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The Use of Derivatives by Italian Companies during the Sovereign Debt Crisis

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Alla nonna Carmela (Luglio 1925 – Giugno 2013)

che, nonostante la sua quinta elementare,

fino al suo penultimo giorno di viaggio diceva a tutti

piena d'orgoglio:

"La Marta mia, quella studia così tanto alla Luiss a Roma

che diventerà una professorona!"

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Introduction

> *"If any one owe a debt for a loan, and a storm prostrates the grain, or the harvest fail, or the grain does not grow for lack of water; in that year he need not give his creditor any grain, he washes his debt-tablet in water and pays no rent for the year."*

This text is the 48th law out of 282 contained in the Code of Hammurabi, who was a king of Babylon reigning from around 1792 to 1750 BC. The contract described in the above extract is a put option, as it gives the farmer the right to walk away from making the payment of his mortgage interest if the harvest falls short. If instead the harvest is plentiful and the farmer has enough grain to pay, the put option would expire worthless.

A subsequent trace of derivatives in history can be found in Aristotle's *Politics*. He tells the story of Thales, a poor philosopher from Miletus who developed a "financial device, which involves a principle of universal application." Thales had great skill in forecasting and predicted that the olive harvest would be exceptionally good the next autumn. Confident in his prediction, he made agreements with area olive-press owners to deposit what little money he had with them to guarantee him exclusive use of their olive presses when the harvest was ready. Thales successfully negotiated low prices because the harvest was in the future and no one knew whether the harvest would be plentiful or pathetic. Moreover the olive-press owners were willing to hedge against the possibility of a poor yield. This type of contract would be defined as a call option.

The rationale on which the first historical examples of derivatives are grounded is quite straightforward and it does not require any sophisticated financial knowledge. The purpose of risk hedging is the transformation of an uncertain

situation where return volatility is maximized due to some unpredictable factors like the weather conditions, into more predictable scenarios where downward outcomes can be avoided.

In the last forty years financial engineering became a very sophisticated science and from the 1970s on, the USA has been the cradle of innovation in derivatives. The development of computers and their growing use in finance, which allowed complex models and computations to be quickly solved, but also the lenient regulatory regime, constituted key elements for innovation.

Notwithstanding the progress in financial engineering, this dissertation will show how Italian non-financial companies stick with the use of plain-vanilla contracts for hedging purposes against unpredictable exogenous events.

Aristotle's story about Thales ends as follows:

> *"When the harvest-time came, and many [presses] were wanted all at once and of a sudden, he let them out at any rate which he pleased, and made a quantity of money. Thus he showed the world that philosophers can easily be rich if they like, but that their ambition is of another sort."*

A company’s ambition is to maximize harvest, however if derivatives were the panacea against all the major unpredictable risks associated with running a business, every enterprise would sign these contracts.

In fact evidence collected in this study will tell a different and much more complex story.

Abstract

This thesis deals with the use of financial derivatives – to hedge interest rate risk, exchange rate risk and commodity price risk - by Italian companies in the years from 2009 to 2012. Sources of the analysis are predominantly financial statements, Bank of Italy's reports and press releases and previous literature on this topic. The main software used are Stata, FactSet and Bloomberg.

The dissertation is organized in four chapters, where Chapter 4 represents a wrap-up of the results obtained through the whole thesis.

Chapter 1 analyses some potential drivers of the use of derivatives by Italian companies through available literature. The purpose is to trace a chronological path of the trends in risk hedging by Italian enterprises. What emerges is that the use of derivatives increased over time and that interest rate risk has become a primary concern in the new millennium.

Chapter 2 describes a sample of 175 Italian non-financial listed companies in relation to derivative use. Most of the paragraphs are dedicated to the analysis of derivative use on industry basis in order to detect possible common denominators characterizing companies operating in similar businesses. The major result is that companies primarily hedge interest rate risk through the use of interest rate swaps. Moreover in the last part of the chapter the differences in the financial statements of hedgers and non-hedgers are discussed.

Chapter 3 is divided in two parts: the first one analyses the potential drivers of derivative use introduced in Chapter 1 using a probit model. All the rationales behind the introduction or the eventual non-significance of the proposed variables are described. The second part develops instead a regression based on panel data to detect some factors influencing the notional amounts hedged

by the companies in the sample. Possible connections with the sovereign debt crisis are also explored in Chapter 3.

The approach used is mostly based on empirical evidence and the aim is to introduce to readers with adequate financial understanding a preliminary snapshot of the evolution of the derivative use in the last years as well as an accurate description of the main features of Italian non-financial listed companies and of their risk hedging common practices.

Keywords: Derivatives, risk hedging, Italy, financial statements, interest rate risk, interest rate swaps, exchange rate risk, commodity price risk, probit model, panel data, notional amount.

Chapter 1: An analysis of the derivative use in the last 20 years

1.1 Introduction.

In the last decades some empirical studies on the use of derivatives by Italian companies have been carried out. Through the related papers an analysis of the evolution of hedging strategies in the last twenty years can be performed.

What emerges is that risk management is a phenomenon which has been gaining importance in the last 12 years. Before 2002 instead adoption of hedging strategies was directly correlated with size of the company and the exchange rate risk was the primary concern.

From 2002 risk management through derivatives became a more common practice, due to macroeconomic instability in both the currency and the debt market. Moreover companies started to increase the use of interest rate derivatives, while exchange rate instruments lost part of their important role as a consequence of the introduction of the Euro. At the same time the range of products available in the market started to mount together with their complexity.

The volume of users rose to more than 43,000 at the beginning of 2005, when the monitoring of derivative contracts became tighter. In response to these new regulatory requirements, the structure of the derivative instruments was simplified. Indeed after the introduction of IAS 32 and 39 and the obligation of financial institutions to disclose to the Central Credit Register credits deriving from derivative contracts, the most complex and exotic instruments were generally dismissed in favour of plain-vanilla contracts whose fair value was easier to compute.

1.2 Use of derivatives in the decade from 1993 to 2002.

Bison, Pelizzon and Sartore (2002) analysed the financial statements of 150 non-financial companies listed on the Milan Stock Exchange in order to study their use of derivative instruments from 1993 to 1999. The methodology was based on a cross-sectional analysis developed year by year to evaluate the evolution of the coefficients of the variables considered.

The starting point was the Modigliani-Miller theorem which states that rational investors use to diversify their shareholding positions to minimize risk. Said differently diversification is the instrument used by rational investors to hedge risk. Thus a company should not undertake any further hedging activities because this might jeopardize the shareholders' objective to maximize profits. However many other economists have pointed out that the three ideal assumptions on which the theorem is grounded are usually violated in practice, as it is not quite realistic to assume absence of transaction costs, absence of taxation and market completeness. After criticizing the lack of empirical evidence of the previously mentioned assumptions these economists identified some market imperfections which can justify the use of derivatives by non-financial companies: taxes on income (Mayers and Smith (1982), Smith and Stulz (1985)), financial distress (Mayers and Smith (1982), Smith and Stulz (1985), Froost, Scharfestein and Stein (1993)), capital markets imperfections, agency costs and information asymmetries (Smith and Stulz (1985), DeMarzo and Duffie (1991 and 1995)). Moreover even the level of market exposure can cause the use of financial derivatives.

Smith and Stulz (1985) proved that if effective marginal tax rates on corporations are an increasing convex function of EBT, then the after tax profit is a concave function of its EBT. If hedging reduces the variability of EBT, then the

expected corporate tax liability is reduced and the expected after tax profit is increased, as long as the cost of hedge is not too large.

In connection to this theory, Bison, Pelizzon and Sartore expected a positive correlation between amount of taxes paid and use of derivative. In other words they claimed that if a company paid high taxes at year t, then at year t+1 it should use hedging instruments to decrease the variability of EBT and thus reduce the amount of taxes paid. In fact they got mixed and contradictory results while analysing one by one the coefficients for the years from 1993 to 1999.

Financial distress should exhibit a positive relationship with the amount of derivatives as the latter contribute to reduce the risks of bankruptcy and restructuring processes with their related direct and indirect costs. If these potential expenses have a fixed component this implies that smaller companies should have higher incentives to sign derivative contracts.

Stulz (1984) claimed that a decrease in expected earnings volatility should decrease the probability of financial distress and facilitate as a consequence the process of getting external leverage. The causality effect should imply that the use of derivatives decreases the earnings volatility and in turn increases debt capacity.

Ross (1977) suggested instead a different relationship between leverage and derivatives, as there is an incentive-signaling equilibrium, according to which only “healthy” companies are able to manage high levels of debt, while “unhealthy” firms would not have any incentives to use a mimicking strategy, due to the costs implied by the high leverage. This theory would suggest a negative relationship between derivative use and level of indebtedness, as the ability of a company to increase leverage should be related to a decrease in

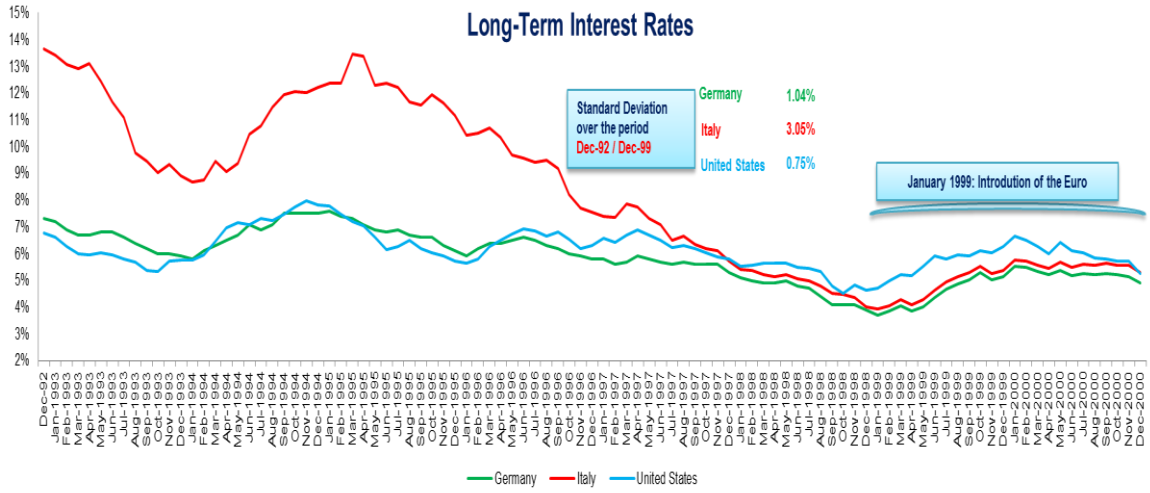
derivative exposure, in an effort not to give negative signals to the market.

Notwithstanding the previously mentioned speculations no evidences of a significant impact of leverage on the decision of using derivatives were found in the study by Bison *et al*. This is due to the fact that the Italian firms included in this experiment used to hedge especially against exchange rate risk (75% of the companies use exchange rate derivatives). Only 32% of the sample used derivatives for the interest rate risk. In the same time period in Germany (Bodnar and Gebhardt (1998)) and US (Wharton School 1998) the use of exchange rate derivatives showed trends similar to Italy's, while the use of interest rate derivatives was more than double. These results were quite surprising because in the years from 1993 to 1999 the volatility of interest rates in Italy was higher than in the other two countries.

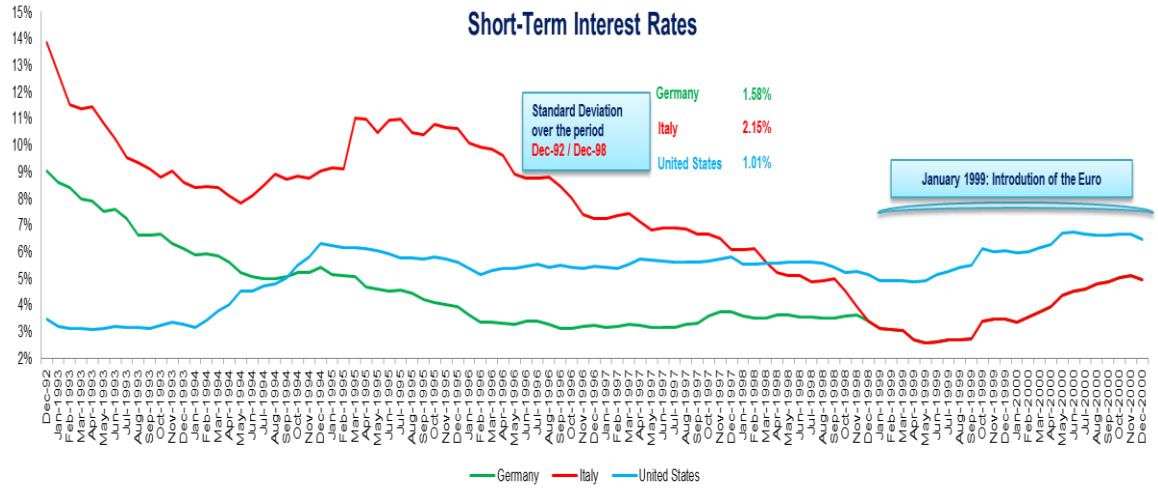
The following graph[1] shows the performance of the long-term interest rates in the reference countries and their related standard deviation. Key definitions of the data are provided below:

- For Germany, data refer to the yield on outstanding listed federal securities with residual maturities of over 9 to 10 years traded on the secondary market.
- For Italy, gross yields of Treasury bonds refer to the yields of bonds traded on the Italian Exchange (M.O.T.) with a residual maturity of 10 years.
- For United States, data refer to yields on government securities with outstanding maturities of 10 years.

[1] Source: OECD statistic database, available at www.stats.oecd.org.



The following graph[2] shows instead the performance of the short-term interest rates in the reference countries and their related standard deviation. Short-term rates are usually either the three month interbank offer rate attaching to loans given and taken amongst banks for any excess or shortage of liquidity over several months or the rate associated with Treasury bills, Certificates of Deposit or comparable instruments, each of three month maturity.



Moreover Bison *et al.* found out that the most common hedging instrument was the plain-vanilla swap which was used by 30%-40% of the companies in the sample, while options were used only by 13% of the firms under analysis. This may be due to the lower level of sophistication of the former compared to the

[2] Source: OECD statistic database, available at www.stats.oecd.org.

latter. Bison *et al.* found instead that derivative use is strongly positively correlated with both total amount of assets (relation which may be caused by the presence of economies of scale) and with level of exposure to foreign currencies. Data showed also that the entrance into the European Monetary Union did not cause any decrease in the amount of contracts signed (at least initially). However the study did not control for the effective volume of derivatives used, but only for the decision by companies to use hedging instruments.

Another result confirmed both empirically and intuitively was that the use of exchange rate derivatives is correlated with the industry, as some sectors like heavy machinery are more exposed to international trade than others.

The increase in investments could cause financing costs to grow thus triggering more uncertain cash flows projections and a related problem of underinvestment. In order to avoid this chain of effects companies which invest more in R&D should try to hedge more their risk with interest rate derivatives. Counter intuitively the coefficients found by Bison *et al.* were never significant. This result can be caused also by the limited use of interest rate derivatives by Italian companies until the beginning of the new millennium, as previously discussed.

Myers (1977) defined underinvestment as a suboptimal decrease of investments in growth opportunities due to insufficient cash flows. When external financing is too costly, companies decide indeed to scale down the volume of R&D expenditures. Sharing Bison *et al.'*s idea, Froot *et al.* (1993) discussed how hedging external risk through derivatives should limit the underinvestment phenomenon.

Assuming this concept is correct, why did Bison *et al*. not get significant

coefficients? And what is the reason for the mixed results that literature has been reporting for years about this topic?

As discussed by Chiorean, Donohoe and Sougiannis (2012) two basic drawbacks generate the problem: endogeneity and firm's economic life cycle.

Underinvestment can cause the use of derivatives which on turn can reduce underinvestment. This explains the simultaneous causality bias which alters any previous research results.

The second problem arises instead from the wrong assumption of the existence of a monotonic function which links measures of growth opportunities and underinvestment. Economic theory should rather suggest that access to growth opportunities and ability to invest in those growth opportunities are not equivalent concepts. For instance a company which commits few investments in R&D is exposed to low growth opportunities, but it cannot be considered as facing an underinvestment issue. If instead a company needs to commit more money to research but it cannot do it because of negative cash flows, then in that case the situation can be defined as underinvestment. Thus the reliability of results is grounded on controlling any model for a variable which represents the firm's life cycle.

To deal with both problems Chiorean *et al.* split the issue in two parts, one *ex-ante* and one *ex-post*. If a company is facing *ex-ante* a problem of underinvestment (taking into account its life cycle), the use of derivatives should work as a hedging opportunity to reduce this risk. Said differently, is the probability to use derivatives a function of underinvestment?

A second analysis should be focused *ex-post* on the change in the amount of investments in growth opportunities as a function of the use of derivatives.

If the results in this two-stage analysis are consistent with each other, then

some reliable conclusions on the importance of derivatives to mitigate underinvestment could be drawn.

Using a sample which encompasses observations from 2000 to 2008, Chiorean *et al.* found out that companies in the sample did not use derivatives as a tool to alleviate underinvestment. This held true for all the three categories examined, i.e. users, new users and non-users. There was instead a clear evidence that the life cycle stage influenced hedging attitude, as the introduction and growth phases represented the most common periods during which derivative contracts were signed.

A drawback of the study by Chiorean *et al.* could be in the absence of a control variable representing the industry, which together with the life cycle stage contributes to define more properly the underinvestment issue. One can indeed intuitively suppose that underinvestment creates different impacts for instance on technological or pharmaceutical companies on one side and on fashion or publishing companies on the other.

1.3 Use of derivatives in the decade from 2003 to 2012.

The use of derivative contracts to hedge interest rate risk started to increase from the second half of 2002, when the contracts signed mounted from a notional value of about $100 billion in 2002 reaching approximately $250 billion in June 2004. The value is compatible with other European countries excluding Germany whose lower volumes are in line with the fact that many German banks signed derivative contracts through investments banks based in London[3].

In 2003 both the number of companies using derivatives and the range of products used were in line with the international trends. If one excludes the

[3] Source: *Utilizzo e ristrutturazione dei prodotti derivati nelle imprese italiane*, Convegno ODC Milano, Emanuele Facile, January 26 2006.

most fancy names the products available in the market were very similar and in most of the cases they were created by international investment banks which subsequently sold them to regional banks.

The reason why many companies started to rely more on the use of derivatives was the macroeconomic instability in both interest rate and exchange rate markets.

31 out of 35 companies included in the survey of Risk Italia used derivative contracts with the aim to hedge firstly interest rate risk and secondly the exchange rate risk. This increase in the use of derivatives came at a time in which the bond market was freezing due to the Cirio's scandal[4].

A recent study by the Bank of Italy (October 2012) analysed the use of derivatives not only by large size companies, but also by small and medium size firms. The three main results of the paper were:

1. Differently from the evidence of the 90's and in line with the results of the survey by Risk Italia, financial derivatives are nowadays a widespread hedging instrument among Italian non-financial companies.
2. Users have more total assets, higher exposure to risks, lower earnings and commit more funds for Capex.
3. Examining risk indicators there is a correlation between financial distress and derivative exposure, in contrast with previous results by Bison *et al*.

In Italy a regulated control of derivatives has been active since 2004 when the decreasing levels of interest rates caused the liabilities from derivative positions to steadily mount. Since January 2005 Italian banks have had the obligation to disclose to a control authority, i.e. the Central Credit Register (*Centrale Rischi*), the positive intrinsic value of their outstanding derivative contracts. This implies

[4] Source: *La gestione del rischio nelle aziende*, Risk Italia 2003, www.risk.net.

that the data retrievable through this entity concern only those instruments with positive fair value for the bank and negative fair value for the non-financial company. Other data which must be disclosed are the type of contract, the time to maturity and the overall duration of the contract. However some important pieces of information like the notional value, the nature of the underlying and the starting date of the contracts are not retrievable at the Central Credit Register.

The obligation to disclose only the contracts with positive fair value is consistent with the role of the Central Credit Register whose aim is to register the credits in the financial system. The directive 139/91 of the Bank of Italy, which contains the guidelines for the recording process of the derivative positions at the Central Credit Register, states that the intrinsic value is the positive fair value of the contract, i.e. the credit position held by the financial institution vis-à-vis the non-financial company, net of any compensation agreements.

Through these data the Bank of Italy can analyse the use of derivatives among Italian companies, the level of exposure to the risks embedded in this type of contracts, the relationship between fair value of derivative contracts and total amount of outstanding debt, the attributes of the banks offering derivative contracts.

The most relevant results highlighted that more than 42,000 companies used hedging instruments in 2011, with a total exposure of €7.4 billion. Derivatives had a negative correlation with operating income and a positive correlation with total assets. Moreover users committed more funds for Capex than non-users and they exhibited a larger exposure to both financial leverage and exchange rate risks arising from trading relations with foreign countries.

As previously stated, the amount of derivative exposure was limited compared to the total indebtedness with banks, however there was evidence of a strong

correlation between derivative use and financial distress. This aspect requires further analysis in order to determine the causality among these two elements.

The information available at the Central Credit Register can be used to study the profile of the companies which use the interest rate swap contracts, which are the most common hedging instrument used by Italian companies. The value of a swap should be equal to zero at the time in which it is signed, but actually it is positive because the bank applies a mark-up to the basic economic conditions in order to get a compensation for both market and credit risk, for the operating costs and to earn a profit on each transaction. Afterwards the contract fair value changes in response to the specific market conditions.

For what concerns contracts entered before 2005, their fair value was disclosed to the Central Credit Register only when the interest rates exhibited large volatility. Since instability dominated the years from 2005 to 2010 the Bank of Italy had the possibility to retrieve information also about these older contracts.

Unfortunately disclosure concerns only those instruments which do not require an upfront cash outflow for the company to enter the agreement, so options are excluded from the analysis. However this drawback does not undermine the validity of the study because the use of options is not as widespread as that of swaps, moreover two thirds of the companies using options hedge their risk also through swaps.

The Bank of Italy reports that in March 2012 non-financial companies had a total negative fair value in derivative contracts which amounted to €6.3 billion corresponding to a notional value of €169.3 billion. The interest rate swap contracts (which for the majority embed also options) represented for all the period the 90% of the contracts, while the remaining percentage was composed by options not embedded in swaps.

Due to the large level of indebtedness with a flexible interest rate cost, the use of derivatives was aimed at decreasing the risk of raising interest rates, so it is straightforward to understand that the bank's profits were negatively correlated with the interest rates benchmarked in the agreements. The contracts which were more often covered were medium- and long-term ones.

In 2005 the companies engaged in the derivative market amounted to 43,000, while in 2010 they were 34,000. The reason lies in the decrease of recorded transactions in the years from 2005 to the first half of 2008, trend which was abruptly reversed thereafter because of the Lehman Brothers' bankruptcy whose consequences were the collapse of the interest rates and the disclosure at Central Credit Register of positions not yet recorded.

The comprehensive intrinsic value of derivative contracts moved from €4.5 billion in January 2005 to €7.8 billion in September 2010. Even the average value grew exponentially as reported in the following table.

Number of Hedgers and Intrinsic Value of Interest Rate Swaps*

	Total Intrinsic Value (In €m)	Number of Companies (In Units)	Average Intrinsic Value per Contract (In €th)	Median Intrinsic Value (In €th)
January 2005	4,509	43,393	104	13
December 2005	3,785	44,681	85	10
December 2006	3,438	38,706	89	9
December 2007	5,290	31,643	167	12
December 2008	6,787	37,772	180	20
December 2009	6,486	36,248	179	23
September 2010	7,808	34,066	229	25

* Sum of the positive intrinsic values signalled by banks to the Central Credit Register.

An important result consists in the fact that companies with higher amount of total assets are those more active in the derivative market, indeed users in the sample had total assets equal on average to €6.7 million, against €0.4 million Euros of non-users.

From a chronological perspective users exhibit a higher amount of total assets and revenues in 2010 compared to 2005, because the smallest companies decided to quit the derivative market in the years after 2005.

Another important finding concerns the financial structure of users, which on average had a ratio of $\frac{DEBT}{DEBT+EQUITY}$ equal to 64%, while non-users registered an average of 37.2%. Other data like quick ratio and liquidity were worse for users compared to non-users, as evident in the following table[5].

Features of Financial Statements for Users and Non-users

Median Values

	Users	Non-users
Total Assets (in € '000)	6,663	431
Net Revenues (in € '000)	5,120	385
ROE (%)	1.6%	6.4%
Financial Expenses/EBITDA	24.0x	2.9x
Bank Debts/Total Debts (%)	98	84
Leverage (%)	65	37
Quick Ratio	3.4x	9.6x
Capex/Net Revenues	1.9x	0.7x
Debt Maturity	42	25

The ratio between fair value of the derivatives and total indebtedness in 2010 was on average 4.4% with a high standard deviation around the mean. The last decile of the distribution contained very high ratios, up to 7.5%.

This may be due to a speculative use of the derivative contracts, to the worsened conditions of the market or to an inefficiency of the hedging instruments.

The hedging activity was more concentrated than the credit activity, indeed the first bank held 77% of the derivative contracts of a given company, against 67% of the total financing credit.

[5] Data refer to 2009 financial statements.

