike price, while the party that enters in a short position is selling the option. On the contrary, an option that gives the right to sell an asset is called *Put Option*, the party that enters in a long position buy the option, obtaining the right to sell the underlying asset at the strike price, while the party that enters in a short position is selling the option.

The Swap agreements are OTC market derivatives in which two counterparties agree to exchange future cash flows, calculated on a notional principal, defining the dates and the amounts of the exchanges. The first Swap agreement was arranged in the 1980, and since then the market displays an enormous growth such that nowadays the Swaps contracts occupy a central position in the derivatives market (Hull, 2012). As happened for most derivatives instruments Swaps were originally developed as hedging instruments whose main purpose was to transfer the risk from one party to the other. However, as we will see in detail in the part of the chapter dedicated to the 2007-2009 U.S. financial crisis, they soon become an instrument also used for speculative purposes with a great amount of exchanges in the secondary market[2]. Most of the times the principal is not exchanged between the two parties.

1.1.1 Interest Rate Swaps (IRS)

The simplest and most common type of Swap is the "plain vanilla" IRS. In this type of swap, one company agrees to pay cash flows equal to the interest, calculated on a notional principal for a predetermined period of years, at a fixed rate. In exchange, it receives cash flows

[2] On this subject, we can consider that the notional amount of CDS passed from the value of 8.42 trillion of USD in the 2004 to the value of 62.2 trillion of USD in the 2007 and such enormous growth was mostly due a "speculative frenzy" (Colon, 2016).

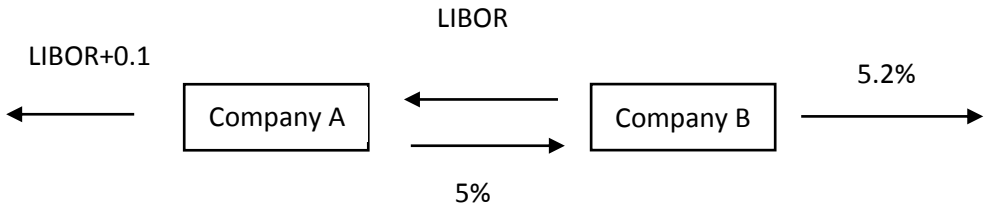
calculated at a floating interest rate[3] on the same notional principal for the same period (Hull, 2012). The Consob[4] identify as characteristic of a "plain vanilla" Swap:

- The maturity of the Swap must be an integer number of years.
- One of the cash flows is based on a fixed interest rate while the other is based on a floating interest rate.
- The notional principal is constant over time.

A "plain vanilla" swap is considered *Par* if the value of the contract, at the time of purchase, for both parties is equal to zero. On the contrary is defined as Non-Par if the value of the contract for one of the party is negative. In the case of a Non-Par Swap the party with a negative value should receive, at the purchase of the contract, a sum, called *up-front*, to compensate for its negative position. This up-front should be equal to the negative market value of the contract. The IRS may be used for transforming a liability or and asset nature. So, a company that wants to transform a LIBOR plus 10 basis points floating rate loan in a 5% fixed rate one will have three set of cash flows.

- Pay the LIBOR + 0.1% to the outside lender;
- Receive LIBOR from the Swap counterparty;
- Pay a fixed 5% to the Swap counterparty;

Figure 1: Interest Rate Swap example (simplified)



Source: (Hull, 2012, p. 151).

It's intuitive that the procedure will be the same in the case of an asset. Generally, non-financial firms will most likely not contact each other directly to settle down an Interest Rates Swap but will contact a financial firm, asking for support in the arrangement of the swap contract. In

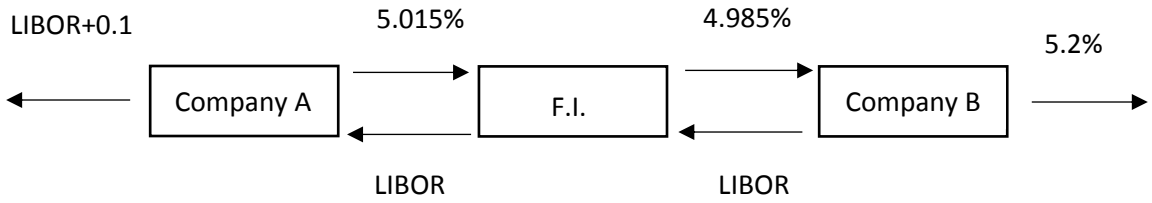
[3] The most common type of floating rate utilized by the companies is the *London Interbank Offered Rate* (LIBOR) (Hull, 2012).

[4] http://www.consob.it/main/trasversale/risparmiatori/investor/prodotti_derivati/principalicategorie_prodottiderivati.html#4

exchange for its role as intermediary, the financial institution obtains a percentage of each cash flows transaction. In this way the financial institution, probably an investment bank:

- Receive from the fixed rate paying company a 5.015% fixed rate cash flows;
- Receive from the floating rate paying company a LIBOR rate cash flows;
- Pay to the fixed rate company a LIBOR rate cash flows;
- Pay to the floating rate company a 4.985% fixed rate cash flows;

Figure2: Interest Rate Swap example



Source:(Hull, 2012, p.153).

In the end, the Financial intermediary will obtain the difference 5.015 – 4.985 = 0.030 for each cash flows exchange. In general, it is difficult that two companies with opposites financial needs will contact at the same time a financial intermediary for setting a Swap. In this case, the financial intermediary acts as market maker by arranging the contract and being the counterparty in the Swap. As we will see in chapter 3, the gain obtained by the financial intermediary was considered by some Italian justice court as a "hidden cost"[5] and this was one of the main issues about the use of the derivatives contract by the Italian local entities.

When it comes to valuation of an IRS there are two methodologies to evaluate it: as the Price of a bond or as a portfolio of Forward rate agreement (FRA).

- If we evaluate the swap in term of a bond price, we will consider the fixed rate cash flows as the interests of a fixed rate paying bond while the floating rate cash flows will be considered as the interest of a floating rate one. In this way, the valuation of the swap for the part that pays floating rate and receives fixed rate will have a value equal to:

$$V_{swap} = B_{fix} - B_{float}$$

[5] http://www.ilsole24ore.com/art/norme-e-tributi/2010-11-07/costi-impliciti-annullano-firma-064017_PRN.shtml

While in the case of the part that pays a fixed rate, and receives a floating rate the value will be equal to:

$$V_{swap} = B_{float} - B_{fix}$$

- If we evaluate the swap as a portfolio of forward rate agreements, we are considering a portfolio in which each FRA represents one of the cash flows exchanges of the swap. Then we will calculate the net cash flows obtained from the FRAs portfolios and sum their present values to obtain the swap value.

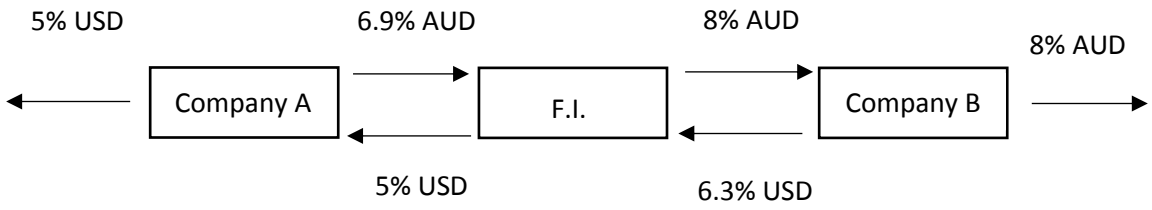
1.1.2 Currency Rate Swaps (CRS)

The Currency Rate Swap is a swap contract in which two counterparties agree on exchanging principal and interests in one currency with principal and interest in another currency (Hull 2012). The principals are normally exchanged at the start and at the end of the swap and are determined to be almost equivalents by using the exchange rate at the initiation of the swap. However, when they are exchanged at the end, if the exchange rate has changed, their value may be quite different. The main difference with the IRS is that both the interest rates in CRS are variables, so the cash flows exchanged may change over times following the change in the exchange rate (Consob, 2012).

So, a company that wants to transform a 5% fixed rate USD loan in a 6.9% fixed rate AUD loan will have three sets of cash flows:

- Paying the 5% USD interest rate to the outside lender;
- Receive the 5% USD interest rate from the financial intermediary;
- Paying a fixed 6.9% AUD interest rate to financial intermediary;

Figure 3: Currency Rate Swap Example



Source: (Hull, 2012, p. 167)

It's intuitive that the procedure will be the same for changing the nature of an asset. All the consideration that we have made for the IRS financial intermediaries are valid also for the CRS. In the example, the financial intermediary will obtain 6.3 – 5 = 1.3% USD and spend 8 – 6.9 = 1.1% AUD for each cash flow exchange. So, the financial intermediaries will be subjected to the currency risk of a drop in USD/AUD[6] exchange rate.

The valuation of a CRS is very similar to the one for the IRS; it may be valuated as the difference between two bond prices or a portfolio of FRA.

- If we evaluate in terms of bond prices, the value in USD of a swap for the part that receives USD and pays AUD is equal to the difference between the price of a bond calculated on the USD fixed interest rate and the price of a bond calculated on the AUD fixed interest rate converted to USD using the exchange rate at time zero S_0.

$$V_{swap} = B_{USD} - S_0 B_{AUD}$$

Instead, the value in USD of a swap for the part receiving AUD and paying USD is equal to the difference between the price of a bond calculated on the AUD fixed rate and converted in USD at the exchange rate at time zero S_0, and the price of a bond calculated on the USD fixed interest rate.

$$V_{swap} = S_0 B_{AUD} - B_{USD}$$

- If we evaluate the swap as a portfolio of forward foreign exchange contracts, we are considering a portfolio in which each foreign exchange contracts represent one of the cash flows exchanges of the swap. Then we will calculate the net cash flows obtained from the forwards' portfolio and sum their present values to obtain the swap value.

Even if the most common types of CRS are the ones that exchange a fixed rate for a fixed rate, there are CRS that exchange a fixed rate in one currency for a LIBOR floating rate in another currency. These types of contracts can be considered as a combination between a fixed-for-floating interest rate swap and a fixed-for-fixed currency rate swap; this combination takes the name of *cross-currency interest rate swap*. Another type of CRS is the *floating-for-floating*

[6]The USD/AUD exchange rate is considered the amount of AUD that may be purchased with one unit of USD.

currency interest rate swap, where a floating rate in one currency is exchanged with the floating rate in another currency.

1.1.3 Credit Derivatives

One of the last improvement in the derivatives market was the creation of the *Credit Derivatives*, a typology of derivatives whose payoffs are based on the creditworthiness of a single company, a group of companies or a country (Hull 2012). The credit derivatives may be divided in *single-name* and *multi-name* derivatives. The most famous single-name derivative contract is the *Credit Default Swap* (CDS), while the most common multi-name contract is the *Collateralized Debt Obligation* (CDO).

The CDS offers insurance against the default risk of a single company. The "underlying" company is defined as *reference entity*, while the default of the company is defined as *credit event*. The buyer of the CDS has the right, if the credit event occurs, to sell the company's bond for its facial value. Instead, the seller of the CDS agrees to buy the bond, if the credit event occurs, for the facial value and in exchange receives regular payments from the buyer of the CDS until the end of the insurance life or the occurrence of the credit event. The facial value that will be paid by the CDS is known as the *notional principal*. If we consider two parties entering into a 5 years CDS on a notional principal of $100.000, the buyer agrees to pay a periodic interest of 22.5 basis points, calculated on the notional, every quarter until the end of the CDS, while the seller agrees to pay the notional of $100.000 in case the credit event occurs. A CDS may be used to hedge a position in a corporate bond assuring a "virtual" risk-free interest rate. We consider an investor buying, for its facial value, a 5 years bond yielding 7% per annum and entering in a CDS, with the same maturity, for protection against the risk of default of the issuer of the bond. The CDS requires a regular payment of 2% per annum reducing the yield obtained by the investor to 5% per annum; however, the CDS guarantees that in case of default of the issuer of the bond the investor will receive back the bond's facial value transferring the default risk to the CDS seller (Hull 2012). This example suggests also a relationship between the CDS spread and the bond yield. If we suppose that the issuer of the bond defaults after 3 years, during the first 3 years the investor will receive a yield of 5% while after the default he will receive back, thanks to the CDS, the notional principal that will be invested at the risk-free rate for the remaining 2 years. This demonstrate that the n-year CDS spread should be equal to the excess n-year bond yield over the risk-free rate, more formally we say that:

$$CDS\ bond\ basis = CDS\ spread - Bond\ spread \cong 0$$

where bond spread represents the excess of the bond yield over the risk-free interest rate (Hull, 2012).

If this relationship does not hold and the excess bond yield is higher than the CDS spread the investor can earn more than the risk-free rate by buying the bond and the CDS. On the contrary, if the CDS spread is higher than the excess bond yields the investor may borrow at a lower rate than the risk-free rate by selling the bond and the CDS contract. The risk-free rate is supposed to be the LIBOR/swap rate.

The CDS spread may be evaluated from default probability estimates of the reference entity. To calculate it, at first, we estimate the default probability and the survival probability of the reference entity for each year. If we assume that the first year default probability is equal to 2% and the survival probability is equal to 98% then the probability of default at the second year will be 0.98*0.02 = 0.0196 while the survival probability will be 0.98*098 = 0.9604 and so on.

Table 1: Default and Survival probability.

Year	Default probability	Survival probability
1	0.0200	0.9800
2	0.0196	0.9604
3	0.0192	0.9412
4	0.0188	0.9224
5	0.0184	0.9039

Source: (Hull, 2012, p.552)

At this point, we need to compute the present values of the expected payments made on the CDS. For doing so, we assume that the risk-free rate is 5% with continuous compounding, that default always happens before the end of the year and that the payments of the CDS interests happen at the end of each year and that are made at the interest rate *s* calculated on a notional of 1. This implies that the survival probability is the probability of each payment to be made so that the expected payment for the third year is equal to $0.9412s$ and its present value is equal to $0.9412se^{-0.05*3} = 0.8101s$. The sum of the present values is equal to $4.0704s$.

Table 2: Calculation of the Present value of the expected payment

Year	Survival probability	Expected payment	Discount factor	PV of the expected payment
1	0.9800	0.9800*s*	0.9512	0.9322*s*
2	0.9604	0.9604*s*	0.9048	0.8690*s*
3	0.9412	0.9412*s*	0.8607	0.8101*s*
4	0.9224	0.9224*s*	0.8187	0.7552*s*
5	0.9039	0.9039*s*	0.7788	0.7040*s*
Total				4.0704*s*

Source: (Hull, 2012, p.552)

After having calculated the present value of the expected payments we need to compute the expected payoff obtained from the CDS in the case of default of the reference entity. We assume that the default always occurs halfway in the year and that the recovery rate is equal to 40%. This implies that the expected payoff at half of the second year is equal to the notional principal 1$ multiplied by the default probability 0.0192 and by $1 - 0.4 = 0.6$, so it is equal to $1 * 0.0192 * 0.6 = 0.0115$, and its present value is equal to $0.0115e^{-0.05*2.5} = 0.0102$. The sum of the present values is equal to 0.0511.

Table 3: Calculation of the Present value of the expected payoff

Year	Default probability	Recovery rate	Expected payoff	Discount factor	PV of expected payoff
0.5	0.0200	0.4	0.0120	0.9753	0.0117
1.5	0.0196	0.4	0.0118	0.9277	0.0109
2.5	0.0192	0.4	0.0115	0.8825	0.0102
3.5	0.0188	0.4	0.0113	0.8395	0.0095
4.5	0.0184	0.4	0.0111	0.7985	0.0088
Total					0.0511

Source: (Hull, 2012, p.553)

It is also necessary to calculate the accrual payments in case of default. If we consider the third year there will be a probability of 0.0192 that an accrual payment of $0.5s$ will be made so that the expected payment is equal to $0.0192 * 0.5s = 0.0096s$ and its expected value is equal to $0.0096se^{-0.05*2.5} = 0.0085s$. The total payment is equal to:

Table 4: Calculation of the Present value of the accrual payment

Years	Probability of default	Expected accrual payment	Discount factor	PV of expected accrual payment
0.5	0.0200	0.0100*s*	0.9753	0.0097*s*
1.5	0.0196	0.0098*s*	0.9277	0.0091*s*
2.5	0.0192	0.0096*s*	0.8825	0.0085*s*
3.5	0.0188	0.0094*s*	0.8395	0.0079*s*
4.5	0.0184	0.0092*s*	0.7985	0.0074*s*
Total				0.0426*s*

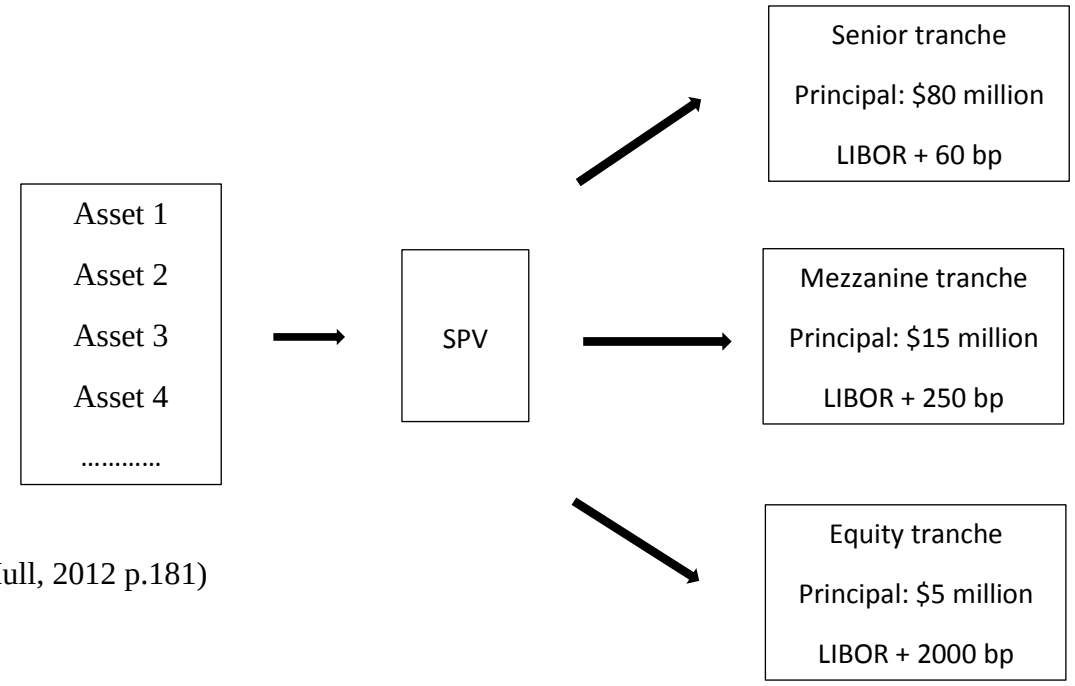
Source: (Hull, 2012, p.553)

To identify the value *s* we need to sum the total present value of the expected accrual payment 0.0426*s* with the total present value of the expected payment 4.0704*s*, obtaining $0.0426s + 4.0704s = 4.113s$. At this point, we need to equate 4.113*s* with the present value of the expected payoff 0.0511 and solve the equation $4.113s = 0.0511$ obtaining $s = \frac{0.0511}{4.113} = 0.0124$.

1.1.4 Collateralized Debt Obligation (CDO)

The CDO is an *Asset-Backed Securities (ABSs)* where the underlying assets are bonds. An ABS is a securitization agreement in which a portfolio of cash flows producing assets is sold by the *originating banks* to a *special purpose vehicle (SPV)* and the cash flows from the asset are divided in tranches (Hull 2012). A simple example may be the case in which a notional principal of $100 million is divided in three tranches: a Senior tranche, a Mezzanine tranche, and an Equity tranche. The senior tranche has a principal of $80 million and pays a LIBOR + 0.6% interest, the mezzanine tranche has a principal of $15 million and pays a LIBOR + 2,5% interest, and the equity tranche has a principal of $5 million and pays a LIBOR + 20% interest.

Figure 4: Asset Backed Securities example



Source: (Hull, 2012 p.181)

The equity tranche is the tranche that has the best returns; it delivers an interest of at least $1 million in case of a LIBOR rate equal to zero. However, the equity tranche is most likely to lose part of the principal and interest payments. This is due to the *"waterfall"* payment system that gives priority to the principal and interests payment of the senior and mezzanine tranches over the equity tranche. It means that after completion of the senior tranche payments the remaining resources will be used to pay principal and interest of the mezzanine tranche and at last, if there are any resources left, it will start the payment of the equity tranche. So, there are two ways to consider an ABS:

- In terms of profits we can say that the senior tranche will be the first to obtain profits, then the mezzanine and at last the equity.
- In terms of losses we can say that the equity tranche will be the first one to bear the losses, then the mezzanine and at last the senior.

In the case of a CDO composed by a portfolio of bonds, we are talking about *cash CDO*. Another type is the *synthetic CDO*, an agreement in which a portfolio of companies and a maturity are selected by the issuer and CDSs, with the same maturity, will be sold as protection against the companies' defaults. The principal of the CDO will be the total of the underlying principals of the CDSs, and the issuer will have cash outflows when the portfolio's companies

default and inflows equal to the CDSs spread. The allocation of the outflows and inflows in the tranches, assuming to have the same three tranches as the cash CDO example, is less complicated than the one for the cash CDO and may be synthesized in this way:

- The equity tranche is responsible for paying CDSs within the 5% of the synthetic CDO principal and receives a payment of 1000 basic point calculated on the outstanding tranche's notional principal.
- The mezzanine tranche is responsible for paying the CDSs from above the 5% to the 20% of the synthetic CDO principal and receives a payment of 100 basis points calculated on the outstanding tranche's notional principal.
- The senior tranche is responsible for paying the CDSs above the 20% of the synthetic CDO principal and receives a payment of 10 basis points calculated on the outstanding tranche's notional principal.

So, if we consider a portfolio's principal of \$100 million the equity, mezzanine and senior tranches will have respectively \$5 million, \$15 million, and \$80 million notional principals and will receive the CDS spread on these principals. In case of companies' default that leads to a CDS pay-outs of \$2 million the equity tranche will be responsible for the payment and its principal will be reduced at \$3 million. If the pay-outs exceed the equity tranche principal, the mezzanine will be responsible for the pay-outs and so on. In a synthetic CDO, there is no initial investment, and it is just necessary to agree on the cash outflows and inflows calculation rule; while in a cash CDO, it is required an initial investment to finance the underlying bonds (Hull, 2012).

The valuation of a synthetic CDO is a complicated procedure that considers various calculations. At first, we suppose that the payments of the CDO happen at times $t_1, t_2, \ldots, t_m$ and that $t_0 = 0$. Then, we define E_j as the expected tranche's principal at time t_j and $v(t)$ as the present value of the \$1 received at time t. At last, we suppose that the CDS spread for one tranche is equal to s per year and because it is paid on the remaining of the tranche principal we can say that the value of the spread is equal to sA with $A = \sum_{j=1}^{m}(t_j - t_{j-1})E_j v(t_j)$. To calculate the present value of the tranche's payoffs, we assume that the loss occurs at half of any time interval and that the expected loss between times t_j and t_{j-1} is equal to $E_{j-1} - E_j$. So, we may define the expected payoffs as $C = \sum_{j=1}^{m}(E_{j-1} - E_j)v(0.5t_{j-1} + 0.5t_j)$.

While the accrual payments are equals to sB where $B = \sum_{j=1}^{m} 0.5(t_j - t_{j-1})(E_{j-1} - E_j)v(0.5t_{j-1} + 0.5t_j)$. At this point, we can state that the breakeven spread of the tranche for the protection buyer happens when $C = sA + sB$ and it is equal to $s = \frac{C}{A+B}$. This relationship demonstrates that if we know the expected principal for each payment dates and the zero-coupon yield curve we can compute the breakeven spread.

1.2 Brief history of the derivatives market

Even if through history there had been numerous types of instruments that may be consider derivative contracts[7], their importance and public knowledge increased in the last 30-40 years (Hull, 2012). The derivatives market, as we know nowadays, was "born" in the 1970s, when the financial institutions started facing an increasing operational risk (Mishkin, 2006). This risk was caused mainly by the end of Bretton Woods agreement and the following suspension of the fixed exchange rates system of the 1971, by the energy crises of the 1973 and 1976 that caused an increase in the volatility of the oil price[8]. Due to the uprising exchange rate risk and volatility of the stock market, caused by the movements of the oil price, it became necessary to use instruments to hedge these risk, so the managers of the financial institutions started using the derivative contracts for hedging. Across the 1980s the derivatives market increased to the point of reaching a value of 20.000 billion of $ in the 1989-1992. During the 1990s, the heavy losses sustained by companies such as *Metallgesellschaft*, *Procter & Gamble* and the default of *Barings Bank* slowed down for some year the expansion of the derivatives market; however, in the October of the 2008 the notional value of the Over the Counter derivatives market was estimated to be around 600 trillion $ and between 35-65 trillion $ were invested in Credit Default Swaps (Greenberg, 2010). If we consider that in the same year the world GDP was evaluated as 63.39 trillion[9] $ it is clear that the financial leverage due to the derivatives use was "enormous" and represented one of the biggest financial issue exposed by the financial crises of the 2008[10].

[7] There are documented cases from the Mesopotamia of the Nineteenth century B.C. to the England and France of the Nineteenth century A.C. (Weber, 2009).
[8] For a more precise description see http://www.consob.it/web/investor-education/crisi-finanziaria-del-2007-2009
[9] http://www.multpl.com/world-gdp/table/by-year
[10] http://www.newsweek.com/600-trillion-derivatives-market-92275

1.2.1 The role of derivatives in the 2008-2009 financial crisis

It is generally recognized that the 2008-2009 financial crisis started with the 2007 U.S. sub-prime market crisis. The sup-prime market *"Refers to the market for subprime loans, subprime mortgages and their securitized forms such as MBS, asset-backed securities, CDOs, etc.*[11]*"* and we can considered as the credit market for the individuals that have poor income or bad credit history such that their debt risk is too much high for the traditional credit market. The expansion of the subprime sector was encouraged by the Community Reinvestment Act (CRA), a federal law that help poor-medium income people to obtain mortgage, and by the support in the securitization of the credit contract provided by quasi-public company as *Fannie Mae* and *Freddie Mac*. The expansion of the sub-prime market baits the real estate bubble while the positive leverage, and the convenience of the CDSs, oversee in the period before the crises, contributes to the speculative frenzy (Colon, 2016). The U.S. bubble last from the 1997 to the first half of the 2006 where the sharp increase in the loans interest's rates makes it impossible for the debtors to pay back the loan, leading to the burst of the bubble. The following increase in the default rates caused a fall in the values of the financial instrument held by the U.S. financial institute that start facing a great liquidity crisis. Financial firms as AIG, Merril Lynch, Freddie Mac, Fannie Mae, HBOS, Royal Bank of Scotland, Bradford & Bingley, Fortis, Hypo and Alliance & Leicester suffered heavy losses that will probably have leaded to their default, as happened for Lehman Brothers, and the only thing that stopped these defaults were a series of bailouts, from the Federal Government. Even if trillions of dollars were spent for these bailouts, the U.S. credit market still suffer a severe credit shortage that transfer the crisis from the financial markets to the "real" market creating what is nowadays known as the "Great Recession". It is difficult to individuate which role the derivatives instrument played in the crisis, especially because the literature on the subject does not completely agree on just one theory. This is also due to the multifaced role overtaken by instruments such as CDS that originally were created as instruments to transfer risk but were also used as speculative instruments on the performance of securities as MBS adding additional risk in the financial markets, in particular when a naked position was taken, and the underlying was not held by the parties (Mirochnik, 2010). In general, we can say that the use of CDS and CDO derivatives exacerbates the risk already present in the U.S. financial markets due to the real estate bubble and the lack of an efficient regulation, but we cannot consider them as the main reason for which the crisis occurs. In first place, the use of derivatives was not the reason for which the real estate bubble occurs, on the contrary is more correct to say that the derivatives were used

[11] http://www.nasdaq.com/investing/glossary/s/subprime-market

for speculative purpose thanks to the presence of the bubble. Moreover, the CDSs market was still liquid for 2/3 of its volume during the 2008 economic crisis[12], so it looks implausible that the derivatives were the reason for the cash shortage that makes necessary the bailouts. Also, professor Greenberger (2010), in his testimony in front of the *Financial Crisis Inquiry Commission* of the U.S. senate, individuate the reasons of the crisis in the lack of regulation of the derivatives and financial markets, stating that: *"Had the norms of market regulation been applicable, these swaps transactions would have been adequately capitalized by traditional clearing norms; and the dangers building up in these markets would otherwise have been observable by the transparency and price discipline that accompanies exchange trading"* (Greenberger, 2010, p. 21). Even before the 2008 crisis, there were great concerns about the dimension and the transparency of the derivatives market, in particular with regard to the OTC markets. Even the New York Fed President Timothy Geithner in 2005 expressed concerns about the backlog in the documentation of credit derivatives, stating also the necessity for a clearing house for the OTC markets[13].

1.3 The Mark-to-Market concept

Which type of accounting rules and standards financial institutions and firms should utilize is a great matter of discussion within specialist literature. In particular, the debate concerns which method of evaluation between the *historical cost accounting* and the *fair value accounting* should be used. Before discussing the terms of the debate, and its influence over the use of derivatives instruments, we will provide a brief description of these two accounting methods.

- In the historical cost accounting the value of the assets is based on the nominal original cost sustained by the companies that holds it. In this way, the values will remain stable over time, even if there are procedures of depreciation that guarantee that the normal deterioration of the assets will be considered. This is the most common type of accounting procedure under the United States' "*Generally Accepted Accounting Procedure"* (GAAP)[14].

[12] For more information read the 2008 Economist's article "The Great Untangling" http://www.economist.com/node/12552204

[13] https://www.forbes.com/2008/06/13/geithner-banks-fed-oped-cx_rl_0613croesus.html

[14] The GAAP is issued by the *Financial Accounting Standards Board* and represents a series of rules and principles to which U.S. companies are subjected in the compliance of their financial statement. https://www.investopedia.com/terms/g/gaap.asp.

- In the fair value accounting the value of the asset is estimated as the price settled by a willing buyer and a willing seller. The estimation procedure is not straightforwardly definable but will change based on the characteristics of the accounted company, on the type of assets, on the condition of the market and on the personal evaluation of the analyst. A type of fair value accounting is the *mark-to-market* where the assets are accounted at the market price. This method guarantees that the assets will be "correctly" estimated, but the value may also change frequently over time and for this reason this methodology is mostly utilized for marketable assets.

So, while the first method gives a stable value to the asset, that in some cases may lead to a misleading evaluation, the second method tries to give an estimation of the asset's real value, implying an increase in the volatility of the asset's value. The IAS 39[15] requires that all the derivatives contracts are evaluated using the mark-to-market approach, stating that:

- In case of instruments traded in active markets it should be used the quoted price;
- For instruments traded in non-active markets it should be used a past transaction market price;
- If there are neither a quoted market price neither a past market price the instrument should be evaluated through a valuation technique.

After the 2007 financial crisis, some authors enquired the relationship between the use of the mark-to-market accounting and the liquidity crisis that contributes to boosting the crisis. In the working paper *"Mark-to-market accounting and liquidity pricing*" the authors develop a mathematical model that proves the existence of a macroeconomic relationship between the use of mark-to-market accounting and the 2007 "chain reaction" caused by the liquidity shortage within the bank and insurance sector (Allen and Carletti, 2006). However, it appears that this drawback is not due to the use of mark-to-market accounting itself, but it is caused by the interaction between the mark-to-market and the definition of capital requirements (Heaton, Lucas, and McDonald, 2010). Moreover, the interaction between a volatile capital measure, as the mark-to-market, and a static capital requirement may cause serious damages in case of an illiquid market and absence of any coordinated policy regulation. Even if the mark-to-market

[15] The *"International Accounting Standard"* n. 39 is the standard, issued by the *International Accounting Standard Board*, that regulates the financial instruments. https://www.investopedia.com/terms/a/accounting-standard.asp

presents some serious drawbacks, its utility in returning the "real value" of financial instruments makes it the preferred accounting method in the evaluation of derivatives contracts; To the point that, as we will see more in detail in chapter 2, some Italian justice courts have considered some contracts null because they lack the indication of the mark-to-market.

Chapter 2: The Italian local authorities' finance

2.1 1970-2001: from the "centralised finance" to the "fiscal federalism"

It is difficult to provide a precise definition of the objectives and functioning of "local governments". This is due to the huge number of different forms of government that exist worldwide and that display a vast variety of legal and constitutional settings. Despite this we will still try to define local government considering the framework elaborated by Giancarlo Pola in his 1999 essay *"A comparative view of local finances in EU member countries: are there any lessons to be drawn"*. In the essay, the author distinguishes between *Unitary Government* and *Federal Government* based on the local government's[16] role and its degree of independence from the central government.

- In a *Unitary Government*, local authorities follow the so-called "agency model" of decentralization. In this model, the decentralization goal is to "put in action" the policy determined by the central government exploiting the advantages of smaller-scale units. Examples of unitary government countries are Italy, France, and Spain.

- In a *Federal Government*, local authorities follow the so-called "choice model" of decentralization. This model goal is to enable local communities to choose between different levels of services and taxations that match their preferences. Examples of federal government countries are Germany and Austria.

However, we should stress that no country belongs to one of this form of government in a "pure" way but is more common to see a different grade of both the models as we will see in the Italian case. Nowadays the Italian Republic, as stated by the article 144 of the Italian constitution, is composed of Municipalities, Provinces, Metropolitan Cities, Regions and by the State[17]. This organization of the state is the final stage of a long process of decentralization that has started with the approval of the constitution in 1947 and "ended" with the 2001 constitutional reform of the title V of the constitution. As we will see, after the second world war and during the seventies, the main objective of the public sector was the reconstruction of

[16] In the essay the author defines as local government every government tiers that does not belong directly to the central government.
[17] We can consider the term "state" as a synonym of central government.

the infrastructure of the country destroyed during the conflict and the creation of the so-called welfare state. During that period, the main way to finance the local government's expenditures was mainly represented by the direct transfer decided and provided by the central government. Nowadays, the European integration process and the changes in the society, such as the aging of the population and the increase of the living standards, turn the public sector from a centralized system in a decentralized one, where the central government is no more capable of financing the local entities expenditures.

2.1.1 The "Centralised finance"

Even if the Italian constitution states, in the article V, that: *"The Republic, one and indivisible, recognizes and promotes local autonomy; implementing in services that depend on the state the largest administrative decentralization; adapts the principles and methods of its legislation to the needs of autonomy and decentralization"* the Italian republic was born as unitary government country with a "centralised finance". The reasons for this unitary framework must be sought in the 1861 birth of the Kingdom of Italy and the compromise between the left-wing parties and the Catholic-liberal parties within the 1946 "Constituent Assembly" (Bernardi and Gandulia, 2004). 1861 was the year of the unification of Italy, occurred thanks to the influence and direct military intervention of the Kingdom of Sardinia[18]. The Kingdom of Sardinia was a kingdom with a unitary institutional and administrative framework similar to the Napoleonic one, and so the new-born Kingdom of Italy was also organized in a similar institutional settlement. In 1946, after the Italian institutional referendum that decreed the birth of the Republic, it was established the Constituent Assembly whose goal was to create the constitution of the new Republic. This task was particularly complicated for the high heterogeneity of the Constituent, with the presence at the same table of parties with heavy ideological differences, such as the Italian Communist Party and the Italian Republican Party, that in many cases made political compromise necessary. This was the reason for which, even if it was maintained the unitary government framework, the constitution promoted the autonomy and decentralization of the local government, in particular with the creation of the *Regions* (Beretta, 1988). These regions were developed as an intermediate administrative level with relevant functions, such as agriculture, professional education and healthcare, and tax autonomy that should have been implemented in 1948. However, this autonomy promotion was more theoretical than practical. The implementation of the regions didn't occur until 1970, the year when the "*Ordinary*

[18] For Kingdom of Sardinia here are considered all the political entities that were controlled by the Savoy.

Regions"[19] were established, and the Constituent did not provide a high tax autonomy to the local government. The arguments provided by the Constituent Assembly for this decision was that the tributary autonomy would have generated inequalities in the cost of services between the different area of the country (Bernardi and Gandulia, 2004). Even when the Regions became operative, their financing was mostly obtained from the direct intervention of the central government, as happened in the Italian municipalities and provinces following the 1972 tax reform, and consequently, their operational autonomy was dramatically reduced. The reason for this setting of the decentralized level was the assumption that the central government was more capable of managing the redistributive function that the single local institution (Pedone, 1999) and the fact that the existing local authorities had displayed various cases of mismanagement. For all these reasons, the role of the local government was marginal until the start of the '80s, as proved by the percentage of taxes owned by the local authorities on the whole amount of the entries, that until 1980 remained under the 10%.

2.1.2 The 1994 Bassanini Reform

During the first half of the '80s, there was an increasing interest in the decentralized finance local system across Europe (Bernardi and Gandullia, 2004). In Italy there were three specific reasons for which the decentralization gained popularity:

- The belief that a reorganization of the states in a decentralized way may have solved the ongoing massive political and institutional crisis.

- The dimension reached by the local government's expenditure has reached the 25% of the total public-sector spending.

- The situation of "irresponsibility" of the local authorities, caused by the separation between the collection of the taxes, still in the hands of the central government, and their spending, in the hands of the local governments.

However, in contrast with the argumentations in favour of a decentralization process, there were also specific reasons against such course. These reasons were: the great economic difference within the country, with a ratio of 3 over 1 between the GDP per capita of the north and south;

[19] In italian "Regioni a Statuto ordinario".

the poor quality of the local political and bureaucratic establishment and the lack of an autonomist tradition within the country (Fausto, 1996); the centralism and dirigisme as leading ideologies (Fossati, 1999). These resistances delayed the decentralization process, with the result that we need to wait until the '90s for seeing the first put in action through the Bassanini Reform[20]. Before analysing the reform, we will briefly expose the two federalist models that were considered in Italy during the '90s: *"Strong Fiscal Federalism"* and *"Responsibility Fiscal Federalism"*[21].

- *Strong Fiscal Federalism* is based on the tradition of confederal states and the thinking of Tocqueville. To "put in action" this model it was necessary a deep change in the Italian institutional status quo, with a reorganization of the tributary system, to guarantee tax autonomy of the local government, and a modification of the constitutional setting.

- *Responsibility Fiscal Federalism* is mainly concerned with the increasing of the managerial responsibility and the political control of the local governments, unifying the tributary policy with the spending decision (Giarda, 1995). This model requires a limited change in the Italian institutional status quo and a high tax autonomy that, however, may be reached through partnership on the national taxes (Bosi, 1995).

The Bassanini reform belongs to the second model of federalism, to the point that was described as "the maximum federalism possible with no constitutional change"[22]. The reform was organized into four different laws:

1) Law 15 March 1997, n. 59 (Bassanini semel) gives "delegation to the Government for the assignment of functions and tasks to local and regional authorities, for the reform of the Public Administration and administrative simplification". In practice the reform:
   a) Redefines the competences between state, regions and, cities implementing administrative federalism.

[20] The reform takes its name from Franco Bassanini, Minister for the public administration from the 1996 to the 1998 and its principal proponent.
[21] These two terms were translated from the Italian *"Federalismo Fiscale Forte"* and *"Federalismo Fiscale della Responsabilità"* (Bernardi, 2000).
[22] Translated freely from the Italian expression "Federalismo amministrativo a costituzione invariata", this expression is widely utilised to describe the reform even if is not clear who coins it.

b) Reorganizes the Presidency of the Council of Ministers, the ministries and the public administration fulfilling the reform process started by the law 23 August 1988 n. 400.
c) Reforms the public employments with regards to the procedure of selection and training of the directors and officials of the Italian public administration.
d) Initiates a massive reallocation of functions from the state to the region, as much as deregulation process of some economic sectors with a strong public influence.
e) Implements the simplification process of the procedures and rules that oversee the Italian public administration.
f) Reforms the Italian public education system, introducing the *"Functional autonomy regime"*[23], a system that guarantees organizational independence and autonomy to each scholastic institute.
g) Introduces the *principle of subsidiarity* for the fulfillment of commons goals.

2) Law 15 May 1997 n. 127 (Bassanini bis) delegates the government with the task to:

a) Simplifies the standards for the administrative documentations, introducing self-certification.
b) Reorganizes the administrative offices of the local governments with regards to the manager's employment and financial equilibrium of the cities.

3) Law 18 June 1998 n. 191 (Bassanini ter) contains some modifications and integrations to the Bassanini semel and Bassanini bis, rules regarding the public administration employment and training and regulations about the school buildings.

4) Law 8 March 1999 n. 50 represents the first attempt to perform an organic reform of the Presidency of the Council of Ministers, the structure of the Council of Ministers and the organization of the Ministers. Precisely the law manages to:
a) Reduces the number of the Ministerial apparatus to twelve and introduces the flexibility principle in the organization of the Ministries.
b) Introduces twelve independent agencies with specific technical-operative's functions.

[23] Translated freely from the Italian term "Regime delle autonomie funzionali".

c) Concentrates the peripheric offices of the state in the "Local Office of the Government"[24] that absorbs the prefectures.

However, the law n.50 1999 was never fully "put in action", the number of the ministers increased, and just a small number of the agencies were created.

Regarding the financing of the local government, in the '90s the profile changes from the direct transfer between state and local governments model to a partnership model. This new type of model was reached through the creation in 1993 of a local tax on property (ICI) in favour of the cities, in 1998 with the creation of a tax on productive activities (IRAP) in favour of the regions, and, in the same year, with a partnership in the tax on personal income (IRPEF) from 5% to 10% for the regions and until 5% for the cities[25].

2.1.3 The 2001 reform of the Title V of the constitution

As we have seen the Bassanini reform was the "maximum federalism possible with no constitutional change". For an organic reform of the Italian constitution in a federalist way we need to wait until 2001 with, the reform of the Title V of the constitution[26]. The reform was organized in one constitutional law, the law 18 October 2001 n.3, that was adopted by the parliament without the two-thirds qualified majority and for which it was requested a confirmative referendum[27]. The reform removes the articles 115, 124, 128, 129, and 130 while modifying the articles 114, 116, 117, 118, 119, 120, 123, 125, 127, and 132.

In this thesis, we will not analyse how each article was changed, but we will just describe the main modifications operated by the reform.

1. The "composition" of the Italian Republic was modified. From the original article 114, that indicates as part of the republic, regions, provinces, and municipalities; we pass to the new article 114 that individuates as part of the republic municipalities, provinces, metropolitan cities, regions, and the state. The article defines regions, provinces, metropolitan cities, and municipalities as autonomous local entities with own statutes,

[24] In Italian "Uffici Territoriali del Governo".
[25] In this period there were also created some other minor tribute such as the rate on excise on petrol.
[26] The title V of the Italian constitution is the part in which the local governments of the Italian Republic are regulated.
[27] The Referendum was won by the "yes" with a result of 64.2% favourable and 35.8% contrary, it was the first time in the republic history that a confirmative referendum was made.

powers, and functions determined by the constitution. The article also individuates Rome as the capital of the Republic.

2. Before the reform, the constitution individuated the areas in which the regions have exclusive competence; all the others were the competence of the state. The reform changed completely the paradigm, individuating the areas in which the state has exclusive competence, such as foreign policy and military defence, and in which state and regions have shared competence, such as the relationships between EU and regions and productive activities policy. In all the other areas the legislative competence is assigned exclusively to the regions. Precisely, the new article 117 states that *"It is up to the regions the legislative power over all the matters that are not specifically reserved to the law of the state"*. In their legislative function is necessary that the regions respect the principle stated in the so-called *framework law* elaborated by the central government.

3. The administrative and financial functions of the local governments have been further expanded. The new article 118 states that the administrative functions are transferred to the municipalities excepts when, for guaranteeing the unity of the services, are transferred to provinces, metropolitan cities, regions, and state following the principles of subsidiarity, differentiation, and adequacy. The attribution to municipalities and metropolitan cities of specific administrative powers is determinate by regional and state law. Also, the law of the state establishes the form of coordination between the state and the regions over the areas of shared competence.

4. It was introduced the *"Fiscal Federalism"* indeed as the financial autonomy of the local governments. Precisely, the article 119 of the constitution states that *"Municipalities, Provinces, Metropolitan cities, and regions have financial autonomy in their entries and expenditures*". The constitution indicates that the local governments may obtain their financing through own tributes, such as ICI, and partnership in state taxes collected from their territories, such as IRPEF. Also, the constitution provides for the establishment of an equalizing fund, regulated by the state law, whose goal is to help the regions with lower fiscal capability. The central government may also provide additional financial resources for economic development, promote social cohesion and solidarity, and support the effective exercise of the personal services. Municipalities, metropolitan

cities, provinces, and regions have their patrimonial assets, attributed by the state's law, and may finance through debt just the investment project.

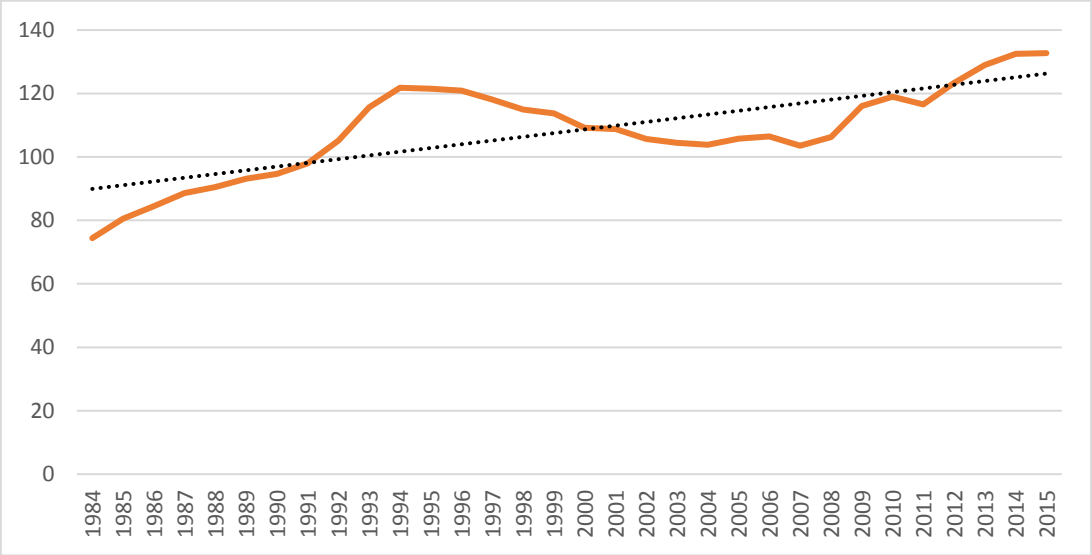
The constitutional's reform concludes the process of decentralization started with the Bassanini reform and put in action the principle contained in the article 5 of the constitution. The 18/02/2000 legislative decree further developed the process of decentralization and financial autonomy of local governments (Giarda, 2000). The decree established a partnership of the 25,7% in the total revenue of the value added tax[28] between the regions and the state, an increase of 0.4% in the IRPEF partnership, and ends all the remaining direct contributions of the central government to the regional's budget. The new structure established by these measures and reforms lead the Italian Republic from a centralized government system to a decentralized system defined by some authors, such as Fossati (1999), Neo-regionalism.

2.2 The main issues of public finance.

As we have seen, the Italian public sector sustained substantial changes that transformed the centralized finance system of the '70s into a decentralized model were regions play a significant role in providing services. However, some characteristic of the Italian public administration remains constant over time, such as the high ratio of GDP and public debt. By looking at the ISTAT historical series, we may observe as the public debt expressed in percentage of the GDP registers a positive heavy linear trend from 1984 to 2010 (figure 5). The primary growth in the public debt was registered in the 1984-1996 period mainly due to the inversion of the United States monetary policy that caused an increase in the cost of debt (Artoni, 2005). In the following period, we assist to a change in the trend with a reduction of public debt across 2000, mainly thanks to the reduction in the cost of debt followed by the change in the monetary policy of the United States and by the sign of the Maastricht treaty. At last, we observe an increase in the public debt in 2008, probably caused by the rise in the cost of debt following the 2007 financial crisis.

[28] In Italian "Imposta sul valore aggiunto" (IVA).

Figure 5: Italian Public debt in percentage of GDP



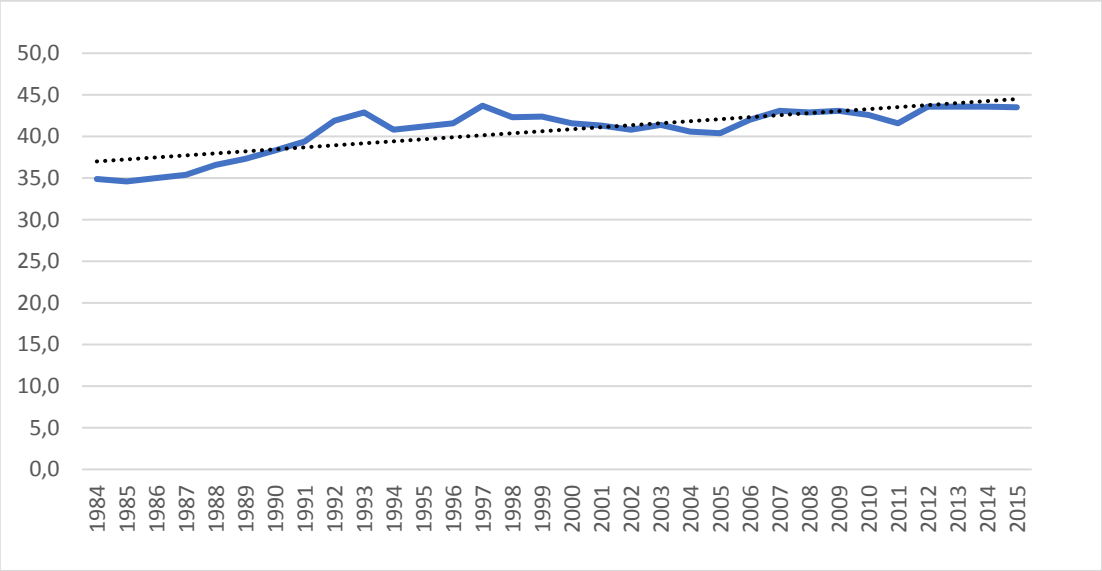
Source: ISTAT's historical series http://seriestoriche.istat.it/

The high public debt is without any doubt the main concern within the Italian public sector. Both for its dimension, in the 2015 Italy was the second EU country for the dimension of its debt reaching 132,7% of the GDP[29], and for its rating, all three bigger rating agencies assign a triple B to the Italian debt[30]. One of the main consequences of the high public debt is that is necessary to maintain a high fiscal pressure. In figure 6, we may observe the fiscal pressure in the percentage of the GDP, and we may observe as from 1984 there was an increase in the fiscal pressure that reaches its peak in 1997. In the following period, the values oscillate from 40% to 43% of the GDP, while in the last four years it was stable at 43,6%.