Another recent survey on risk management and use of derivatives by non-financial Italian firm was carried out through a survey by Bodnar *et al*. in 2008. The sample was composed by 123 companies listed on the Italian Stock Exchange and 403 unlisted firms. Of this sample 64 refused *at priori* to be part of the analysis. The choice to include unlisted companies was dictated by the low number of listed companies. The response rate was 18.53%, i.e. 14 listed and 72 unlisted companies, in line with other comparable surveys, where the response rate never hit the 30%. (Bodnar *et al.* (1998) 20.70%, Jalivand (1999) 28.10%, Jalivand and Switzer (2000) 28.10%, De Ceuster *et al.* (2000) (21.86%), Malin *et al.* (2001) 28.80%, Pramborg (2005) 25.59% and Fatemi and Fooladi (2006) 21%).

The companies were firstly asked whether they preferred insurance or derivatives when dealing with seven specific categories of risk: exchange rate, interest rate, commodities, counter-party, energetic, country, equity and operations. Four were the risks that the highest percentage of Italian companies tried to hedge: exchange rate risk (more than 67% of respondents), interest rate risk (more than 60%), counter-party risk (more than 30%) and commodity risk (more than 25%). Hedging strategies consisted in using either derivatives or insurance. Derivative use was more spread for interest rate risk (56% of respondents), exchange rate risk (55% of respondents), commodity risk (23%) and energetic risk (21%). In the other domains the use was close or equal to zero.

These results can be partly explained by the fact that unless one considers those classes of risk like interest rate risk, which is common to all the different companies, other categories like equity risk and country risk are specific to some firms and for this reason, based on the specific business, the use of

derivatives can be much higher than the overall average.

Usually large size companies are the main users of derivatives, a condition which may be justified by higher exposure and economies of scale.

According to the survey, the most common reasons for derivative use are in order: avoidance of large losses from unexpected price movements / events (VaR) (32.56%), shareholders' expectations of risk management (32.56%), reduction of cash flow volatility (20.93%) and increase in reported earnings profitability (18.60%).

Among the concerns regarding derivatives, 37.50% mentioned monitoring and evaluating hedge results, 26.54% mentioned market risk associated to unforeseen changes in the market value of derivative positions, 17.00% chose the credit risk while accounting treatments and disclosure requirements were referred respectively by 14.68% and 10.26% of respondents. The most serious concern appeared to be market risk (30.23%) followed by monitoring and evaluating hedging results (18.60%).

For what concerns the introduction of IAS 32 and 39, requiring new disclosure policies for the derivative instruments, 68% of the sample claimed that the International Accounting Standards did not influence their hedging choices, while 12% answered that they preferred to reduce the use of derivatives not to meet disclosure problems, another 12% declared to have changed the type of instruments used.

When facing interest rate risk management Italian companies preferred swapping from floating rate debt to fixed rate debt payments, and 42% of the sample had been using swap contracts at least sometimes, as it is evident in the following table.

Frequency of Transactions in the Interest Rate Derivative Market

Transactions in IR Derivative Market	Frequently	Sometimes	Rarely	NA
Swap from Fixed Rate to Floating Rate Debt	0.00%	7.89%	21.05%	71.05%
Swap from Floating to Fixed Rate Debt	15.79%	26.32%	23.68%	34.21%
Fix in Advance the Rate (Spread) on New Debt	15.79%	13.16%	21.05%	50.00%
Reduce Costs or Lock-in Rates for Future Financing	8.11%	24.32%	24.32%	40.30%

More than 55% of the respondents said that interest rate swaps were the most important instruments used, while option combinations accounted for 21% and forward rate agreements for 9%.

Preference Among Interest Rate Derivative Instruments

FRA Agreements	9.30%	Interest Rate Swaptions	6.98%	Option Combinations	20.93%
Interest Rate Futures	–	OTC IR Options	2.33%	Alter the Timing of Debt	4.65%
IRS	55.81%	Exchange-Traded Options	2.33%	Other	2.33%

When asked if they used any benchmarks to evaluate the interest rate risk management, 40% answered they did not use any benchmarks, while 57% of the remaining share declared to use a market index (e.g. LIBOR) against the costs of funding.

Benchmarks Used for Evaluating IR Risk Management of Debt Portfolio

Benchmark	
Our Firm Does Not Use a Benchmark for the Debt Portfolio	38.24%
Of those with a Benchmark	
Realised Cost of Fund Relative to a Portfolio with a Specified Ratio of Fixed to Floating Rate Debt	14.29%
Realised Cost of Funds Relative to a Market Index	57.14%
Realised Cost of Fund Relative to a Portfolio with a Specified Duration	14.29%
The Volatility of Interest Expense Relative to a Specified Portfolio	9.52%
Other Benchmark	4.76%
Total	**100.00%**

1.4 Some considerations about the fair value of derivative contracts.

The pricing of a derivative transaction begins with the determination of a benchmark mid-market price at which the net present value is zero at the

inception of a transaction. Nonetheless if the dealer were actually to transact at the mid-market price it would incur uncovered transaction costs without earning any return as a compensation for acting as a market maker. The actual price transaction with the client is therefore not the mid-market price but a bid or offer price at which the dealer realizes a positive estimated NPV[6].

In Italy losses on derivative contracts have mounted in the last years. These instruments, instead of protecting companies from adverse market moves, created even more exposure to risk. For this reason, starting from the end of 2008, many hedgers have decided to extinguish their negative positions prematurely[7].

The information asymmetries which is usually encountered in the financial sector generates a different bargaining power between the intermediary, the “strong” party who owns pieces of information not disclosed in the market and the investor, the “weakest” party, who can just trust that the intermediary will operate in the client's best interest.

An inquiry by CONSOB carried out in 2004 points out that the small and medium size companies have started using derivatives at the end of the 90's following the expectations of an increase in the interest rates. The macroeconomic conditions in Europe and USA until 2005 proved that expectations were incorrect and huge losses were generated. Some companies held their positions up to the first half of 2005 and thereafter they started to recover because of the increase in the interest rates. Other companies chose instead the way of renegotiation through the inception of new contracts which usually were much more complex, in order to absorb the loss of the previous contracts. These new contracts caused in the following years even higher losses.

[6] Source: *The value of a new swap*, D. Mengle, ISDA Research Note; 2010.
[7] Source: *I contratti derivati stipulati dalle aziende*, Autonomie Locali srl, www.robertorusso.it.

CONSOB detected in 2004 cases in which the financial intermediary decided to propose very exotic instruments to companies entering the derivative market for the first time.

The reason can be found in the difficulty to compute their fair value. In this way banks could hide the losses on the contracts and change the terms which became even more unfavourable.

Instead of pursuing a hedging purpose these contracts became an open bet, a speculative instrument which can undermine the stability of the Italian companies.

1.5 The impact of the sovereign debt crisis on the credit supply.

(Sources: Bank of Italy)

In 2011 Italian companies saw their profitability harmed because of the decrease in revenues and the mounting cost of money. Financial statements, characterized since 2008 by a persistent weakness, were further jeopardized by leverage at his highest historical peak since the 90's. The crisis of the sovereign debt reached the financial statements of companies through the worsened conditions of credit supply, as banks demanded for higher interest rates and used stricter rules to choose eligible borrowers. As reported by the Bank of Italy the percentage of companies claiming not to have received the full amount of credit demanded reached in 2011 its highest levels since the outburst of the financial crisis. Although the Government was implementing policies to make the access to credit easier, companies were facing huge difficulties in debt repayments thus incurring in delays and more frequent defaults.

The data contained in financial statements available on Cerved reveal that in 2010 less than half companies recovered their pre-crisis revenues levels. In

2011 EBITDA was further reduced by 1.1% reaching its lowest level since the 90's (33.6%). Profitability was hurt also by the increasing burden of financial expenses, which peaked 21% of EBITDA, three percentage points more than in 2010. Declining profitability meant for companies lower ability to self-finance investments, which were declining as well due to falling households' demand for goods and services. Financing need, in slight recovery compared to 2010, amounted to €33 billion in 2011.

Based on data retrieved at Invind, the Bank of Italy estimated that the average number of days in credit receivable was on average 104 days, 8 days more compared to the years before the crisis. Given the almost unchanged contractual terms for credit, it is reasonable to assume that the days in accounts receivable increased because of delays in payments by customers.

In 2011 the debts towards banks increased sharply by €19 billion (0.7%). While in the Euro zone short term debt was 24% of the total, in Italy the share of bank debts due in less than 12 months amounted to 38%.

Leverage, which is expressed as debt over debt plus equity (at market value), increased by 3% during 2011, reaching 48%, mostly due to falling market value of equity. This leverage amounted to 8% in 2000 and increased up to 40% in 2008, as a result of low funding costs. Italian companies owe a much higher debt to banks than other countries like France, UK, France and Japan. The use of bank debt has been decreasing in the last years in the Euro area and in the Anglo-Saxon countries and it has been replaced by bond issues. Generally speaking Italian companies owe 70% of their financial debt to banks, while the average in the Euro area is 50%.

Notwithstanding the mounting financial needs, growth in credit supply started to slow down at the beginning of 2011 and it became negative during the first

months of 2012. Smaller companies exhibited more difficulties to access new funding, further many differences were registered in terms of industry, as sectors like energy received loans with much more ease than industries like construction.

The accounts receivable bought by factoring companies mounted by 15.3% during 2011 in order to help the companies retrieve cash in a period in which clients' payments were exposed to more recurring delays.

Credit to Companies

Values Registered at the End of the Period; % Changes Every 12 Months

	2008	2009	2010	2011
Banks				
Industries				
Manufacturing Industry	5.9	(7.8)	(1.6)	0.8
Constructions	13.2	1.9	0.1	(2.7)
Services	6.7	(4.5)	(0.8)	2.1
Other	9.2	6.2	7.8	8.5
Technical Forms				
Current Accounts	8.5	(19.0)	(1.2)	0.5
Mortgages	7.4	5.7	5.0	0.5
Other Loans	5.7	3.6	(4.2)	1.0
Total	**7.0**	**(3.0)**	**0.9**	**0.5**
Financial Firms				
Leasing	9.5	(4.0)	0.7	0.4
Factoring	13.1	(14.7)	4.6	15.3
Other Financing	14.1	(22.6)	62.4	(9.0)
Total	**10.5**	**(7.8)**	**3.8**	**3.3**
Banks and Other Financial Institutions				
Total	**7.7**	**(3.6)**	**1.3**	**0.9**

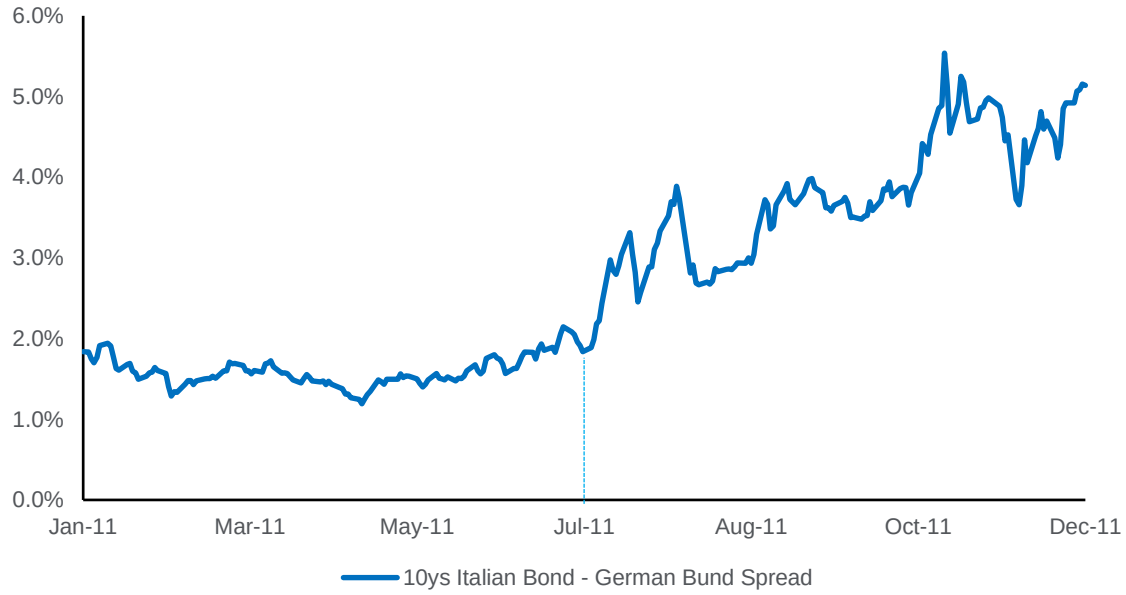
The strong relationship between banks and companies in Italy is a consequence of the structure of the Italian economy, which is composed mostly by small and medium size enterprises which are not able to have access to the capital markets. Moreover the family-based ownership structure is an impediment to the listing on the Stock Exchange of many large size companies.

A study by the Bank of Italy tried to detect the impact of the sovereign debt crisis on the credit supply. The main challenge faced through such a kind of study was

to assess the exogeneity of the sovereign debt crisis, which instead in most of the cases is a consequence of troubles in the banking system.

Although sovereign spreads may rise as a consequence of the deterioration in domestic banks' balance sheets, or of the burst of an asset price bubble, which induces governments to bail out financial intermediaries (Acharya *et al*. 2012 showed that government bail-outs of banks lead to higher sovereign spreads), this was not the case in Italy. During 2010 increasing concerns on the sustainability of public finances in Greece, Ireland and Portugal eventually led these countries to ask for international assistance from the European Union and the International Monetary Fund. Risk premia on interbank and bond markets rose. Italian banks experienced an increase in the cost of wholesale funding, but their condition was not far from the one of their European peers.

The situation changed dramatically from June 2011, when rapidly deteriorating Greek economic conditions fuelled fears of a Euro-area break-up and triggered contagion to Italy. Between June and July 2011, indeed, S&P downgraded the Greek debt to CCC, the lowest rating for any country it reviews, Greek political instability rose, and announcements of an involvement of the private sector in Greek debt restructuring were made, characterizing it as a "selective default". The following figure shows the magnitude of the increase in sovereign spreads on Italian 10 year government bonds with respect to the benchmark 10 year German Bund. All the action is concentrated in the second part of 2011, when spreads increased sharply since June, reaching 370-390 basis points in September 2011 and a peak of 530 basis points in November 2011.



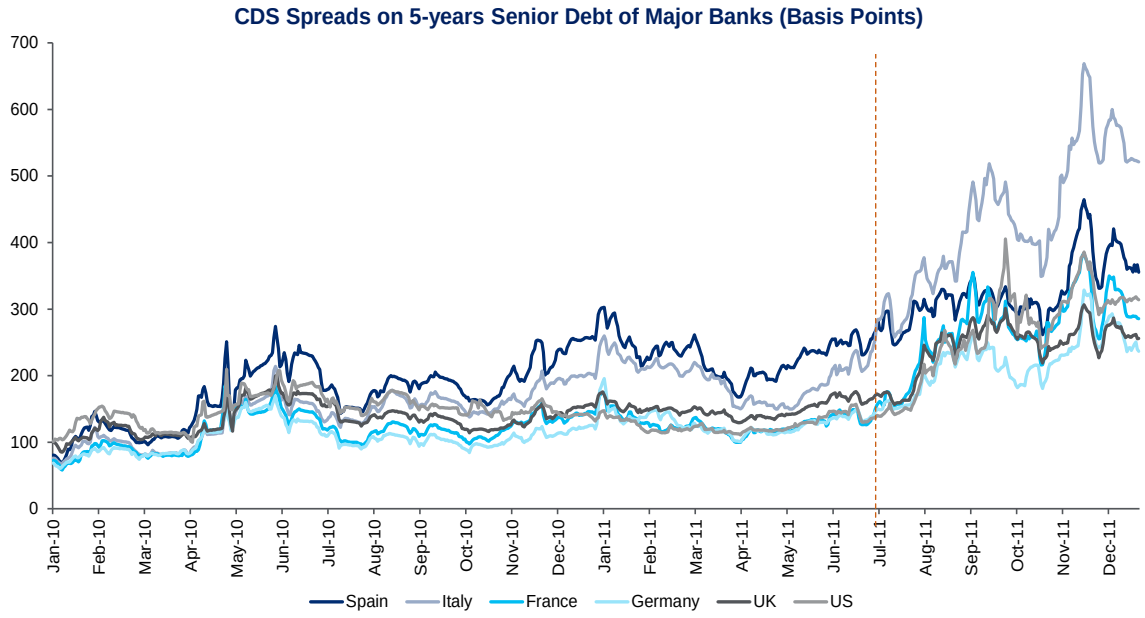
As opposed to what happened in other European countries the increase in sovereign yields cannot be attributed to the instability of the financial sector. The weakness of Italian public finances is in fact driven by the high level of public debt and the low growth rate of the economy, which are both long standing features of the Italian economy (Bank of Italy 2011). Moreover, as opposed to what happened in Ireland or Spain, state aid to the banking sector was extremely limited and did not impact significantly on public deficit. Finally, Italy did not experience a housing bubble.

On the other hand the sovereign debt crisis had an impact on the banking system, as it is evident observing the reaction of investments by firms which have been scaled down in the second half of 2011.

Another key way to observe the impact of the sovereign debt crisis is through the reaction on different banks. Foreign banks have headquarters in countries where the effects of the crisis are milder. Although these banks lend to Italian companies, their liabilities are composed mainly by international inter-bank transfers from their headquarters that raise funds either in their home country or in the international wholesale markets. This is partially a shield to the increase in

funding costs due to country specific shocks, to which instead local banks are fully exposed.

Another direct consequence on the financial sector caused by the sovereign debt crisis is observable in the movement of the CDS. Its spread on the senior debt for the largest Italian banks becomes significantly higher than that experienced by comparable financial intermediaries in other countries.



After having discussed the exogeneity of the sovereign debt crisis the next step is to study its impact on the credit supply. To this purpose two periods are identified: the first from January to June 2011 and the second from July to December 2011. Further the study encompasses companies which are exposed to at least two banks, one which is Italian, the other foreign. The idea is that foreign banks, being headquartered in countries where the sovereign risk grows much less, are more shielded from the sovereign tensions than Italian banks.

The analysis shows how Italian banks decreased lending and increased interest rates because of the sovereign debt crisis. A further result is the reluctance of Italian banks to terminate the existing relationships whereas the probability of accepting new clients became lower.

Another important result shows how assuming two banks have the same market capitalization, the same size (ratio of sovereign securities from European troubled countries to total assets) and the same ratio of wholesale funding to total assets, in a situation of crisis, being an Italian or a foreign bank still makes a difference in the attitude towards credit supply. Further it was proved that it is quite difficult for the companies to switch their request for credit from Italian banks to foreign banks.

1.6 A detailed analysis of the evidence about derivatives collected by the Bank of Italy in the years from 2008 to 2012.

Every 6 months the Bank of Italy discloses information about the outstanding over-the-counter derivative contracts owned by a sample of Italian banks which are very active in this sector[8].

This type of analysis was introduced in 1998 as an initiative of the Committee on the Global Financial System which regularly organizes meetings in Basel at the Bank for International Settlements, under the aegis of the Committee of Central Banks governors of the G-10 Group.

This enquiry is based on reporting every 6 months on a consolidated basis the statistics about over-the-counter derivative contracts held by banks and financial intermediaries based in countries of the G-10. Results are based on the recommendations contained in the report “Proposals for improving global derivatives market statistics”, introduced by the above mentioned Committee in July 1996.

The objects of the analysis are the notional and gross market values (both

[8] The financial groups included in the analysis are Unicredit, Intesa Sanpaolo, Monte dei Paschi di Siena, Banco Popolare and UBI Banca. They control more of 90% of the total derivative contracts held by Italian banks.

positive and negative) of derivative contracts on exchange rates, interest rates, share and indices (equity-linked), commodities and credit default swaps (since 2004).

For all the contract types it is also required a subdivision according to residual life (less than 1 year, between 1 and 5 years, more than 5 years).

During the first half of 2009 a decrease in the use of derivatives by 4.5% was recorded in contrast with the evidence in the other countries of the G-10, where there was an average increase in the use of derivatives by 12%.

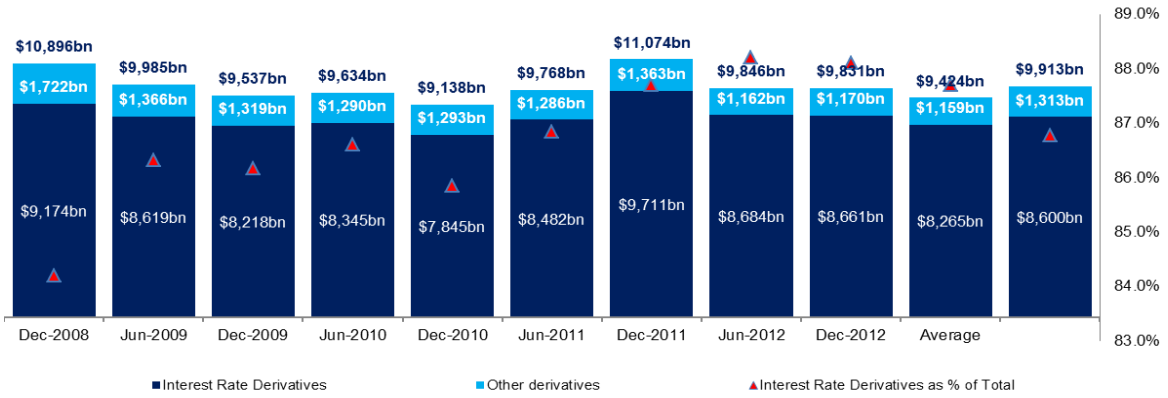
Nevertheless during the second half of 2009 and the whole 2010 the trend was in line with the other members of the G-10.

In June 2011, while the rest of the countries witnessed an increase in the notional amount of derivative contracts of 18%, in Italy the growth rate was just 13%. In the second half of 2011 the notional amounts of contracts fell by 11% because of the depreciation of the Euro vis-à-vis the Dollar, which is the currency used for derivatives reporting.

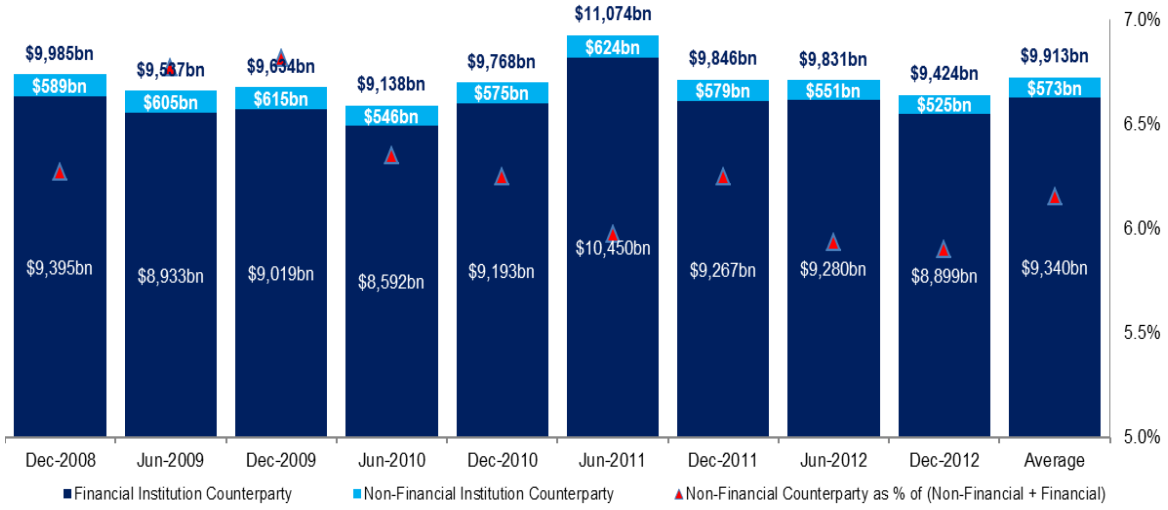
During the five years under analysis the notional amount of the contracts represented a very small share of the whole sample in the G-10 countries, averaging 1.6%. The following table and graph detail the composition of the notional amounts in the period from January 2008 to December 2012.

Derivative Contracts per Risk Class *(Notional Amounts in $bn)*

Risk Category	30/06/2008	31/12/2008	30/06/2009	31/12/2009	30/06/2010	31/12/2010	30/06/2011	30/12/2011	30/06/2012	30/12/2012
Financial Derivatives										
Exchange Rates	1,298.7	1,059.0	1,007.2	986.9	1,050.1	1,046.5	1,091.2	954.3	906.5	925.3
Interest Rates	9,174.2	8,618.5	8,218.0	8,344.5	7,845.3	8,481.8	9,711.4	8,684.3	8,660.6	8,264.7
Commodities	423.4	307.0	312.0	302.6	242.4	239.3	271.3	207.2	263.4	233.7
Total	**10,896.3**	**9,984.5**	**9,537.2**	**9,634.0**	**9,137.8**	**9,767.6**	**11,073.9**	**9,845.8**	**9,830.5**	**9,423.7**
Credit Derivatives										
Bought CDS	430.5	395.3	367.9	376.2	274.4	288.8	284.7	263.6	356.5	314.6
Sold CDS	440.1	400.3	370.8	387.1	293.6	305.8	308.4	274.5	367.9	313.5
Total	**870.6**	**795.6**	**738.7**	**763.3**	**568**	**594.6**	**593.1**	**538.1**	**724.4**	**628.1**



Considering the recipients of the contracts, financial institutions are the most common banks' counterparty, while non-financial institutions represent the counterparty for about 11% of exchange rate derivatives, 6% of interest rate derivatives and 9% for credit default derivatives.



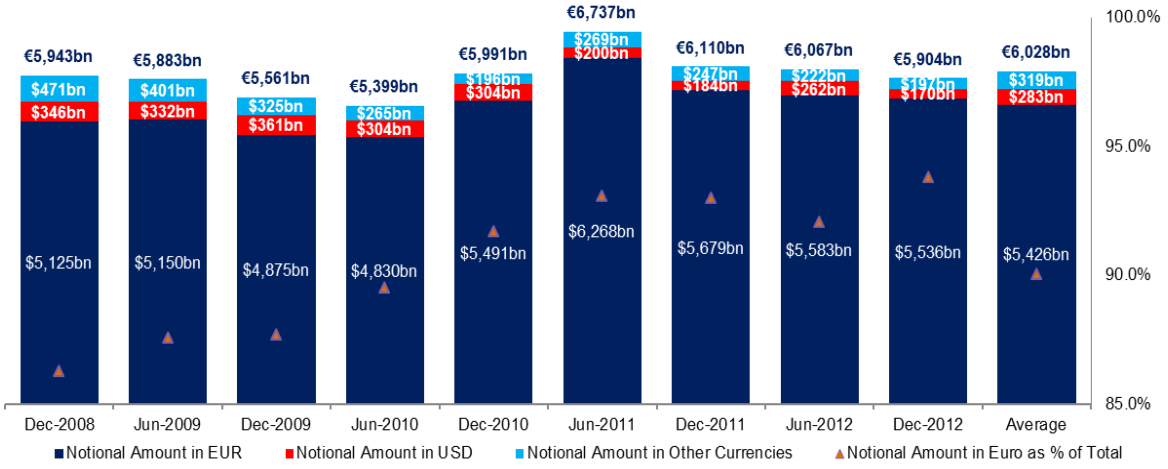
For non-financial institutions notional amounts of interest rates derivatives always represent around 80% of the total debt covered by derivative instruments.

Derivative Contracts per Risk Class - Non-Financial Institution as Counterprty

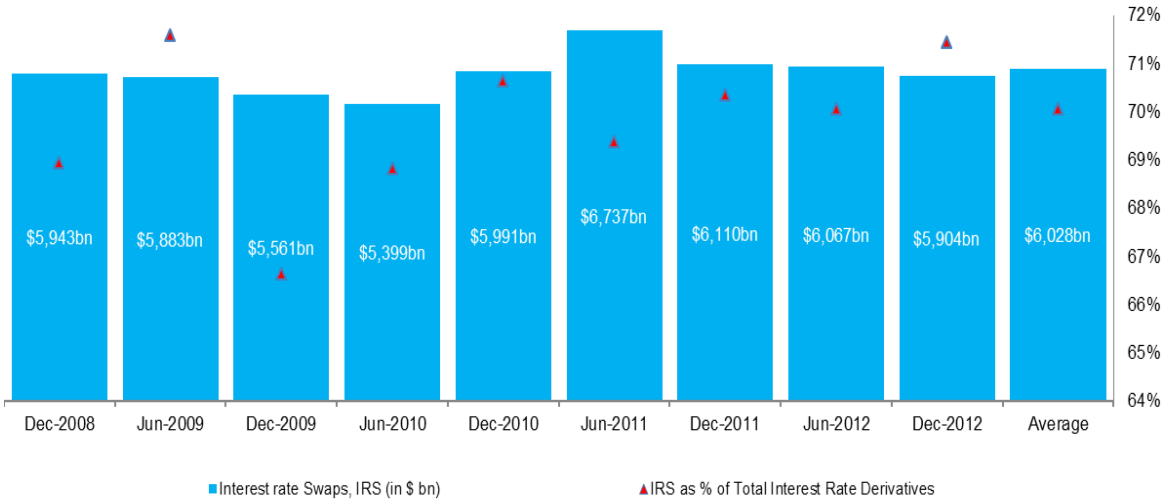
(Notional Amounts in $bn)

Risk Category	30/06/2008	31/12/2008	30/06/2009	31/12/2009	30/06/2010	31/12/2010	30/06/2011	30/12/2011	30/06/2012	30/12/2012
Financial Derivatives										
Exchange Rates	129.2	120.5	109.6	101.3	105.6	115.9	112.4	100.3	99.2	101.7
Interest Rates	372.5	442.0	467.8	490.4	420.6	439.5	491.2	461.0	437.9	416.2
Commodities	19.6	26.6	27.1	23.0	19.5	19.1	20.3	17.7	13.6	7.0
Total	**521.3**	**589.1**	**604.5**	**614.7**	**545.7**	**574.5**	**623.9**	**579.0**	**550.7**	**524.9**

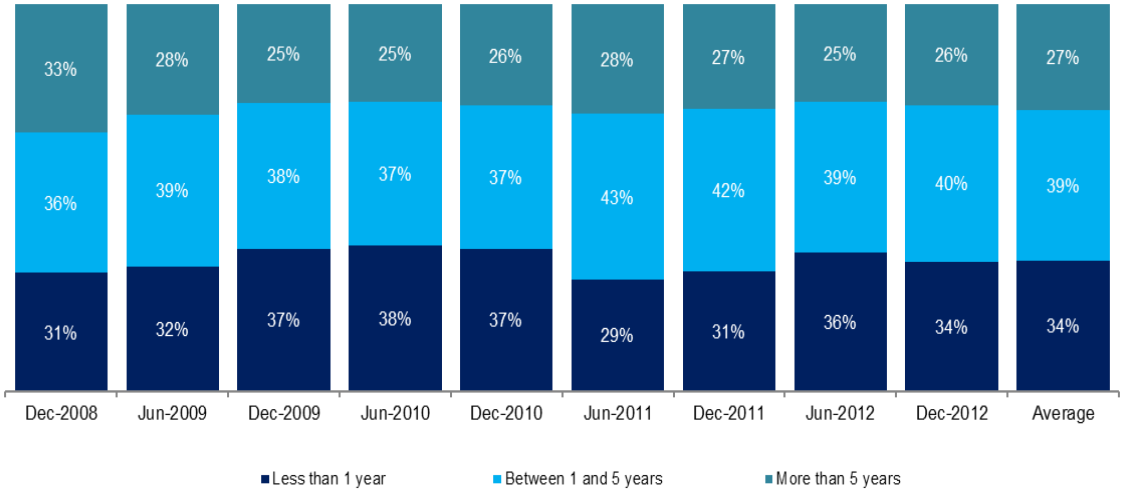
Interest rate risk is hedged mainly for notional amounts in Euro. The notional amount in dollars decreased instead from 5% in 2009 to 3% in 2011. The following graph summarizes the evolution of debt covered by interest rate risk derivatives in the years from 2008 to 2012. Other currencies include yen and pound.



Interest rate swap is the most used instrument which covers around 70% of the total notional amount, while forward rate agreements and options represent the remaining portion.



A final remark concerns the residual life of the interest rate derivative contracts, which cover in a quite uniform way debt with different times to maturity, with a slight predominance of medium term contracts.



1.7 Linking the sovereign debt crisis to the use of derivatives.

The above analysis concerning the years from 2009 to 2012 shows how the tightened credit supply conditions and worsened costs of debt are associated with a stable and high demand for hedging instruments.

Nonetheless it should be remembered as a matter of facts that non-financial institutions represent a share of 5% of the total notional amount of interest rate derivatives.

One of the main implications of these results is that the sovereign debt crisis has been introducing more uncertainty which implies more willingness of both financial and non-financial institutions to buy hedging instruments in order to avoid higher cost of debt in the future. Having a portfolio composed mainly by Italian sovereign bonds, Italian banks may be from one side worried about the default risk of the loans held in their balance sheets, while from the other side more attracted by higher returns. Although these two reasons are opposite, they

both lead to the intuition that, facing a higher percentage of insolvency by Italian companies, banks are less willing to grant them credit or they ask for higher premia.

Thus one could consider the sovereign debt crisis as a factor exacerbating the already difficult scenario of Italian credit supply.

As it will be noticed though the empirical analysis of the sample introduced in the next chapter, most of the IRS used by non-financial companies transform the variable rate into fixed rate which always leads to negative fair value of the instrument. Since entering these contracts is not costless (as showed in paragraph ***1.4***) one could wonder where is the need to sign these new contracts in a climate in which the Euribor is very low.

Apparently a reason of this choice could be the fear that these interest rates may be raising in a close future as a consequence of a Central Bank's tighter monetary policy.

Chapter 2: Analysis of a sample of Italian non-financial listed companies

2.1 Selection criteria and description of the collection methodology..

The sample is composed by 175 non-financial listed companies and it includes data covering the years from 2009 to 2012 which embrace the onset of the sovereign debt crisis.

For the sake of consistency all the companies analysed close their financial statements on 31 December, implying that those selecting 31 March or 30 June as reporting date were excluded from the sample. Considering the four-year analysis approach, the total number of financial statements analysed was 700.

Companies which were listed during 2013 or which entered the market in 2013 as a result of extraordinary finance operations (CNH Industrial and World Duty Free) were also considered not representative for the purpose of the study.

After collecting all the relevant elements, the sample was split on an industry basis. Key industry definitions follow an Italian coverage investment banking rationale and they are introduced below.

- **Utilities**: sector which contains companies providing one or more than one of the following social services: electricity, gas and water distribution and waste collection, disposal and treatment. They operate on municipal basis.
- **Energy and Power**: industry which includes companies dealing with the production and sale of energy (also from renewable sources), gas and fuel.
- **Telecoms, Media and Technology** (or TMT): this industry includes information technology developers, telephone and Internet products and services providers, publishing houses, TV broadcasters, betting and gaming companies.

- **Real Estate**: this sector includes companies specialized in the acquisition and management of residential, commercial and industrial buildings.
- **Consumer**: Industry including the subsectors of food & beverage and fashion (excluding luxury).
- **Luxury**: It includes companies specialized in the production of high-end consumer durables.
- **Infrastructure**: Sector which encompasses companies focused on construction, management and maintenance of motorways, bridges, airports and ports.
- **Healthcare**: This industry encompasses companies in one of the following subsectors: pharmaceutical, chemical and medical appliances.
- **Industrial**: This sector includes companies involved with aerospace and defence, industrial machinery, tools, lumber production, construction, cement and metal fabrication.

Below there is a summary of the items collected from the financial statements of the sample companies:

- **Balance sheet**: total assets, total financial debt, cash and equity.
- **Income statement**: revenues, EBITDA, EBIT, interest expenses, income taxes and net profit.
- **Cash flow statement**: capital expenditures.

Through the use of the notes to the financial statement it was possible to retrieve information about the use of hedging instruments. Data were collected using a binary approach with “1” standing for positive answer. In this paper, only financial derivatives are considered, i.e. instruments used to hedge the interest rate, the exchange rate and commodity and energetic risks. Credit derivatives are instead disregarded and are beyond the purposes of this study.

Questions which were answered for each of the 700 financial statements analysed were the following:

1. Does the company use derivatives during the fiscal year? If the answer was "0", no further questions were answered.
2. Does the company use interest rate derivatives? If "1", then also the following questions were addressed:
   2.1 Does the company use fixed-for-floating[9] interest rate swaps?
   2.2 Does the company use floating-for-fixed[10] interest rate swaps?
   2.3 Does the company use interest rate options?
   2.4 Does the company use other instruments? If "1" then:
      2.4.1 Name of the instrument(s)
   2.5 Specify (when available) the residual notional amount of the financial debt covered by interest rate derivatives.
3. Does the company use exchange rate derivatives?
4. Does the company use derivative on commodity prices?

The main topics explored in Chapter 2 are the following:

1. Description of the evolution of the use of derivative instruments in the years from 2009 to 2012.
2. Focus on derivatives to hedge interest rate risk on both an all sample basis and an industry specific one.
3. Comparison between the financial statements of users and non-users.

[9] Fixed-for-floating interest rate swaps are contracts through which the company agrees with its counterparty (the financial institution), to pay a fixed interest rate in lieu of a floating interest rate

[10] Floating-for-fixed interest rate swaps are contracts through which the company agrees with its counterparty (the financial institution), to pay a floating interest rate in lieu of a fixed interest rate.

2.2 Sample description.

The sample is composed by 175 companies which are divided as follows:

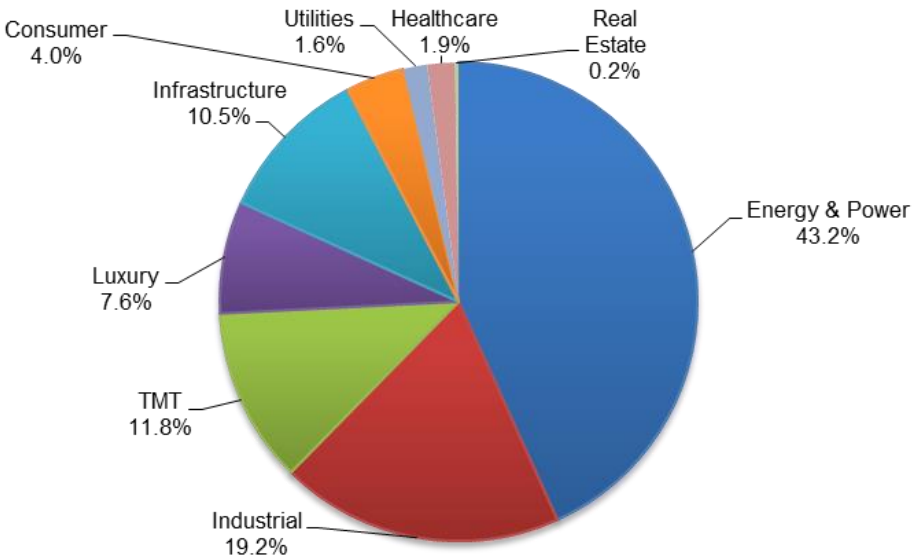
Industry	Number of companies	Companies
Industrials	52	Ansaldo STS, Bastogi, B&C Speakers, Bialetti Industrie, Biesse, Bolzoni Auramo, Brembo, Buzzi Unicem, Caltagirone, Carraro, Cembre, Cementir, Cobra Automotive Technologies, Datalogic, DelClima, De Longhi, EEMS Italia, Elica, Emak, Fiat, Finmeccanica, Gefran, Giovanni Crespi, Gruppo Ceramiche Ricchetti, I.M.A., Impregilo, Indesit, Interpump Group, Isagro, Italcementi, Landi Renzo, Maire Tecnimont, Montefibre, Nice, Panariagroup Industrie Ceramiche, Piaggio, Pininfarina, Pirelli & C., Premuda[11], Prima Industrie, Prysmian, Ratti, Reno de Medici, ROSSS, SABAF, Saes Getters, SOGEFI, Tenaris, Tesmec, Vianini Industria, Vianini Lavori, Zignago Vetro.
Telecoms, Media and Technology	41	Acotel Group, Arnoldo Mondadori Editore, Best Union Company, CAD IT, Cairo Communication, Caltagirone Editore, CDC Point, CHL, Class Editori, Dada, Dmail Group, EI Towers, EL.EN, Engineering - Ingegneria Informatica, Esprinet, Exprivia, Eurotech, Fidia, Fullsix, Gruppo Editoriale L'Espresso, Gtech, Gruppo Il Sole 24 Ore, It Way, Mediacontech, Mediaset, Mondo TV, Monrif, Moviemax, Noemalife, Olidata, Poligrafici Editoriali, Poligrafica San Faustino, RCS Mediagroup, Reply, Seat Pagine Gialle, SNAI, Tas Tecnologia Avanzata dei Sistemi, Telecom Italia Media, Telecom Italia, Tiscali,TXT –Esolutions.
Consumer	23	AEFFE, Antichi Pellettieri, Autogrill, Basic Net, Bioera, Bonifiche Ferraresi, Borgosesia, Caleffi, Centrale del Latte di Torino & C., Ciccolella, CSP International Fashion Group, Davide Campari, Enervit, Geox, Giorgio Fedon & Figli, La Doria, MARR, Parmalat, Poltrona Frau, Stefanel, Valsoia, Yoox, Zucchi.
Energy & Power	15	Alerion Clean Power, Ambienthesis, Edison, Enel Green Power, Enel, ENI, ERG, Falck Renewables, Gas Plus, Industria e Innovazione, Kinexia, K.R. Energy, Saipem, Saras, Ternienergia.
Infrastructure	11	Aeroporto di Firenze, ASTM, Atlantia, Autostrade Meridionali, Fiera di Milano, Retelit, SAT, Save, Snam, SIAS, Terna.
Healthcare	10	Amplifon, Cell Therapeutics, Diasorin, Eukedos, Molecular Medicine, Pierrel, Recordati, Servizi Italia, SOL, Sorin.
Real Estate	10	AEDES, Astaldi, Beni Stabili, Brioschi Sviluppo Immobiliare, Compagnia Immobiliare Azionaria, Gabetti Property Solutions, IGD, Nova Re, Prelios, Risanamento.
Utilities	8	A2A, Acea, Acque Potabili, ACSM – AGAM, Ascopiave, Biancamano, Hera, Iren.
Luxury	5	Brunello Cucinelli, Luxottica, Safilo Group, Salvatore Ferragamo, Tod's.
Total	**175**	

[11]Premuda is more properly located in the shipping industry, however due to both the lack of other companies in the same industry and its scope of business (transportation of dry bulk and liquid bulk mostly for the heavy industry), it was included in the industrial sector.

By using the financial software FactSet the market capitalization of all the companies in the sample can be downloaded.

As at the end of December 2012 the total market capitalization of the Italian Stock Exchange was €366 billion. Since the sum of all the market values of the companies in the sample is ca. €285 billion, about 78% of the total capitalization of the Italian stock exchange is included in the sample.

The contribution of each industry market capitalization to the total is shown in the following graph.



Total Market Capitalization of the Sample: €285bn

A remarkable aspect is that Telecoms, Media and Technology and Industrial sectors include in aggregate 93 companies while Energy and Power only 15, however in terms of total market capitalization the former account globally for 31.0% share while the latter for 43.2%.

Moreover infrastructure, including only 11 companies, has 10.5% market share against Telecoms, Media and Technology which counts 41 companies with a market share of 11.8%.

2.3 IAS 39 and the accounting of derivative instruments.

IAS 39 in its current form was introduced in 2005 in an effort to create a higher degree of transparency and consistency in the reporting of financial instruments. However as it rules a very complex area it caused during the years a lot of derogations and inconsistencies. For this reason in 2008 IASB decided to launch a new project, called “IFRS 9: Financial instruments”, which should represent a replacement of IAS 39. This project is composed by three stages: Classification and Measurement, Impairment Methodology and Hedge Accounting. Starting from 2015 IFRS 9 will be the only standard accepted.

Italian companies in the years under analysis use IAS 39, which is here shortly discussed in order to have a better understanding of the data retrievable in the financial statement of a listed company. Any specific accounting issue and technicality is beyond the purpose of this dissertation.

Derivatives can be used for two different purposes, either speculation or hedging. A speculative (trading) derivative is kept with the purpose to realize profits based on present expectations of the trends in financial markets. In such a situation the risk is created through the acquisition of the instrument and it does not exist before it.

A hedging position neutralizes instead the negative consequences of unfavourable changes in some financial variables like interest rates, exchange rates, commodity prices and so on. For this reason the risk exists before the acquisition of the instrument which is used as a way to neutralize it.

IAS 39 recognizes the difference between the two categories of derivatives and establishes different accounting procedures for them.

If the instrument is recognized as an effective hedge the hedge accounting is used. A derivative is recognized as a hedging instrument when its fair value or

the cash flow which derives from it is able to offset the changes in the fair value or cash flows deriving from the hedged underlying in a range from 80% to 125%. IAS 39 establishes three types of coverage: fair value hedge, cash flow hedge and net investment hedge[12].

The fair value hedge is that type of coverage which offsets the change in the fair value of the underlying with an opposite change in the value of the derivative instrument. Fixed rate loans are an example of contracts which can be covered through a fair value hedge by using a floating-for-fixed interest rate swap.

The cash flow hedge is defined within IAS 39 as the coverage to the variability risk of the financial flows deriving from a financial asset/liability, as it happens when they are exposed to a variable rate. The future cash flows are thus the protected elements. A fixed-for-floating interest rate swap can create a cash flow hedge.

Almost all the Italian companies state clearly in their financial statements that their use of derivatives is for risk management, however just in a few cases they can use the hedge accounting - as per IAS 39 - for 100% of the fair value of the instruments.

2.4 Evolution in the use of derivatives.

The number of companies using hedging instruments is stable in the years under analysis, averaging 124 units.

Interest rate derivatives are the most used instruments and the number of hedgers increases from 101 in 2009 to 110 in 2012.

Exchange rate risk is hedged on average by 76 companies, while commodity price risk by about 20 companies.

[12] It is related to exchange rate risk than interest rate risk and thus is not described here. However, for the sake of completeness, its accounting rules are close to the cash flow hedge.

Among interest rate hedgers about 58 are also exchange rate risk hedgers while about 19 cover all the three risks, implying that commodity risk hedgers are also both exchange rate and interest rate risk hedgers.

The following table summarizes these results.

	Derivative users		Derivative users by type of risk hedged								
			Interest rate (1)		Exchange rate (2)		Commodity price (3)		Number of simultaneous hedgers of		
	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total	(1) and (2)	(1) and (3)	(1), (2) and (3)
2009	122	*69%*	101	*57%*	74	*42%*	21	*12%*	55	20	19
2010	122	*69%*	101	*57%*	75	*43%*	19	*11%*	55	18	17
2011	125	*71%*	104	*59%*	76	*43%*	20	*11%*	57	19	18
2012	125	*71%*	110	*63%*	77	*44%*	18	*10%*	63	17	16

Analysing more in detail the use of interest rate derivatives it is evident how Italian companies use very straightforward hedging instruments and that the interest rate swap is the most common ones. No exotic contracts are present in any of the financial statements analysed.

Companies use fixed-for-floating interest rate swaps to fix the cost of variable interest rate debt. The rationale is the expectation of an increase in the reference rate. In fact in almost all the cases the fair value of these instruments is negative, as a consequence of a low interest rate policy carried out by the European Central Bank in the years after 2008.

Floating-for-fixed interest rate swaps are mainly used in the context of bond issues and private placements in an effort to hedge the fair value risk of the financing. Indeed if the interest rates decrease but the issuer has to pay a fixed stream of cash flows the financing costs would be higher than those implied by current market conditions.

What is evident after a preliminary analysis is that usually more than 50% of the companies in the sample use fixed-for-floating interest rate swaps in all the years from 2009 to 2012, while less than 10% uses floating-for-fixed interest rate swaps.

Interest rate options are used only by 5 companies in the sample, with the exception of 2009 where the number registered is 4.

Other instruments are used by less than 30 companies and they can be interest rate caps, interest rate floors, interest rate collars and cross currency interest rate swaps. The latter generate a simultaneous hedge of both interest rate and exchange rate risk.

The following table shows the details of all the previously mentioned data.

	Interest rate derivative users by type of contract							
	Fix.-for-Float. IRS		Float-for-Fix. IRS		IR Options		Other Contracts	
	Number	As % of Total	Number	As % of Total	Number	As % of Total	Number	As % of Total
2009	92	52%	13	7%	4	2%	30	17%
2010	93	53%	13	7%	5	3%	26	15%
2011	98	56%	14	8%	5	3%	25	14%
2012	100	57%	15	9%	5	3%	29	16%

The following table details the evolution in the use of interest rate derivatives other than IRS and options.

	Other interest rate derivative contracts							
	Caps		Floors		Collars		CCIRS	
	Number	As % of Total	Number	As % of Total	Number	As % of Total	Number	As % of Total
2009	13	7%	1	1%	11	6%	12	7%
2010	11	6%	1	1%	6	3%	12	7%
2011	9	5%	0	0%	6	3%	13	7%
2012	11	6%	0	0%	6	3%	15	9%

Below are the changes from non-users to users (and vice-versa) of interest rate derivatives in the years from 2009 to 2012. The remarkable aspect is that the highest increase in the number of users is registered in the years from 2010 to 2012.

	2009-2010	2010-2011	2011-2012
Non users to users	5	10	8
Users to non users	5	7	2
Net change	**0**	**3**	**6**

Most of the companies specify in the notes to the financial statement the total notional amount of the debt hedged through interest rate swaps.

The following table shows how many users disclosed this information year by year.