[29] This result is particularly worrying if compared to the mean of the EU country (85,2%) and to the recommended value of the ECB (60%).

[30] The BBB valuation is the last within the "investment grades", for lower valuation we talk about "speculative grade".

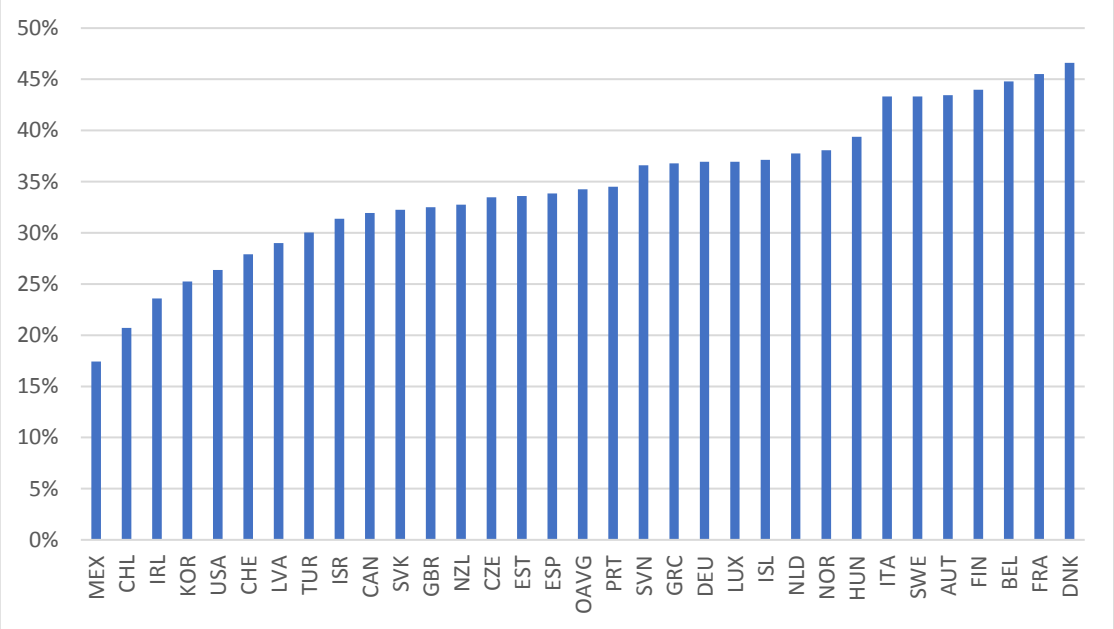
Figure 6: Italian Public debt in percentage of GDP



Source: ISTAT's historical series http://seriestoriche.istat.it/

In general, we may observe as the Italian tax revenue is one of the highest of the world as we may see from the data collected by OECD in the 2015 (Figure 7).

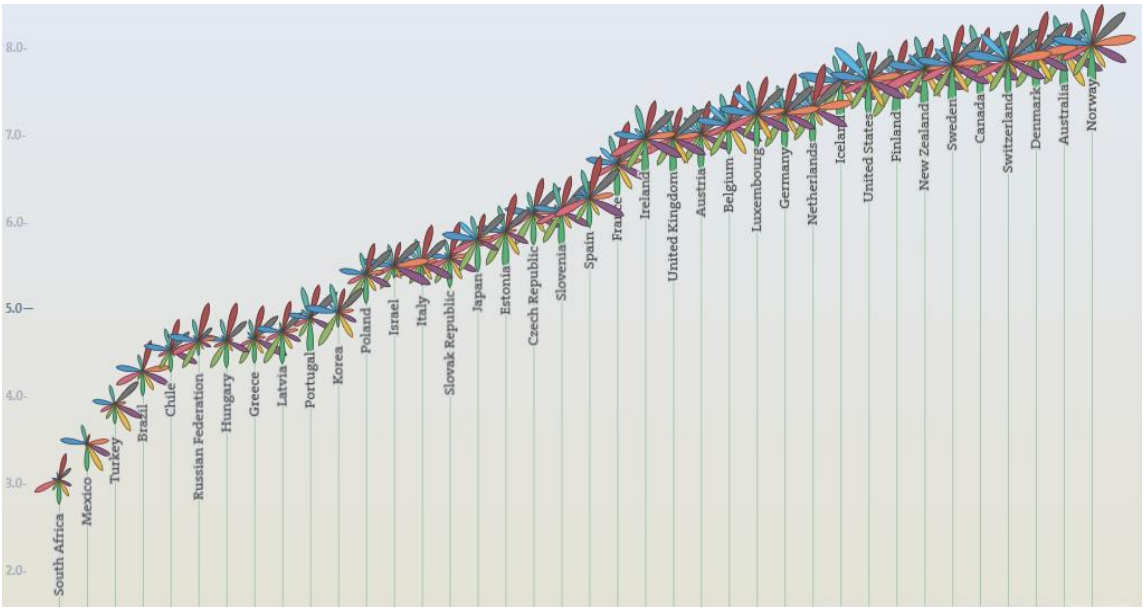
Figure 7: Tax Revenue in percentage of GDP of OECD's countries



Source: OECD online database https://data.oecd.org/tax/tax-revenue.htm

However, at this high degree of tax revenue do not correspond a high quality of the public services. Even if is difficult to quantify the quality of the services of a country we can still measure the quality of life, and the perception of the level of the services. By looking at the 2016 Bes report[31] on the quality of public services we may observe as indicators such as the local transports, utility services, and childcare register a decrease in the last years. This is in line with the 2017 relationship of the *"Ufficio Studi di Confartigianato"* that indicates as Italy is on the 50° position in the *"Doing business"* rankings and as only the 23% of Italian citizen are satisfied with the quality of services, against the European average of 52%. Moreover, the "OECD Better Life index" indicates as most of the high tax revenue states are also among the countries with the better living standards, while Italy is not (Figure 8).

Figure 8: OECD Better Life Index



Source: OECD better life index website
http://www.oecdbetterlifeindex.org/it/#/55555555555

These researches describe a country that is not capable of using in an efficient way tax revenue or that use them for different purposes than provide services for the citizens. Indeed, we may see the high public debt and the high tax revenue as some of the reasons for which in the last years the fiscal federalism gains popularity (Fossati, 1999). In particular, the political agenda of parties such as the Northerner League individuates in the fiscal federalism the way to reduce

[31] Bes report is a report conducted by ISTAT whose aim is to measure the quality of life of Italian citizens through the analysis of 12 indicator such as health, security, education, and quality of services.

the taxes and improve the local services, while the central government considers it as the best method to reduce the public expense. Moreover, the process of European integration, with the introduction of *Stability and Growth Pact*, further exacerbates the need for a reduction of the public debt. So, in this part of our thesis, we will analyse the impact of these processes on the local government's finances.

2.2.1 The impact of the Internal Stability Pact on the local governments

The European *Stability and Growth Pact* was introduced to guarantee that the objectives individuated by the Maastricht treaty of a level of public debt within the 60% of the GDP and a public deficit within the 3% will be respected.

If these objectives are not fulfilled the European Commission may initiate the *Excessive Deficit Procedure*, a particular type of infringement proceedings organized in three steps.

1. If a country is close to the 3% deficit limit, the *European Commission* proposes to the *European Council of the Ministers* to vote an *"Early Warning"* that will become an official recommendation if the country overcomes the 3% limit.

2. After the recommendation, if the country did not put in action sufficient measure to correct the deficit, it can be applied a sanction in the form of a fruitless deposit that will be converted in fine after two years of the persistence of the excessive deficit. The fine will be composed of a fixed level equal to the 0.2% of the country's GDP and by a variable level equal to the 10% of the excessive deficit. However, the sanction cannot overcome the 0.5% of the GDP

3. If the country can apply sufficient corrective measures, the procedure is suspended until the deficit level return to being smaller than the 3% limit. However, if the measures are not effective the procedure will be repeated, and the fine will be applied.

However, the pact just delineates the principles the European countries should follow, while their practical application is empowered to each country internal policies. For this purpose, in 1998 was introduced the *Internal Stability Pact* (ISP). The article 28 of the law n. 448/1998, outlining the *Internal Stability Pact*, states that the local governments contribute to the national financial objectives, set by the *Stability and Growth Pact*, through the progressive reduction of

their public expenses and deficit[32]. Furthermore, the article determines the reduction of the public deficit as the 0.1% of the national GDP setting the actions through this reduction will be obtained:

- Improve the efficiency, increase the productivity, and reduce the costs in the management of the public services.
- Control the growth of the current expenditure in comparison with the previous years.
- Empower the control activity on the local government's own taxes for assuring an increase in the tax base.
- Increase in the financing through payment and tariffs on individual services.
- Sell properties that are not functional to the institutional activity of the local governments.

Moreover, the article states that in case of application of the *Excessive Deficit Procedure's* sanction, the local government that has not respected the limit imposed by the ISP will be called to contribute to the payment of the sanction. The rules of the ISP sustained many modifications over the years. While in the period 1999-2001 the rules of the ISP were the same for any local government level, in the period 2002-2004 we have a "separation" in the rules for Regions and Municipalities.

The Legislative Decree N. 347/2001 established the regionals ISP stating that the regions need to limit, in 2002, their current expenses growth to the 4.5% of the 2000 level while for the following years the limit will be the level of the expected inflation. For current expenses, the decree considers just the accruals and the cash of the regions, in this way the ISP does not affect the expenses for interests, for programs financed with community funds and especially for the national healthcare system[33]. The determination of the health care expenses limit was delegated to agreements elaborated in the *"Permanent Conference for relations between State and Regions"*[34]. The agreement of the 8 of August 2001 determines higher expenses thresholds and support in the financing of the existing deficits in exchange for the regional commitment of respecting the limits so defined and the implementations of rules and regulations that will assure the fulfilment of those limits. In the case, the regions will not respect these limitations the article

[32] In the article the deficit is defined as the difference between the tax revenue effectively collected by the local governments, except from the direct contribution of the central government, with their expenses.

[33] The health care expenses contribute to the 70% of the regionals total expenses http://leg15.camera.it/cartellecomuni/leg14/RapportoAttivitaCommissioni/testi/05/05_cap16_sch01.htm

[34] Freely translated from the Italian "Conferenza permanente per i rapporti tra stato e regioni".

40 of the financial law N. 448/2001 provides that the will be applied the limitations and penalties of the previous 3 of August 2000 agreement, and so the regions will not receive the promised financial support for their deficit. These penalties were extended for all the 2002-2004 period by the legislative decree N. 63/2002.

The 2002 Municipalities ISP introduces two types of limitations to the public expenses:

- The limitations of the deficit growth, computed in terms of cash and calculated as in the previous Pact, in the order of the 2.5% of the 2000 deficit level.
- The limitations to the accruals expenses growth, computed both in terms of commitments and payments, in the order of the 6% of the 2000 level.

Moreover, the financial law for the 2002 defines a reduction of the central government direct financing of the 1%, that will increase to the 2% in 2003 and 3% in 2004. However, the "double" limitations to the public expenses were modified in 2003, and the ISP for the municipalities return to have a singular limitation regarding the deficit growth. This time the deficit was calculated on both the cash and the legal accruals, letting outside from the computation the capital account's expenses.

The 2005 Financial act further modify the limitations of the ISP passing from a limitation in the local government's deficit's growth to a limitation in the local government final expenditures growth, in the measures of cash, legal accruals, and capital account's expenses, for any local governments. The limitations in the regional expenses are in the order of the 4.8% of the 2004 expenses level, while for the municipalities the boundary varies based on the capability of the single municipality to keep its average current expenditure per capita below the average current expenditure per capita recorded within the demographic level to which it belongs. So, in the case the expenditures of the single municipality are higher than the demographic level the limits will be equal to 10% of the 2004 expenditure level, in the other case it will be equal to 11.5%. However, there are some typologies of expenses that are not subjected to the Internal Stability Pact.

With regards to the current expenses are excluded: personnel cost, health care system expenses, expenses for current transfer towards the public administration, social services expenses, passive interest rate expenses, expenses for natural disasters, expenses originated from juridical

sentence over off-budget debts and expenses derived from the exercise of transferred or delegated functions.

With regards to capital's account expenses are excluded: the expenditures for direct transfer towards the public administration, the expenses originated from the granting of credit, the expenditure due to natural disaster and the expenses for the exercise of transferred or delegated functions.

In conclusion, we may notice the "federalist" reforms and of the Internal Stability Pact have produced an increase in the financial responsibility of the local administrations and a reduction in their expenditure. As we will see more in detail in chapter three these conditions and the lack of a suitable regulation allows for the spread of using derivatives contracts by public administrations.

Chapter 3: The use of Derivatives contracts by the Local Authorities

3.1 The derivatives contract in the Italian Public Administrations

As we have seen in the previous chapter, the main issue of the Italian public administration is the quantity and quality of public debt. Therefore, the main concern of the public administrations was to find suitable tools to finance new investments and manage the existing debt in a more efficient way. The *"Manual of Innovative Finance for the Public Administration"* indicates as traditional financing instruments the mortgage, with *"Cassa Depositi e Prestiti"* as the main provider. After the 90s, the public administrations start utilizing more sophisticated financing strategy such as the emission of Obligations, Leasing contracts and the Project Financing (Meneguzzo, 2003). Moreover, there were also purchased derivatives contracts such as swaps and options to perform active liability management of the public administrations. In our work, we will not examine all these new instruments, but we will just discuss briefly the use of derivatives contracts by the central government and analyse in detail the use within local governments.

The use of derivatives contracts by the public administration for debt management is a controversial practice. If used correctly, it should reduce the cost of debt, the level of the deficit, and improve the efficiency of the public administration. However, some researchers observe that the use of derivatives in the country with a high level of debt may cause, on the long term, an increase in the volatility of debt and deficit with unpredictable effects on their amount (Oldani et Savona, 2005). These concerns appear reasonable if we consider some news articles concerning the financial situation of the Italian treasury department. On the *"L'Espresso"* of 12 February 2017, it was reported a journalist investigation regarding two IRS and two "Swaption"[35] contracts that had a negative interest for the treasury department of 23.5 billion of euro for the 2011-2015 period. These contracts were signed in 1994 by the Italian treasury department and Morgan Stanley and give the right to the bank to enter in the swap agreement if the contract has a positive mark-to-market of at least 50 million dollars.

[35] A Swaption is an option that gives the right to enter in a swap agreement; this type of contracts is exchanged into the OTC market.

Table 5: Interest paid by the Italian treasury department due to derivatives contracts

YEAR	INTEREST PAYMENT IN BILLION OF EURO
2011	-2.4 €
2012	-5.5 €
2013	-3.5 €
2014	-5.4 €
2015	-6.7 €
TOTAL	-23.5 €

Source: L'Espresso 12 February 2017 p.25

Moreover, an article of the Financial Times on the same case observes as the treasury department renegotiated the contract in the attempt to stagger the payments to the bank but at a more disadvantageous term for Italy. In the article is also reported the opinion of Professor Gustavo Piga[36] that argues as the derivatives were used mainly to perform "*window-dress account"* to meet the standards settled by the Maastricht treaty (Dinmore, 2013). Therefore, the use of derivatives by the public administration may look as a bad practice whose aim is more window-dressing accounts than performing a correct hedging strategy. However, we should also notice that not all the countries that utilize derivatives for hedging purpose face the same problem as Italy, that actually results as the country with the highest negative impact, and that some country is able to obtain benefit from their use as displayed in table 6.

Table 6: Interest received by the treasury departments in 2015 due to derivatives in euro area.

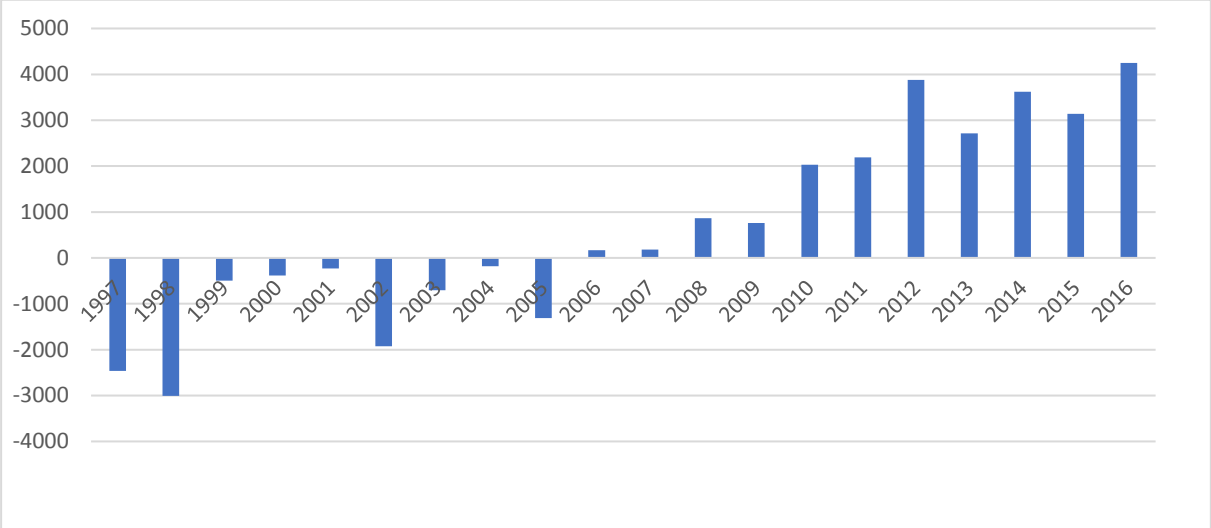
COUNTRY	INTEREST RECEIVED IN MILLION OF EURO
Italy	-3843 €
Greece	-587 €
Germany	-475 €
France	+167 €
Finland	+757 €
Netherlands	+5308 €

Source: L'Espresso 12 February 2017 p.31

[36] Gustavo Piga is professor in Macroeconomics at the University of Rome "Tor Vergata".

Also, the impact of Italian derivatives on the public debt and deficit is not constant over time, recording a positive impact in the period 1997-2005 and a negative one in the period 2006-2016 as displayed in figure 9. This trend may be explained by a change in the strategy of the treasury department. In fact, until 2005 the treasury used interest rate swaps with a short maturity to obtain a fixed interest rate in exchange for a variable one to meet the Maastricht treaty's objectives regarding the public deficit. From 2006 the strategy of the treasury starts settling swap contracts with a longer maturity that guarantee a variable interest rate in exchange for a fixed one, to extend the maturity of the public debt. By performing the change in the maturity length, the treasury department bore a higher risk of decrease in the variable interest rates, that started reducing greatly in the 2007 economic crisis (Longo, 2017).

Figure 9: Impact of derivatives contract on deficit in millions of euro



Source: Sole 24 Ore http://www.ilsole24ore.com/art/finanza-e-mercati/2017-12-14/derivati--stato-ridurre-deficit-poi-e-arrivato-conto-24-miliardi-205415.shtml?uuid=AEGX3LSD

In conclusion, it is not the goal of our thesis to find an answer to the ongoing debate about using derivatives for active debt management, but we still presented this issue to underline some of the main problems that characterize the use of derivatives by public administrations such as the lack in transparency, the difficulty in finding public personnel that know how to manage correctly these instruments, and the lack of a suitable regulation; as we will see more in detail when we will talk about the derivatives within the local authorities.

3.1.1 Derivatives contract within the Italian local authorities

The use of derivatives instrument by a local government is not a "new" practice worldwide. On the 6 December 1994, the Californian *Orange County* fill the paper for federal bankruptcy protection due to the financial distress caused by the high leverage derivatives strategy operated by the *Orange County Investment Pool* (OCIP). The main reason for which the county started using such strategy was due to the introduction of Proposition 13 in 1978 that reduce the amount of taxes on private property to a maximum of 1% of their cash value (Halstead, Hegde and Klein 2004). The strategy performed by the county's treasurer-tax collector Robert Citron[37] was to use the equity of the OCIP, 7.5 billion of dollars, as collateral to borrow additional resources and increase the total asset to 20.5 billion. In this way, the leverage of the Pool was equal to 20.5/7.5 = 2.7, a value not particular high if we consider that before the default Lehman Brothers has a leverage of 30 (Jacque, 2010). However, the pool was supposed to be a money mutual fund, so it was not supposed to be leveraged in the first place. Moreover, the leverage was a double-edged sword, that allows the pool to obtain impressive returns if the cost of debt is lower than the generated yields but will produce severe cash shortage in case of high cost of debt. After 22 years of astonishing returns, thanks to the low-interest rates, an increase in the cost of debt cause a sharp decrease in the pool's returns and a depreciation of the collaterals. This lead to the lenders call for additional resources to compensate the capital shrinking, request that the pool was unable to satisfy due to the cash shortage. To summarize, the investment strategy applied by Citron was to "turn" a money market mutual fund into a hedge fund, increasing greatly the interest rate risk of the Orange County and causing a loss for 1.65 billion of dollars (ibidem, 2010).

A similar case was the *Hammersmith and Fulham London Borough Council*, one of the 32 councils that composed the city of London, whose massive use of interest rates swap derivatives produced some major changes in the England local authorities' financial regulation. The council started using derivatives instruments from 1983 until 1989 when the authority possessed 277 contracts outstanding with a notional exposure of nearly 3 billion of pounds (Tickell, 1988). During the 1983-1987 the borough acted as any other prudent institution using swaps to manage its interest rate risk (Veeder, 1991). From 1987 the council changes its approach by increasing the number of outstanding contracts, that reached 592, and by employing more sophisticated instrument such as swaption. The increase in the number of contracts was so severe that

[37]The county's treasurer-tax collector is an elective office that Citron hold from 1971 to 1995. His political carrier ended due to the County's default and to the following process that sees him guilty of misappropriating public funds, falsifying documents and misleading.

Hammersmith alone held the 10% of all the sterling swap market, in this phase all the transactions of the council were processed solely by the Finance Department's officers, while the elected councillors had no knowledge of the situation. The instruments purchased by the borough "bet" on the maintenance of interest rates at a low level, "unfortunately" the United Kingdom went through a period of relative economic growth that causes an increase in the interest rates. The breaking point was reached on 25 February 1989 when an article of the *Independent* makes public a report of the *District Auditor*, the local expenses watchdog, that sustained as the London Borough Council was not entitled of purchasing swap contracts and that it was necessary to apply to court to clarify the past and future financial position of Hammersmith and Fulham (Tickell, 1988). The following process ended on the 21 January 1991, after three degrees of judgment, with the declaration of the *House of Lords* for which the local authority did not have the authority and the competence to sign derivatives contracts. The main consequence of this process was that all the derivatives adopted by the local authorities were void and so all the financial resources received or paid must be returned[38]. These two cases present some of the main issues of using derivatives contracts by local governments and, as we will see, they were very similar to the Italian cases.

The Italian local authorities started using derivatives contracts in 1996 when the ministerial decree n. 420/1996 was enacted. The decree required that for hedging the currency rate risk all the loan in foreign currency must be accompanied by a currency swap, that should change the nature of the loan in foreign currency into a domestic one without introducing new risks. By looking at the historical series of the derivatives issued by local authorities we may see the evolution of the derivatives market.

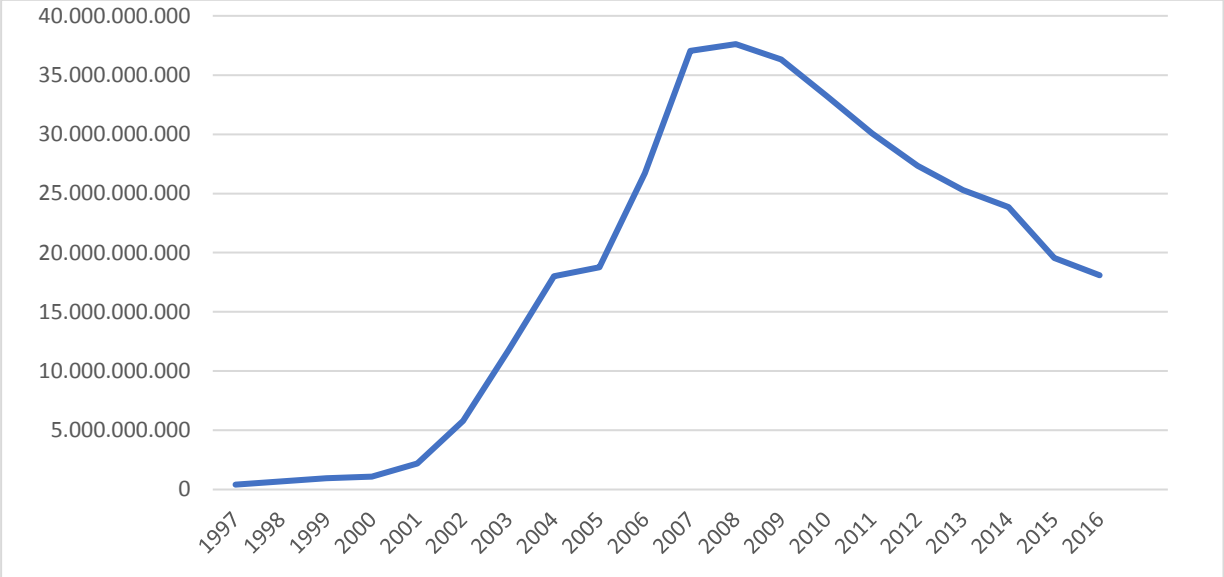
[38] As declared by the layer George Legatt , one of the bank's lawyer in the Hammersmith case, for the Italian journalistic program "REPORT" http://www.report.rai.it/dl/Report/puntata/ContentItem-1835da4a-0467-441b-804d-37587996534d.html

Table 7: Historical series of active derivatives contracts signed by Italian local authorities

YEAR	NOTIONAL IN EURO	NUMBER OF AUTHORITIES	NUMBER OF CONTRACTS
1997	413,165,519	1	1
1998	692,052,245	2	3
1999	942,052,245	3	5
2000	1,099,052,245	3	6
2001	2,204,743,538	43	61
2002	5,802,621,120	180	243
2003	11,759,527,212	383	521
2004	18,006,825,872	550	762
2005	18,766,875,346	607	871
2006	26,720,929,914	743	1170
2007	37,042,601,471	796	1331
2008	37,613,960,541	694	1196
2009	36,320,524,569	549	1002
2010	33,243,015,225	362	727
2011	30,058,500,411	298	617
2012	27,327,984,874	246	506
2013	25,289,993,864	221	459
2014	23,847,475,527	209	423
2015	19,546,437,787	188	378
2016	18,105,069,404	178	350

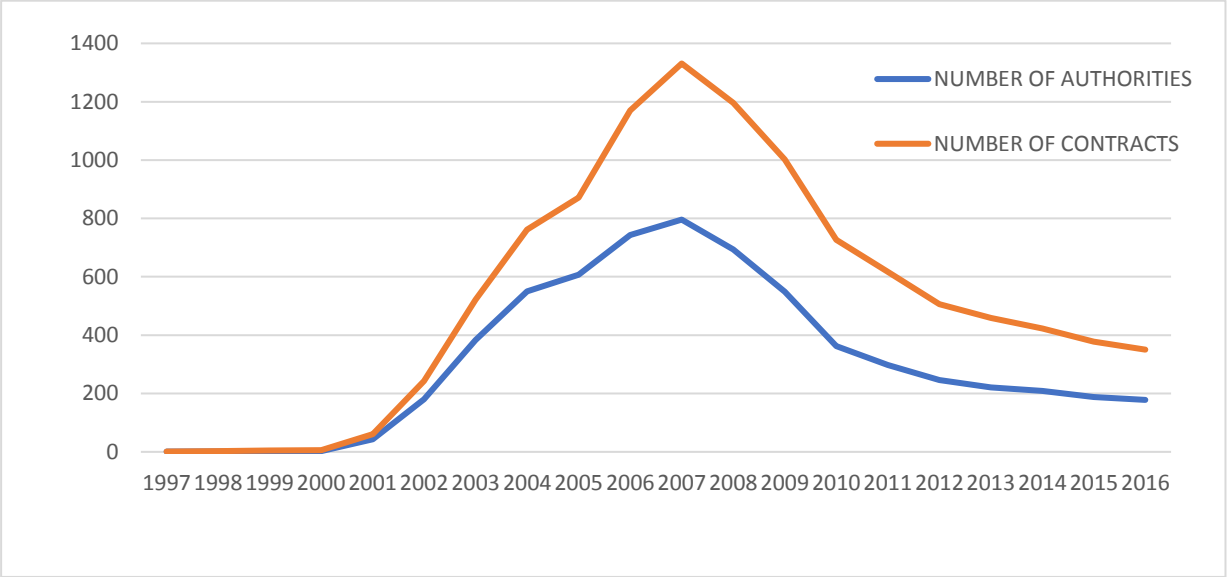
Source: MEF department of treasury report 5
http://www.dt.tesoro.it/it/debito_pubblico/enti_locali/statistiche.html

Figure 10: Notional principal of Italian local authorities' derivatives contract



Source: MEF department of treasury report 5
http://www.dt.tesoro.it/it/debito_pubblico/enti_locali/statistiche.html

Figure 11: Number of active derivatives contract and number of Italian local authorities



Source: MEF department of treasury report 5
http://www.dt.tesoro.it/it/debito_pubblico/enti_locali/statistiche.html

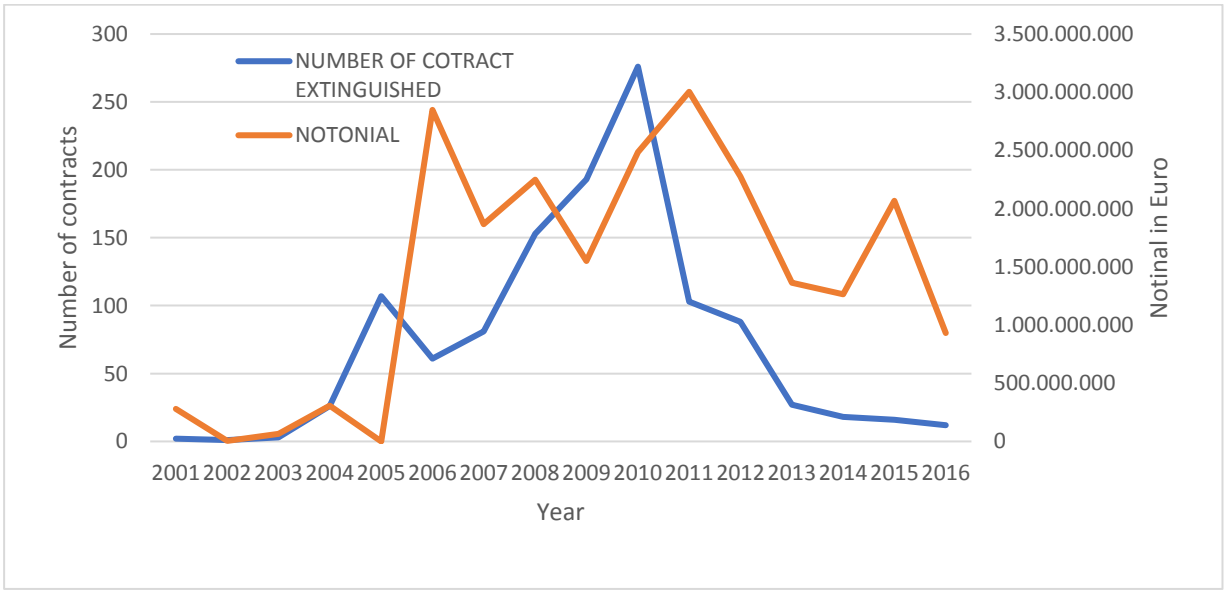
As we can see from table 7 and figures 10 and 11 the use of derivatives increases sharply from 2001 and reaches its peak in 2007-2008 where the value of the notional reaches the 37.6 billion of euro. After this peak, we observe a severe decrease in the number of authorities that use derivatives and in the number of contracts underwritten. This may be explained by the perception of the derivatives as a high-risk instrument that followed the 2007 economic crisis. The reduction in the notional principal is less severe than the reduction in the number of contracts and authorities. This may be explained with the fact that the administrations that underwrite contracts with a "small" notional were able to close them immediately producing a sharper reduction in the number of contracts than in the value of the notional. This supposition may be confirmed by confronting the number of derivatives contracts that were extinguished, with the corresponding value of the initial notional extinguished. By looking at figure 12, we may observe as the number of contracts ended and the corresponding notional extinguished do not have the same pattern or trend. For example, if we consider 2010, the year with the highest number of contracts terminated, we may see as the notional is still smaller than the notional of the 2006 year in which just 61 contracts were ended. Moreover, if we calculate the average notional for each contract, by dividing the total notional for the total number of contract, we obtain 19,333,059 that is small if compared with the 116,821,134 of the contract *"Rialto"* underwritten by the City Council of Venice.

Table 8: Historical series of extinguished Italian local authorities' derivatives contracts

YEAR OF ESTINCTION	NUMBER OF COTRACT ESTINCTED	NOTIONAL
2001	2	278,886,726
2002	1	4,648,112
2003	3	66,105,551
2004	26	307,486,150
2005	107	2.689.621.844
2006	61	2,849,507,253
2007	81	1,866,428,527
2008	153	2,247,689,678
2009	193	1,549,659,427
2010	276	2,484,813,939
2011	103	3,003,708,483
2012	88	2,276,517,561
2013	27	1,362,418,556
2014	18	1,264,702,169
2015	16	2,066,342,702
2016	12	932,765,571
TOTAL	1167	22,561,680,405

Source: MEF department of treasury report 4
http://www.dt.tesoro.it/it/debito_pubblico/enti_locali/statistiche.html

Figure 12: Number of contract extinguished and corresponding notional



Source: MEF department of treasury report 4
http://www.dt.tesoro.it/it/debito_pubblico/enti_locali/statistiche.html

Across the years the regulations and type of derivatives used by local governments sustain major changes. It is difficult to describe in detail the changing process due to the heterogeneity of the local governments and the purchased instruments. However, we may consider the schematization performed by the *"Istituto per la Finanza e l'Economia Locale"* that identify three phases in the use of derivatives.

1. From 1996 to 2005 the main issue of local governments was restructuring debt. Many authorities had long maturity debts with fixed interest rates that were higher that the market interest rate. This happened because these debts were settled before Italy entered in the EU area, therefore in a period in which the interest rates were high. Moreover, the article 41 of the 2002 financial law gives the possibility to issue *Bullet Bond*[39] only if an amortization fund is issued or if it is issued a swap for amortization purpose. So, in this phase the use of derivatives is mandatory in case of debts in foreign currency, as stated in the previously discussed decree n. 420/1996, and in case of issuing of a Bullet Bond. On the other side, it is not mandatory but permitted to use:
    a) Interest Rate Swap, only in the plain vanilla formula;
    b) Plain vanilla Forward Rate Agreement;
    c) Interest Rate Cap and Interest Rate Collar[40];
    d) Other derivatives instruments, obtained through combination of the previously cited derivatives, whose goal is to change the interest rate from floating to fixed and vice versa after at a certain date or after a certain period;
    e) Other derivatives operation whose goal is to restructure the debt, only in the case the instrument has a maturity shorter or equal than the underlying debt.

    The minister, regarding the instruments at terms *d* and *e*, required that the combination does not incorporate leverage or other types of multiplier. Moreover, the minister also remembered that all these instruments should be used only to reduce an existing exposition of the local authority (Atelli, 2008). In this first phase investment banks placed especially swaptions with the combination of interest rate swap and *Digital*

[39] A Bullet Bond is a debt instrument whose principal value is paid all at the maturity date. The instruments issued by the Italian Local governments are *"Buoni Ordinari Regionali"* (BOR) released by the regions, *"Buoni Ordinari Provinciali"* (BOP) issued by the provinces, and *"Buoni Ordinari Comunali"* (BOC) released by the city councils.
[40] An interest rate cap is a series of European call option, with a fixed rate as the strike, that may be exercised when the floating rate reaches a certain point; in the case the options are put the instruments is called interest rate floor. An interest rate collar is a combination of a long (short) cap with a short (long) floor.

Option[41], that may hardly be considered a hedging instrument and are more a speculative tool (Cherubini and Parlato, 2014). The use of Digital Options in combination of swap, cap, and collar agreements is considered illicit under the ministerial decree n. 389/2003 and by the following circular issued by the Ministry of Economy in the 25/05/2004. Indeed, these instruments were used to increase the coupon payments interest rate in case a certain threshold is reached. In this way a collar agreement that guarantee the city council to fix the interest rate to 3%, in the case the Euribor is equal or lower than 3%, to the Euribor, in the case the Euribor is between 3% and 6%, and to 6% in the case is higher or equal to the 6% may be changed in an agreement in which if the Euribor reach the 6% the bank may exercise the option and the city council must pay an 8% coupon.

2. From 2005 to 2013 new regulation concerning the use of derivatives were introduced. The 2007 financial law modifies the derivatives regulation with the commas 736, 737, and 738.
    - Comma 736 aims is to "elevate" into law the principles and criteria stated previously by the ministry (Atelli, 2008). Therefore, the comma introduces four boundaries to enter into derivatives contracts. The operation must reduce the final cost of the debt, reduce the exposition to the market risk of the local authority, shall be an accessory to the negative payments due, and reduce the risk of the payments due. The reduction of the final cost of debt cannot be considered in a literal sense because it is impossible to predict ex-ante how the interest rates will change.
    - Comma 737 introduce the commitment for the local authority to communicate to the Minister of Finance the specific and all the related documents of the contract before concluding it. If the commitment is not respected then the contract is invalid and is inefficient and, therefore, do not produce result.
    - Comma 738 obligates the local governments to maintain, for at least 5 years, a database where all the data about the derivatives contracts issued will be conserved.

[41] Digital Options are a type of Exotic Option that allows the owner to obtain a fixed amount in the case a certain threshold is reached or nothing if it expires without reaching it.

The law 24 December 2007, with commas from 381 to 384, introduces some regulations that can be summarized as:

- All the derivatives contracts made by local authorities must have all the information at the maximum transparency;
- The contracts must be issued following a ministerial framework;
- The Minister of Economics will verify the conformity of the contracts;
- The local authority that subscribe the contract shall certify to understand completely the characteristics and the risks of the underlying contract;
- The local government must prepare a note, attached to the financial statement, in which are reported the costs and the financial burden derived from the derivatives instruments;
- The contracts that do not follows these rules are inefficient;
- All the violations are communicated to the "Corte dei Conti" that act accordingly with the law to prosecute who committed the violation.

However, these regulations become "unnecessary" because of the article 62 of the legislative decree 25 June 2008 n. 112. The decree introduces a temporary prohibition for the local authorities to conclude derivatives contract until the Minister of Economic and Finance (MEF) will introduce a regulation that will define which type of contracts the local authorities may subscribe. The prohibition lasted for 5 years and in that period the minister was not able to elaborate the regulation, having a problem, in particular, with the rules that should guarantee the transparency of the agreements (Cherubini and Parlato, 2014). In this phase, and before the introduction of the prohibition, the main type of contracts used was the interest rate collar that should be a suitable instrument to hedge the interest rate risk. However, many local authorities, and the same ANCI[42], sustain that the banks propose instruments that were not suitable with the local government's purposes and that in general, the insurance obtained through the derivative contract by the authorities was worthless if compared with the insurance obtained by the bank (Cherubini and Parlato, 2014). Moreover, another issue in this phase was the so-called "hidden cost" of the contract, that we will be discussed in detail

[42] The National association of the Italian municipality, in Italian *"Associazione Nazionale Comuni Italiani"*.

in the next paragraph, and that was one of the main reason for which many local authorities sue the banks for misleading practice.

3. From 2013 until nowadays the prohibition introduced in 2008 becomes permanent with the article n.1 comma 572 of the law 2014. Precisely, the article states that:
    - It is prohibited to enter into derivatives contracts as defined by the article 1 comma 3 of the legislative decree 24 February 1998 n. 58;
    - It is prohibited to renegotiate the existing derivatives contracts;
    - It is prohibited to negotiate financing contract that includes derivatives instrument.

    However, the same article in the commas 3-bis, 3-ter, and 3-quater established some exceptions:

    - The total early termination of the derivatives contracts.
    - The reallocation of the contracts to another entity through a subjective novation, and without any modifications of the contracts original shape.
    - The restructuring of the contract to reduce the liabilities on which the contracts are based or to change the nature of the interest rate to maintain the total debt equal to the original liability. In the renegotiation, no supplementary derivatives should be used.
    - The financing contract that includes interest rate cap.

By looking at the regulation evolution of derivatives contract we may suppose that the use of derivatives was overall negative for local governments. Indeed, the permanent prohibition introduced in 2014 is a clear demonstration of a negative evaluation of the local government's derivatives experience.

3.2 Main controversial

Around 2008 there was an increase in the perception of derivatives contract's risk. This was caused both by their role played in the 2007 financial crisis and by their contribution to the financial distress of many Italian local authorities. Even the media were interested in the matter and on the many legal cases that were promoted across Italy[43]. For example, *"Report"*, one of the most important Italian journalistic television programs, dedicated two episodes on the use of derivatives. The first episode, "*Il banco vince sempre"*, was aired on the 14 October 2007 and described the use of derivatives in Italian small and medium enterprise and in the local governments; while the second episode, *"Speculando s'impara"*, was aired on the 8 April 2008 and deal specifically with the use of derivatives contracts within the local authorities. In both episodes derivatives contracts are presented as "ambiguous" tools that are difficult to understand and to be used. Precisely, they underline some of the main legal issues concerning the use of these instruments. In our thesis, we will not analyse all the legal issues concerning derivatives use but we will concentrate on the two issues that were discussed the most by the media and by the Italian courts of justice: the qualified operator and the implicit cost.

3.2.1 The qualified operator

The regulation regarding the type of investor knows two different phases, one before the 2007 introduction of the *MiFID*[44] in Italy and one after it. In our thesis, we will focus on the regulation before the MiFID because most of the legal cases regard contract issued before the introduction of the European directive. Before the introduction of the MiFID, the main rule that governs the types of customers and their rights and duty was the article 31 of the CONSOB's regulation n. 11522/1998. The regulation divided the users of financial instruments into two types, *Retails investors* and *Qualified operators*. Precisely, the article 31 states that the provisions of articles 27, 28, 29, and 30 do not apply to the qualified operators; these provisions are:

- Article 27 states that financial intermediaries need to monitor to detect any conflict of interest, cannot operate for their customer if they have a conflict of interest and must indicate in a formulary the presence of any conflict of interests.

[43] To see a brief list of some of the main legal cases regarding derivatives use by local government in the discussed period we refer to the 29 April 2009 *"The Republic"* article *"Enti locali, scatta l'allarme derivati inchieste da Milano a Taranto"* http://www.repubblica.it/2009/04/sezioni/economia/crisi-31/crisi-31/crisi-31.html.

[44] The *Market in Financial Instrument Directive* (MiFID) is the name given to the EU directive 2004/39/CE one of the most important steps in moving towards an integrated European financial market regulating matter such as the classification of the customers or the informative obligations.

- Article 28 states that the intermediaries before providing services or signing contracts must inquire the customer's knowledge on financial tool, provide to them the description of the risk connected with each instrument, and cannot make or propose financial operations if they didn't provide the necessary information on the nature of the instruments. Moreover, the article indicates as the intermediaries need to inform the customers in the case the instruments generate an effective or potential loss of the 50% of the assets given as collateral for the operation or if the value of the reduction of the invested capital reaches the 30%.
- Article 29 states that the intermediaries must avoid performing non-suitable operations for the customer, even if the customer requires the operation.
- Article 30 states that the intermediaries can provide their services just under regular contract. A contract to be regular must indicate the service provided and their characteristics, indicates the maturity and the eventual renegotiation procedure, indicates how the customer can give orders or instructions, and provide frequent documentations to the investors.

To be considered as a qualified operator it is necessary to have a knowledge and direct experience of the financial markets and financial instrument certified by the legal representative or to be one of the types of institution that are automatically considered qualified operators, such as pension fund, investment fund, and authorized intermediaries. In the article are not indicated any objective characteristics to demonstrate the truthfulness of any declarations that in many cases was a merely auto certification. This made the declaration of being a qualified operator as one of the biggest controversies of the use of derivatives contracts, specifically, it was not clear if the only declaration was sufficient to consider an investor as a sophisticated operator and therefore to make him lost the "protection" of articles 27, 28,29, and 30. In this way, many local authorities sue the banks sustaining that the information provided was not sufficient and that they signed the contract due to misleading practices. On this subject the *"Corte di Cassazione"*[45], with the 26 May 2009 sentence n.12138, provides an important clarification; stating that the declaration is itself sufficient to consider an investor a qualified operator unless it is clear, considering the information provided to the intermediaries, that the declaration is false. A fake declaration does not produce any effects and, therefore, the intermediaries are subjected to the previously discussed articles. In this case, it is necessary to

[45] The Cassazione is the last court of justice in the Italian legal system with authority over the sentence of the lesser courts.

verify if the intermediary make some actions that can cause the annulment of the contract following the rules of the civil code regarding the conclusion of contracts.

After the introduction of the MiFID, the typologies of investors were changed in *Retail Customer*, *Professional Customer*, and *Eligible Counterparty*. Moreover, the professional customers are divided in *Private Customer* and *Public Customer*; with the last one that is subject to additional regulations of the Minister of Economics and Finance. The new CONSOB regulation, n.16190/2007, introduces also objective characteristics for obtaining the title of professional customer and eligible counterparty such as the dimension of the company or if they are authorized to operate into the exchange market. In conclusion, in our research on the subject we have seen as, until 2007, the main source of legislation was a secondary source such a CONSOB regulation with many "weak points" for example lacking any indication regarding the case of inefficient declaration. Due to this, it was necessary the intervention of the judiciary to elaborate a suitable approach that however was not able to indicate a specifically penalty.

3.2.2 Implicit Commission

In the online glossary of the *Sole 24 Ore*, the implicit commissions are defined as the difference between the fair value of a swap contract and the eventual upfront paid by the bank. The commission is also described as the bank's profit for arranging the contract and the reserve for the counterparty risks and the hedging risks to which the bank is exposed (Hull, 2012). The implicit cost was one of the themes on which media, like *Report*, focused the most, arguing that *"So on one side we have the local authorities who say that there are no costs and on the other the financial operator that say that there is a cost that is invisible."* (Report, 2008). The transmission gives the impression that banks do not provide all the information needed to the local governments, that do not have the knowledge to understand the instruments that they are purchasing, to obtain a hidden profit. This approach appears to be shared by some Italian justice courts, such as the "Consiglio di Stato[46]" with the sentence 7 September 2011 n. 5032, and the Civil Court of Milan with the sentence 14 April 2011 n. 5118. In sentence 5032, the court considers as temporarily legitimate the decision of the Province of Pisa to void in self-protection the interest rate swap contract signed with DEBFA Bank Plc and DEXIA S.p.A. In the sentence, the court recognizes how, even if the contract was legitimate, the public administration may still annul it because the economic viability required by the article 41 of the law 28 December 2001 n. 448 was not correctly estimated due to the presence, presumed, of the implicit costs.

[46] The "Consiglio di Stato" is the superior administrative court of justice within the Italian legal system.

Sentence 5118 states that swap contracts that are underwritten by the public administration that presents a negative mark-to-market that is not entirely compensated by an upfront should be considered null. The court justifies his decision by considering that the nature of the contract was distorted due to the high negative mark-to-market and by the presence of implicit commissions, that cause an initial mismatch against the local authority[47] that is not in line with the purpose of debt restructuring. Moreover, the court ignores the fact that the city council presented the declaration for being a qualified operator, rejecting also the bank's defence that in "real life" is not possible to have a swap contract with an initial value equal to zero and that the so-called commissions are the compensation for the contract's arrangement. Some courts follow a completely different approach justifying the application of the implicit commission. This is the case of the sentence 10 December 2012 n.2660 of the justice court of Verona, that argues that the implicit costs are perfectly legitimate. The court, following the previously discussed sentence n. 12138/2009 of the Cassazione court's approach, ignores the alleged infractions of the general behavioural constraint of the financial intermediaries due to the presence of the declaration of qualified operator. Also, the court states that the gross margin in favour of the bank is not automatically a sign of abnormalities of the operations unless the imbalance against the customer is excessive. In this way, the tribunal accepts the defence that there are no swaps that have an initial value equal to zero in the "real world", and that even if the commission are too much severe this cannot lead to the annulment of the contract but to a simply compensation.

To us it appears as the regulation over the subject of the implicit cost is not complete, letting the subject being ambiguous and letting different juridical approaches coexists. Moreover, it appears as the mechanics of swap contract, as described by Jonh Hull[48], are not understood by the courts, that in some cases, see the implicit cost simply as a trick of the banks to obtain an illicit profit.

[47] The sentence obscure, we suppose for privacy reason, the name of the city council that settled the contract.
[48] Even the term "implicit cost" may be considered misleading, considering that the customer of the swap does not really have any actual cost but he just enters in a contract with a mark-to-market slightly negative but whose negativity may change during the life of the contract and do not preclude the contract to produce a reduction in the cost of debt.

Chapter 4: Case studies: The municipalities of Milan and Venice.

In this chapter, we will present two case studies regarding the use of derivatives contract by Italian local authorities, the case of the city of Milan and the case of the city of Venice. In our opinion, analysing in detail two real examples may help to understand the issues presented in the previous chapters.