	2009	2010	2011	2012
Disclosed	83	87	86	91
Undisclosed	18	14	18	19
Total number of hedgers	**101**	**101**	**104**	**110**

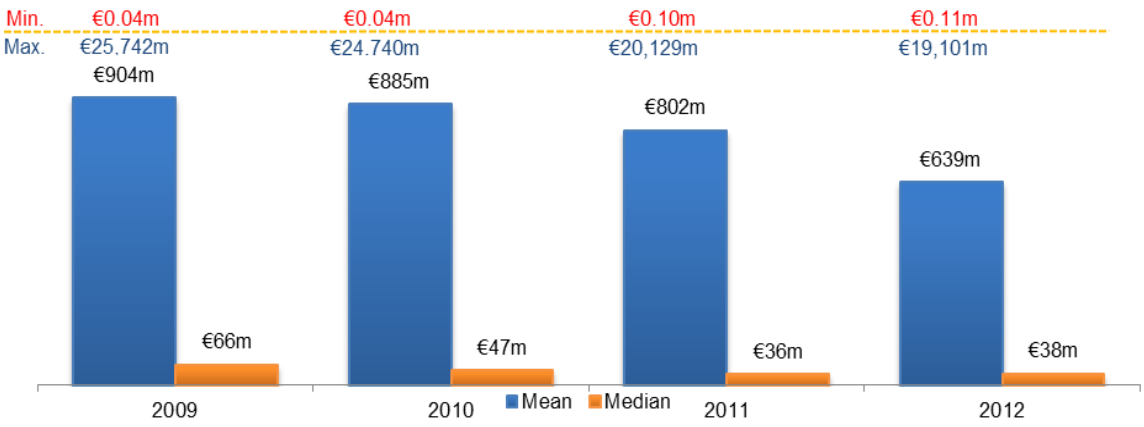
On average 83% of the companies in the sample disclosed the amount of debt hedged. If the remaining 17% is excluded from the sample, some statistics on the average hedged debt can be performed.

In the context of this study two types of analysis are performed: one which considers only hedgers, the other which includes both hedgers and non-hedgers.

For what concerns hedgers, the average mean amount of notional debt covered by interest rate derivatives is €807 million and it decreases from €904 million in 2009 to €639 million in 2012. The mean is biased upwards by the presence of many outliers. Indeed the maximum amount hedged decreases from €26 billion in 2009 to €19 billion in 2012. However the median is on average €47 million, suggesting that at least half of the hedgers display in their accounts notional

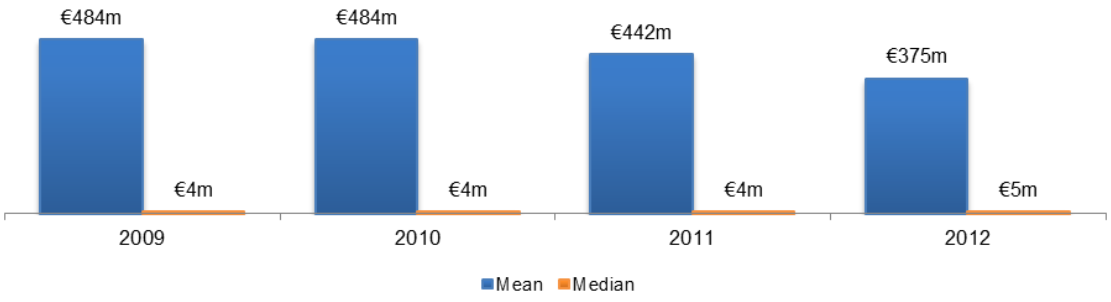
amounts lower than €50 million.

The following graph summarizes the key statistics previously discussed.



Means and medians display a CAGR respectively of (11%) and (17%).

When considering both hedgers and non-hedgers the figures are deflated and what emerges is that on average the mean notional amount is €446 million, while the median notional amount is ca. €5 million causing the maximum to emerge as an even stronger outlier. One can presumably conclude that, if the sample is efficient in representing Italian non-financial listed companies, more than half of the Italian listed companies hedge less than €5 million of debt in the years from 2009 to 2012. Data are summarized in the following graph.



2.5 Derivative use on industry basis.

The analysis is repeated on an industry basis in order to find out any eventual sector-based trends.

2.5.1. Industrials sector.

This is the most populated category in the sample and it counts 52 units.

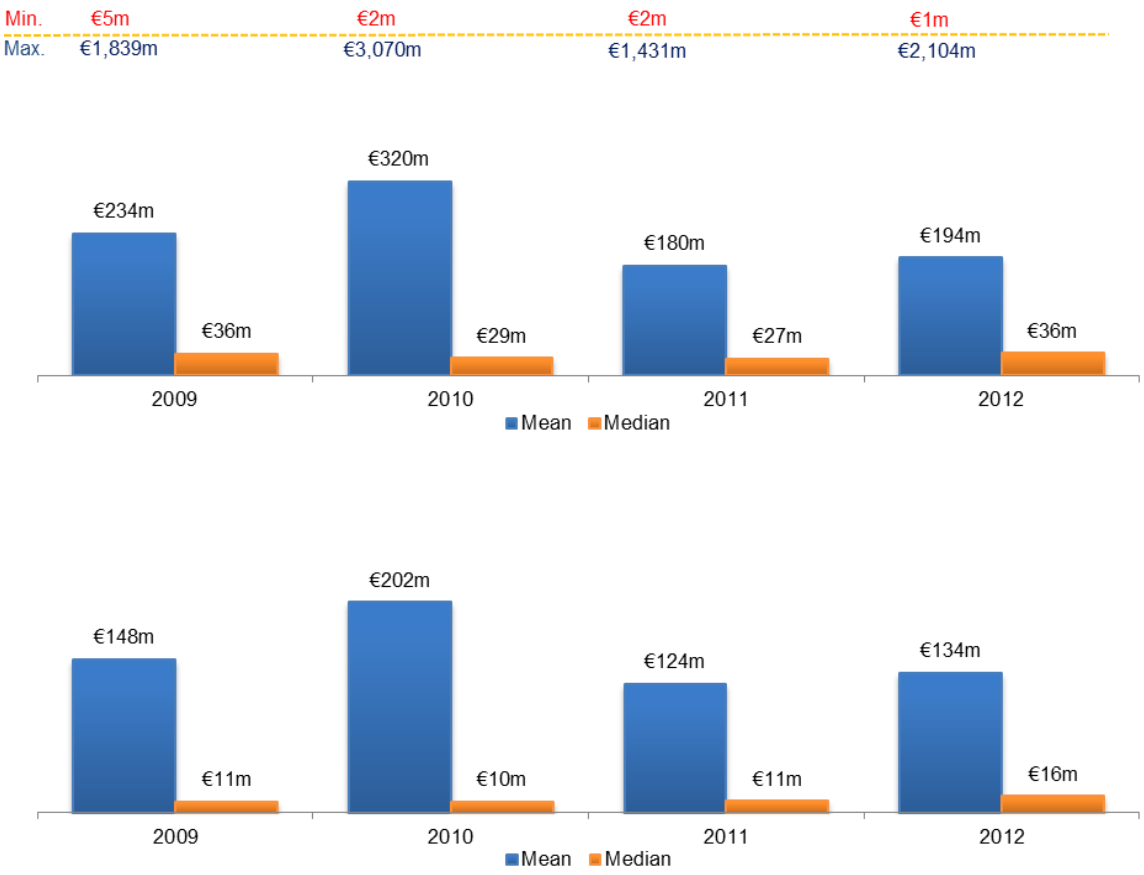
In the context of derivative use key findings are the following: about 85% are users, interest rate and exchange rate hedgers are in close proportion (about 70%) and in more than 50% of the cases interest rate hedgers are also exchange rate hedgers. For what concerns commodity price risk, every company using derivatives of this category also hedges the other two risks.

	Derivative users		Derivative users by type of risk hedged								
			Interest rate (1)		Exchange rate (2)		Commodity price (3)		Number of simultaneous hedgers of		
	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total	(1) and (2)	(1) and (3)	(1), (2) and (3)
2009	42	81%	34	65%	32	62%	9	17%	24	9	9
2010	42	81%	34	65%	33	63%	8	15%	25	8	8
2011	47	90%	37	71%	34	65%	9	17%	24	9	9
2012	45	87%	37	71%	34	65%	7	13%	26	7	7

This group uses almost exclusively fixed-for-floating IRS, while other instruments are used by few companies.

	Interest rate derivative users by type of contract							
	Fix.-for-Float. IRS		Float.-for-Fix. IRS		IR Options		Other Contracts	
	Number	As % of Total	Number	As % of Total	Number	As % of Total	Number	As % of Total
2009	34	65%	3	6%	2	4%	8	15%
2010	34	65%	3	6%	2	4%	6	12%
2011	37	71%	4	8%	2	4%	8	15%
2012	34	65%	5	10%	1	2%	10	19%

The next two graphs show the evolution of mean and median for hedgers (the first one) and for both hedgers and non-hedgers (the second one).



2.5.2 Telecoms, Media and Technology sector.

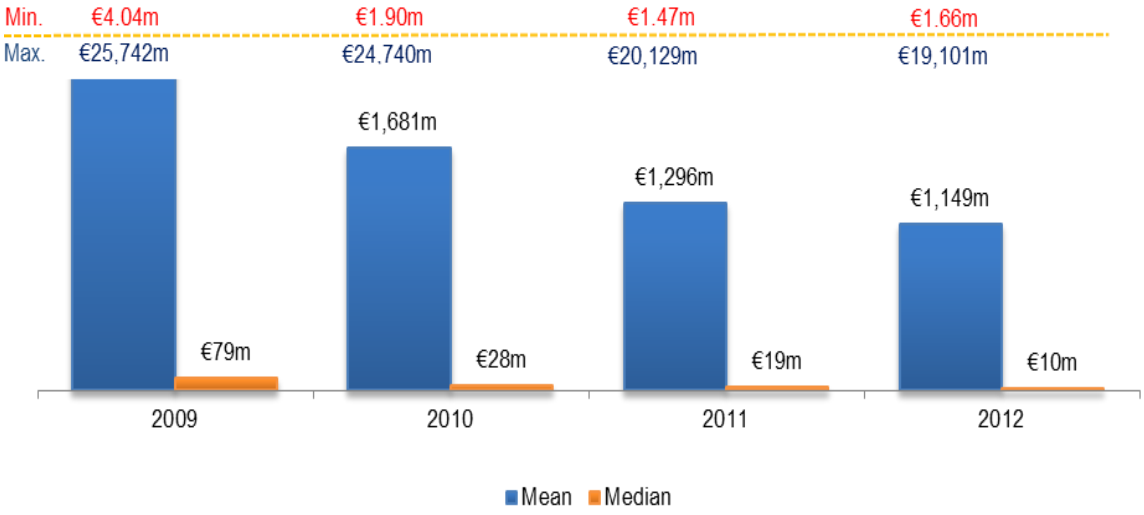
The group includes 41 companies among which about 52% are hedgers, covering mainly interest rate risk. Less than 20% uses also exchange rate derivative instruments.

	Derivative users		Derivative users by type of risk hedged								
			Interest rate (1)		Exchange rate (2)		Commodity price (3)		Number of simultaneous hedgers of		
	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total	(1) and (2)	(1) and (3)	(1), (2) and (3)
2009	21	*51%*	17	*41%*	7	*17%*	1	*2%*	5	1	1
2010	20	*49%*	18	*44%*	7	*17%*	1	*2%*	6	1	1
2011	21	*51%*	19	*46%*	7	*17%*	1	*2%*	6	1	1
2012	22	*54%*	20	*49%*	9	*22%*	1	*2%*	8	1	1

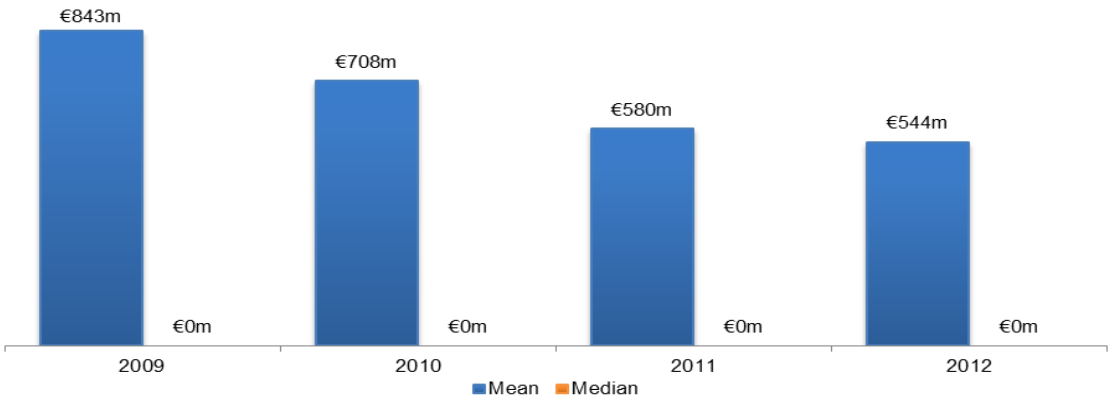
The most common instrument is the fixed-for-floating IRS used by about 40% of the companies in the group.

	Interest rate derivative users by type of contract							
	Fix.-for-Float. IRS		Float-for-Fix. IRS		IR Options		Other Contracts	
	Number	*As % of Total*	Number	*As % of Total*	Number	*As % of Total*	Number	*As % of Total*
2009	**14**	*34%*	**3**	*7%*	**0**	*0%*	**6**	*15%*
2010	**15**	*37%*	**3**	*7%*	**0**	*0%*	**7**	*17%*
2011	**16**	*39%*	**3**	*7%*	**0**	*0%*	**5**	*12%*
2012	**17**	*41%*	**3**	*7%*	**1**	*2%*	**5**	*12%*

Due to the presence of Telecom Italia, which represents a huge outlier in terms of assets size, the mean notional amount is biased upwards as proved by the median of about €34 million. A clear decreasing trend is evident in mean, median, minimum and maximum amount hedged.



The following graph, which considers both users and non-users, shows also the same trend. In this case the median is zero, due to the fact that only half of the sample use interest rate derivative instruments. As a matter of facts, in the following graph the median equal to zero because two companies do not disclose the notional amount.



2.5.3 Consumer sector.

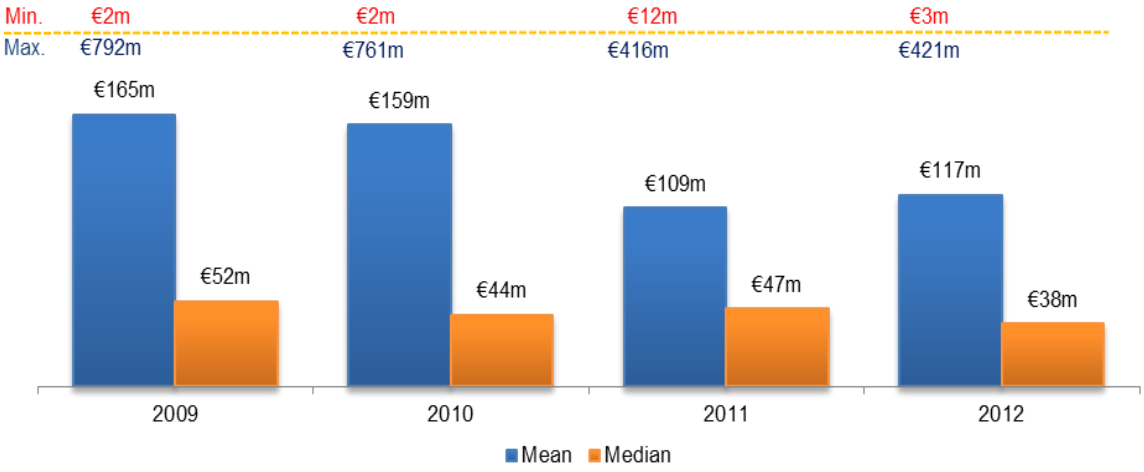
The group is composed by 23 companies. In the years from 2009 to 2011 the use of exchange rate derivatives is more spread than that of interest rate derivatives, while the latter show a larger frequency in 2012 (58%). Empirical data confirm the intuition that commodity price risk is irrelevant for this sector.

	Derivative users		Derivative users by type of risk hedged								
			Interest rate (1)		Exchange rate (2)		Commodity price (3)		Number of simultaneous hedgers of		
	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total	(1) and (2)	(1) and (3)	(1), (2) and (3)
2009	16	70%	10	43%	13	57%	0	0%	7	0	0
2010	16	70%	9	39%	13	57%	0	0%	6	0	0
2011	14	61%	10	43%	12	52%	0	0%	8	0	0
2012	15	65%	13	57%	11	48%	0	0%	9	0	0

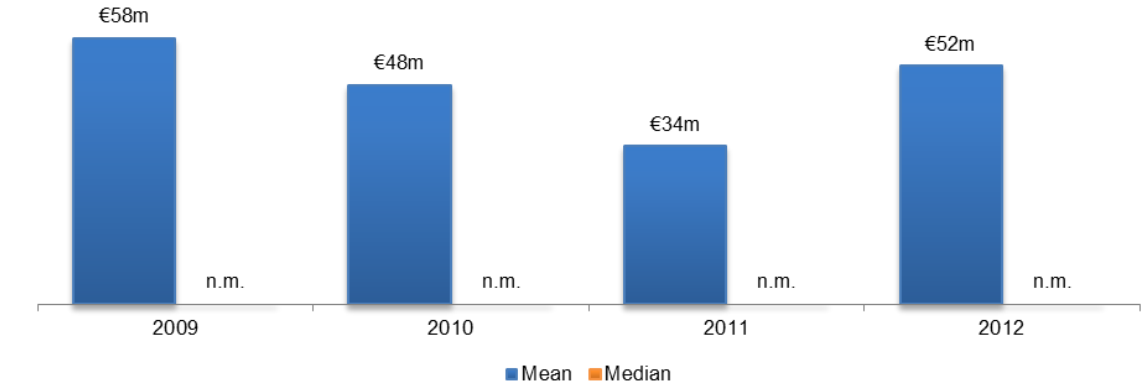
Fixed-for-floating IRS are the most common instruments.

	Interest rate derivative users by type of contract							
	Fix.-for-Float. IRS		Float-for-Fix. IRS		IR Options		Other Contracts	
	Number	As % of Total	Number	As % of Total	Number	As % of Total	Number	As % of Total
2009	8	35%	2	9%	0	0%	3	13%
2010	7	30%	2	9%	0	0%	2	9%
2011	9	39%	2	9%	0	0%	2	9%
2012	11	48%	2	9%	0	0%	3	13%

On average among hedgers the mean of the notional amounts is €137 million while the median is €45 million.



The median of both hedgers and non-hedgers is considered not meaningful because it is biased towards zero by a high proportion of companies not disclosing the debt notional amount.



2.5.4 Energy and Power sector.

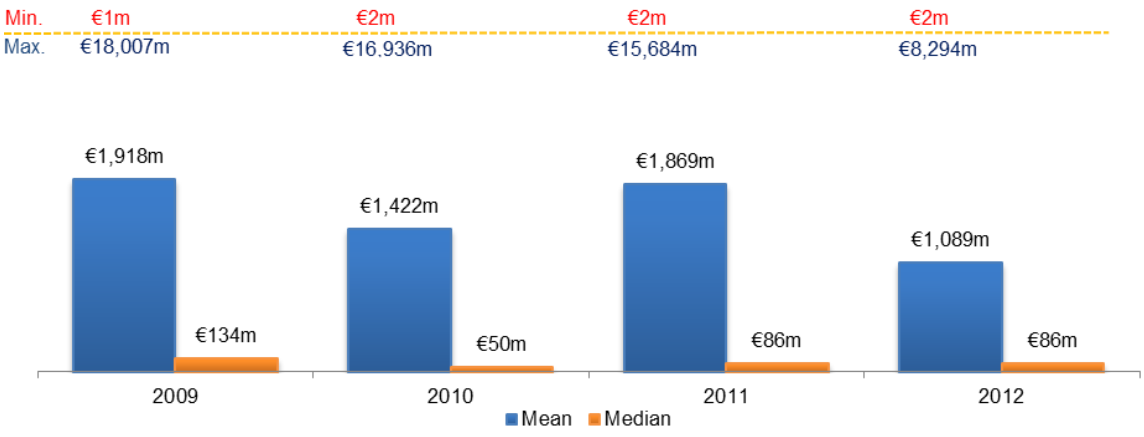
The group counts 15 elements. Almost 90% uses interest rate derivatives, followed by exchange rate and commodity price instruments users.

	Derivative users		Derivative users by type of risk hedged								
			Interest rate (1)		Exchange rate (2)		Commodity price (3)		Number of simultaneous hedgers of		
	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total	(1) and (2)	(1) and (3)	(1), (2) and (3)
2009	13	*87%*	12	*80%*	8	*53%*	8	*53%*	7	7	7
2010	15	*100%*	14	*93%*	7	*47%*	7	*47%*	6	6	6
2011	14	*93%*	12	*80%*	7	*47%*	7	*47%*	6	6	6
2012	14	*93%*	13	*87%*	7	*47%*	7	*47%*	6	6	6

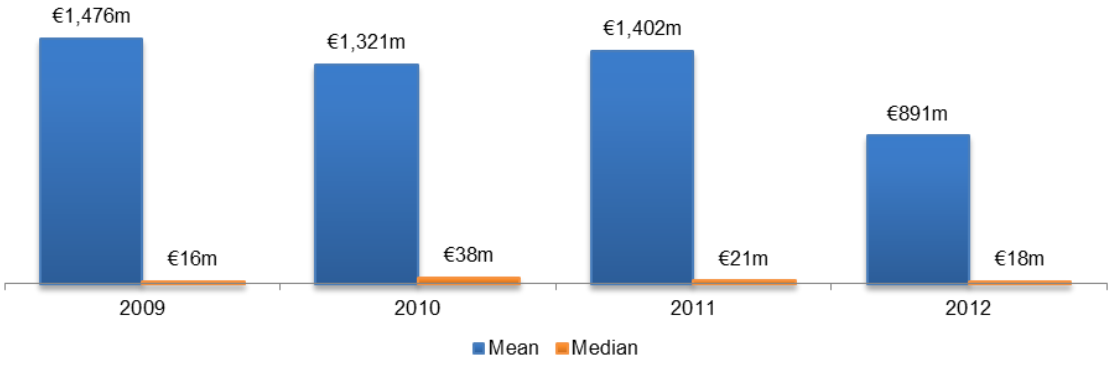
The most used instrument is the fixed-for floating interest rate swap, while the other interest rate risk instruments are used by less than 20% of the sample group members.

	Interest rate derivative users by type of contract							
	Fix.-for-Float. IRS		Float.-for-Fix. IRS		IR Options		Other Contracts	
	Number	As % of Total	Number	As % of Total	Number	As % of Total	Number	As % of Total
2009	11	*73%*	2	*13%*	1	*7%*	3	*20%*
2010	12	*80%*	2	*13%*	2	*13%*	4	*27%*
2011	12	*80%*	2	*13%*	1	*7%*	2	*13%*
2012	12	*80%*	2	*13%*	2	*13%*	4	*27%*

Mean and median notional amount hedged are on average €1,575 million and 89 million respectively.



Below are mean and median evolution when considering both hedgers and non-hedgers.



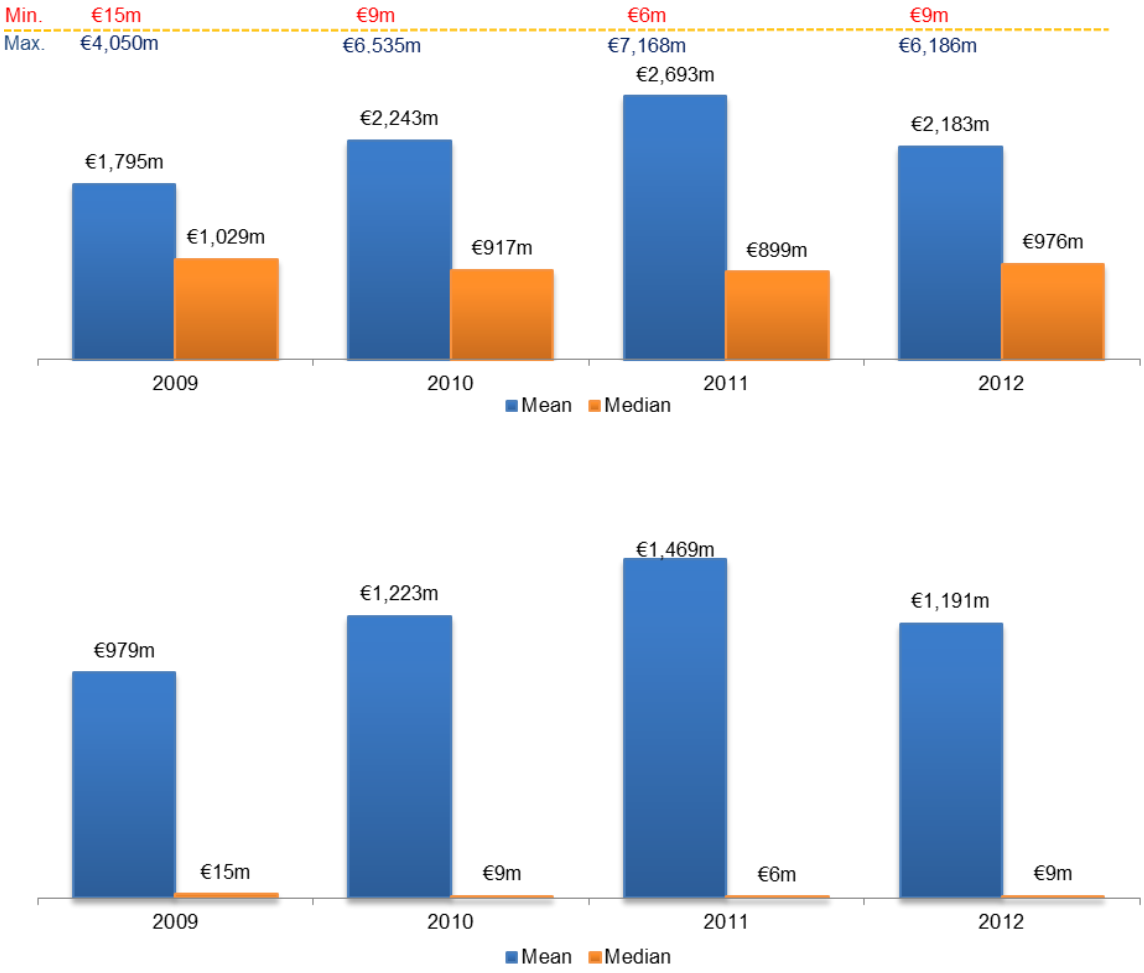
2.5.5 Infrastructure sector.