The case of Milan is presented to underlying the legal issues linked to the use of derivatives, specifically regarding the difficulties of the magistracy in judging these cases and the lack of a suitable regulation on the matter.

The case of Venice is presented to deepen the evaluation process of financial operations concerning derivatives and trying to understand if the decision of the city council of Venice were reasonable.

4.1 Milan case study

The case of Milan regards the use of derivatives contracts in the city's debts renegotiation process and the following process for fraud promoted against the arrangers banks by the penal court of Milan. In our thesis, we will describe the facts as indicated by the sentence n. 13979/2012 and the following appeal sentence n.1937/2014. In 2005, due to the lost revenues obtained from the failed selling of SEA's stocks[49], the city was facing a financial shortage that made difficult to reach the balanced budget. Specifically, Giorgio Porta, the general director of the city of Milan, indicated a lost revenue of 100 million of Euro for which it was necessary to reduce the current expenses. However, 2005 was the year before the election, and the reduction of the expenses was an unpopular decision. For this reason, the assessor to the budget, Mario Talamona, decided to use the possibilities provided by law 28 December 2001 n. 448 and by the decree 1 December 2003 n.389 to convert the debts toward Cassa Depositi e Prestiti and other banks into a bullet bond with a linked amortizing swap. The following

[49] SEA S.p.A. is the group that controls and manages the Linate and Malpensa airport and all the connected activities. The city of Milan tried to sell, in 2005, through auction the 33% of their participation in SEA S.p.A for at least 600 million of Euro. However, the selling was a troubled process that was suspended by the *Regional Administrative Tribunal* due to the decision of the city to change the auction's conditions while the tender was under execution.

tender process for the selection of the arranger banks for issuing the bullet bond and eventually restructuring an existing IRS with Unicredit Bank saw as winners *JP Morgan Chase bank*, *Deutsche Bank*, *UBS Limited* and *Depfa Bank Plc*. that agreed to provide their services in exchange for a commission of 0.01% on the total of the operation. On the 27 May 2005, the four banks sent to the offices of the city a Memorandum relative to the financial bond, with attached the calculation over the economic viability, estimated in 57 million of euro, of the operation that was the necessary condition for issuing the bullet bond. At this point, the city could choose between three different instruments to amortize the bond; the creation of an *Internal Amortizing Fund*, issuing an *Amortizing Swap* or issuing an *Amortizing Swap with Sinking Fund*. The fund was considered not a suitable decision due to the managing difficulties and to the high fiscal cost connected, while the swap with sinking fund was considered not suitable due to the fiscal ambiguity of the instrument and to the longer issuing procedure that was against the city plans[50]. For these reasons, it was chosen the "simple" amortizing swap and, on 16/06/2005, the city council approved the city's government decision of issuing a bullet bond with the four arrangers bank as counterparties of the linked swap. Therefore, on 24/06/2005 it was performed the pricing of the bond, and on 27/06/2005 was issued the bond with a principal of a 1 billion and 700 million euro underwriting, at the same time, four amortizing swap contracts with a linked collar. Precisely, the contracts were organized as follows:

- The city receives a fixed interest rate payment, calculated on the bond's principal, from the bank that are equal to the bond's coupon.
- The city pays to the banks a variable interest rate, equal to the Euribor 12 months plus a spread, calculated on a decreasing principal that follows a predetermined amortizing plan.
- The payments of the city are subjected to a collar with a cap equal to 6.19% and a floor of 3.48%.
- The city delivers to the banks the capital share indicated on the amortizing plan, not receiving any payment on these shares.
- At the maturity of the swaps, the banks will deliver to the city all the accumulated shares of capital and the city will extinguish the bond.

[50] On this matter, we recommend reading the testimonies of the lawyer Danusso, bank's defense attorney, reported at page 201-202 of the appeal sentence 1937/2014.

At this point, the banks and the city decided to incorporate into the operation an old IRS contract, with Unicredit bank as counterparty, and a negative mark-to-market for the city of 96 million euro. To integrate this swap the city paid 20 million euros to Unicredit bank, with the resources set aside for this purpose. The four arrangers bank bought 48 million and "distributed" them into the new operation while the remaining 28 million were renegotiated by Unicredit bank and acquired in 2006 by Deutsche Bank through the modification of the existing swap contract. Between 2006 and 2007 the city renegotiated the contracts with the banks many times, the last operation was the purchase of a CDS over the default of the Italian Republic in exchange for an upfront of 14 million of euro.

All these operations were considered by the Prosecutor of Milan as complex fraud operated by the four banks against the city of Milan. For this reason, it was requested the formal accusation of the four banks and of some banks and city's officers, as we will see more in detail in the next paragraph. The judgment at first instance saw the four banks guilty of fraud and sentence them to pay a penalty of 1 million euro each and to return 88 million of euro obtained through the fraud; however, the sentence was overturned in appeal, and the four banks were found innocent. In our thesis, we will analyse in detail the two sentences underlining for which reason the appeal court found the first instance sentence not reasonable.

4.1.1. The first instance process

The sentence n.13976 of 19 December 2012 was one of the most important sentences on the use of derivatives by local authorities. The importance of the sentence is both in the fact that it is one of the few cases where banks were banks were sentenced to a penal felony and because the following appeal sentence was an important contribution to the debate on the use of derivatives by local authorities (Danusso, 2014). The sentence, delivered by the monocratic judge Oscar Magi, listed seventeen defendants[51] for ten charges[52]. The Prosecutor of Milan asked the absolution for lack of evidence for Giorgio Porta, Mauro Mauri, and two bank's officers while he asked the conviction of all the other defendants, demanding a penalty for each bank of 1,500,000 euro and the seizure of 72,544,496 euro as the profit of the fraud. Before discussing the reasons for which the first instance's judge condemned the defendants, we will

[51] Among the defendants eleven were bank's officers, there were also the four arrangers banks and two city's officers; Giorgio Porta general director of the city and Mauro Mauri member of the city's technical commission that evaluate the bullet bond.

[52] All the charges were for fraud; the charges from A to B were relative to the economic viability declaration, the charges from C to F regarded the falsification of the swap amortizing's condition to obtain an illicit profit and the charges from G to L were against the four banks for the administrative irregularities connected to the fraud.

briefly discuss the *"report Corielli*[53]*"*. The report answered to five technical questions of the monocratic judge; these questions were:

1. If the IRS settled with Unicredit bank in 2002 should have been considered a liability of the city and if this liability should have been considered in the economic viability declaration. Professor Corielli stated that active derivatives contracts could not be considered liabilities. However, the MEF's decree n. 389 of the first December 2003 indicates that derivatives can be made just on existing liabilities. Issuing the bullet bond, the city of Milan was closing the liability on which the Unicredit's swap was based. Therefore, the expert indicates that the city should have closed the Unicredit's swap before opening the new amortizing swap and that the costs for closing it should have been considered in the economic viability declaration.

2. If the banks obtained a profit from the operation and how much was this profit considering the market's bid/ask spread for the swap interest rate, the volatilities to evaluate cap and floor and the credit spread for the counterparties. On this matter, professor Corielli didn't take a position. Stating that a cost for the city is not automatically a profit for the banks and that the evaluation of which ones are profits of the banks is "duty" of the tribunal and limiting his analysis on the evaluation of the positive position of the banks. This positive position is evaluated as 53,769,148 Euro for the first operation (bullet bond) and between 37,648,158 and 45,318,103 for all the following operations (renegotiations and CDS)[54].

3. If it is correct to say that the swap's initial value should be equal to zero and if the eventually disadvantaged party should receive compensation to rebalance the contract. Moreover, the judge wanted to know how much the costs for intermediation should be and if the banks should have informed the counterparty of these costs. The professor stated that the initial value of the swap should be equal to zero but the counterparty that buys the swap, in this case, the city, must pay the arranging cost, that the two counterparties exchange a credit position and that additional spread may be added. On

[53] The report was made by Francesco Corielli, at the time associate professor of General and Financial Mathematics at the Bocconi University of Milan.

[54] The main difference between the evaluation of Professor Corielli and the defence's evaluation regarded the "use" of the credit in the first operation. The defence's evaluation did not consider the cost of credit of the bank while the professor considered it into a 2-way risk model. For more information, we recommend reading the analysis of professor Corielli from page 54 to page 69 of the sentence n.13976 of 19 December 2012, in particular, we suggest paying attention to table 1 at page 57.

the correct estimation of the arranging cost, the expert observed as there was no estimation of the costs, in the sense that the banks and city did not discuss these costs. Regarding the compensation, in the opinion of Corielli a swap with a not equivalent initial value that requires compensation, such as upfront, cannot be performed in the current case. At last, the professor indicates as he "lacks" the legal knowledge to say which types of information on the costs the banks should have communicated to the city. However, the professor was surprised by the fact that the banks were both arrangers and counterparties of the city of Milan, making the legal matter on their informative duties confused.

4. If there were alternatives to the swap to amortize the bullet bond and if these other options were considered. In the opinion of the professor, alternative options were considered, but their economic viabilities were not exhaustively analysed.

5. If the profit obtained by the banks should have been entered in the budget when the contract was settled or just after each financial transaction generated by contract. Professor Corielli, in his valuation of the IAS39[55] functioning, indicated that the operation produced an initial profit that will be corrected for each future financial transaction generated by the operations.

The court's judgement of conviction was based on two juridical matters: the fake declaration of economic viability and the conflict of interest derived from the double position as arrangers and counterparties taken by the banks. On the first matter, the judge considered the calculation of the economic viability as the fundamental core of the bank's misleading practice that led the city of Milan to worsen its financial position. In his interpretation on the matter, the judge took into account a long series of laws and regulation such as:

- The article 119 of the constitution that allows the local authorities to make debt just for financing their investments.

- The already discussed article 41 of the law n. 448/2001 that discipline the emission of bullet bond.

[55] The *International Accounting Standards 39: Financial Instruments: Recognition and Measurement* is an international accounting standard for financial instruments released by the *International Accounting Standards Board* (IASB) that was adopted by the European Union in 2004.

- The 1 December 2003 ministerial decree concerning the access of the capital market by the local authorities and the following 27 May 2004 MEF's circular letter that clarify the application of this regulation.

- The financial law for the 2003 n.289 that states, at the last comma of the article 30, the nullity of the contracts that violate the article 119 of the constitution.

- The 28 June 2006 MEF's circular letter even if it is after the first city's operation.

The judge considered the reduction of the debt's costs as the main purpose of article 41 and therefore the concept of debt cannot be limited to the liabilities, but the terms cost must be seen in the broader sense. In this way, the simple verification of the economic viability as indicated in article 41 is not sufficient to guarantee the effective costs of debt reduction. In particular, the judge supposed that the derivatives contracts should be included in the evaluation[56], unless their initial value is equal to zero and, therefore, the swap represents no additional cost. Moreover, the procedure of "absorbing" a derivative contract into a new one was considered in contrast with the MEF's circular letter of the 27 May 2004. That indicates as derivatives can be made only on liabilities, and, in the opinion of the judge, that no renegotiation may produce an additional cost for the city. Therefore, the economic viability of 57 million of Euro, which in the opinion of the judge was guaranteed for all the 30 years of the operation[57], was faked due to the lack of the implicit and explicit cost of the operation. Specifically, the judge evaluated, in this case with no support from the Professor Corielli, the cost of the operations in the order of 52 million for the first operation and 14 million for the second. To which it should be summed 68 million of the Unicredit's swap, and 33 million for the renegotiations of the 2006 and 2007. Obtaining a total cost of 167 million, that is higher than the certified economic viability of 57 million provided by the banks. The defence presented by the banks was that the Unicredit swap existed before and after the issuing of the bullet bond and therefore will be incorrect to compute it as a cost of the operation; this defence was considered as completely illogical by judge Magi.

[56] This was not done for the Unicredit swap, whose negative mark-to-market of 96 million of Euro was not considered in the evaluation of the economic viability.
[57] The calculation provided by the banks did not provide a 30-year guarantee as we will see more in detail in the next paragraph.

On the banks' conflict of interest, the main legislative source that we must take into account is the already discussed article 31 of the CONSOB's regulation 1522/1998[58]. The prosecutor of Milan individuated two different type of juridical interpretations of the article 31. The first approach interpreted the norm in a formally, indicating that the formal declaration of a legal representative of the society exonerate the intermediary from verifying if the customer possesses the required expertise to be a qualified operator. The other approach is the opposite and claims that even in the presence of a formal declaration the intermediary must still verify the credibility of the declaration by verifying the effective customer's competence[59]. In the opinion of the prosecutor, the Milan court of justice, with the sentence 3513/2012, follows the second approach. Therefore, the banks, which in their role as arrangers were subject to the Italian law[60], were obligated to follow the article 21 of the *Testo Unico delle Disposizioni in Materia di Intermediazione Finanziaria* (T.U.F.) that indicates as the intermediaries in providing their services should:

- Act with diligence, fairness, and transparency in the interest of the customer and for the integrity of the financial market.
- Obtain the necessaries information from the customer and guarantee that will be properly informed.
- Organize themselves to reduce at the minimum the conflicts of interest and, in a conflict situation, acting in the way that guarantees to the customer transparency and fair treatment.
- Possess resources and procedure that will guarantee to perform services efficiently.
- Having a management independent, sound, and cautious that will guarantee the respect of the customer's rights.

These principles were "put in action" by the CONSOB's regulation and in the opinion of the prosecutor were not respected. With particular regards for the verification of the actual knowledge of the city on the financial markets, as indicated by the article 28, and regarding the lacked communication of the banks' conflict of interest, in breach of the article 27. Moreover,

[58] The article states that in case of qualified operators all the customer's protections guaranteed by the articles 27,28,29 and 30 of the regulation do not apply.
[59] For a list of the Italian courts of justice that follows the two different approaches, we suggest the reading of the pages 136-137 of the Milan tribunal 13476/12 containing the declaration of the Milan prosecutor.
[60] As determined by article 13 of the city's Executive Decision n. 57/2005 that indicates specifically the Italian law as the legal source that will regulate the tender for the arrangers roles.

the banks due to the article 13 of the ISDA Master Agreement[61] were subjected to the English law in their role as counterparties. For the prosecutor, the banks were subjected to the *Financial Services Authority's* (FSA) regulations, precisely to the principles included in the *Conduct of Business* (COB). The COBs considered by the prosecutor is the 4.1.4 that states as the financial institution must perform any suitable action to understand if the customer is a *retail customer*, an *intermediate customer*, or a *homogenous counterparty*. The rules also indicate that local authorities should be considered intermediate customers, and therefore can receive all the customer's protection guaranteed by the FSA's principles 6, 7, 8, and 9. These principles state that the intermediary must act with regard to the customer's interests and suitably treat them, considers the customer's needs for information and provide them in a clear way, manage the conflicts of interest in an appropriate way and that must guarantee the adequacy of its advice for any customers. However, there is the possibility to consider a local authority as a homogenous counterparty. But the procedure provided by the COB 4.1.12 requires that the intermediary communicates in written form to the customer that is going to be put into the professional category, and that will, therefore, have lost all the protections provided by the FSA's principles. Moreover, the COB 4.1.15 indicates that the customer's typology must be verified every year to ensure that is the one most suitable for the type of business made by the customer. In the opinion of the prosecutor, the banks did not follow the COB's provisions and therefore even in their role as counterparty they fail in informing the customer of the existing conflict of interest. The judge found the argumentations of the prosecutor reasonable and indicates as the conflict of interest was due to the coexistence of two different types of economic profit earned by the banks; a fee profit for the arrangers' services and a profit due to the effective profit derived from the market as counterparty. Moreover, the judge sustained that even if the city of Milan presented in the past[62] a declaration as qualified operator, this was not sufficient to let the banks assuming that the city possessed the suitable knowledge and that was necessary a verification as indicated by the English and Italian regulations. Therefore, the lack of this verification and the failure in providing to the city any of the protections required by the article 21 TUF and by the FSA is, in the opinion of the judge, a guilty omission that hides a fraudulent intention.

[61] This agreement is the contract with which the city of Milan, the 27 July 2005, accept the contract proposed by the four banks and in which the banks are indicated as counterparties.

[62] The declaration was presented in 2002 when the city issued the swap with Unicredit.

However, the following appeal process completely annuls all the decision taken by the Judge Oscar Magi, with the result that the penalties and the confiscated profits were returned to the banks.

4.1.2. The appeal processes

Following the first instance sentence, the four banks appealed to the fourth penal chamber of the Milan Appeal Court[63] that absolved, with the 3 June 2014 sentence n. 1937, the four banks and all the sentenced officials because *"…there is no substance to the fact"*[64]. Due to this sentence, the penalties applied to the banks, the confiscated "profits", and the officials' punishments were annulled. Before discussing the Judges' argumentations for reversing the first instance sentence, we will briefly discuss the reason for the appeal invoked by the four banks. Each bank presented a detailed and articulated appeal in which they clarified their position and offered a long series of reasons for which the first instance sentence should be annulled. In our work, we will present just the motivations as presented in the sentence, integrated, where necessary, with some of the specific argumentations presented by each bank. The court of appeal individuated three motivations of annulment common to all the banks and one made by the Depfa Bank Plc. The motivations common to the four banks are the invalidity for apparent justification, the invalidity for the divergence between the original charges and what discussed in the sentence, and the invalidity for the illicit use of the valuation provided by David Dobbel. While the argumentation presented by the only Depfa Bank is the lack of a translation of the proceedings of the trial.

- Regarding the apparent justification, the articles 125 of the Code for Criminal Procedure (c.c.p.) indicates that in case of missing justification the sentence is null. Moreover, the article 546 of the c.c.p. indicates that the sentence must contain the facts and the regulations on which the sentence is based and the reasons for which the judge does not consider credible the contraries proofs presented by the defence. In the opinion of the appellants, the judge conclusions were *"…completely disconnected from the findings of the trial…and the judge was surprisingly disproved by his expert…"*[65]. Specifically, the judge ignored or analyse in a superficial way most of the proofs presented by the

[63] Composed by the president Luigi Martino and by the two councilors Paolo Maria Giacardi and Franca Anelli.
[64] Translated from the Italian legal expression *"Perché il fatto non sussiste"* that represents the full acquittal formula in the Italian legal system.
[65] UBS's appeal page 87 as reported in the appeal sentence at page 80.

defendants[66], made consideration on the proof based on wrong or not proved assumptions, and committed material mistakes that produced severe consequences in the sentence. For example, UBS considered completely wrong the valuations provided by the judge on the economic viability both in terms of legal basis and mathematical calculations. In the first place, is reported that legal definition of economic viability is the reduction in the financial value of the local authority's total liabilities, net of commissions and the eventual retrocession of the tax revenue and that the calculations should be borne by the local authority and not by the bank. Therefore, in the opinion of the bank, the derivatives contracts cannot be included in the evaluation of the economic viability because they do not represent a liability[67]. In the second place, the calculations made by the judge, with no support from the experts, considered wrongfully the cost of the derivatives operation two times and incorporated the cost of the futures swap renegotiations. Specifically, the first instance judge subtracted from the economic viability of 57 million, indicated by the banks, 66 million[68] of implicit costs on the first operation, as evaluated in the Corielli's report. 68 million of "explicit" cost, as estimated by the judge, represented by the Unicredit swap, and 38 million of implicit costs for the swap renegotiations of the 2006 and 2007 with a final negative position for the city of 110 million. In the opinion of the bank[69], in the evaluation of 57 million was already considered the deterministic representation of the IRS/COLLAR that if removed will return an economic viability into a range between the 90,3 million and 74,3 million of euro, as estimated by the city's experts. If from this evaluation are removed the 66 million of the first operations the viability remains in a range between 8 million and 24 million. That must be increased to 41,7 million due to the presence of the *early termination clause*[70] and further increased to 53,9 million since the bank in the June 2005 did not know that in September of the same year there will be a renegotiation of the IRS/COLLAR. Moreover, from this estimation should not be subtracted either the 68 million of the Unicredit's swap. Since it is being obtained from the negative swap's mark-to-market, that is not a liability, and that was already considered in the

[66] Such as the support provided to the city by the Chiomenti law firm, one of the most important financial law firm in Milan, or the placet obtained by the city from the MEF regarding the operation.
[67] As also stated by the Judge's expert professor Corielli in his report.
[68] This 66 million is divided into 52 million as an implicit cost for the emission of the bullet bond and 14 million for the renegotiation of the Unicredit's swap.
[69] That even if did not agree with the calculation procedure provided by the prosecutor's experts still decide to utilize them in the following evaluation to prove that the judge calculations are incorrect under any point of view.
[70] This clause allowed the city to ask the liquidation of the contract through cash at any moment if the rating of the bank would be lower than A.

renegotiation cost of 14 million and neither the 38 million of the future renegotiations because the bank did not know, and cannot logically predict, their existence. Therefore, the so calculated economic viability is very close to the value estimated by the banks in the June 2005, making the supposition of the judge of operation negative for the city fake. Moreover, the bank criticized also the argumentations regarding the infringements of the Italian and English regulations. Stating that the city of Milan asked to be treated a qualified operator and therefore were not subjected to the already discussed TUF protections and that in the ISDA master agreements the banks refused to be considered as advisors of the city, so they were not subjected to the previously discussed English regulations.

- Regarding the divergence between the original charges and what discussed in the sentence, article 521 of the c.c.p. states that there must be a correlation between the charges and the sentence. In the opinion of the banks there were various modifications during the process that were not reported in the charges and are against article 521, and therefore the sentence should be annulled. The first modification considered by the banks is the change in the defendants' number by changing the role of the city's officials from a co-defendant in the fraud to victims of the same fraud. The second change regarded the so-called implicit cost. In the charges, were indicated as the illicit profit obtained by the banks since the value of the swap was not equal to zero and therefore the city was taking a negative position. However, in the process the source of illegality was no more the lacked zero value but the fact that the implicit costs were not communicated to the city. The third change was relative to the violations of the Italian laws that the banks should have performed in their role as advisors. This charge was not present in the first charges ad was indeed introduced not by the prosecutor but from the city of Milan in their role of civil part.

- Regarding the illicit valuation of David Dobell, article 359 of the c.c.p. allows the judge to use experts to inquire and evaluate fact of the process that requires a specific technical knowledge. However, the Corte di Cassazione, with the sentence n.11037/2008, indicated as the violation of foreign law is the task of the only judge and, therefore, the expert can just individuate which laws should be applied in the specific case. In the opinions of the banks, this was not the case of the Dobell's valuation that was simply received by the judge and considered as proof and source of conviction.

- The last motivation, raised only by the Depfa Bank, considered as the lack of translations of the proceedings of the trial damaged the defence right of the defendants as granted by article 178 c.c.p. and making difficult to exercise the right of contrary proof as granted by the fourth comma of article 468 of the c.c.p.

The requests of nullity presented in the appellants' motivations were rejected by the court. Regarding the apparent justification, the court evaluated the motivations presented by the first instance judge questionable, as we will see more in detail in the appeal's recollection of the event, but still present, and therefore the indications of article 125 were respected. Similarly, the court recognised the divergences between the initial charges and the sentence but argued that this change did not preclude the defences' capability of protesting their innocence that is a requirement for the nullity through the article 521[71]. Regarding the Dobell's valuation, the court stated that both the defences and the prosecutor used experts to clarify legal position and the regulation's provisions and therefore cannot be asked the invalidity of the Dobell's valuation. However, the court recognised also that the experts' reports were used in some cases as proof and source of the fact, and, therefore, decided that in those cases they will be evaluated just as an eyewitness testimony or as a legal memorandum. On the lacked translation of the trial's proceedings, the court did not find the appellant argumentation reasonable because the translation of the trial's acts is reserved only to the foreign citizens that do not speak the Italian language. This was not the case of the Depfa Bank that was active and makes business stable in Italy. Moreover, the alleged violation of the right of contrary proof was also rejected. Since the appellants were able to conduct, in the opinion of the appeal court, an efficient defence that enlarged the trial's period and this was not possible if the right of proof, as granted by the article 468, was not exercised by the defences.

Even if the nullity requests were all rejected, the appeal court believed that the first instance sentence must be completely reformed, since the alleged fraud did not exist, lacking all the constituent elements, in any of the prosecutor's charges. In the first place, the approach utilized in the appeal was completely different from the first instance. In the opinion of judge Magi, the city of Milan should have received higher protection in its contractual relationship, since it was managing public resources. The appeal court agreed on the fact that the presence of public resources required a high level of attention but argued that this must be provided by the city of

[71] As indicated by the second penal chamber of the "Corte di Cassazione" in the sentence n.47840/2012.