This group includes 11 companies which use almost exclusively fixed-for-floating interest rate swaps.

	Derivative users		Derivative users by type of risk hedged								
			Interest rate (1)		Exchange rate (2)		Commodity price (3)		Number of simultaneous hedgers of		
	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total	(1) and (2)	(1) and (3)	(1), (2) and (3)
2009	6	*55%*	6	*55%*	1	*9%*	0	*0%*	1	0	0
2010	6	*55%*	6	*55%*	1	*9%*	0	*0%*	1	0	0
2011	6	*55%*	6	*55%*	2	*18%*	0	*0%*	2	0	0
2012	6	*55%*	6	*55%*	2	*18%*	0	*0%*	2	0	0

	Interest rate derivative users by type of contract							
	Fix.-for-Float. IRS		Float-for-Fix. IRS		IR Options		Other Contracts	
	Number	*As % of Total*	Number	*As % of Total*	Number	*As % of Total*	Number	*As % of Total*
2009	6	*55%*	0	*0%*	0	*0%*	1	*9%*
2010	6	*55%*	0	*0%*	0	*0%*	1	*9%*
2011	6	*55%*	0	*0%*	1	*9%*	1	*9%*
2012	6	*55%*	0	*0%*	0	*0%*	0	*0%*

Below are the mean and median notional amounts for hedgers, followed by a graph showing the mean and median for both hedgers and non-hedgers.



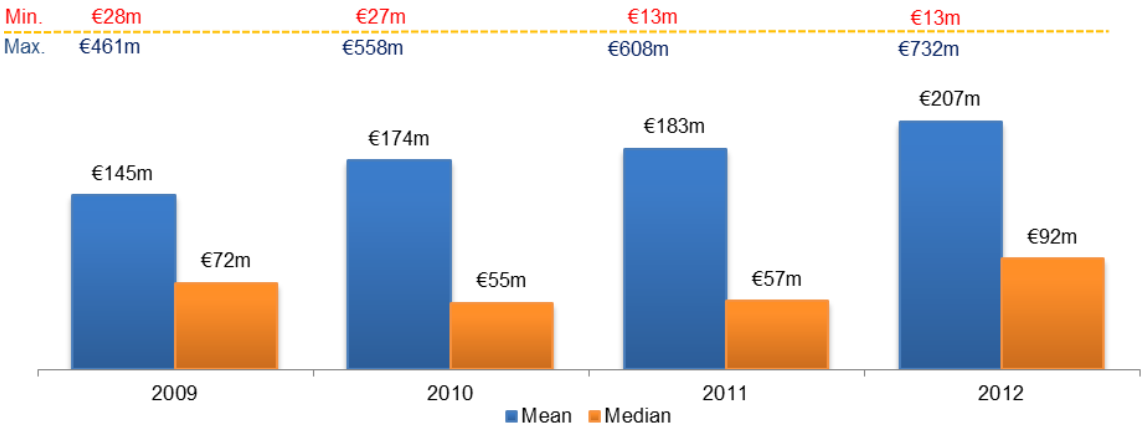
2.5.6 Real Estate sector.

The group includes 10 companies, 7 of which use interest rate derivatives and 3 exchange rate derivatives. The most used contract is the fixed-for-floating interest rate swap.

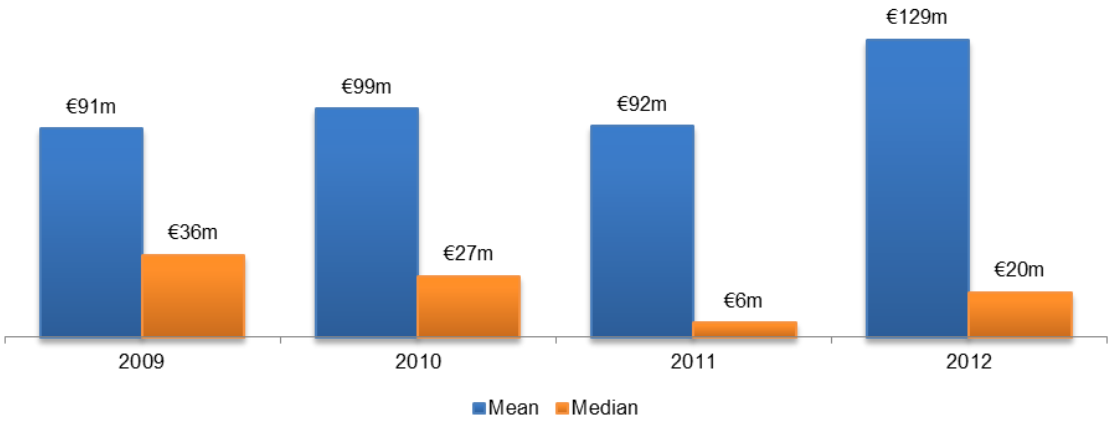
	Derivative users		Derivative users by type of risk hedged								
			Interest rate (1)		Exchange rate (2)		Commodity price (3)		Number of simultaneous hedgers of		
	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total	(1) and (2)	(1) and (3)	(1), (2) and (3)
2009	7	70%	7	70%	2	20%	0	0%	2	0	0
2010	7	70%	6	60%	3	30%	0	0%	2	0	0
2011	7	70%	6	60%	3	30%	0	0%	2	0	0
2012	7	70%	7	70%	3	30%	0	0%	3	0	0

	Interest rate derivative users by type of contract							
	Fix.-for-Float. IRS		Float-for-Fix. IRS		IR Options		Other Contracts	
	Number	*As % of Total*	Number	*As % of Total*	Number	*As % of Total*	Number	*As % of Total*
2009	**6**	*60%*	**0**	*0%*	**1**	*10%*	**4**	*40%*
2010	**6**	*60%*	**0**	*0%*	**1**	*10%*	**2**	*20%*
2011	**5**	*50%*	**0**	*0%*	**1**	*10%*	**3**	*30%*
2012	**6**	*60%*	**0**	*0%*	**1**	*10%*	**3**	*30%*

Both mean and median show an upwards trend suggesting that the notional amount hedged increased over the past years.



When all the group is considered the mean increases largely from 2011 to 2012, however no particular remarks can be spotted.



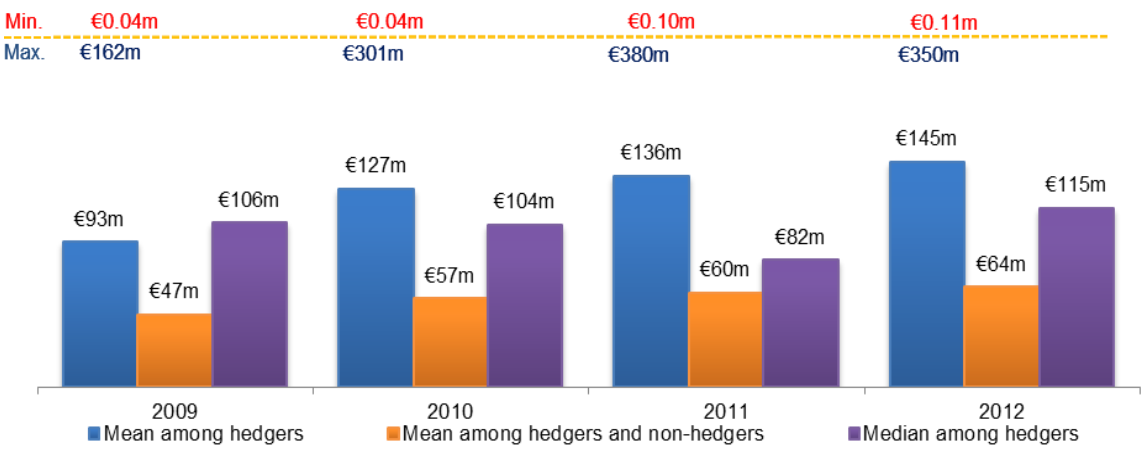
2.5.7 Healthcare sector.

The group is composed by 10 companies, 6 of which hedge interest rate risk. All the exchange rate risk hedge use also interest rate risk instruments.

	Derivative users		Derivative users by type of risk hedged								
			Interest rate (1)		Exchange rate (2)		Commodity price (3)		Number of simultaneous hedgers of		
	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total	(1) and (2)	(1) and (3)	(1), (2) and (3)
2009	6	*60%*	6	*60%*	4	*40%*	0	*0%*	4	0	0
2010	5	*50%*	5	*50%*	4	*40%*	0	*0%*	4	0	0
2011	5	*50%*	5	*50%*	4	*40%*	0	*0%*	4	0	0
2012	5	*50%*	5	*50%*	4	*40%*	0	*0%*	4	0	0

	Interest rate derivative users by type of contract							
	Fix.-for-Float. IRS		Float.-for-Fix. IRS		IR Options		Other Contracts	
	Number	As % of Total	Number	As % of Total	Number	As % of Total	Number	As % of Total
2009	4	*40%*	2	*20%*	0	*0%*	3	*30%*
2010	4	*40%*	2	*20%*	0	*0%*	2	*20%*
2011	4	*40%*	2	*20%*	0	*0%*	2	*20%*
2012	5	*50%*	2	*20%*	0	*0%*	2	*20%*

Median for the whole group is zero, due to the presence of many non-hedgers, so mean and median for hedgers were consolidated in a unique graph with the mean for the whole group.



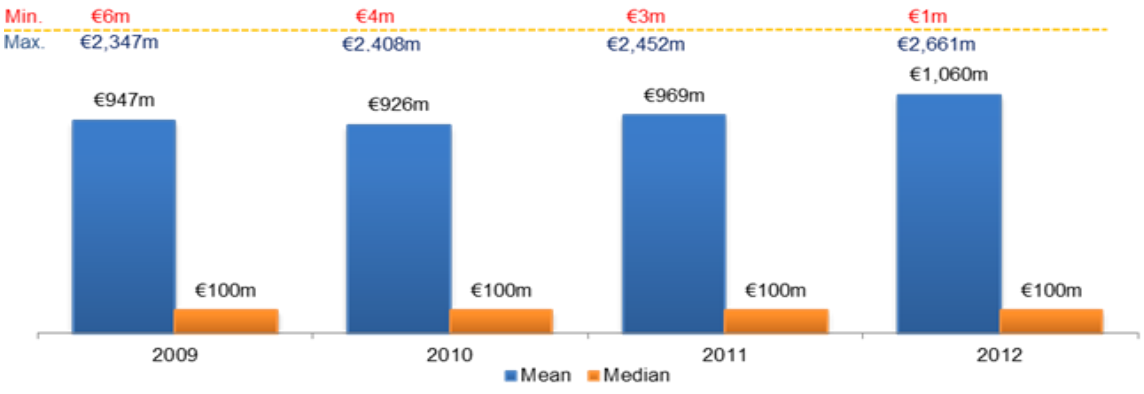
2.5.8 Utilities sector.

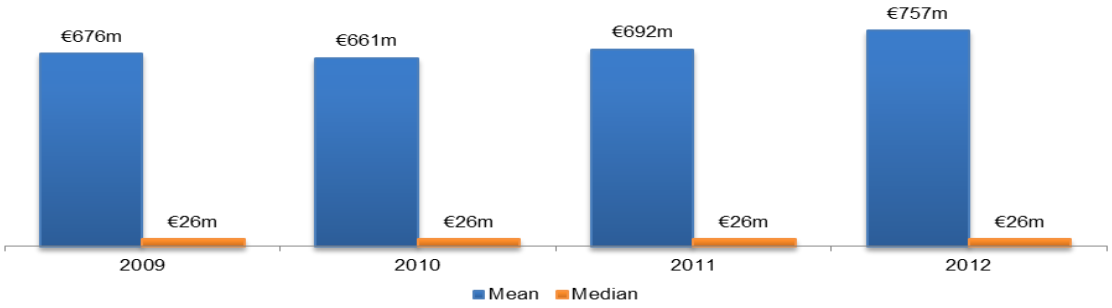
The group is composed by 8 companies. 6 of them are hedgers and in this category all the three types of risks can potentially provide reasons to start a hedging policy.

	Derivative users		Derivative users by type of risk hedged								
			Interest rate (1)		Exchange rate (2)		Commodity price (3)		Number of simultaneous hedgers of		
	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total	(1) and (2)	(1) and (3)	(1), (2) and (3)
2009	6	*75%*	6	*75%*	3	*38%*	3	*38%*	3	3	2
2010	6	*75%*	6	*75%*	3	*38%*	3	*38%*	3	3	2
2011	6	*75%*	6	*75%*	3	*38%*	3	*38%*	3	3	2
2012	6	*75%*	6	*75%*	3	*38%*	3	*38%*	3	3	2

	Interest rate derivative users by type of contract							
	Fix.-for-Float. IRS		Float-for-Fix. IRS		IR Options		Other Contracts	
	Number	*As % of Total*	Number	*As % of Total*	Number	*As % of Total*	Number	*As % of Total*
2009	6	*75%*	1	*13%*	0	*0%*	2	*25%*
2010	6	*75%*	1	*13%*	0	*0%*	2	*25%*
2011	6	*75%*	1	*13%*	0	*0%*	2	*25%*
2012	6	*75%*	1	*13%*	0	*0%*	2	*25%*

Below are instead the mean and median notional amounts for hedgers and for the whole group.





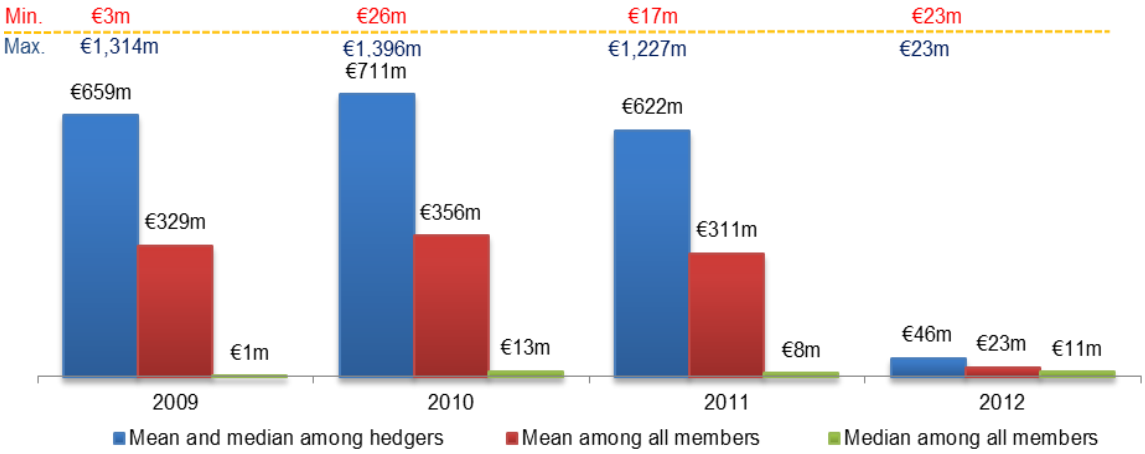
2.5.9 Luxury sector.

In the luxury sector almost all companies are derivative users.

	Derivative users		Derivative users by type of risk hedged								
			Interest rate (1)		Exchange rate (2)		Commodity price (3)		Number of simultaneous hedgers of		
	Number	% of Total	Number	% of Total	Number	% of Total	Number	% of Total	(1) and (2)	(1) and (3)	(1), (2) and (3)
2009	5	*100%*	3	*60%*	4	*80%*	0	*0%*	2	0	0
2010	5	*100%*	3	*60%*	4	*80%*	0	*0%*	2	0	0
2011	5	*100%*	3	*60%*	4	*80%*	0	*0%*	2	0	0
2012	5	*100%*	3	*60%*	4	*80%*	0	*0%*	2	0	0

	Interest rate derivative users by type of contract							
	Fix.-for-Float. IRS		Float-for-Fix. IRS		IR Options		Other Contracts	
	Number	*As % of Total*	Number	*As % of Total*	Number	*As % of Total*	Number	*As % of Total*
2009	3	*60%*	0	*0%*	0	*0%*	0	*0%*
2010	3	*60%*	0	*0%*	0	*0%*	0	*0%*
2011	3	*60%*	0	*0%*	0	*0%*	0	*0%*
2012	3	*60%*	0	*0%*	0	*0%*	0	*0%*

Since only two companies disclose the notional amount of the contracts, mean and median among hedgers coincide.



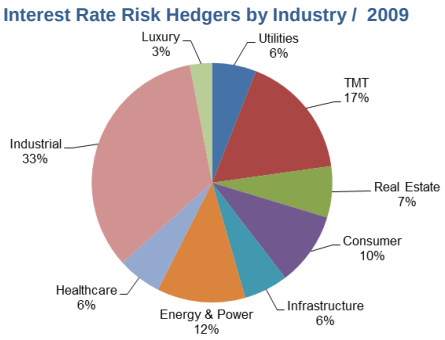
2.5.10 Types of risk hedged on industry basis.

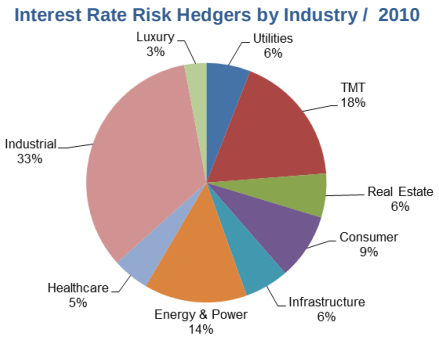
Companies hedge primarily interest rate risk. Indeed, on industry basis, the frequency of hedging instruments is always higher than 40%, with peaks of 70-80% reached by Energy and Power, Utilities and Industrials.

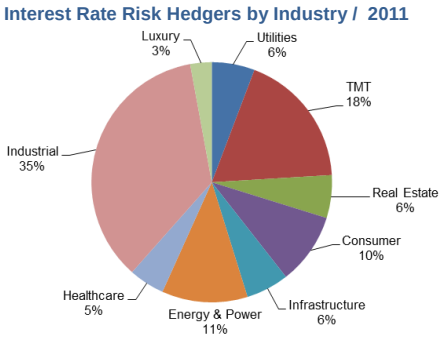
Interest Rate Risk Hedgers on Industry Basis

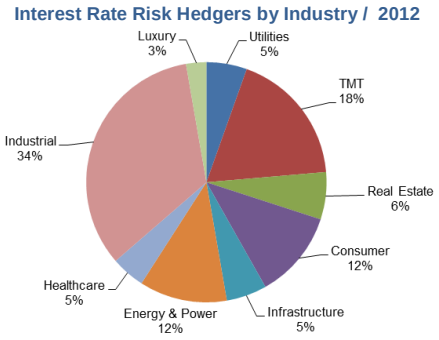
	Total number of companies	2009	2010	2011	2012
Industrials	52	65%	65%	71%	71%
Telecoms, Media & Technology	41	41%	44%	46%	49%
Energy and Power	15	80%	93%	80%	87%
Consumer	23	43%	39%	43%	57%
Real Estate	10	70%	60%	60%	70%
Infrastructure	11	55%	55%	55%	55%
Healthcare	10	60%	50%	50%	50%
Utilities	8	75%	75%	75%	75%
Luxury	5	60%	60%	60%	60%

In terms of contribution to total amount of hedgers, the highest is provided by Industrials sector.







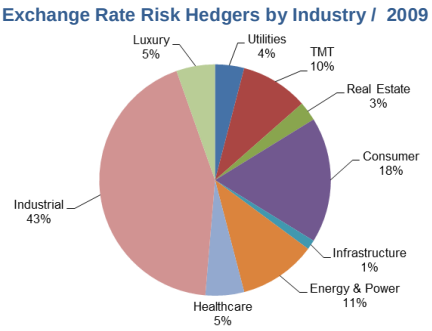


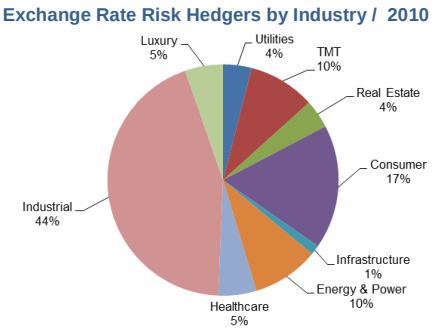
Exchange rate risk is instead hedged mainly by those companies with more intense international activities, mainly belonging to Industrials, Energy and Power, Consumer and Luxury sectors. The last two sectors are intuitively more exposed to cross-border business due to the consolidated success of the "Made-in-Italy", while the first two industries encompass big corporate groups with global footprint.

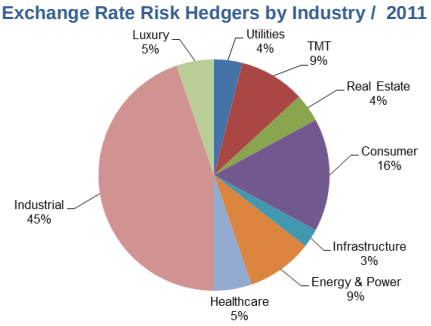
Exchange Rate Risk Hedgers on Industry Basis

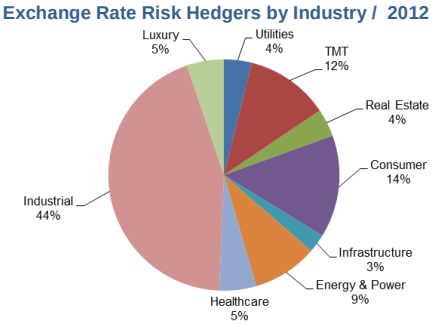
	Total number of companies	2009	2010	2011	2012
Industrials	52	62%	63%	65%	65%
Telecoms, Media & Technology	41	17%	17%	17%	22%
Energy and Power	15	53%	47%	47%	47%
Consumer	23	57%	57%	52%	48%
Real Estate	10	20%	30%	30%	30%
Infrastructure	11	9%	9%	18%	18%
Healthcare	10	40%	40%	40%	40%
Utilities	8	38%	38%	38%	38%
Luxury	5	80%	80%	80%	80%

As a percentage of total hedgers, Industrials sectors counts the highest number exchange rate derivative users.









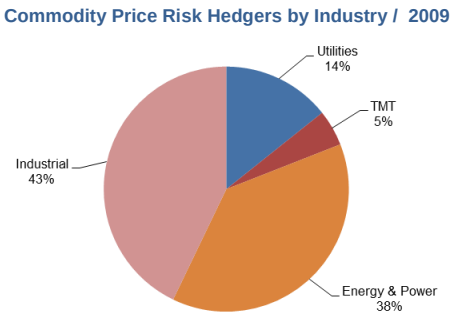
Commodity price risk is hedged only by those companies which have a part of the business focused on the use of raw materials and need to limit their unexpected price movements as a way to stabilize inflows and outflows.

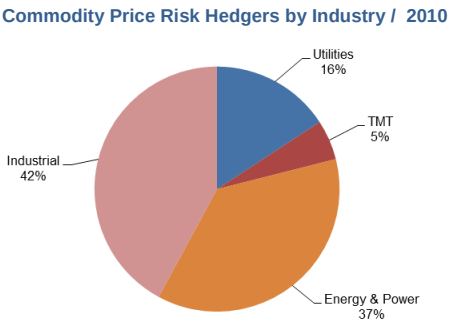
Energy and Power sector counts the highest number of commodity price risk hedgers.

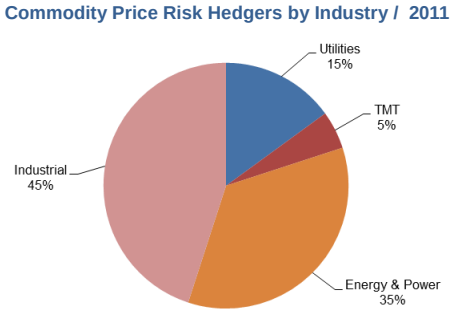
Commodity Price Risk Hedgers on Industry Basis

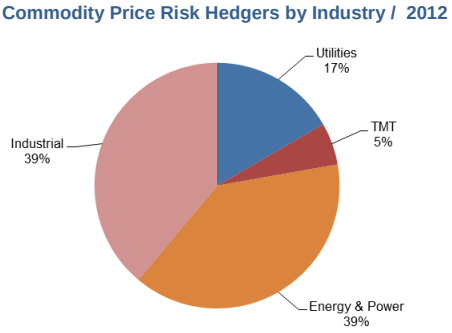
	Total number of companies	2009	2010	2011	2012
Industrials	52	17%	15%	17%	13%
Telecoms, Media & Technology	41	2%	2%	2%	2%
Energy and Power	15	53%	47%	47%	47%
Consumer	23	0%	0%	0%	0%
Real Estate	10	0%	0%	0%	0%
Infrastructure	11	0%	0%	0%	0%
Healthcare	10	0%	0%	0%	0%
Utilities	8	38%	38%	38%	38%
Luxury	5	0%	0%	0%	0%

Most of the contribution to the total amount of commodity price hedgers comes from Industrials and Energy and Power sectors.









2.5.11 Notional amounts and relevant financial statement figures.

An interest rate risk hedging strategy is aimed at decreasing the variability of a company's financing costs. At this stage it is useful to observe what is the average percentage of debt that an Italian listed company hedges. This analysis has only a descriptive purpose, because no conclusions can be drawn on the risk aversion of market actors, due to the absence of data in this survey covering neither the total amount of variable rate debt or share of bonds on total debt. Further studies could investigate the risk aversion of companies taking into account more detailed balance sheet data.

Notional amount over Capex is useful because, assuming that companies need financing for capital expenditures, the higher the amount of investments the higher will be the need for hedging it. For this reason it would be useful to observe what is on average the ratio between the previously mentioned figures.

Here is a summary table which shows the evolution of these variables in the years from 2009 to 2012.

	Notional amount / Total debt		Notional Amount / Capex	
	Mean	Median	Mean	Median
2009	20%	4%	2.60x	0.19x
2010	20%	4%	3.71x	0.20x
2011	19%	2%	2.77x	0.19x
2012	19%	3%	4.75x	0.22x

On average the percentage of total debt hedged is 20%, however the median is just around 4% due to the presence of some outliers and to the fact that many companies hedge only a small share of their debt.

The mean notional amount hedged is around 3.5x times the Capex, however the median shows that notional amount is just about one fifth of the Capex. This may be also due to the use of fixed rate debt which does not require hedging.

2.6 Comparison between users' and non-users' financial statements.

Following the approach of the Bank of Italy a comparison between some key items of the financial statements of derivative users and non-users are analysed in this paragraph.

In all the years from 2009 to 2012 users show higher mean and median of total assets, Revenues and Capex.

When considering the ROE, it is higher among users in terms of median, but it is lower in terms of mean.

Debt / Debt+Equity is computed considering the market value of equity. Also in this case the ratio is higher for users than for non-users in terms of both mean and median.

Derivative users vs. non-users - Mean values

	2009		2010		2011		2012	
	Users	Non-Users	Users	Non-Users	Users	Non-Users	Users	Non-Users
Total Assets (in € m)	6,016	227	6,458	225	6,462	269	6,535	228
Revenues (in € m)	3,164	127	3,364	137	3,736	146	4,190	123
ROE	11%	15%	11%	9%	12%	15%	11%	13%
D/(D+E)	44%	37%	43%	39%	49%	46%	51%	43%
Capex (in € m)	392	11	377	8	405	9	390	8

Derivative users vs. non-users - Median values

	2009		2010		2011		2012	
	Users	Non-Users	Users	Non-Users	Users	Non-Users	Users	Non-Users
Total Assets (in € m)	625	140	718	157	715	140	685	120
Revenues (in € m)	404	72	493	94	468	72	462	69
ROE	10%	7%	10%	7%	11%	5%	10%	6%
D/(D+E)	44%	36%	43%	38%	51%	46%	50%	45%
Capex (in € m)	20	4	17	3	20	3	17	3

The same analysis can be performed to consider only interest rate derivative users.

Hedgers have higher amount assets, record more revenues and commit more resources for capital expenditures. They also display higher leverage.

ROE does not exhibit relevant differences among users and non-users.

Interest rate derivative users vs. non-users - Mean values

	2009		2010		2011		2012	
	Users	Non-Users	Users	Non-Users	Users	Non-Users	Users	Non-Users
Total Assets (in € m)	7,172	292	7,638	383	7,368	774	7,097	731
Revenues (in € m)	3,727	222	3,917	301	4,182	554	4,499	537
ROE	14%	15%	11%	9%	16%	15%	14%	13%
D/(D+E)	47%	35%	46%	36%	53%	43%	53%	41%
Capex (in € m)	472	11	450	13	466	36	426	35

Interest rate derivative users vs. non-users - Median values

	2009		2010		2011		2012	
	Users	Non-Users	Users	Non-Users	Users	Non-Users	Users	Non-Users
Total Assets (in € m)	801	193	765	198	731	184	721	164
Revenues (in € m)	483	112	504	154	478	118	464	104
ROE	9%	9%	10%	9%	11%	8%	10%	9%
D/(D+E)	48%	35%	45%	37%	54%	44%	52%	41%
Capex (in € m)	33	5	28	5	24	4	19	5

2.7 Conclusions and further developments.

Relying on the results in this chapter the main findings concern the use of derivatives as a widespread practice among Italian companies. The most common instrument is the fixed-for-floating interest rate swap, which stabilizes the cost of debt eliminating the uncertainty around financing cash outflows. However the notional amount of the contracts is low when compared to total debt. This may be due either to the presence in the financial statements of a large proportion of fixed rate debt (aspect not monitored with this experiment) or to the Italian companies' aversion towards derivative instruments. Further studies may be addressed to analyse this point.

In the context of this experiment it is shown how Energy & Power, Infrastructure and Luxury are the sectors which use hedging more intensively.

The highest notional amount is registered for hedgers in Infrastructure and Energy & Power sectors, however the results are less robust when considering the whole industry groups and not only their respective hedgers.

What is evident is that in the years from 2009 to 2012 there was no material change in the number of companies using interest rate derivative contracts (the overall increase over these four years was 9%), implying that recent macroeconomic trends did not impact the hedging policies of the economic actors in the sample. However when considering the whole sample a downward trend of the mean and median notional amount hedged can be observed. This could be due to several causes, like the expiration of contracts which were not renewed, the decision to increase the percentage of fixed rate debt, or simply the decrease of derivative exposure.

Industry plays a role in determining the type and intensity of hedging policies, in particular heavy industries are more likely to use interest rate derivatives.

When observing the financial statements, some items like revenues, total assets and Capex are higher for hedgers than for non-hedgers.

The other results got through this chapter are mixed, and they might have been partly jeopardized because of the worsened operating performance, which is common to all Italian companies in the last years. In other words, in a situation of exogenous shock created by the crisis, some financial statement data, like those concerning profitability, were compromised, thus making more difficult to detect differences between hedgers and non-hedgers.

In the next chapter the probability of using interest rate derivatives will be further investigated through the use of a probit model.

Chapter 3: Econometric models to detect some causality effects on the use of interest rate derivatives

3.1 A probit model: methodology.

Following the description of the sample composed by 175 Italian listed companies, the impact of some financials on the probability to use derivatives for interest rate risk coverage is now addressed.

The topic will be developed through the use of a probit model, which is a type of regression where the dependent variable can only take two values, in this case user or non-user of hedging instruments. As the probit model represents a non-linear relationship, the coefficients do not have a straightforward interpretation. They rather appear inside the cumulative standard normal distribution function Φ and the only straightforward meaning they have is that their sign directly indicates whether the independent variable has a positive or negative effect on the probability that the dependent variable is equal to 1.

Non-linearity of the model also implies that coefficients cannot be estimated through Ordinary Least Squares (OLS). Among the other models available, modern software like Stata use the Maximum Likelihood Estimation ("MLE").

This approach consists in the maximization of the likelihood function, which is in turn the joint probability distribution. Because of this rationale, MLE chooses the parameters to maximize the probability of drawing the data that are actually observed. In this sense, the MLEs are the parameter values "most likely" to have produced the data.

Some software report tests of joint hypothesis on multiple coefficients using the F-statistic, while other software use the chi-squared statistic. In this context the second approach is used.

The chi-squared statistic is q x F, where q is the number of restrictions being tested. Because the F-statistic is, under the null hypothesis, distributed as χ^2_q/q in large samples, q x F is distributed as q x χ^2_q in large samples. Because the two approaches differ only in whether they divide by q, they produce identical inferences.

To verify the reliability of the outcomes, the same approach used by Bison *et al.* for the years from 1993 to 1999 is replicated: the model will be tested indeed in the years from 2009 to 2012. If the coefficients are consistent in the different periods under analysis, then some reasonable conclusions on the impact of the selected factors on the use of derivatives within the regression might be drawn.

A discussion on the limits of this model and on its possible further developments will follow the empirical results. The aim is to understand any possible drawbacks which might have jeopardized the reliability of these regressions and try to address them under a critical perspective.

3.2 Description of the factors analysed and of the related independent variables used.

The aim of interest rate derivatives is to stabilize the cash outflows of a financing or the fair value of a bond issue or private placement. As discussed in Chapter 1, if effective marginal tax rates on corporations are a convex increasing function of EBT, then the after tax profit is a concave function of its EBT. As explained by Smith and Stulz (1985), this would imply that a company uses derivatives as a way to reduce the variability of EBT and decrease the amount of expected corporate tax liabilities, increasing in this way its expected after tax profit. Following this reasoning, Bison, Pelizzon and Sartore tried to measure the impact of taxation on hedging strategies by Italian non-financial

listed companies in the years from 1993 to 1999.

In the context of this study, tax expenses are retrieved from the income statements of the analysed companies.

However, it should be underlined that Italian actual fiscal policy allows enterprises to use net operating losses carryforwards and a fixed corporate tax rate (rather than progressive bands). This implies that Smith and Stulz's basis assumption of a progressive tax regime is not present in Italy. As a result there should be no significant connection between the use of derivatives and marginal tax rate. If this is the case, the possible intuition is that there are no incentives for enterprises to stabilize the EBT through hedging, because the tax rate is independent on the pre-tax profit.

Another factor which will be tested is size which is measured, like in previous literature, through the amount of total assets registered at the end of each reference year by the companies in the sample.

Leverage is instead evaluated as total debt, expressed as an accounting measure on 31 December, over total debt plus equity, which is estimated instead as the market capitalization of the net outstanding shares (or "NOSH") at the same date. The NOSH is obtained by subtracting to the overall amount of shares outstanding for each category (ordinary, saving and so on) the number of related treasury shares at the reference date. The NOSH is then multiplied by the unit price at the same date to get the total market capitalization.

The reasons why the market value of equity has been preferred to its accounting value are basically three:

1. Some companies display negative accounting net worth as a consequence of retained losses which deplete the value of paid in capital. However the use of a negative figure for equity would be misleading, as the market value

of the stock might in the worst scenario tend to zero, but it cannot become negative.

2. Market value of equity is the most reliable figure reflecting the price at which an inside shareholder could exit its investment in an arm's length transaction with a willing buyer. This is a way for a current shareholder to assess the desirability of its stake as a trade-off between return and risk.
3. Professional analysts compute the firm value of a company by using the market value of equity and the accounting value of debt at the same reference date.

A very common leverage multiple is Net Debt over EBITDA. However the reasons why it is not used in the context of this study are basically two:

1. Some companies display negative net debt, others negative EBITDA. Both factors would decrease the number of observations available with an evident loss of accuracy.
2. EBITDA figures are not meaningful when considering the industry of real estate, as the structure of the income statement is different due to the nature of the business. Using EBITDA would have caused issues of comparability among industries.

There is then the issue concerning underinvestment, which in Chapter 1 was defined in terms of R&D expenses. According to Bison *et al.* (2000) there should be a positive correlation between R&D expenses and derivative use. The evidence that they collected however was not significant.

Chiorean, Donohoe and Sugiannis (2012) tried to redefine the concept of underinvestment by assuming that the business life cycle has an impact on the requirements of capital committed to R&D. Moreover they split the observations in two groups, one *ex-ante* and the other *ex-post*. *Ex-ante* they measured the

probability to use derivatives as a function of underinvestment. *Ex-post* they analysed instead the change in the amount of investments as a function of derivative use. According to this study introduction and growth phases were the periods when hedging instruments were mostly used, however hedgers did not use derivatives as a way to decrease underinvestment.

In the context of this study, since R&D expenses are accounting figures which, as such, might be manipulated, the underinvestment problem is expressed in terms of Capex and industry. As mentioned in Chapter 1, the rationale is that some industries are more capital intensive than others. For this reason Capex, which is a measure of cash outflows for property, plants and equipment, is considered as a variable interacting with dummies representing the different industries in the sample under analysis.

Expected results should be that some industries like industrials, infrastructures and healthcare should have more derivative users. If it is assumed indeed that these sectors need more investments to keep their machinery at a high productivity level, then an interaction variable which links capital expenditures (a continuous variable) to industry (a dummy variable) should be an appropriate way to compare the following situations, assuming size is kept constant:

1. Same Capex, different sectors.
2. Different Capex, same sector.
3. Different Capex, different sectors.

Moreover a cash-related figure like Capex, which is retrievable from the cash flow statement, in the section dedicated to investing activities, may be more appropriate for objective comparisons among different companies.

In this study another factor is investigated, the market value of equity as a proxy for the risk perceived by investors. It is worth to recall at this stage the small cap

premium linked to the size effect described by Rolf Banz in 1981. Although classical investment theory said expected returns for the security should only be based on quantifiable market risks, 33 years ago the real life evidence began to emerge for a “size effect” that was not fully explained by risk differences. Over the period 1936-1975, Banz was able to show that “the common stock of small firms had, on average, higher risk adjusted returns than the common stock of larger firms.” Banz noted that size by itself is not the determinant of higher return, but instead a hidden risk that is not priced. He estimated that if every month a portfolio is rebalanced in terms of small and large caps and of long and short positions, small caps outperform large caps by 20%. However Banz observed that this correlation is not linear and that this was true only for the smallest companies in the market as the other portfolios showed the same returns on a risk adjusted basis.

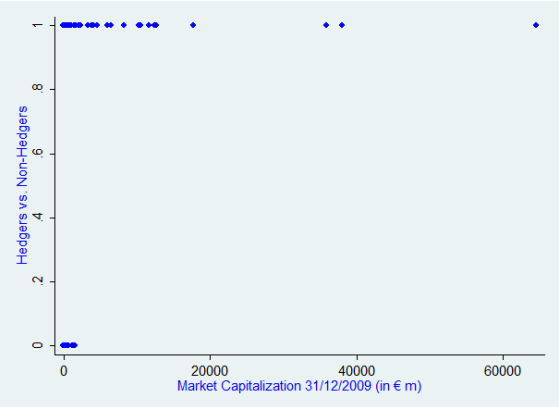
Following Banz’s study other scholars observed the same phenomenon over different time ranges: Kathman (1998) found that the annual rate of return on small caps was 12.7% while for large caps 11%. French and Fama (1992) observed that in the period from 1927 to 2001 small caps returned on average 20% annually while larger caps 11.74%.

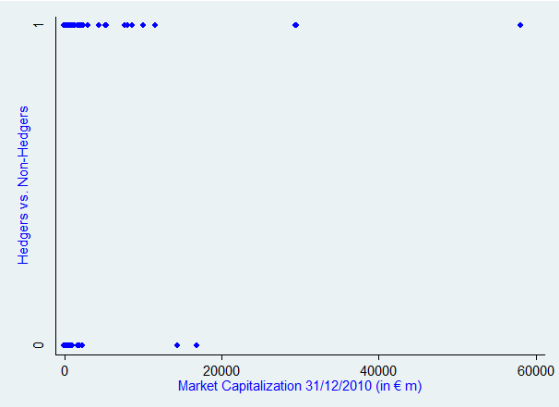
In the decade from 1997 to 2006, Votruba (2006) observed that small cap stocks delivered a 13.5% compounded annual return, while large caps returned 8.4%, when looking at the S&P500 and Russell 2000 indexes.

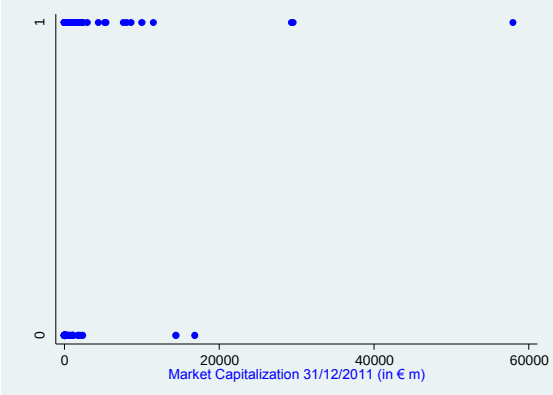
The rationale behind the abnormal return of small caps might be the fact that they are less monitored by market researchers, thus they are perceived as riskier.

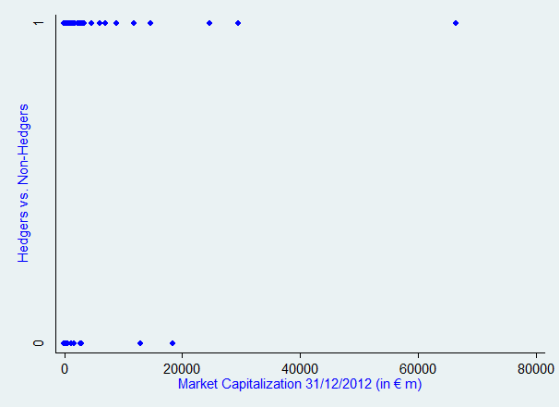
If this is the case smaller caps should have more incentives to hedge risk than larger caps, in order to make their performance less volatile and maintain the

market appetite for the stock.









These graphs show the market capitalizations of hedgers and non-hedgers for the years from 2009 to 2012.

Some considerations might be drawn:

1. Non-hedgers tend to have small market capitalizations, excluding two outliers.
2. Hedgers are superior in number, however there is a higher concentration among smaller caps, even if the range of variability of market capitalizations for hedgers is higher than for non-hedgers (excluding the outliers).

The previous graphs give a simple snapshot of the structure of the Italian Stock Exchange, which is composed almost completely by medium and small size

actors.

Following the introduction of all the factors with their related variables, the results of the model are discussed below in order to evaluate their impact on the probability to use derivatives. Data are presented from the most recent to the oldest, starting from 2012 and going back to 2009.

3.3 Analysis of the data referred to 2012.

Stata output will be presented through the use of summary tables built as per following explanations:

- Rows contain all the factors which theoretically might have an impact on the probability that the dependent variable is equal to 1.
- Columns differentiate the specifications of the models.
- Every cell of the table displays the coefficient associated to the corresponding independent variable and the p-value, in smaller characters, linked to the statistics.

Robust probit regressions are carried out within the model, in order to control for heteroscedaticity and outliers.

In the bottom part of every table there are the number of observations analysed by Stata and the results of the χ^2 and of the pseudo-R^2 tests.

	Outcome of robust regressions: coefficients & associated p-values - 2012						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Size	0.0001 0.062	0.0002 0.054	0.0002 0.034	0.0003 0.003	0.0003 0.002	0.0003 0.012	0.0003 0.016
Leverage	1.0526 0.004	0.9906 0.008	1.4381 0.000	1.3557 0.000	1.2783 0.001		
Taxes		(0.0017) 0.077	0.0007 0.590	0.0012 0.296	0.0016 0.204	0.0008 0.883	
Capex times:							
Industrials			0.0555 0.007	0.0490 0.011	0.0451 0.015		
TMT			0.0071 0.552	0.0041 0.706			
Consumer			0.0233 0.199	0.0191 0.269			
Energy & Power			(0.0025) 0.139	(0.0036) 0.012	(0.0043) 0.004		
Infrastructure			0.0244 0.523				
Healthcare			0.0166 0.092				
Real Estate			0.0130 0.271				
Utlities			0.0038 0.505				
Luxury			0.0034 0.616				
Market Capitalization						(0.0003) 0.102	(0.0003) 0.017
Constant	(0.3691) 0.067	(0.3634) 0.071	(0.8919) 0.000	(0.7945) 0.000	(0.7258) 0.001	0.0871 0.485	0.0840 0.508
Number of Observations	175	175	174	174	174	175	175
Wald χ^2	12.71	19.07	44.21	38.17	33.14	7.08	6.63
Prob > χ^2	0.0017	0.0003	0.0000	0.0000	0.0000	0.0695	0.0363
Pseudo-R^2	0.1052	0.1118	0.2302	0.2186	0.2103	0.1217	0.1216

Regression (1) shows how leverage is significant at 1% level, while size has a significance level slightly below 5%. They both have a positive impact on the probability to hedge. The pseudo-R^2 is 10.52%, meaning that total assets and leverage can explain only a small fraction of the variability of the dependent variable.

Regression (2) adds taxes to the model, showing how they have a negative impact on the probability to hedge. The resulting coefficients of size and leverage remain stable, while the significance of the coefficient linked to size improves. The pseudo-R^2 increases to 11.18%, but part of this improvement is due to the features of the pseudo-R^2 itself.

It measures indeed the fit ability of the model using the likelihood function.

Because the MLE maximizes the likelihood function, adding another regressor to a probit model increases the value of the maximized likelihood, just like adding a regressor necessarily reduces the sum of squared residuals in linear regressions by OLS.

Regression (3) adds also capital expenditures multiplied by dummies representing industries, as to account for differences related to investments opportunities in the sectors included in the sample. In regression (3) four important findings can be highlighted:

1. “Industrials x Capex” has a coefficient significant at 1% confidence level, while all the others are not significant.
2. The variable “taxes” is not significant at 5% level.
3. Size is significant at 5% level, while leverage at 1% level.
4. Some industries incorporate very few observations, implying that the accuracy of the coefficients associated to the interaction variables is very low and might deplete the reliability of the whole model. In other words it might be not appropriate to add in relation to Capex as many interaction variables as the number of industries in the experiment.

Even if the model has an increased pseudo-R^2, its fit ability seems not to be optimal due to the point previously discussed.

The model is next improved by using only those interaction variables where the dummy refers to an industry counting a discrete number of observations, i.e. Industrials, TMT, Consumer and Energy and Power. When all these dummies are equal to zero, the observation falls in one of the remaining five industries in which the sample was split.

Regression (4) highlights some important points:

1. The pseudo-R^2 is 21.86%, displaying a decrease of less than 2% compared

to model (3).

2. Size and leverage are significant at 1% level, however taxes are again not significant.
3. The interaction variables with significant coefficients at 5% level have as dummies Industrials and Energy and Power.

In regression (5) “TMT x Capex” and “Consumer x Capex” are omitted. In this context the pseudo-R^2 stays at 21.03%, however the coefficients of “taxes” are not significant.

Regression (6) and (7) are similar in terms of variables to (1) and (2), but market capitalization is used in lieu of leverage, in order to see whether the former by itself has an influence on the probability of using derivatives. Indeed, since leverage and market capitalization are correlated factors (as the latter is incorporated in the denominator of the former), the model would be biased if they were both used in the same regression.

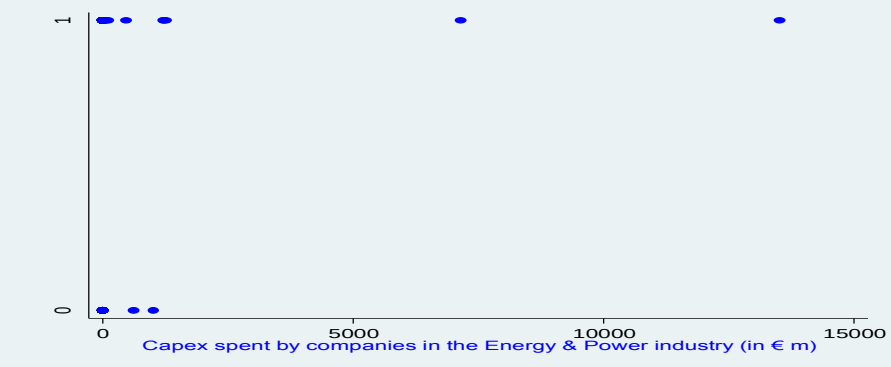
Compared to (2), model (6) has a slightly higher pseudo-R^2. Size is significant at 5% level, but market capitalization and taxes are not.

Compared to (1), model (7) shows that the coefficient of size is significant a 5% level. Also market capitalization is significant at 5% level. The impact of market capitalization on the probability of hedging reflects expectations. Assuming indeed that two companies have the same size, the one having lower market capitalization will post a higher probability to be a hedger.

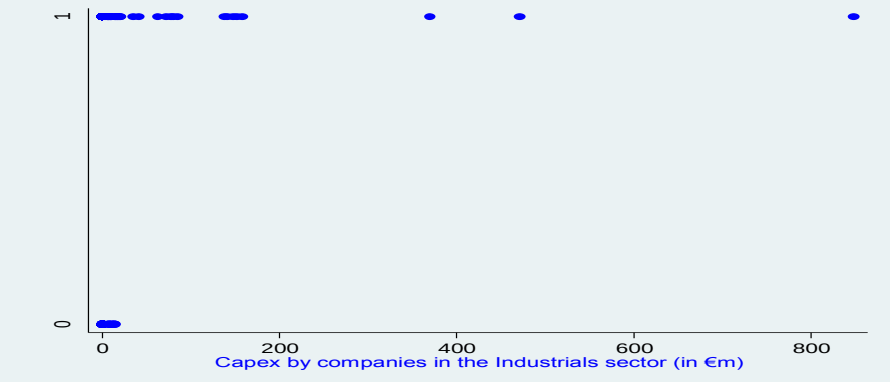
At this stage it is worth to provide a possible explanation on the sign of “Capex x Energy and Power” in regressions (3), (4) and (5). It looks like, keeping constant size and leverage, an increase in capital expenditures should imply a decrease in the probability to use hedging instruments. In order to address this issue in a more critical way, a graphical representation which links Capex of the Energy

and Power industry to the feature of being hedger or non-hedger is shown below.