Milan that should have done everything in his power to receive the protections guaranteed by the Italian law and, therefore, cannot hide under the information asymmetry. In the second place, the reconstruction of the events performed by the court of appeal is different from the first instance one in many aspects. In the opinion of the court, the city of Milan chose to reduce the cost of debt through a bullet bond in a completely autonomous way. Since was necessary to find 100 million to close the city's balance and the choice of reducing the expenses was not suitable due to the unpopularity of the decision at the next year elections. None of these two conditions, which in the opinion of the appeal judges are the main reasons for which it was decided to issue a bullet, were under the control of the banks. Moreover, also the decision of amortizing the bullet with a swap amortizing was taken without the direct intervention of the banks, as we already discussed at the beginning of this chapter. Also, the court of appeal evaluated in a completely different way some of the documents that in the opinion of first instance judge represented important proofs of the misleading practice of the banks. Specifically, the first instance judge considered the memorandum of the 27 May 2005, regarding the economic viability, as a proof of the fraud stating falsely a 30 years economic viability of 57 million. This opinion is rejected by the appeal judge, that, before analysing the economic viability of the operation, indicated as the supposed certification of 30 years did not exist, and the calculation of the economic viability was a duty of the city that was completely disregarded. The technical commission, that was created to evaluate the banks' proposal and produce the economic viability's calculation was created the morning of the 24 June and dismissed in the afternoon of the same day and therefore did not have the time to evaluate or produce any calculations[72]. Another document cited by the appeal judge is the *Surano's Note*. A paper prepared by the city's lawyer *Maria Rita Surano*, in which were contained two specifications that in the opinion of the appeal court prove as the city was informed about the fact that they may make a tender to find the counterparties of the IRS/Collar and that the swaps do not have zero value. In the note, the four banks were indicated as *"the natural counterparties"* for the swap operation that was defined as a *"neutral operation"*. The lawyers of the banks found the two expressions completely wrong and asked the city's lawyers to remove them stating that the swap operation was not neutral and making a precise reference to the implicit cost of the swap. The modifications of the Surano's Note were incorporated in the *Consolidated Note* that maybe is the document on which there is the greatest change between

[72] This found confirmations in the fact that none of the city's officials was ever able to provide the calculations performed by the city of Milan. But simply said that was not their task, or in some case that they do not have the knowledge for doing it, and that they have based their decision entirely on the calculations provided by the banks.

the opinions of the first instance judge and the appeal one. For the first instance judge, the note represented the proof of the deception operated by the banks, since it was reported that the counterparties were selected without a tender and that the bank's proposal was not confronted with other ones to avoid speculative movements. This was seen by the judge, and by its expert, as an *"immoral suasion"* with the banks that convinced the city to avoid any confrontation in order to obtain a profit from the operation. On the other side, the appeal judge considered the note, and the following *swap letters*, as an important defensive document that indicates as the banks were committed in supporting the city in the operation, doing even what was unnecessary. In the first place, the appeal judge noticed as the theory for which the banks convinced the city not to inquire if there was a better proposal than the banks' one is simply illogical. Because required the assumption that the city's officials were so easy to be manipulated to require *"…support administrators"* (Martino and Anelli, 2014, p 228). Moreover, the appeal judge stated that the Note was not a document that the banks must provide or that was necessary for their operations but was requested by the city, that actively participated in any of the preparation's phases of the note[73]. The reason for which the city required the note was, in the opinion of the appeal judge, to have a paper in which were provided a suitable reason to justify the decision of the city to not make a tender in order to individuate the counterparties[74]. Moreover, after the Consolidated Note the city requested to each bank to sing the so-called Swap Letters, a new type of documents in which the banks certify that the swap will be made at the market conditions. This type of document, exactly as the Consolidated Note, is not a banks' standard document but was indeed requested by the city to obtain another assurance that the operation was done at the market condition. In the opinion of the appeal court, the city's officials did not have any right to pretend these documents and should have instead performed the economic viability calculation as demanded by the already discussed article 41. Another moment of the first operations that see the disagreement between the first instance and the appeal judge is the *Pricing*[75]. In the first sentence, the pricing is indicated as the implementing moment of the fraud, the moment in which the city of Milan received damage due the to implicit cost applied by the bank. While, in the opinion of the appeal court, the pricing is another proof of the lack of any fraud. Since the operation was a success obtaining a spread of 0.03, against

[73] The fact that the modifications of the Surano's Note were incorporated into the Consolidated Note proves indeed that the note was the product of a long procedure that sees the collaboration of both city and the banks.
[74] In the opinion of the appeal court, the reason for which was not made the tender was again the lack of time of the city that needed to conclude the operations within the 30 of June. Moreover, the judges indicated also an attempt by the city's officials to obtain a document that will discharge them from their responsibility.
[75] The pricing is the moment in which are settled the initial term of the operation such as the interest rate applied, the cap and the floor.

the limit of 0.06 indicated by the city, a rating of AA- and was believed will produce 168 million in the following three years. Regarding the renegotiation of the Unicredit's swap, that for the judge Magi was a cost that was not computed. The appeal judge described it as a simple operation in which the city asked to the banks to "take care" of the negative mark-to-market of the swap, that after some renegotiations with Cassa Depositi e Prestiti was equal to 48,16 million, in exchange of a worsening of the IRS/Collar.

At this point, it is useful to analyse the "technical" reasons for which the court of appeal decided that there was no fraud. The analysis of the court of appeal considered various technical aspects of the operations. In our work, we will try to summarize them in three main arguments *the illicit profit*, *the city's damage*, and *the artifices and deceptions*. These represent the constituent elements of the fraud as indicated by the article 640 of the Italian Penal Code.

- Regarding the illicit profit, the main concern of the appeal judge is to understand if the implicit cost of the operation may be considered as an illicit profit of the banks, as sustained in the first instance process. The appeal judges sustained that the equivalence between implicit cost and illicit profit is fake. This equivalence assumes that a swap contract must have an initial value equal to zero, that in the opinion of the appeal judge is *sine iure*, being in contrast with the indications contained in the CONSOB's financial notebook n.63 of the April 2009[76].However, the first instance judge, accordingly with the Corielli's report, stated that implicit cost was legitimate just for half the amount[77]. The court of appeal in evaluating this position must answer to three different question.
    1. If is it correct to consider the implicit cost legitimate just until the threshold indicated by the professor Corielli.
    2. If the bank should have communicated to the city the part exceeding the legitimate threshold.
    3. If the communication of the implicit cost will have changed the city decision of concluding the swap.

  The answer to the first question will be discussed in this part of our thesis, while the other two questions will be discussed in part regarding the artifices and deceptions. For

[76] The notebook defines the total price of a non-equity investment product as the sum between two components the *fair value*, that represents the theoretical price, and the *mark up*, that represents the product margin of the intermediary.

[77] Precisely the report of professor Corielli indicated that until the implicit cost stay within the half of the half of the bid/ask spread are not illicit but if they are higher should be communicated to the customer to avoid imbalances in the will of the customer.

the appeal judges, even if we consider the implicit cost exceeding the legitimate threshold, we cannot talk of illicit profit due to the nature of the banks' *day one profit*. The day one profit is the value obtained by subtracting the mid-market to the value obtained from a financial operation net of the transaction cost and, in the opinion of first instance judge, should represent the illicit profit of the banks. The appeal judges observed as the day one profit is not a definitive profit but just a value that indicates what the bank will gain, theoretically, in the case the operation is concluded. Therefore, the day one profit cannot be considered an illicit profit to which shall correspond, as indicated by the article 640, a specular financial damage to the city.

- The appeal court believed that the city of Milan did not sustain any damages. In the evaluation of the first judge's expert the implicit cost should be 52 million, and therefore the city of Milano should have sustained a specular patrimonial damage, that never occurred. Indeed, the city of Milano closed the IRS/Collar for a positive mark-to-market of 450 million making not credible the assumption that the operation was fraudulent.

- For the appeal judges, there were neither deceptions and artifices neither misleading practice. In the opinion of the first instance judge, the deceptions were the malicious elimination of the protection guaranteed by the FSA regulations, and the falsehood of the economic viability calculations due to the omission of the Unicredit's swap. Regarding the FSA regulations the appeal judges argued that the banks never really broke the laws, since the city of Milan was a qualified operator[78], therefore not subjected to the discussed protections, and the banks never do anything that produced damages to the city. On the contrary, the appeal judges indicated the already discussed Surano and Consolidated Note as proofs of the good faith of the banks. Before talking about the supposed false declaration, we will return on the issue regarding the communication of the implicit cost. In the opinion of the appeal judges, the banks informed the city of the existence of the implicit cost, with the 3 June 2005 memorandum, and this did not change the mind of the city about the operation. Therefore, even if we accept the prosecutor's theory, discussed in the analysis over the implicit costs, the banks' implicit cost cannot be considered as an illicit profit. Regarding the omission of the Unicredit's swap in the economic viability calculations, in the opinion of the appeal judges,

[78] The city of Milan never asked to be not considered as a qualified operator, neither before nor after the process.

following the law, the already discussed article 41, the derivatives contract should not be included in the viability calculation because they are not liabilities.

In conclusion, being all the three constituent elements of the fraud absent, the banks, and therefore their officials, cannot be accused of fraud. In our opinion, this legal case is one of the most important one regarding the use of derivatives by the local authority. Not only for the magnitude of the financial operations, that was one of the biggest bond emission by a local authority in Europe and the biggest in Italy, but especially for the fact that our convictions on the matter were shaken. Knowing that the banks were accused of fraud we, wrongfully, supposed that the city of Milan sustained serious financial losses due to the use of derivatives. When we discovered that there were no losses and that the operation indeed produced a positive mark-to-market of 450 million of Euro we were really stunned. Our main surprise regards the fact that even with no clear sign of losses the prosecutor of Milan still built a case against the four banks. It makes us even more surprised, the fact that even after it was clear that the first series of charges was "impossible to prove" the prosecutor just decide to change those charges. Moreover, we were amazed, in a negative way, by the fact that even considering all these matters the first instance judge still decided to declare the conviction of the four banks.

4.2 Venice Case study

The case study of Venice regards the use of four swaps contracts, called *"Rialto"*, *"Canaletto/Fenice"*, *"Città di Venezia"*, and *"Cassa Depositi e Prestiti"*, over the local authority's debt. The use of derivative contracts to reduce the cost of debt of the city was a controversial practice that, so far, produces more costs than benefits. Before describing the effect of these contracts on the city's finances, we will provide a brief description of their "history". These contracts were settled to hedge the interest rate risk of a series of debts contracted by the city; Specifically:

- The *"Rialto"* hedges a bond issued in 2002. The bond was renegotiated in 2007 into a 125.2 million notional principal bond paying a floating interest rate coupon equal to the Euribor 6M + 0,21% with maturity at 2037.
- The *"Canaletto/Fenice"* hedges a bond issued in 2002 and renegotiated in 2006 into an 83.9 million bullet bond paying a fixed interest rate of 4,265% with maturity at 2026. The renegotiated bond was composed of the old 2002 bond, with a notional of 68.9

million, summed with a new bullet bond with a notional of 15 million and paying the same fixed interest rate.

- The *"Città di Venezia"* hedges a 2004 bond with a remaining debt, at the end of 2007, of 16.6 million paying a floating interest rate equal to the Euribor 6M + 0.01% and ended in 2014.
- The *"Cassa Depositi e Prestiti"* hedges a series of 43 mortgages made with the Cassa Depositi e Prestiti before 2002 for total debt, at the end of 2007, of 24 million paying a fixed rate interest between a range of 4% and 6.07%[79].

As we will see more in detail in the next paragraph, the use of derivatives produced a serious worsening in the debt of the city that, together with the reduction of the financial resources provided by the *Casino of Venice*[80], becomes one of the main issues of the city's administrations. Indeed, the local newspaper "La Nuova Venezia" dedicated many articles, at least 14, on the matter indicating the derivates contract as one of the main cause of the increase in the Venetian debt (Rossi, 2013). Moreover, it is also reported that Giorgio Orsoni, major of Venice from April 2010 until June 2014, instructed in 2010 the city's lawyers to sue the bank *Merril lynch*. Specifically, the city argued that the bank, in its double role of counterparty and advisor in the renegotiation of the swap Canaletto/Fenice, charged some hidden cost on the city and asked, therefore, compensation for damages. On this matter, it was also reported that the banks proposed a transitional agreement to the city, in which the contract should be extinguished, and part of the hidden cost should be returned to the city (Tanucci, 2015). However, this transaction has not occurred yet, and the swap is still present in the 2017 financial statement and the estimated budget for the years 2018-2020.

4.2.1. The swap contracts and their impact on the debt

In this part of our thesis, we will describe the four derivatives contracts, indicating for each of them the main characteristics and the positive or negative cash flows that they produced from their settling until 2017. After this description, we will analyse the impact that these contracts had on the city's budget, with particular regards to the city's debt. In our analysis, we will use

[79] In the documents attached to the city's balance it is not reported the maturity dates of these 43 mortgages.
[80] The Casino of Venice is controlled the CMV S.p.a., that is owned at the 100% by the City of Venice and was one of the main sources of revenues of the city. However, during the period 2009-2011, there were recorded continuous operating deficits that obligated the city to provide new financial resources to restore the company's equity as indicated in the deliberation n.363/2016/PRSP of the "Corte dei Conti".

the data provided each year, since 2007, by the city of Venice in its financial statement. In the financial statement there were reported, for each contract, the contract's notional principal, the interest on the bond that the city paid, the interest rate applied by the bond and the differentials produced by the swap. These are calculated as the difference between the received and payed cash flows, the additional cost due to the swap contract, and the total cost sustained by the city, calculated as the sum between the interest rate on the bond and the additional cost due to the swap.

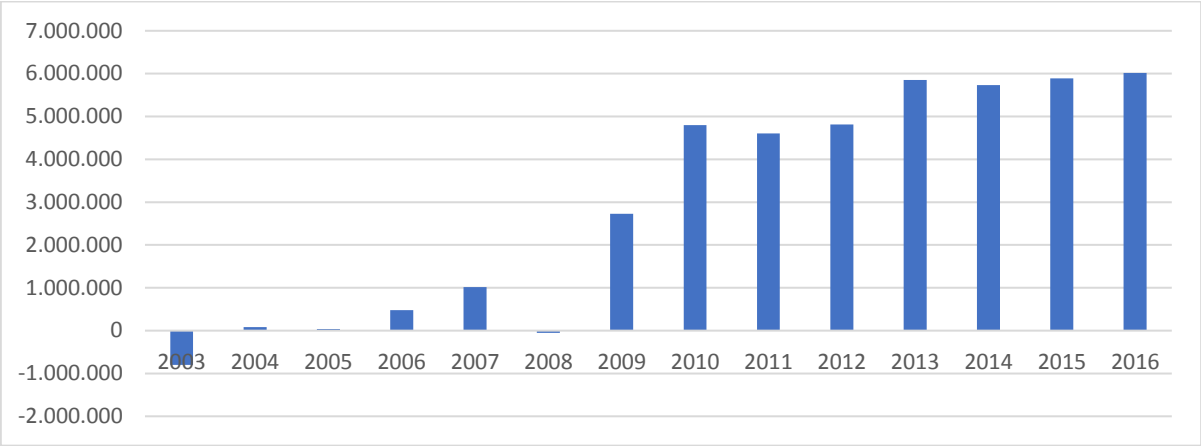
The *Rialto* was an IRS contract with a 31 years maturity that was settle in the 2002 with the investment bank *Bearn Stearns Companies, Inc* as counterparty. The reports provided by the city indicated neither how much was the notional principal neither the interest rates applied prior 2007 renegotiation. However, in the Report's episode *"Speculando s'impara"* it is reported that the swap was based on the floating rate Libor [81]. This assumption found confirmation in the interest rates reported in the financial statement for the period 2003-2006 that are similar to the Libor 6M on the Euro. In 2007, the swap was renegotiated into an IRS/Collar with the takeover of *Dexia Crediop* and *Intesa/BIIS* as counterparties. In the new contract, the maturity was increased until 2037, with a principal notional of 125,227,710.24 Euro. By the agreement the city receives, every six months, a floating rate equal to the Euribor 6M + 0.21% calculated on a decreasing notional, equal to the remaining debt of the bond, in exchange the city pays the same floating rate limited by the Collar in a range between 7% and 5,47%. In table 10, it is reported the performance of the swap as indicated by the city's financial statement[82]. By looking at graph 13, we may observe as the period in which the contract produced the highest negative differential is the period 2009-2016 and that the cost of debt increases sharply after the 2007's renegotiation. This also coincides with a change in the composition of the total cost of debt. By looking at graph 14, we may observe as the component relative to bond's interest rate was higher than the additional cost due to the swap until 2008. Since 2009, the additional cost due to the swap becomes the main component of the total cost connected with the operation. By the last available financial statement, the negative mark-to-market is equal to 59,419,062 Euro. This mark-to-market is equal to almost the 48% of the initial notional principal and we suppose that the values is so high because in its calculation were considered also the capital amount that the city need to pay. This contract is the one with

[81] http://www.report.rai.it/dl/Report/puntata/ContentItem-1835da4a-0467-441b-804d-37587996534d.html

[82] The data provided by the city show indeed some discrepancies, such as the difference in total cost of debt and the sum between the interest rate paid by the city and the additional cost of debt due to the swap. However, we decided to use them because they were the only data available and the city did not provide the information necessary to compute them by ourselves.

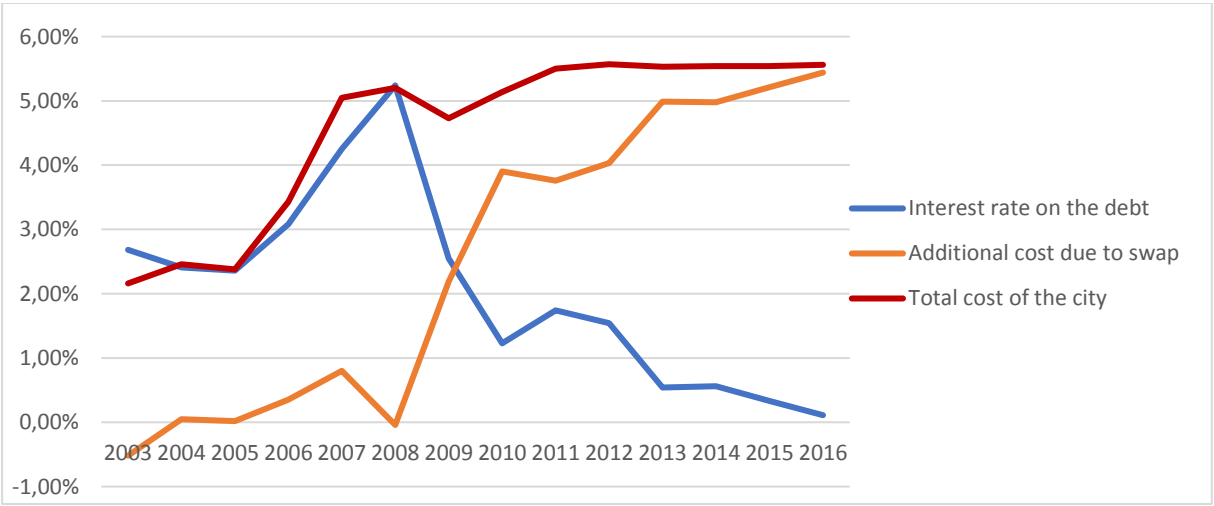
the biggest notional principal and with the longest maturity, and that produce the highest negative differentials. This happened due to the collar linked to the swap, that in case of Euribor lower than 5.47%, as in period that followed the 2007 economic crisis produce just additional cost.

Figure 13: Negative differentials in Euro produced by the swap *"Rialto"*.



Source: Financial statement of the City of Venice
https://www.comune.venezia.it/it/content/rendiconto-gestione-2016.

Figure 14: Composition of the total debt's cost of the swap *"Rialto"*.



Source: Financial statement of the City of Venice
https://www.comune.venezia.it/it/content/rendiconto-gestione-2016.

Table 9: Main indicators of *"Rialto"* swap's performance.

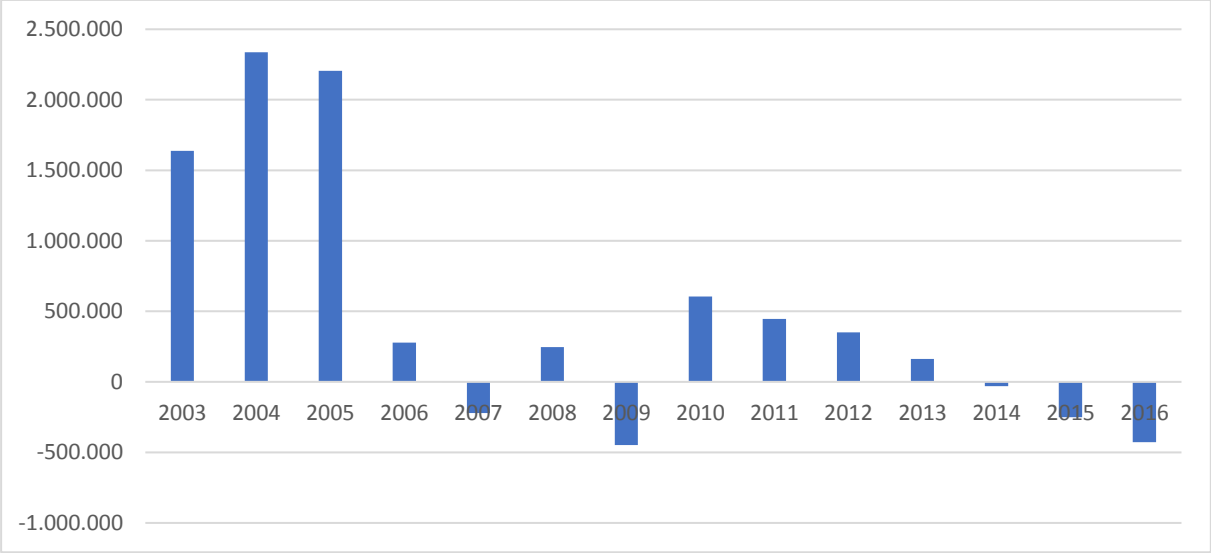
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Medium capital	154,750	149,420	143,405	135,326	127,247	125,214	124,788	123,089	121,286	119,372	117,343	115,190	112,906	110,483
Negative Mark-to-market	NA	NA	NA	NA	NA	NA	NA	29,912	45,050	54,497	42,508	63,630	56,201	59,419
Interest on debt	4,150	3,596	3,386	4,168	5,413	6,562	3,178	1,520	2,116	1,840	633	650	370	123
Interest rate on the debt	2.68%	2.41%	2.36%	3.08%	4.25%	5.24%	2.55%	1.23%	1.74%	1.54%	0.54%	0.56%	0.33%	0.11%
Negative swap's differential	-799	81	34	478	1,018	-51	2,731	4,801	4,604	4,811	5,851	5,732	5,886	6,016
Additional cost due to swap	-0.52%	0.05%	0.02%	0.35%	0.80%	-0.04%	2.19%	3.90%	3.76%	4.03%	4.99%	4.98%	5.21%	5.44%
Total cost of the city	2.16%	2.46%	2.38%	3.43%	5.05%	5.20%	4.73%	5.14%	5.50%	5.57%	5.53%	5.54%	5.54%	5.56%

Source: Financial statement of the City of Venice https://www.comune.venezia.it/it/content/rendiconto-gestione-2016.

The *Canaletto/Fenice* was an IRS swap contract settled in 2002 with a length of 24 years, with the investment bank *Merril Lynch* as counterparty. The reports provided by the city indicated neither the amount of the notional principal neither the interest rates applied prior to the 2006 renegotiation. In 2006, the swap was renegotiated into an amortizing swap with a notional principal of 83,875,800 Euro, composed by the remaining debt of the Canaletto bond and the new Fenice bond. By the agreement the city needs to deposit, every six months, a certain amount whose final sums at maturity will be equal to the notional principal. Moreover, the city receives a fixed interest rate equal to 4.265% calculated on the notional principal, in exchange for the payment of a fixed interest rate equal to 5.5% until 2010 and 5.6% until maturity, calculated on the notional principal net of the deposit. The agreement also included the exchange of two guarantees against the credit risk of the two counterparties. The city sold to the bank a CDS on the default of the Italian Republic[83], while the bank provided a pledge on the deposit that will be stored in a third bank. In table 10, is reported the performance of the swap as indicated by the city's financial statement. By looking at graph 15, we may observe as the period in which the contract produced the highest negative differential is the period before 2006. After the renegotiation, the differential decreases sharply in the period 2006-2008, reaching its lower level in 2009. In 2010, the differential increased again reaching a new peak, smaller than the pre-renegotiations levels, and then decrease continuously reaching negative levels in 2015 and 2016. By looking at graph 16, we may observe as the total cost of debt displayed two different trends. In the period 2003-2010, we observe a volatile trend with the highest level reached in 2005 and the lowest level in 2006; while from 2010 we observe a decreasing trend reaching its lower level in 2016. Moreover, we may observe as the evolution of the cost of debt is based mainly on the additional cost due to the swap while the bond's interest rate, since 2007, remains constant over time. By the last available financial statement, the contract has a positive mark-to-market equal to 48,806,805 Euro. This mark-to-market is equal to the 58% of the initial notional principal and we suppose that the values is so high because in its calculation were considered also the final capital amounts that the city will receive due to the amortizing swap. Also, we should remember that the amortizing swap requires the payment of the deposit to repay the bond and, therefore, the cost of the operation is higher than the value of the swap's differential.