In the graph it is evident how companies are almost all hedgers of interest rate risk and there is a huge concentration of hedgers at low levels of Capex. Indeed when considering non-hedgers, they do not commit more resources for capital expenditures. This proves again that the negative relation between Capex and dependent variable in regressions (3), (4) and (5) might not be interpreted as implying that lower capital expenditures increase the probability of using interest rate derivatives, but instead as a structural bias of the model itself.



To test whether this reasoning can be correct, Capex for companies in the Industrials sector is represented in the following graph. After having excluded Fiat, which is an outlier in the group with capital expenditures of €7.5 billion, it is visually evident how hedgers commit more funds for Capex than non-hedgers.



3.4 Analysis of the data referred to 2011.

	Outcome of robust regressions: coefficients & associated p-values - 2011						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Size	0.0001 0.023	0.0002 0.016	0.0001 0.143	0.0002 0.002	0.0002 0.001	0.0006 0.000	0.0005 0.000
Leverage	1.1727 0.002	1.1258 0.004	1.1079 0.006	1.1420 0.003	1.1458 0.003		
Taxes		(0.0024) 0.023	(0.0013) 0.202	(0.0009) 0.432	(0.0008) 0.456	(0.0051) 0.000	
Capex times:							
Industrials			0.0097 0.162	0.0066 0.310	0.0064 0.321		
TMT			0.0040 0.422	0.0008 0.567			
Consumer			0.0032 0.508	(0.0001) 0.990			
Energy & Power			(0.0001) 0.925	(0.0015) 0.071	(0.0016) 0.051		
Infrastructure			0.0208 0.294				
Healthcare			0.0159 0.167				
Real Estate			0.1524 0.436				
Utlities			0.0068 0.363				
Luxury			0.0045 0.179				
Market Capitalization						(0.0005) 0.005	(0.0005) 0.004
Constant	(0.5421) 0.010	(0.5557) 0.008	(0.6826) 0.003	(0.6395) 0.003	(0.6416) 0.003	(0.1024) 0.380	(0.0849) 0.469
Number of Observations	175	175	175	175	175	175	175
Wald χ^2	16.27	22.83	37.63	31.79	32.53	30.53	13.75
Prob > χ^2	0.0003	0.0000	0.0002	0.0000	0.0000	0.0000	0.0010
Pseudo-R^2	0.1135	0.1277	0.1749	0.1498	0.1492	0.1615	0.1509

Regressions (1) and (2) have the following features in common with 2012:

1. Similar pseudo-R^2: this implies that the variables used have a comparable explanatory power.
2. The coefficients of leverage have the same sign and similar absolute values.
3. Similar coefficients for size and taxes, which however are in 2011 always significant at 5% level.

When turning to regression (3), instead, only leverage appears to be significant. The non-significance of the interaction variables might be justified by the same rationale introduced for data related to 2012, i.e. the fact that

variables which relate to only about 10 observations would cause a loss of accuracy in the coefficient estimation of the model.

Considering this drawback regression (4) eliminates some of the interaction variables. In this case only size and leverage have a significant coefficient.

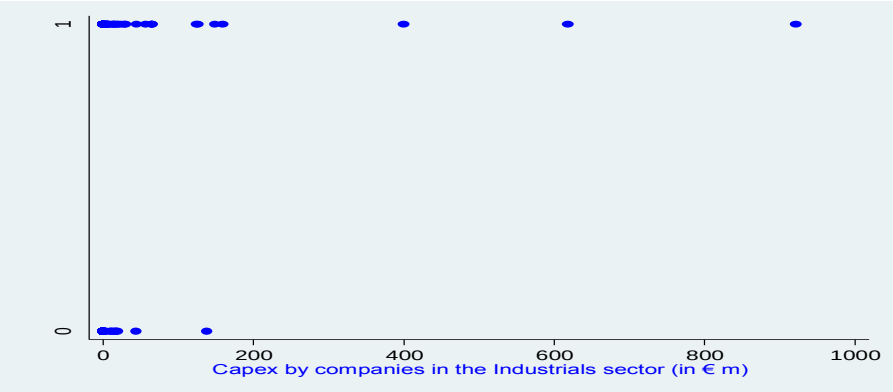
The same considerations hold true in regression (5).

Model (6) shows, like in 2012, that market capitalization has a negative impact on the use of interest rate derivatives. However, differently from regression (6) run in 2012, the interaction variables are now significant at 5% level. Also taxes are significant at 1% level.

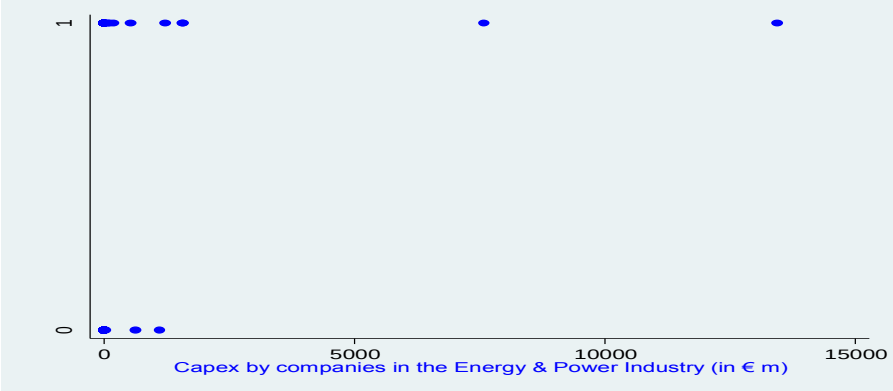
Regression (7) has results similar to those obtained in 2012.

In 2011 the pseudo-R^2 is never higher than 20% and this implies that the regressions are able to explain only a lower fraction of the volatility of the dependent variable.

A further difference with 2012 can be outlined observing capital expenditures by companies in the industrials sector. Indeed after having excluded Fiat, it looks like there is not a wide difference in Capex between hedgers and non-hedgers. Said differently, there is no clear evidence of the fact that hedgers commit more capital for property, plant and equipment. However there are other three outliers (excluding Fiat) with higher than average Capex. This might be a potential explanation of the positive sign of the coefficient, although the evidence is not enough to make the variable significant.



The following graph refers instead to the Energy and Power industry.



As in 2012 the limit is that companies are almost all hedgers, thus the structural bias might have jeopardized both the sign of the coefficient and its significance.

3.5 Analysis of the data referring to 2010.

	Outcome of robust regressions: coefficients & associated p-values - 2010						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Size	0.0005 0.001	0.0004 0.008	0.0003 0.181	0.0004 0.045	0.0003 0.134	0.0006 0.001	0.0007 0.001
Leverage	1.1265 0.009	1.2114 0.008	1.1376 0.016	1.1524 0.014	1.1706 0.013		
Taxes		0.0053 0.429	0.0141 0.194	0.0106 0.309	0.0082 0.387	0.0076 0.359	
Capex times:							
Industrials			0.0063 0.480	0.8220 0.551	0.0078 0.371		
TMT			0.0040 0.726	0.0025 0.822			
Consumer			(0.0078) 0.176	(0.0083) 0.124			
Energy & Power			0.0221 0.010	0.0209 0.014	0.0214 0.012		
Infrastructure			0.0150 0.714				
Healthcare			0.0046 0.702				
Real Estate			0.0279 0.569				
Utlities			0.0011 0.881				
Luxury			(0.0115) 0.154				
Market Capitalization						(0.0004) 0.010	(0.0003) 0.004
Constant	(0.7156) 0.001	(0.7620) 0.001	(0.8276) 0.001	(0.8166) 0.001	(0.7816) 0.001	(0.3092) 0.017	(0.2918) 0.025
Number of Observations	172	172	172	172	172	173	173
Wald χ^2	22.23	23.21	31.88	31.24	31.62	14.15	11.30
Prob > χ^2	0.0000	0.0000	0.0014	0.0001	0.0000	0.0027	0.0035
Pseudo-R^2	0.2171	0.2184	0.2515	0.2437	0.2357	0.2032	0.2012

Regressions (1) and (2) are similar in terms of coefficients to those run with 2012 and 2011 data. Nonetheless the pseudo-R^2 is more than 10% higher.

In contrast with previous results, taxes do not exhibit a significant coefficient in none of the models.

Furthermore capital expenditures do not seem to predict the probability that the dependent variable equals 1. The only significant coefficient at 5% level is associated to “Energy and Power x Capex”.

Size is significant in all the regressions examined excluding (3).

Leverage and market capitalization are significant at 1% level.

On average the pseudo-R^2 in the models referring to 2010 are higher than

those obtained in 2012 and 2011, implying that the independent variables have a higher explanatory power in 2010 than in 2011 and 2012.

3.6 Analysis of the data referring to 2009.

	Outcome of robust regressions: coefficients & associated p-values - 2009						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Size	0.0009 0.000	0.0010 0.002	0.0009 0.010	0.0009 0.004	0.0009 0.005	0.0013 0.000	0.0012 0.000
Leverage	0.9909 0.0250	0.9461 0.051	0.8208 0.102	0.8941 0.067	0.9139 0.059		
Taxes		(0.0031) 0.8030	(0.0049) 0.729	(0.0032) 0.806	(0.0022) 0.861	(0.0096) 0.465	
Capex times:							
Industrials			0.0094 0.4160	0.0081 0.460	0.0083 0.447		
TMT			(0.0015) 0.3380	(0.0018) 0.806			
Consumer			0.0074 0.6850	0.0042 0.460			
Energy & Power			0.0165 0.2160	0.0155 0.235	0.0156 0.232		
Infrastructure			(0.0044) 0.5160				
Healthcare			0.0111 0.4020				
Real Estate			0.0181 0.7440				
Utlities			0.0128 0.2190				
Luxury			(0.0010) 0.9700				
Market Capitalization						(0.0003) 0.301	(0.0005) 0.009
Constant	(0.8500) 0.000	(0.8362) 0.000	(0.8721) 0.000	(0.8655) 0.000	(0.8671) 0.000	(0.4555) 0.001	(0.4458) 0.001
Number of Observations	170	170	168	168	168	171	171
Wald χ^2	21.40	21.39	33.67	28.75	23.59	18.52	18.53
Prob > χ^2	0.0000	0.0001	0.0008	0.0002	0.0003	0.0003	0.0001
Pseudo-R^2	0.2756	0.2759	0.3016	0.2938	0.2928	0.2561	0.2540

In 2009 all size maintains a positive and significant correlation with the probability of using derivatives.

Leverage shows the highest significance in regressions (1), (2) and (5), while market capitalization is significant only in model (7).

The pseudo-R^2 in all the regressions considered is higher in 2009 than in the following years.

In the next paragraphs the evolution of the coefficients will be analysed in order to detect some possible implications suggested by the regressions.

Furthermore, a discussion on the limits of this model and on its possible future developments will be developed.

3.7 Yearly comparison of the different models.

The size effect in model (1) is significant in all the years under analysis.

Only in 2012 significance goes slightly below 5%.

Leverage is always significant at 5%.

The explanatory power of the regression decreases sharply from 27.56% in 2009 to 11.35% in 2011.

	Model (1)			
	2009	2010	2011	2012
Size	0.0009 0.0000	0.0005 0.0010	0.0001 0.0230	0.0001 0.0620
Leverage	0.9909 0.0250	1.1265 0.0090	1.1727 0.0020	1.0526 0.0040
Constant	(0.8500) 0.0000	(0.7156) 0.0010	(0.5421) 0.0100	(0.3691) 0.0670
Number of Observations	170	172	175	175
Wald χ^2	21.40	22.23	16.27	12.71
Prob > χ^2	0.0000	0.0000	0.0003	0.0017
Pseudo-R^2	0.2756	0.2171	0.1135	0.1052

When considering model (2), leverage is significant at 5% level in 2009 and at 1% level in the following years. Size is significant at 5% in 2011 and in 2012, while at 1% level in 2009 and in 2010. Taxes instead are significant at 1% level only in 2011.

Also in this case from December 2010 to December 2011 there is a steep drop in pseudo-R^2.

	Model (2)			
	2009	2010	2011	2012
Size	0.0010	0.0004	0.0002	0.0002
	0.0020	0.0080	0.0160	0.0540
Leverage	0.9461	1.2114	1.1258	0.9906
	0.0510	0.0080	0.0040	0.0080
Taxes	(0.0031)	0.0053	(0.0024)	(0.0017)
	0.8030	0.4290	0.0230	0.0770
Constant	(0.8362)	(0.7620)	(0.5557)	(0.3634)
	0.0000	0.0010	0.0080	0.0710
Number of Observations	170	172	175	175
χ^2	21.39	23.21	22.83	19.07
Prob > χ^2	0.0001	0.0000	0.0000	0.0003
Pseudo-R^2	0.2759	0.2184	0.1277	0.1118

Model (3) adds the interaction variables referred to all industries and capital expenditures.

Because of the composition of the sample and the large disproportion between the most populated industry (52 observations) and the least populated ones (5 observations), the use of nine interaction variables does not look as the most appropriate choice.

Size is significant in two years out of four, while leverage in three years. Taxes are never significant.

	Model (3)			
	2009	2010	2011	2012
Size	0.0009	0.0003	0.0001	0.0002
	0.0100	0.1810	0.1430	0.0340
Leverage	0.8208	1.1376	1.1079	1.4381
	0.1020	0.0160	0.0060	0.0000
Taxes	(0.0049)	0.0141	(0.0013)	0.0007
	0.7290	0.1940	0.2020	0.5900
Capex times:				
Industrials	0.0094	0.0063	0.0097	0.0555
	0.4160	0.4800	0.1620	0.0070
TMT	(0.0015)	0.0040	0.0040	0.0071
	0.3380	0.7260	0.4220	0.5520
Consumer	0.0074	(0.0078)	0.0032	0.0233
	0.6850	0.1760	0.5080	0.1990
Energy & Power	0.0165	0.0221	(0.0001)	(0.0025)
	0.2160	0.0100	0.9250	0.1390
Infrastructure	(0.0044)	0.0150	0.0208	0.0244
	0.5160	0.7140	0.2940	0.5230
Healthcare	0.0111	0.0046	0.0159	0.0166
	0.4020	0.7020	0.1670	0.0920
Real Estate	0.0181	0.0279	0.1524	0.0130
	0.7440	0.5690	0.4360	0.2710
Utlities	0.0128	0.0011	0.0068	0.0038
	0.2190	0.8810	0.3630	0.5050
Luxury	(0.0010)	(0.0115)	0.0045	0.0034
	0.9700	0.1540	0.1790	0.6160
Constant	(0.8721)	(0.8276)	(0.6826)	(0.8919)
	0.0000	0.0010	0.0030	0.0000
Number of Observations	168	172	175	174
χ^2	28.75	31.88	37.63	44.21
Prob > χ^2	0.0002	0.0014	0.0002	0.0000
Pseudo-R^2	0.2938	0.2515	0.1749	0.2302

In model (4) the most relevant result is that taxes and interaction variables do not seem to be significant, apart for “Industrials x Capex” and “Energy and Power x Capex” in 2012.

	Model (4)			
	2009	2010	2011	2012
Size	0.0009	0.0004	0.0002	0.0003
	0.0040	0.0450	0.0020	0.0030
Leverage	0.8941	1.1524	1.1420	1.3557
	0.0670	0.0140	0.0030	0.0000
Taxes	(0.0032)	0.0106	(0.0009)	0.0012
	0.8060	0.3090	0.4320	0.2960
Capex times:				
Industrials	0.0081	0.8220	0.0066	0.0490
	0.4600	0.5510	0.3100	0.0110
TMT	(0.0018)	0.0025	0.0008	0.0041
	0.8060	0.8220	0.5670	0.7060
Consumer	0.0042	(0.0083)	(0.0001)	0.0191
	0.4600	0.1240	0.9900	0.2690
Energy & Power	0.0155	0.0209	(0.0015)	(0.0036)
	0.2350	0.0140	0.0710	0.0120
Constant	(0.8655)	(0.8166)	(0.6395)	(0.7945)
	0.0000	0.0010	0.0030	0.0000
Number of Observations	168	172	175	174
Wald χ^2	28.75	31.24	31.79	38.17
Prob > χ^2	0.0002	0.0001	0.0000	0.0000
Pseudo-R^2	0.2938	0.2437	0.1498	0.2186

Model (5) is similar to (4). Taxes show mixed signs of the coefficient in the different years and are never significant. This regression confirms that no particular inferences can be made about the impact of capital expenditures on the choice to use interest rate derivative contracts.

	Model (5)			
	2009	2010	2011	2012
Size	0.0009 0.0050	0.0003 0.1340	0.0002 0.0010	0.0003 0.0020
Leverage	0.9139 0.0590	1.1706 0.0140	1.1458 0.0030	1.2783 0.0010
Taxes	(0.0022) 0.8610	0.0082 0.3870	(0.0008) 0.4560	0.0016 0.2040
Capex times:				
Industrials	0.0083 0.4470	0.0078 0.3710	0.0064 0.3210	0.0451 0.0150
Energy & Power	0.0156 0.2320	0.0214 0.0120	(0.0016) 0.0510	(0.0043) 0.0040
Constant	(0.8671) 0.0000	(0.7816) 0.0010	(0.6416) 0.0030	(0.7258) 0.0010
Number of Observations	168	172	175	174
Wald χ^2	23.59	31.62	32.53	33.14
Prob > χ^2	0.0003	0.0000	0.0000	0.0000
Pseudo-R^2	0.2928	0.2357	0.1492	0.2103

Model (6) replicates model (2), substituting leverage with market capitalization. Size is always significant at 1% level, while instead market capitalization is significant at 5% in two out of four years. No particular conclusions can be drawn on the causality effect of taxes on the dependent variable.

Like in the previous models, the pseudo-R^2 is higher than 20% in both 2011 and 2012, while it is 16% in 2011 and 12% in 2012.

	Model (6)			
	2009	2010	2011	2012
Size	0.0013	0.0006	0.0006	0.0003
	0.0000	0.0010	0.0000	0.0120
Taxes	(0.0096)	0.0076	(0.0051)	0.0008
	0.4650	0.3590	0.0000	0.8830
Market Capitalization	(0.0003)	(0.0004)	(0.0005)	(0.0003)
	0.3010	0.0100	0.0050	0.1020
Constant	(0.4555)	(0.3092)	(0.1024)	0.0871
	0.0010	0.0170	0.3800	0.4850
Number of Observations	171	173	175	175
Wald χ^2	18.52	14.15	30.53	7.08
Prob > χ^2	0.0003	0.0027	0.0000	0.0695
Pseudo-R^2	0.2561	0.2032	0.1615	0.1217

Model (7), which omits taxes, has a pseudo-R^2 similar to (6).

Market capitalization and size are always significant at about 1% level.

	Model (7)			
	2009	2010	2011	2012
Size	0.0012 0.0000	0.0007 0.0010	0.0005 0.0000	0.0003 0.0160
Market Capitalization	(0.0005) 0.0090	(0.0003) 0.0040	(0.0005) 0.0040	(0.0003) 0.0170
Constant	(0.4458) 0.0010	(0.2918) 0.0250	(0.0849) 0.4690	0.0840 0.5080
Number of Observations	171	173	175	175
Wald χ^2	18.53	11.30	13.75	6.63
Prob > χ^2	0.0001	0.0035	0.0010	0.0363
Pseudo-R^2	0.2540	0.2012	0.1509	0.1216

3.8 Preliminary discussion on the results of the experiment.

The detailed analysis developed in the previous paragraphs points out some important findings:

1. Taxes in the context of this model do not exhibit any particular impact on the probability to use derivatives. Indeed the coefficients show a change in sign and in significance level which is conditional on the number and type of parameters used in the regressions. As pointed out at the beginning of the chapter, the intuition is that in a fixed tax rate regime there is no particular incentive to stabilize the EBT through the use of hedging policies.
2. Issues related to capital expenditures display first of all a structural nature. In the context of non-financial listed companies, there is a high discrepancy in terms of number of observations contained in different industries. Moreover the presence mainly of small and medium enterprises might jeopardize the coefficients suggesting some misleading conclusions. An example of this

issue was described when dealing with the capital expenditures related to Energy and Power. The companies in this industry are almost all hedgers of interest rate risk. Due to this fact, there is no evident difference in terms of Capex between hedgers and non-hedgers. Hedgers display a similar amount of Capex (excluding some outliers) of non-hedgers but are more numerous in terms of observations. This might potentially contribute to explain the nature of some coefficients. Due to the structure of the Italian Stock Exchange, no inferences on the relationship of underinvestment and derivative use might be drawn in the model under exam.

3. The significance and sign of the coefficient of size is consistent in the different years and scenarios, excluding model (4) where there are all the interaction variables. This leads to the conclusion that in the context of this experiment size has a positive impact on the probability to use derivatives.
4. As expected, leverage has a positive effect on the dependent variable. The results appear consistent under different scenarios and in all the years under exam.
5. Market capitalization has a negative impact on the probability to hedge and its significance is stable excluding year 2012 in model (6).

Considering the fact that the yearly net change in the number of hedgers is very low, namely 0 at the end of 2010, 3 in 2011 (1.71% over the total number of observations) and 6 in 2012 (3.43% over the total number of observations), a factor's impact on the choice to use derivatives should remain more or less constant in a time frame of only 4 years.

A relevant point is that the presence of the sovereign debt crisis did not cause any particular change in hedging policies by Italian companies from 2010 to 2011 and 2012. Moreover the impact of the different factors on the dependent

variable was quite stable, as the coefficients on size, market capitalization and leverage kept similar values in the different years under analysis. The only significant change is the ability of the model to explain the variability of the dependent variable, as the pseudo-R^2 drops consistently from 2010 to 2011. Since size is expressed in accounting terms, its value is less impacted by a macroeconomic shock. The same rationale does not hold for market capitalization and leverage as it will be pointed out in the next paragraph.

3.9 Bank of Italy's findings on the leverage of Italian companies.

According to the Bank of Italy's white papers in 2011 companies' financial debt increased overall by €19 billion (or 0.7%); short-term debt was the main driver of this increase. Leverage, computed as the ratio of total financial debt to total financial debt plus equity at market price, increased by 3% up to 48%, mainly reflecting the reduction in the market value of equity.

The ratio of firms' financial debts to GDP is much lower in Italy than in other countries, namely France, Spain, United Kingdom and Japan. However, because of the lower equity value, leverage is higher compared to France and United Kingdom.

The financial structure of Italian firms is characterized by a higher incidence of bank debt than the levels prevailing in the euro area and the Anglo-Saxon countries (66% in 2012 as against approximately 50 and 30%). During the crisis, dependence on bank credit, particularly high among small and medium-sized enterprises, has amplified the refinancing problems connected with the deterioration of banks' balance sheets and tighter lending policies.

In 2011 the Bank of Italy reported that Italy was still strongly dependent on bank financing, while such reliance had diminished in the Euro area and the Anglo-

Saxon countries in conjunction with stepped-up recourse to the bond market.

In 2012 the Bank of Italy reported instead a resurgence of corporate bond issue, against the backdrop of worsening credit access conditions. According to Dealogic data, gross domestic and international issues amounted to €33 billion, a historically high figure, although bonds still made up less than 10% of financial debt, a modest level by international standards.