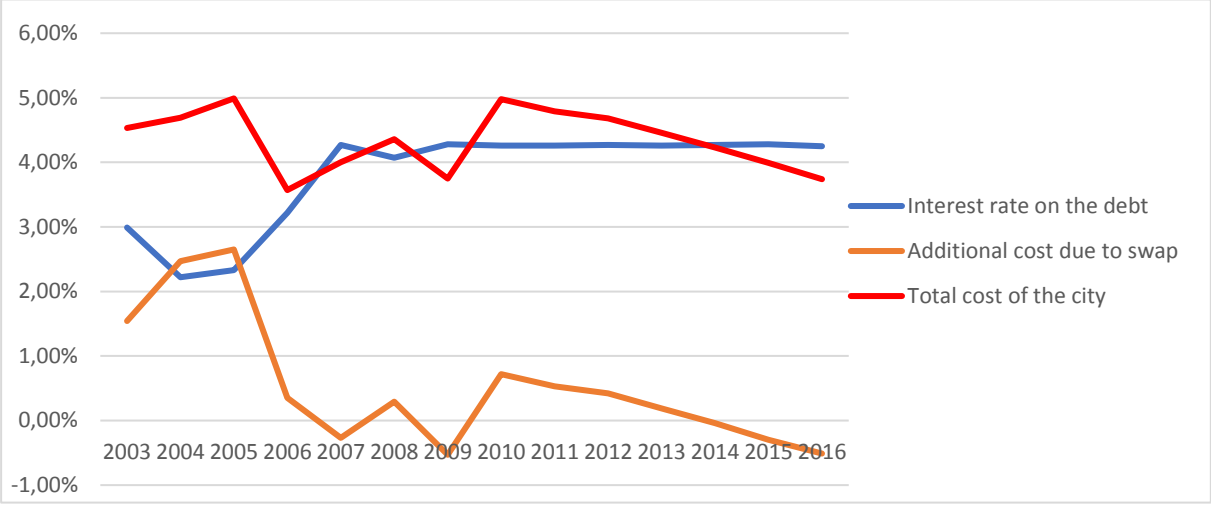
[83] The CDS' maturity corresponds to the maturity of the bond and can be exercised just in case of default of the Italian Republic. By the information provided by the city, we suppose there is no premium in favour of the city.

Figure 15: Negative differentials in Euro produced by the swap *"Canaletto/Fenice"*.



Source: Financial statement of the City of Venice https://www.comune.venezia.it/it/content/rendiconto-gestione-2016.

Figure 16: Composition of the total debt's cost of the swap *"Canaletto/Fenice"*.



Source: Financial statement of the City of Venice https://www.comune.venezia.it/it/content/rendiconto-gestione-2016.

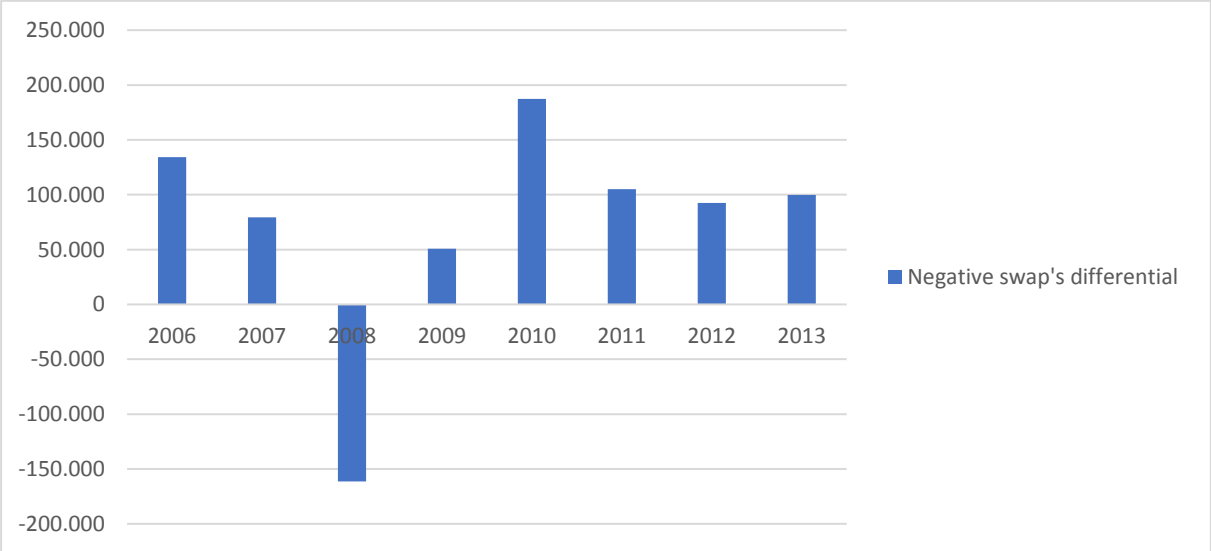
Table 10: Main indicators of *"Canaletto/Fenice"* swap's performance in thousands of euros.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Medium Capital	106,184	94,704	83,225	79,246	82,388	83,876	83,876	83,876	83,876	83,876	83,876	83,876	83,876	83,876
Positive Mark-to-market	NA	NA	NA	NA	NA	NA	NA	4,120	14,754	22,866	23,076	37,040	41,401	48,807
Interest on debt	3,177	2,101	1,943	2,548	3,514	3,413	3,591	3,569	3,569	3,579	3,575	3,577	3,593	3,563
Interest rate on the debt	2.99%	2.22%	2.33%	3.22%	4.27%	4.07%	4.28%	4.26%	4.26%	4.27%	4.26%	4.27%	4.28%	4.25%
Negative swap's differential	1,638	2,337	2,206	278	-221	247	-448	604	447	350	163	-31	-250	-427
Additional cost due to swap	1.54%	2.47%	2.65%	0.35%	-0.27%	0.29%	-0.53%	0.72%	0.53%	0.42%	0.19%	-0.04%	-0.30%	-0.51%
Total cost of the city	4.53%	4.69%	4.99%	3.57%	4.00%	4.36%	3.75%	4.98%	4.79%	4.68%	4.46%	4.23%	3.99%	3.74%
Deposit	NA	NA	NA	913	2,331	2,473	2,624	2,784	2,953	3,133	3,324	3,527	3,741	3,969

Source: Financial statement of the City of Venice https://www.comune.venezia.it/it/content/rendiconto-gestione-2016.

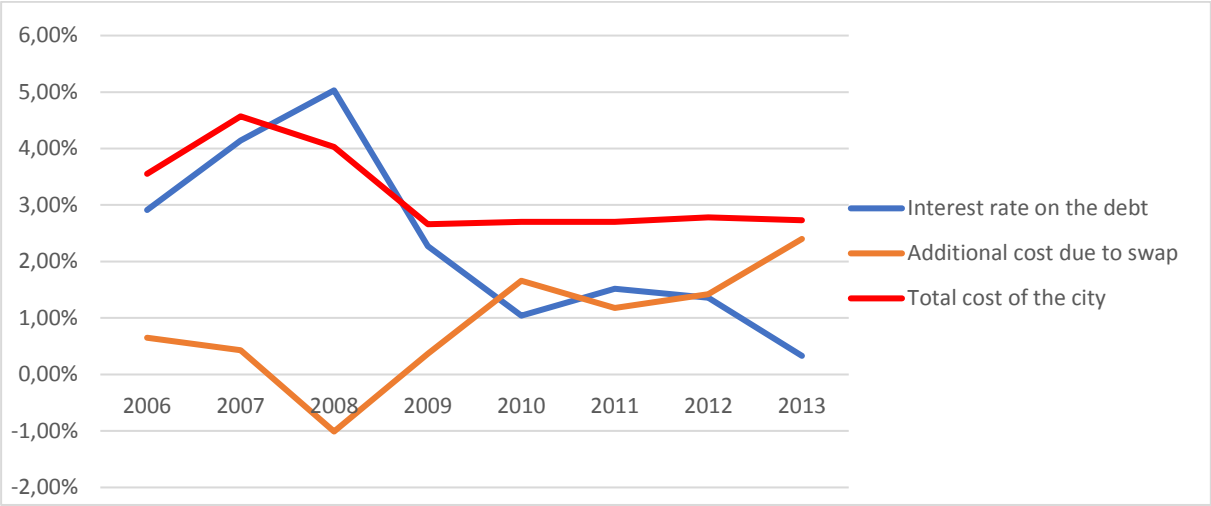
The *Città di Venezia* was an IRS/Collar swap contract issued in 2005 that expired in 2014, with the investment bank *Barclays* as counterparty. The reports provided by the city indicate a notional principal equal to 21,386,700 Euro and that the contract was never renegotiated. By the agreement, the city received a floating interest rate equal to the Euribor 6M + 0.01% calculated on a decreasing notional principal. In exchange, the city paid the same floating interest rate but limited by the Collar in a range between 4.85% and 2.65%. Since 2011 the Collar's increases to a Cap of 4.95% and a Floor of 2.75%. As displayed in graph 17, we observe that except 2008, the year in which the Euribor reach the highest level, the contract produced negative differentials in all the years of its life, reaching the highest negative level in 2010. Regards the total cost of debt, the contract displayed an increasing trend until 2007, then a sharp decreasing trend until 2009 and remained stable close to level 2.75% for all the rest of its remaining life. This pattern may be explained by the movement in the floating interest rate that increases until 2008, the only year in which the Euribor surpassed the collar's Cap, and then decreasing continuously under the level of the Floor. Therefore, the swap has reduced the cost of debt only in 2008 while, in the period between 2009 and 2013, represented the main component of the cost of debt. In 2013, the last year on which we have information on the swap, the negative mark-to-market was estimated at 42,450 Euro. This mark-to-market is equal to almost the 0.2% of the initial notional principal. Between, the contracts that we are analysing this was the one with the shortest maturity and the smallest notional principal.

Figure 17: Negative differentials in Euro produced by the swap *"Città di Venezia"*.



Source: Financial statement of the City of Venice
https://www.comune.venezia.it/it/content/rendiconto-gestione-2016.

Figure 18: Composition of the total debt's cost of the swap *"Città di Venezia"*.



Source: Financial statement of the City of Venice
https://www.comune.venezia.it/it/content/rendiconto-gestione-2016.

Table 11: Main indicators of *"Città di Venezia"* swap's performance in thousands of euro.

	2006	2007	2008	2009	2010	2011	2012	2013
Medium Capital	20,791	18,416	16,040	13,664	11,287	8,911	6,535	4,159
Negative Mark-to-market	NA	NA	NA	NA	233	177	142	42
Interest on debt	604	763	807	311	117	135	89	14
Interest rate on the debt	2.91%	4.14%	5.03%	2.27%	1.04%	1.52%	1.36%	0.33%
Negative swap's differential	134	79	-161	51	187	105	93	100
Additional cost due to swap	0.65%	0.43%	-1.01%	0.37%	1.66%	1.18%	1.42%	2.40%
Total cost of the city	3.55%	4.57%	4.03%	2.66%	2.70%	2.70%	2.78%	2.73%

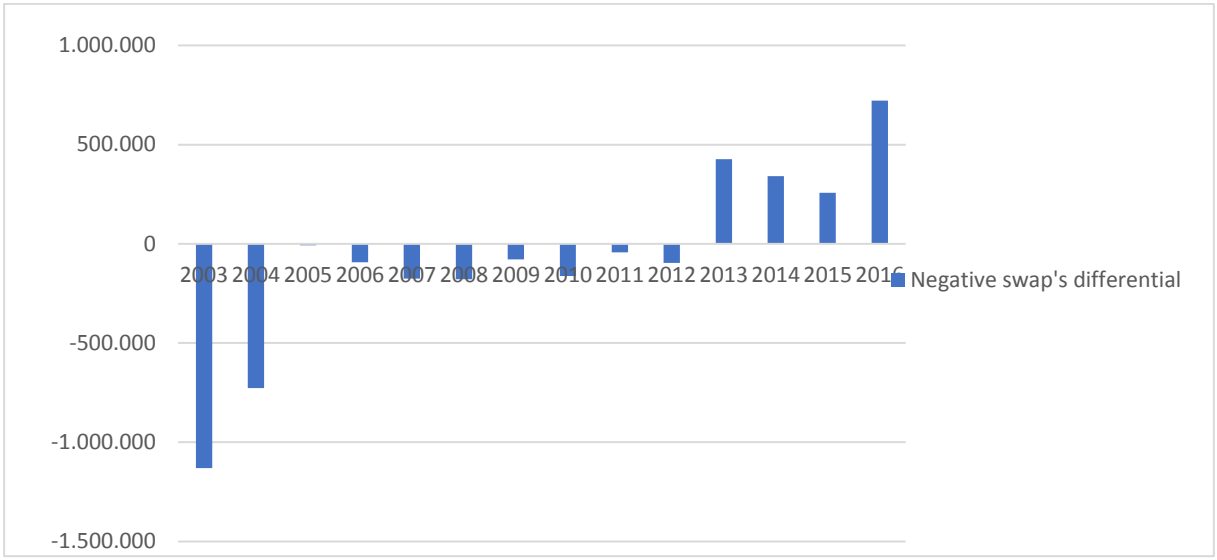
Source: Financial statement of the City of Venice
https://www.comune.venezia.it/it/content/rendiconto-gestione-2016.

The *Cassa Depositi e Prestiti* was an IRS swap contract settled in 2002 and renegotiated in 2004 with the investment bank *Merril Lynch* as counterparty. The city's financial statements indicate that the contract's maturity is the 2022 and its notional principal, at the renegotiation, is equal to 30,573,444. By the agreement, the city received an interest rate equal to the ones applied to the underlying bonds[84]. In exchange, the city pays a fixed capital amount to which it is summed an interest amount calculated on a decreasing notional by applying a fixed interest rate of 5.07% or the Euribor 6M + 0.59% if higher. In the financial statements, the interest rate paid by the city is equal to 5.76% for all the years; therefore, we suppose that the fixed capital amount is equal to the 0.69% of the remaining debt. In the financial statement, it is reported that the amortization of the underlying bonds provides for decreasing payment and, therefore, that the aim of the swap contract is to stabilize the payments by producing positive cash flows for the first half of its life and negative for the second[85]. This is confirmed by the swap's differentials, that until 2012 generates positive cash flows for the city and then started being negative as displayed in figure 19. By paying a fixed interest rate, the Euribor never reach the 5.76% level, the city's total cost of debt depends entirely on the additional cost due to the swap. Figure 20 indicates that, at first, the swap reduced the overall cost of debt, in a more valuable way in the first two years and then slightly until 2012. Then the swap caused a sharp increase in the cost of debt that became particularly severe in 2016 when the additional cost was even bigger than the interest rate of 5.76% and makes the overall cost equal to 12,74%. In 2016 the negative mark-to-market was estimated at 1,966,537 Euro. This mark-to-market is equal to the 64% of the initial notional principal and we suppose that the values is so high because in its calculation were considered also the capital amount that the city need to pay. This contract was the only one that produced positive differentials for an appreciable period, from 2003 to 2012, and, therefore, it is only contract that, until now, produced a saving for the city.

[84] The financial statements do not provide any information regarding the interest rates applied to the 43 underlying bonds of the contract and therefore was not possible to estimate neither the nature neither the value of the interest rate received by the city.

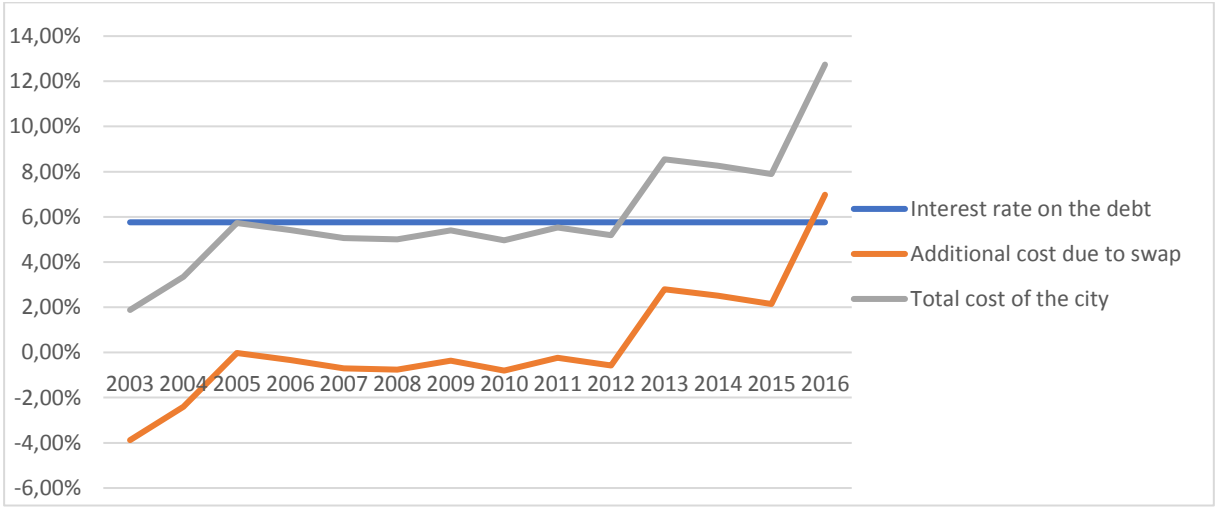
[85] In the financial statement it is not reported how this objective will be reached and how it is expected to evolve the Euribor 6M.

Figure 19: Negative differentials in Euro produced by the swap *"Cassa Depositi e Prestiti"*.



Source: Financial statement of the City of Venice
https://www.comune.venezia.it/it/content/rendiconto-gestione-2016.

Figure 20: Composition of the total debt's cost of the swap *"Cassa Depositi e prestiti"*.



Source: Financial statement of the City of Venice
https://www.comune.venezia.it/it/content/rendiconto-gestione-2016.

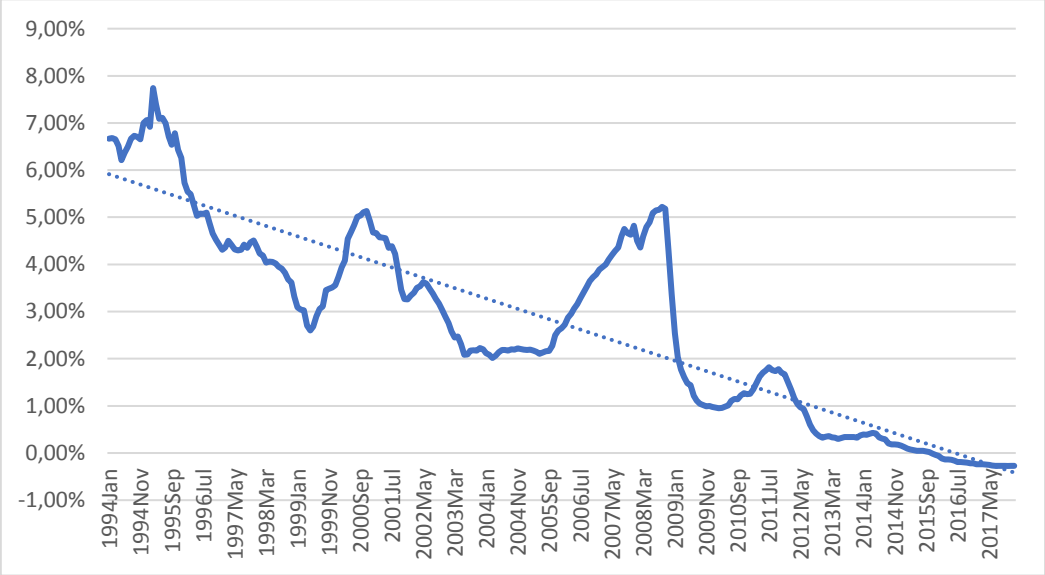
Table 12: Main indicators of *"Cassa Depositi e Prestiti"* swap's performance in thousands of euros.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Medium Capital	31,775	30,160	28,508	26,855	25,202	23,550	21,897	20,245	18,592	16,939	15,287	13,634	11,981	10,329
Negative Mark-to-market	NA	NA	NA	NA	NA	NA	NA	3,491	3,633	3,707	3,288	2,934	2,694	1,967
Interest on debt	1,678	1,737	1,642	1,547	1,452	1,356	1,261	1,166	1,071	976	881	785	690	595
Interest rate on the debt	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%	5.76%
Negative swap's differential	-1,130	-727	-7	-92	-175	-179	-78	-163	-42	-96	427	342	257	721
Additional cost due to swap	-3.88%	-2.41%	-0.03%	-0.34%	-0.70%	-0.76%	-0.36%	-0.80%	-0.23%	-0.57%	2.79%	2.51%	2.14%	6.98%
Total cost of the city	1.88%	3.35%	5.73%	5.42%	5.06%	5.00%	5.40%	4.96%	5.53%	5.19%	8.55%	8.27%	7.90%	12.74%

Source: Financial statement of the City of Venice https://www.comune.venezia.it/it/content/rendiconto-gestione-2016.

In the financial statement of the city of Venice it was reported that the aim of the four swaps was to stabilize the cost of debt of the underlying bonds. Therefore, the nature of the interest rates applied by the *"Canaletto/Fenice"* contract was changed from a floating rate to a fixed one[86], while the floating rate of the contract *"Rialto"* and *"Città di Venezia"* were stabilized using two collars. Considering the trend of the Euribor 6M, the stabilization of the interest rate produced more damages than advantages. As we can say from figure 21, the evolution of the Euribor 6M displays a decreasing trend that, in particular since 2009, will have provided more convenient rates than the one obtained by stabilizing the rates.

Figure 21: Euribor 6 months with trend's line.



Source: European Money Market Institute (EMMI) https://www.emmi-benchmarks.eu/euribor-org/about-euribor.html.

Regarding the impact of the swaps on the city's debt, by confronting the data obtained by the quarterly report of the December 2008 with the December of 2016 we observe a reduction of the debts covered by the swaps. Specifically, figure 22 shows that in 2008 the "swapped" debts[87] were the 72% of the overall debts of the city while in 2016 it was reduced to just 62%.

[86] As indicated by the *"Allegato al Rendiconto finanziario 2010"* that was adopted by the City Council of Venice with the deliberation n.56 of the 29 April 2011 "http://www.comune.venezia.it/it/content/rendiconto-gestione-2010-2" 01 February 2018.

[87] In the calculation of the swapped debt, we had considered the remaining debt of the swaps *"Rialto"*, *"Città di Venezia"*, and *"Cassa Depositi e Prestiti"*. While for the swap *"Canaletto/Fenice"* it was considered the notional principal net of the deposit of the amortizing swap.

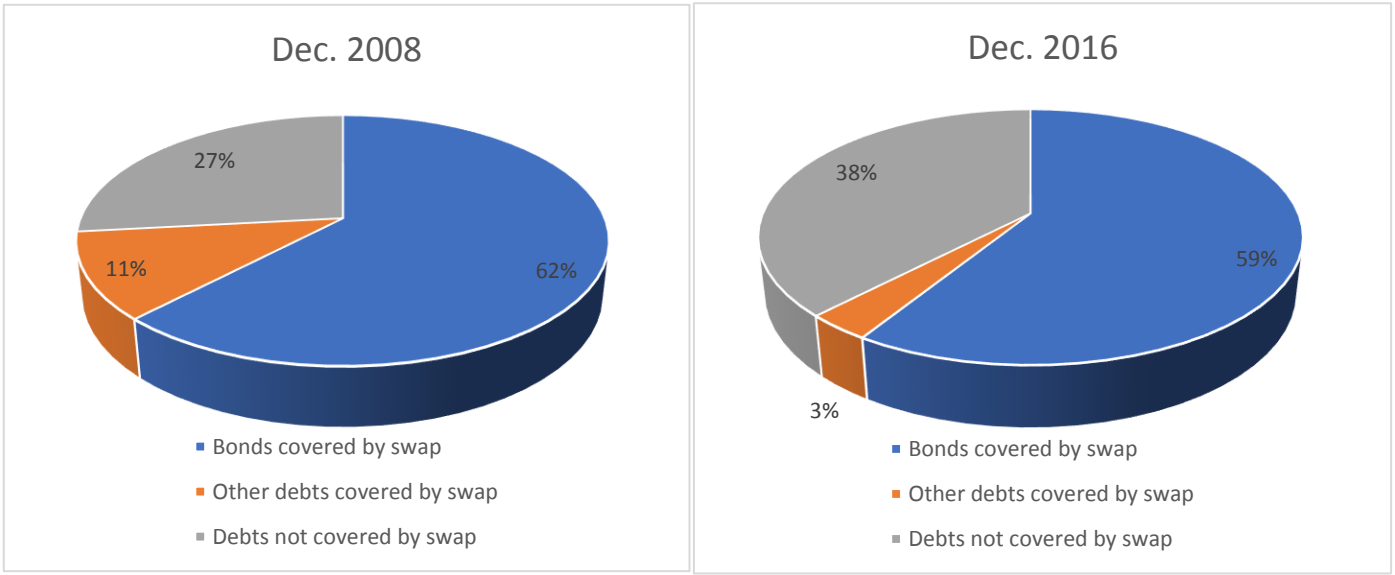
This reduction is caused mainly by the reduction of the underlying debt of the *"Cassa Depositi e Prestiti"* swap, indicated in figure 22 as "other debts covered by swap", that passed from the 11% in 2008 to just the 3% in 2016 of the city's total debt, reducing its level from the 36.57 million of 2008 to just 9.09 in 2016 as reported in table thirteen. Also, we observe an increase in the level of the non-swapped debt that, increasing from 87.43 to 103.18 million, became the 38% of the city's debt in 2016.

Table 13: Composition of the overall city's debt.

	Dec. 2008		Dec. 2016	
Bonds covered by swap	203357	62%	160677	59%
Other debts covered by swap	36568	11%	9089	3%
Total debts covered by swap	239925	73%	169766	62%
Debts not covered by swap	87429	27%	103177	38%
Total debts	327354	100%	272943	100%

Source: Quarterly reports on the city's debt https://www.comune.venezia.it/it/archivio/21141.

Figure 22: Composition of the overall city's debt in 2008 and 2016.



Source: Quarterly reports on the city's debt https://www.comune.venezia.it/it/archivio/21141.

However, the debt hedged by swaps remains most of the city's debt and represents one of the main concerns regarding the stability of the city's budget, as reported by the "Corte dei Conti" in its deliberation n.110/2017PRSP. The court's judges were concerned with the effect that the derivatives' differentials caused on the city's income statement. As displayed in table fourteen, the negatives impact on the income statement in the period 2010-2016 was within a range between 8 and 10 million euros. This was a great concern for the "Corte dei Conti", that observed as in 2014 the total of the financial expenses was 17.47 million of which 9.61 were produce just by the swap contract (Ibidem, 2017).

Table 14: Impact of the swaps on the city's income statement in thousands of euros.

	2010	2011	2012	2013	2014	2015	2016
Negative differentials	5592.73	5155.90	5253.28	6540.55	6124.01	6143.19	6736.91
Deposit Amortizing swap	2783.92	2953.46	3133.33	3324.15	3526.59	3741.36	3969.21
Positive differentials	162.62	41.97	96.05	0.00	37.56	250.17	427.03
Negative Impact on the income statement	8214.04	8067.40	8290.56	9864.70	9613.04	9634.38	10279.09

Source: Financial statement of the City of Venice
https://www.comune.venezia.it/it/content/rendiconto-gestione-2016

Moreover, the judges were concerned with the *"Rialto"* contract, with particular regards to its collar. In their opinion, the collar was not linked to the evolution of the Euribor 6M and, therefore, they asked a clarification on the risk hedging strategy operated by the city (Ibidem, 2017).

4.2.2. The "Città di Venezia" swap analysis

The analysis performed in the previous paragraph did not verify either the convenience of the swaps either if the use of the contracts by the city were reasonable. For doing so, we should evaluate the contracts at the time when they were signed to verify which position the city was taking by entering in each contract. Unfortunately, the information provided by the city was not sufficient to analyse in detail all the contracts. Therefore, our analysis will be limited only to the *"Città di Venezia"* swap, that is the only contract for which we possess enough information

to perform a suitable analysis[88]. The contract required the payment of semi-annual floating interest rate, equal to the Euribor 6M + 0.01%, in exchange for the same interest rate calculated on a decreasing notional principal. By confronting the data provided by the city in its financial statements and its quarterly reports on debt we were able to identify the amortization plan pf the underlying debt as displayed in table 15. The debt had a fixed capital amortization with each capital rate equal to 1,188,150 euro.

Table 15: Amortization plan for the underlying debt of the *"Città di Venezia"* swap.

Payment Date	Capital Payment	Remaning Notional Debt
30/06/2006	1188150	21386700
30/12/2006	1188150	20198550
30/06/2007	1188150	19010400
30/12/2007	1188150	17822250
30/06/2008	1188150	16634100
30/12/2008	1188150	15445950
30/06/2009	1188150	14257800
30/12/2009	1188150	13069650
30/06/2010	1188150	11881500
30/12/2010	1188150	10693350
30/06/2011	1188150	9505200
30/12/2011	1188150	8317050
30/06/2012	1188150	7128900
30/12/2012	1188150	5940750
30/06/2013	1188150	4752600
30/12/2013	1188150	3564450
30/06/2014	1188150	2376300
30/12/2014	1188150	1188150

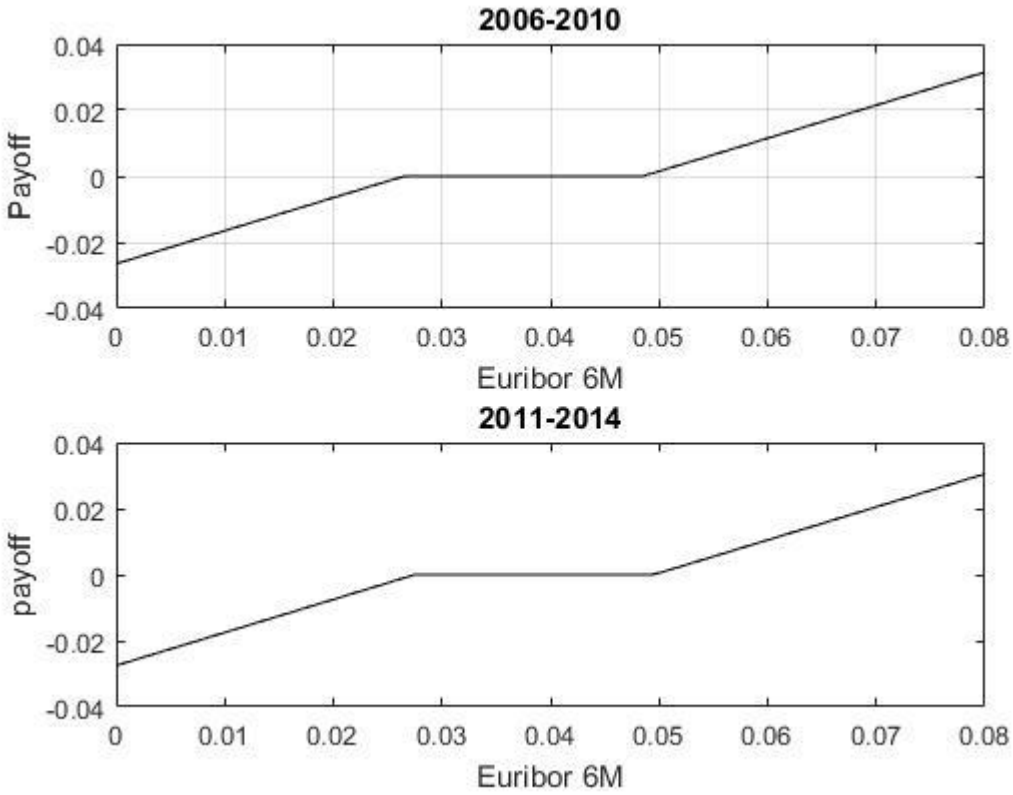
Source: Financial statement and Quarterly reports on the city's debt of the City of Venice https://www.comune.venezia.it/it/content/rendiconto-gestione-2016

Since the swap exchanged the same interest rate, calculated on the same notional, the differential from the swap, and therefore the swap's value, will be necessarily equal to zero. However, the interest rate paid by the city was limited by a collar, that stabilizes the interest rate in a range between 2.65% and 4.85% until 2010 and in range between 2.75% and 4.95% since 2011. Therefore, as displayed in figure 23, the contract produced a positive payoff for the

[88] Specifically, this is the only contract that was never renegotiated, and for which we know the underlying bond amortization plan.

city in the case Euribor was higher than the collar's Cap and negative in the case it was smaller than the collar's Floor.

Figure 23: Payoff of the *"Città di Venezia"* Collar.



Source: Financial statement of the City of Venice
https://www.comune.venezia.it/it/content/rendiconto-gestione-2016

Therefore, to evaluate the position taken by the city, we need to estimate the value of the Collar. Being the collar a combination between a long position in a Cap and a short position in a Floor, to evaluate it we must calculate the value of the Cap and subtract the value of the Floor. For the evaluation of European style interest rate options, it is utilized a modified version of the Black's Model[89]. The main assumption of Black's model is that the underlying interest rate of the option is lognormally distributed at the option's maturity *T*. The extension of the model used to evaluate Caps and Floors assumes a world that is forward risk neutral with respect to a zero-coupon bond maturing at time t_{k+1}, specifically stating that:

[89] The Black's model is a modification of the Black Scholes Merton model developed by Fisher Black in 1976; its main application is the pricing of options on interest rates.

1. The Current value of any security is its expected value at time t_{k+1} multiplied by the price of a zero-coupon bond *P(0, t_{k+1})*.
2. The expected value of an interest rate valid between t_k and t_{k+1} is equal to the corresponding forward interest rate.

(Hull, 2012).

Therefore, the price of a caplet that provides a payoff at time t_{k+1} is equal to:

$$L\delta_k P(0, t_{k+1}) E_{t_{k+1}}[\max(R_k - R_K\ , 0)]$$

Where $E_{t_{k+1}}$ is the expected value in a forward risk-neutral world, δ_k is equal to the difference between t_{k+1} and t_k, R_k represent the interest rate observed between t_k and t_{k+1}, and R_K is the strike of the caplet. When the forward rate F_k underlying the Cap is assumed to have a constant volatility σ_k, R_k is lognormally distributed with the standard deviation of $\ln(R_k) = \sigma_k\sqrt{t_k}$. From this relationship, we may derive the Black's formula for caplet pricing that is equal to:

$$L\delta_k P(0, t_{k+1})\,[\,F_k N(d_1) - R_K N(d_2)]$$

Where

$$d_1 = \frac{\ln\left(\frac{F_k}{R_K}\right) + \sigma_k^2 t_k \frac{1}{2}}{\sigma_k\sqrt{t_k}}$$

$$d_2 = \frac{\ln\left(\frac{F_k}{R_K}\right) - \sigma_k^2 t_k \frac{1}{2}}{\sigma_k\sqrt{t_k}} = d_1 - \sigma_k\sqrt{t_k}$$

Similarly, the Black's formula for the floorlet is equal to:

$$L\delta_k P(0, t_{k+1})\,[\,R_K N(-d_1) - F_k N(-d_2)]$$

Where *N* is the cumulative normal distribution function.

Therefore, to evaluate each caplet, we need to evaluate the forward rate F_k applied to each caplet and the volatility of the forward rate σ_k. For estimating the forwards rates, that were expected when the contract was signed, we first need to compute the zero rates curve. To do so we have considered the par yield term structure "composed" by the Eonia, Euribor 6M and Eurirs[90] interest rates as reported in the second column of table 16. Then, we have utilized the

[90] The Euro Interest Rate Swap indicates the average interest rates at which the most important European banks subscribe swaps to hedge the interest rates risk.

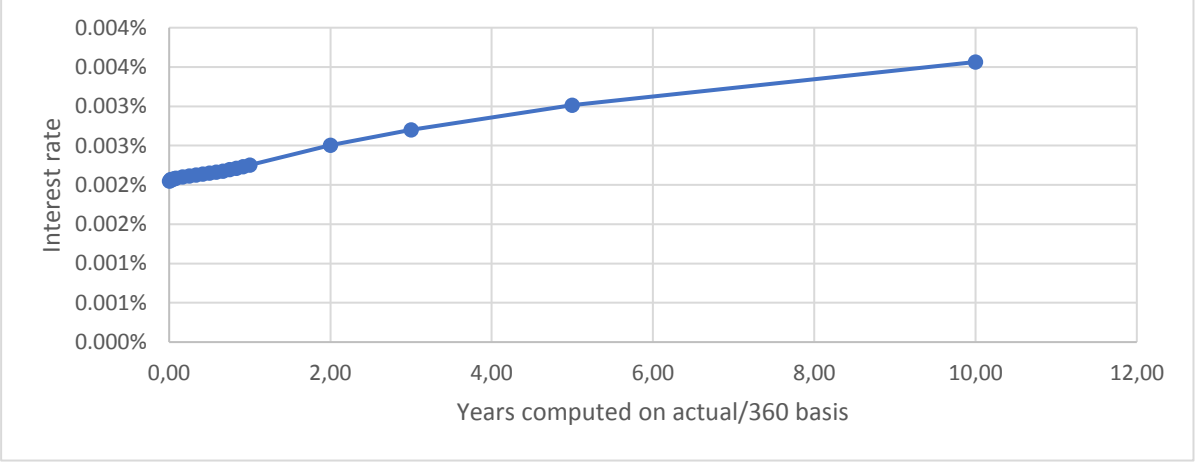
Matlab's function *IRDataCurve.bootstrap* to compute the zero rates term structure, reported in the third column of table 16, from the par yield structure through the bootstrap method.

Table 16: Euribor Par Yield and Zero Rate term structure with continuously computed rates.

Type	Par Yield term structure	Zero Rate term structure
O/N	2.049%	2.049%
1 week	2.070%	2.070%
2 weeks	2.070%	2.069%
3 weeks	2.077%	2.076%
1 Months	2.084%	2.082%
2 Months	2.103%	2.099%
3 Months	2.115%	2.109%
4 Months	2.127%	2.119%
5 Months	2.138%	2.128%
6 Months	2.153%	2.141%
7 Months	2.165%	2.151%
8 Months	2.177%	2.161%
9 Months	2.195%	2.177%
10 Months	2.214%	2.193%
11 Months	2.232%	2.209%
12 Months	2.253%	2.228%
2 Years	2.506%	2.460%
3 Years	2.699%	2.650%
5 Years	3.014%	2.970%
10 Years	3.564%	3.556%

Source: European Money Market Institute https://www.emmi-benchmarks.eu/euribor-org/about-euribor.html

Figure 24: Par Yield term structure curve



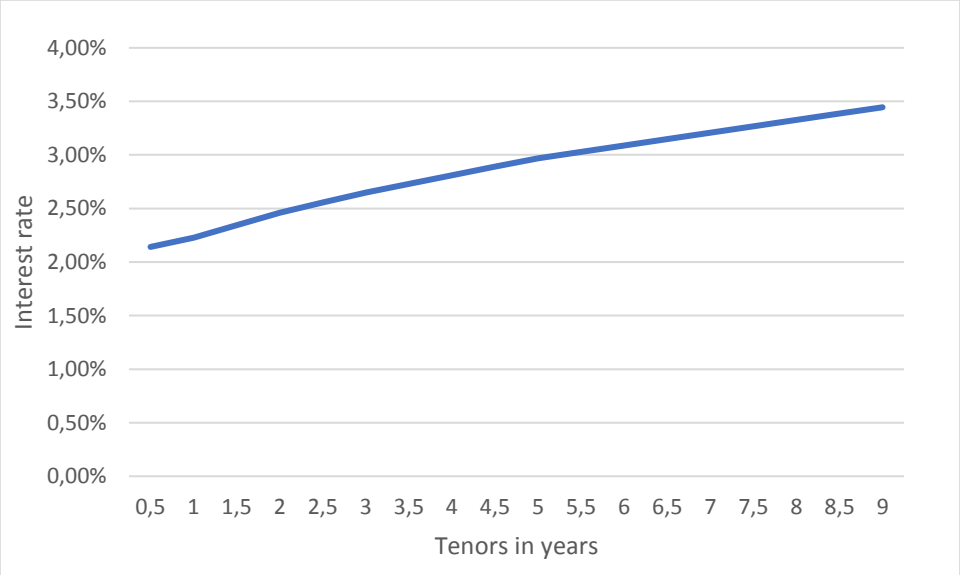
Source: European Money Market Institute https://www.emmi-benchmarks.eu/euribor-org/about-euribor.html

At this point, to individuate the interest rate for all the missing payment periods we will use the linear interpolation formula:

$$Rate_k = \frac{(T_k - T_t) * Rate_{t+1} + (T_{t+1} - T_k) * Rate_t}{(T_{t+1} - T_t)}$$

where $Rate_k$ is the interest rate for the missing period T_k, while $Rate_t$ and $Rate_{t+1}$ are the interest rates of the known periods T_t and T_{t+1}. For using the linear interpolation, it is necessary that $T_t < T_k < T_{t+1}$. By applying this interpolation formula, we obtain the zero rates curves for all the payment periods in which the swap produces differentials as reported in the first column of table 16. The zero rates obtained in this way are displayed in figure 25 and show an increasing trend with a starting value of 2.14% in for the first payment in 2006 and a final value of 3.44% for the last payment of 2014.

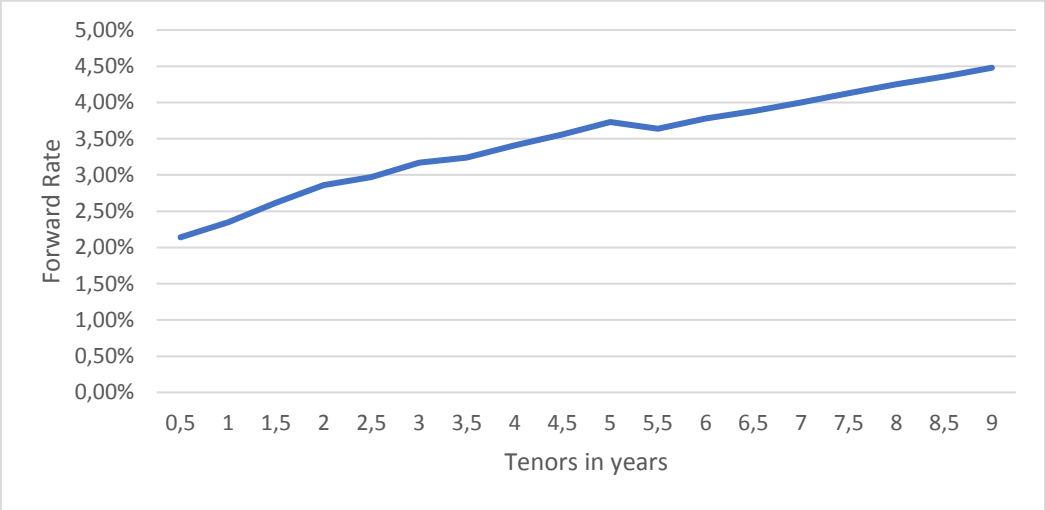
Figure 25: Zero-rates Curve for the Euribor 6M continuously compounded.



Source: Personal computation of data from the European Money Market Institute https://www.emmi-benchmarks.eu/euribor-org/about-euribor.html

After obtaining the zero rates, we can calculate the forward rate for each period by using the Matlab function *zero2fwd*, which calculates the forward rates from the zero ones. In this way, we obtain the forward rates for each of the caplets as displayed in figure 26 and table 17.

Figure 26: Forward rate Curve continuously compounded.



Source: Personal computation of data from the European Money Market Institute https://www.emmi-benchmarks.eu/euribor-org/about-euribor.html

Table 16: Par yield, Zero rates and Forward rates for the Euribor 6M.

Tenors in years	Zero Rates Euribor 6M	Forward rates Euribor 6M
0.5	2.14%	2.14%
1	2.23%	2.35%
1.5	2.34%	2.62%
2	2.46%	2.86%
2.5	2.55%	2.97%
3	2.65%	3.17%
3.5	2.73%	3.24%
4	2.81%	3.41%
4.5	2.89%	3.56%
5	2.97%	3.73%
5.5	3.03%	3.64%
6	3.09%	3.78%
6.5	3.15%	3.88%
7	3.21%	4.00%
7.5	3.27%	4.13%
8	3.33%	4.25%
8.5	3.39%	4.36%
9	3.44%	4.48%

Source: Personal computation of data from the European Money Market Institute https://www.emmi-benchmarks.eu/euribor-org/about-euribor.html

The last information that we need to evaluate the caplet and floorlet is the volatility of the forward rate. We decided to use as a proxy of the forward rate volatility the historical volatility calculated on the price of the Futures on the Euribor 3M[91]. To do so, we have calculated the standard deviation on the six months prior to the signature of the contract, and we have used the obtained value of 8.74% as flat volatility. Using the previously discussed Black's formula we estimate the Cap's value equal to 19,238 euro while the Floor's value is equal to 86,339 euro and, therefore, we estimate the Collar's value equal to -68,118 euro that represents the "theoretical" values of the Collar.

Table 17: Evaluation of each Caplet and Floorlet.

Payment Date	Notional Principal	Forward rate	Cap level	Floor level	Caplet	Floorlet
30/06/2006	21386700	2.14%	4.85%	2.65%	0	53,955
30/12/2006	20198550	2.35%	4.85%	2.65%	0	29,630
30/06/2007	19010400	2.62%	4.85%	2.65%	0	2,753
30/12/2007	17822250	2.86%	4.85%	2.65%	0	0
30/06/2008	16634100	2.97%	4.85%	2.65%	2	0
30/12/2008	15445950	3.17%	4.85%	2.65%	31	0
30/06/2009	14257800	3.24%	4.85%	2.65%	93	0
30/12/2009	13069650	3.41%	4.85%	2.65%	336	0
30/06/2010	11881500	3.56%	4.85%	2.65%	790	0
30/12/2010	10693350	3.73%	4.85%	2.65%	1,581	0
30/06/2011	9505200	3.64%	4.95%	2.75%	1,021	0
30/12/2011	8317050	3.78%	4.95%	2.75%	1,578	0
30/06/2012	7128900	3.88%	4.95%	2.75%	1,963	0
30/12/2012	5940750	4.00%	4.95%	2.75%	2,345	0
30/06/2013	4752600	4.13%	4.95%	2.75%	2,597	0
30/12/2013	3564450	4.25%	4.95%	2.75%	2,529	0
30/06/2014	2376300	4.36%	4.95%	2.75%	2,083	0
30/12/2014	1188150	4.48%	4.95%	2.75%	1,270	0

Source: Personal computation of data from the European Money Market Institute https://www.emmi-benchmarks.eu/euribor-org/about-euribor.html

So, it could appear, by the information available in 2005, that it was not reasonable for the city to sign the contract. Specifically, by looking at the values of each caplet and floorlet, as reported in table 18, it appears that the protection bought by the city through the Cap is worthless for the first nine payments and then becomes slightly positive for the last nine payments. On the other side, the protection that the city sold to the bank through the Floor was highly positive for the

[91] The use of the futures contract as a proxy is reported in the ECB monthly bulletin from 1999 to 2014.

first two payment, slightly positive for the third, then become worthless until maturity. However, we should remember that any Interest Rate Swap operation presents some commissions costs. In our case, the negative Collar's value is equal to the 0.3% of the initial notional principal and, therefore, it may be considered as the bank's commission cost.

In conclusion, the Collar did have a negative value for the city that can be explained by the bank's commission cost. However, we still want to underline that the city obtained a weak protection against uptrend movement of the Euribor since forward rates, expected in 2005, were lower than the Cap's level. Moreover, we must remember that the 2007 financial crisis completely changed the trend of the interest rates worldwide. This caused a change in the Euribor trend, that reached lower levels than the ones forecasted in 2005, and, therefore, made the city's position even worst.

Conclusion

The aim of this thesis was to understand how Italian local authorities have used derivatives contracts and if their use is an appropriate practice. At first, we analyse the Italian public finance evolution with regards to the passage from a "centralised finance" to the "fiscal federalism". This evolution transformed a public system based on the financial irresponsibility of local governments to a system where they became financially independents (Fossati, 1999), with the possibility of using new and more sophisticated financial instruments such as derivatives. However, it emerged that the main concern of the central government was to reduce the public debt, to meet the commitment taken with the Maastricht treaty, through the reduction of the public expenses. Therefore, the fiscal federalism represented for the local authorities a serious reduction in their expenditure capabilities and higher central control on their debt capacity, through the introduction of the Internal Stability Pact. Therefore, local authorities started using tools such as derivatives contract to manage their cost of debt. However, in some cases, derivatives were used as *"window-dress account"* method to finance the local governments' expenses through swap's upfronts without breaking the commitments indicated by the Internal Stability Pact (Dinmore, 2013).

In general, during our research, we noticed that most of the Italian local authorities that used derivatives sustained heavy losses, as happened for example to the city of Venice. In many cases, these heavy losses convinced the local government to rely on legal litigation. Specifically, the local authorities lamented a lack of transparency from the banks and the charge of additional implicit costs that were not previously communicated. The situation was considered so negative by the legislator that after just six years from their introduction in 2002 it was introduced a temporary prohibition on the use of derivatives that became permanent in 2014. Therefore, we may say that in the opinion of the legislator the use of derivatives by local authorities is a negative practice that must be avoided.

However, we want to underline that derivatives contracts, if managed correctly, are fundamental tools to hedge risks. Indeed, by what we have seen during our research, we believe that the main reason for the Italian negative outcomes was the lack of a suitable regulation, as reported in chapter three.

Specifically, the regulations introduced in 2001 were not able to prevent the spread of speculative instruments such as IRS combined with *digital option* (Cherubini and Parlato, 2014), and prior the 2007's financial law the local authorities, in subscribing derivatives contracts, were not subjected to any ministerial control. Moreover, the attempts of Consob and MeF to create an organic regulation for the use of derivatives contracts by local government, between 2008 and 2014, were completely unsuccessful, leading to the already discussed 2014 permanent prohibition (ibidem, 2014). At last, we observe that the use of derivatives always presents a risk and that even the most precise evaluation may still be "invalidated" by some unpredictable market event, such as the 2007 economic crisis.

In conclusion, in our opinion derivatives are useful hedging instrument but require precise knowledge of the financial markets and an organic regulatory framework to avoid any not appropriate use. When these elements are missing derivatives may produce severe negative outcomes that, in the case of utilization by local authorities, may put in danger the capability of the local governments to provide their services to citizens due to the financial resources shortage.

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