Companies' Liabilities[1] (as at end of period)

	Percentage composition of Liabilities					Financial Ratios			
Countries and years	Financial Instruments[2]	Borrowings	Equity	Accounts payable and other liabilities[3]	Total Liabilities / GDP	Financial Debt / GDP	Share of Bank Debt[4]	Leverage[5]	Financial Assets / GDP
Italy									
2007	2.1	30.8	47.6	19.4	2.29	0.75	69.5	40.9	1.03
2010	3	33.2	43.5	20.3	2.26	0.82	68.4	45.4	0.97
2011	2.9	34.7	40.6	21.8	2.15	0.81	70	48	0.96
2012	3.4	34.7	41.3	20.6	2.18	0.83	66.5	48	0.98
France									
2007	3.7	20.1	64.3	11.8	3.95	0.94	40	27.1	2.71
2010	5.6	22.5	58.5	13.4	3.69	1.04	38.9	32.4	2.56
2011	6.2	23.9	55.2	14.7	3.45	1.04	39.4	35.3	2.44
2012	6.7	22.5	56.5	14.3	3.72	1.09	37	34.1	2.56
Germany									
2007	2.5	28.3	48	21.2	1.92	0.59	54.4	39.1	1.28
2010	3.1	31.9	42.5	22.5	1.91	0.67	47.7	45.1	1.31
2011[6]	3.4	35.4	38.3	22.9	1.8	0.7	44.8	50.3	1.26
2012	2.7	29.1	44	24.2	1.81	0.58	52.7	42	1.27
Spain									
2007	0.4	34.2	48.3	17.1	3.81	1.32	64.3	41.7	2.27
2010	0.6	40.9	43.1	15.4	3.39	1.41	60.5	49.1	1.99
2011	0.7	41.9	41.4	16	3.16	1.35	58.2	50.7	1.89
2012	0.5	40	45.2	14.3	3.23	1.31	51.5	47.3	1.94
Euro area[7]									
2007	2.4	28.9	54.2	14.5	2.94	0.92	52.8	36.7	1.81
2010	3.4	31.8	49.9	14.9	2.88	1.01	50.3	41.4	1.81
2011	3.7	33.4	47.5	15.4	2.74	1.02	49.5	43.9	1.76
2012	3.9	31.4	49.6	15.1	2.81	0.99	50	41.5	1.83
United Kingdom									
2007	10	29.1	56.8	4.2	2.74	1.07	36	40.7	1.36
2010	9.9	30.2	55.7	4.1	2.73	1.1	33.3	41.9	1.42
2011	12	30.1	53.6	4.3	2.63	1.11	30.3	44	1.47
2012	12	27.5	55.5	5.1	2.74	1.08	28.5	41.6	1.4
United States[8]									
2007	9.4	15.7	57.4	17.6	3.02	0.75	38.6	30.4	1.22
2010	12.7	14.9	53.4	19	2.74	0.76	33.2	34.1	1.2
2011	13.6	14.9	52.9	18.6	2.66	0.76	32	35	1.22
2012	14.6	14.2	55	16.2	2.78	0.8	29.8	34.4	1.23
Japan									
2007	6.5	26	45.2	22.3	2.84	0.92	....	41.8	1.82
2010	7.7	31.9	37.4	23.1	2.48	0.98	....	51.4	1.73
2011	8	34.1	33.7	24.2	2.41	1.02	....	55.5	1.76
2012	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Sources: Bank of Italy and Istat for Italian data. For the other countries: Banque de France and INSEE (France); Deutsche Bundesbank (Germany); Banco de España (Spain); Eurostat and BCE (Euro area); Bank of England and Central Statistical Office (United Kingdom); Federal Reserve System - Board of Governors e Bureau of Economic Analysis (United States); Bank of Japan e Cabinet Office (Japan).

Notes: 1. From Bank of Italy's Annual Reports for 2011 and 2012 – 2. Includes fair value of derivatives. – 3. Includes insurance provisions and pension funds. – 4. Percentage values; share of bank borrowings over total financial debts. For the United States it includes also *asset-backed securities*, ABS from private issuers. – 5. Percentage values. It is equal to the value of financial debt over financial debt plus equity at market price. – 6. Data refer to 3rd quarter. – 7. Data refer to 17 countries in the Euro area. – 8. Data refer to the non-financial business sector.

3.10 Impact of the sovereign debt crisis on the results of the experiment.

According to the situation summarized above, during 2011, the year when the sovereign debt crisis exploded in Italy, companies increased leverage by 3% mainly as a result of the decrease in the value of equity.

A potential explanation of the decrease in the equity price resides in the risk return trade-off faced by an investor. In a situation in which the sovereign bond spread over the German Bund increases at high levels against historical average, investing in sovereign bonds might become a more desirable option than equity, due to the lower risk related to the investment.

This pulls down the demand for stocks and consequently their prices, depressing the total market capitalization while increasing the overall leverage of a company.

As a proof of this the total value of the Italian Stock Exchange fell from €425 billion in 2010 to €332 billion in 2011.

Analogously the total market capitalization of the sample is €314 billion in 2009, €326 billion in 2010, €266 billion in 2011 and €284 billion in 2012. The fall in market value of equity from December 2010 to December 2011 is about 19%.

However the net change in hedgers, as specified above, was 3 from December 2010 to December 2011.

This implies that potentially the choice to use hedging instruments is uncorrelated with the presence of a macroeconomic shock.

By looking at the results of the model the only impact of the sovereign debt crisis might be noticed in the change of the pseudo-R^2 in 2011 and 2012.

The reason might be that through leverage and market capitalization, which are market values related to the last day of each year, the exogenous shock partially impacted the predictability power of the model.

Since in 2013 the total market capitalization of the Italian Stock Exchange at the end of December 2013 was €447 billion, 22% higher than in December 2012, this might suggest that future analysis should encompass also data related to 2013 to test whether the pseudo-R^2 improves, assuming an almost constant number of hedgers.

Below the probabilities of hedging are estimated for models (1) and (7) in the years from 2009 to 2012 using different levels of the independent variable in each reference year.

Forecasted Probability

Model (1)

	Leverage	Size			
		Min.	Median	Mean	Max
2009	Min.	20%	30%	100%	100%
	Median	36%	**48%**	**100%**	100%
	Max.	60%	72%	100%	100%
2010	Min.	24%	29%	93%	100%
	Median	41%	**47%**	**97%**	100%
	Max.	65%	71%	99%	100%
2011	Min.	29%	31%	51%	100%
	Median	52%	**54%**	**73%**	100%
	Max.	73%	74%	88%	100%
2012	Min.	36%	37%	57%	100%
	Median	56%	**57%**	**75%**	100%
	Max.	74%	76%	88%	100%

Model (7)

	Market Capitalization	Size			
		Min.	Median	Mean	Max
2009	Min.	33%	49%	100%	100%
	Median	30%	**45%**	**100%**	100%
	Max.	9%	17%	100%	100%
2010	Min.	39%	48%	100%	100%
	Median	37%	**46%**	**100%**	100%
	Max.	22%	29%	99%	100%
2011	Min.	47%	53%	99%	100%
	Median	45%	**51%**	**99%**	100%
	Max.	20%	25%	93%	100%
2012	Min.	53%	58%	95%	100%
	Median	52%	**57%**	**95%**	100%
	Max.	35%	40%	88%	100%

It is remarkable how in 2011 and in 2012 the probability that a company uses interest rate derivatives is higher than 50% at lower thresholds of size, leverage

and market capitalization. Due to the low net change of users during these four years, the intuition is that in these different regressions an external shock influenced the impact of the different variables on the dependent one.

For the sake of completeness, below are reported the levels of total assets, market capitalization and leverage used in the previous tables.

The most noticeable aspect is that total assets are stable in the years from 2009 to 2012 as it is an accounting value, while market capitalization displays a higher volatility.

	Leverage				Total Assets (€)				Market Capitalization (€)			
	2009	2010	2011	2012	2009	2010	2011	2012	2009	2010	2011	2012
Min.	0%	0%	0%	0%	14m	16m	14m	13m	3m	4m	4m	3m
Median	42%	42%	51%	48%	352m	353m	348m	367m	176m	161m	120m	95m
Mean	41%	42%	48%	48%	4,261m	4,570m	4,693m	4,733m	1,850m	1,898m	1,537m	1,642m
Max.	97%	97%	98%	97%	160,457m	168,052m	169,805m	169,805m	64,479m	59,192m	57,999m	66,442m

3.11 Limits of the model and further developments.

The seven probit models run in this study are all characterized by a low pseudo-R^2. This implies that the predictability power of these regressions in not high, maybe as a consequence of the existence of other factors connected with the probability to hedge interest rate risk.

The evidence suggests that only size, leverage and market capitalization exhibit a stable causality effect on the dependent variable. However it is not sufficient by itself to make reliable estimations.

In order to overcome this issue, it would be important to investigate other factors which might cause the use of derivatives.

One of these might be the sophistication of management, as more qualified managers might ask for complicated hedging strategies.

Another factor could be the average duration of financial liabilities, expressed as years to maturity. Assuming indeed that two companies have the same size it

might be the case that the company with more proportion of long-term debt is more likely to use interest rate derivatives to limit the potential adverse impact related to unexpected unfavourable movements in the interest rate curve.

As evident in the sample under analysis most of the companies use fixed-for-floating interest rate swaps, choosing a fixed interest rate in lieu of a variable ones. An interesting analysis would be finalized to understand whether the percentage of variable interest rate debt over total debt has an impact on the probability to sign derivative contracts.

Furthermore the decision to use sophisticated hedging policies might be linked to the composition of shareholdings. A company whose majority of shareholding positions is held by institutional investors might be more incentivized to use sophisticated hedging policies.

Even the attitude of shareholders towards risk might influence the management's decisions on derivative use. If the shareholders with the biggest stakes in the company are mostly risk-averse, the use of derivatives could provide investors with more insurance about the stability of cash flows. A proxy for shareholders' preference for risk might be the level of dividend per share paid by the company during the reference year. Evidence indicates that risk-averse investors prefer investing in companies granting a fairly high dividend per share level, whilst risk lovers prefer investing in those companies whose share price is characterized by higher volatility in order to increase their payoff.

Potentially the sovereign debt crisis influenced the pseudo-R^2 of the model but it did not influence in a significant way the hedging attitude of Italian companies. A way to test these findings is through the introduction of a new regression which analyses the impact of the same variables in 2013, when the market capitalization of the Italian Stock Exchange started to recover from the effects of

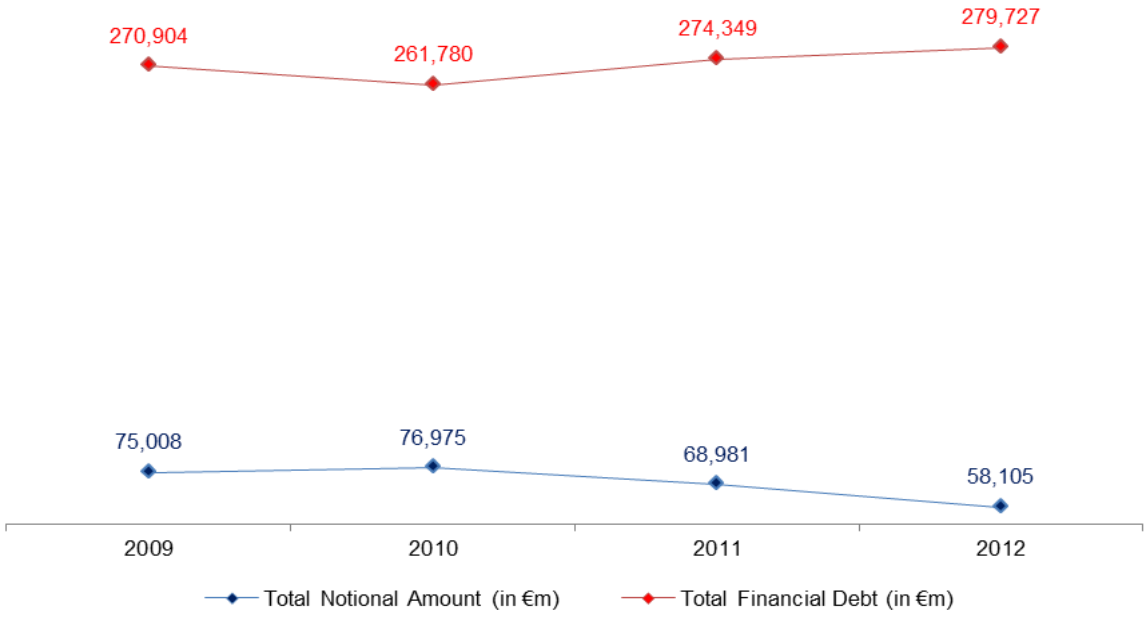
the sovereign debt crisis. If the coefficients of market capitalization and leverage in 2013 keep constant and the pseudo-R^2 rises to pre-crisis levels, then it could be the case that part of its downward pressure in 2011 and in 2012 is due to an external macroeconomic shock.

3.12 Factors influencing the notional amount: a new regression model with panel data.

As observed in Chapter 1, the total notional amount hedged by the companies within the sample declined from €75 billion in 2009 to €58 billion in 2012.

Observing the following graph, it can be pointed out an inverse relation between notional amount and indebtedness, expressed as total financial debt on the balance sheet.

The decrease in total notional amount started in 2011 and was exacerbated in 2012.



In this paragraph a new model is run in order to investigate some possible factors influencing the notional amount hedged by Italian non-financial listed companies: to this purpose a regression with panel data controlling for both

entity fixed and time fixed effects is introduced below.

In the context of this analysis, panel data refer to data for all the 175 companies and they are collected in the years from 2009 to 2012.

There are two types of fixed effects that should be considered while carrying out the analysis:

- **Entity fixed effect**, which should consist mostly in the company-specific hedging policy which does not change over time. In other words each company should have in the regression its own intercept which does not change over a short number of years.
- **Time fixed effect**, which consists in a variable changing through time but common to all the observations.

The existence of an entity fixed effect is evident when reading the financial statements, as companies usually declare that by policy they should maintain a given ratio of fixed to variable rate debt or that they avoid to hedge risks through derivatives.

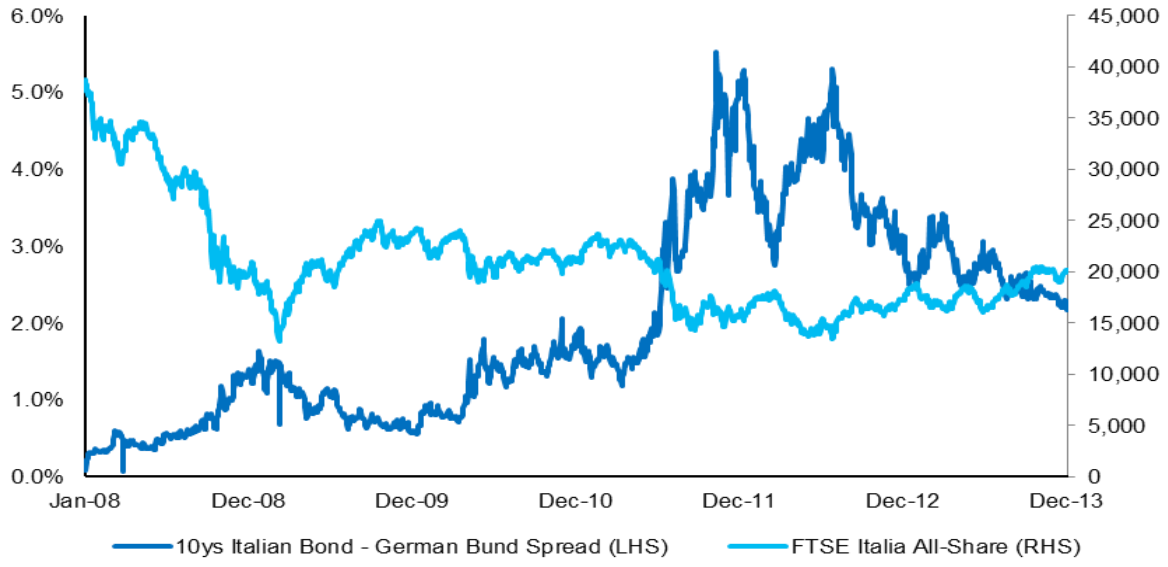
Time fixed effects could consist instead in some external factors (macroeconomic, financial, political or of other nature) which impact all the entities in a given time period. In this case, due to the interconnection between Treasury bond market and stock market, it could be expected that the sovereign debt crisis can represent a reason for companies to change the notional amount on derivative contracts in 2011 compared to previous years.

The following graph links the trend of the Treasury bond market to the volatility of the stock market, namely the interest rate on the 10-year Italian Treasury bond and the FTSE MIB All Share index, showing their inverse correlation. This should outline two important remarks:

- Assuming that leverage has some impact on the choice of the share of debt to

be hedged, Italian companies should increase notional amounts as market capitalization erodes, in an effort to stabilize the costs of increased leverage.

- The Treasury bond market offers sustainable returns at a virtually limited risk, meaning that banks should be more incentivized to invest in Treasury bonds rather than to lend fresh money to clients. This can translate, as it will be shown in paragraph 3.14, to higher volatility and instability in credit market, thus to the need to hedge new loans.



Source: Bloomberg.

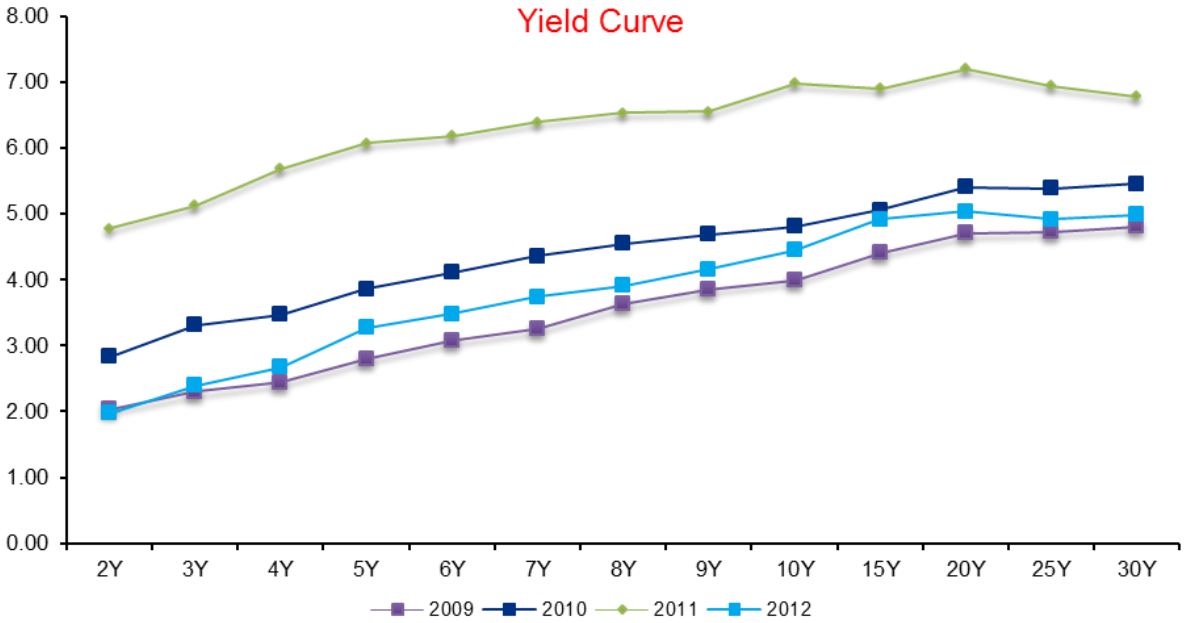
The presence of an external shock is evident also in the high volatility in credit default swaps starting from the second half of 2011.

Source: FactSet.

Moreover the yield curve, which shows the relation between the level of interest

rate and the time to maturity, known as the "term", was characterized by an upward shift in 2011.

The following graph compares the yield curves as on 31 December of the reference years.



Source: FactSet.

In order to detect whether these time fixed macroeconomic and financial effects are significant, the regression will include two dummy variables, the first which is equal to 1 if the observation is in 2009 or in 2010, the other which is 1 if the observation refers to 2011 or 2012.

The other variables included in the model are the following:

- **Leverage**, expressed in terms of total debt over total debt plus equity at market price. The rationale should be that higher leverage implies an increase in the riskiness of the company, which might be partially offset through the use of derivatives and a subsequent stabilization of the financing costs. Moreover, since leverage contains the market capitalization of companies in the denominator, it should be an indirect channel through which the sovereign debt crisis impacts the regression in 2011 and in 2012.
- **Cash**, which should have a negative impact on amount of debt hedged.

Indeed if a company is more liquid than others having a similar level of leverage, it should be able to have access to better contractual terms for financial loans.

- **Size**, in terms of total assets, which should be positively correlated with notional amount, as bigger companies need more funds to finance their assets.

After all these considerations, a robust linear regression is run in order to deal with possible outliers and control heteroscedasticity which might limit the significance of the model.

Results are summarized in the below table (p-values are reported below the coefficients):

	(1)	(2)
Size	0.2 0.0310	0.2 0.0300
Leverage	274.3 0.0540	
Cash	(0.8) 0.0220	(0.8) 0.0230
Dummy 2009-2010	71.9 0.0120	51.3 0.0570
Constant	(262.9) 0.4530	(134.4) 0.7040
Number of Observations	619	625
Prob>F	0.11	0.02
Adj. R^2	0.97	0.97
Entity fixed effect	Absorbed	

As evident in regression (1), the causality effect previously discussed is confirmed by empirical evidence:

- Size and leverage have a positive impact on the notional amount hedged.
- Cash is negatively correlated with the notional amount.
- The intercept in the years 2009 and 2010 is €72 million higher than in the two subsequent years. This implies that the companies within the sample tend to hedge more before the sovereign debt crisis.

The p-values prove significance of all the variables at 5% level and the R^2 is 97%, however the F statistic reveals that it exists the probability that some variables in the model are equal to zero. Since leverage has the lowest significance within model (1), it is eliminated in model (2). The F statistic is acceptable at 5% level in model (2), however the dummy variable capturing the fixed effect is partly compromised as its significance falls slightly below 5% level. Moreover its coefficient is €20 million lower.

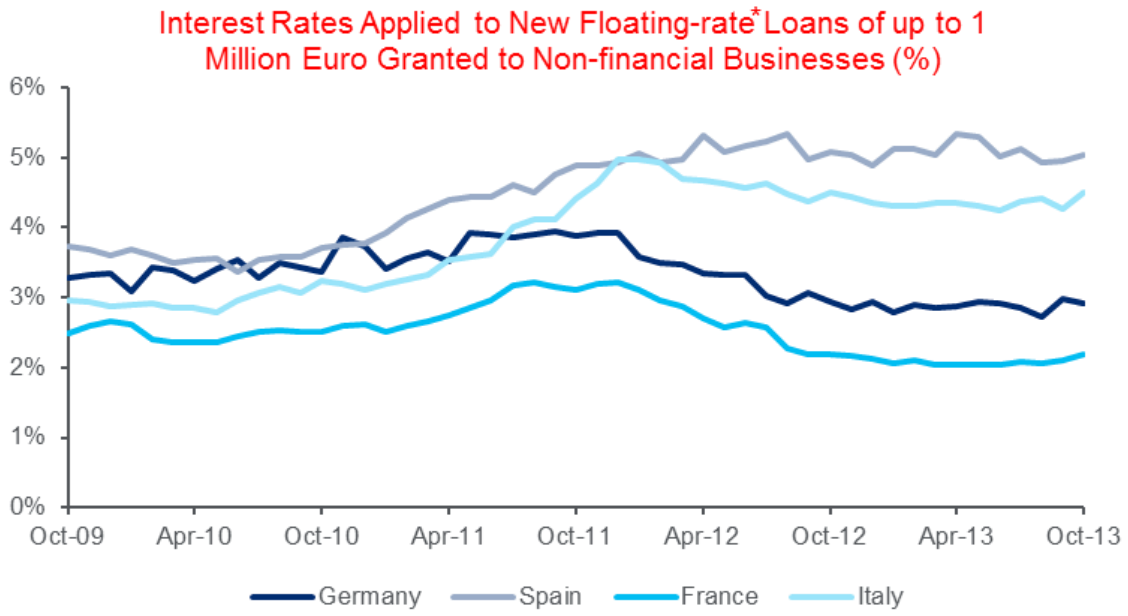
The sovereign debt crisis seems not to have an impact on the trend of notional amount in the years from 2009 to 2012 within the model:

- The direct channel of crisis propagation, represented by the level of the intercept specified through the dummy variables, has a positive sign after controlling for size, cash and leverage, differently from what expected. In other words companies tend to hedge more before the sovereign debt crisis.
- Leverage, the indirect channel of crisis propagation, does not provide such a strong evidence to assert that it represents a significant factor for hedging policy decisions.

Paragraph 3.14 will dig deeper in these two anomalies, providing further evidence that the management decisions on hedging policies might be uncorrelated with the sovereign debt crisis.

3.13 Analysis of financing costs in the last years.

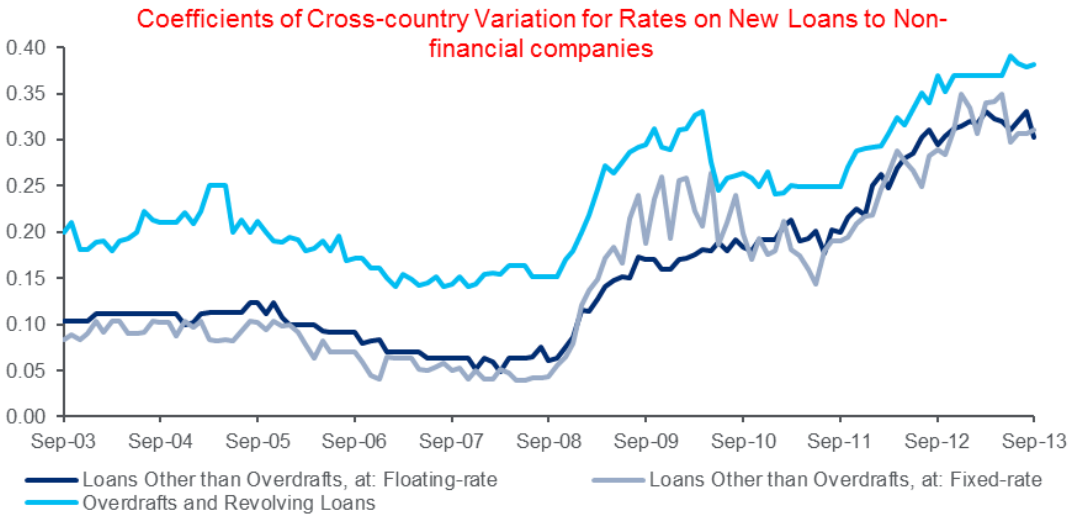
A European comparison shows a wide divergence in rates on new loans to non-financial companies. In Italy floating interest rates applied to new loans started to soar in 2011, and kept an above average volatility up to the first half of 2012.



Source: ECB.

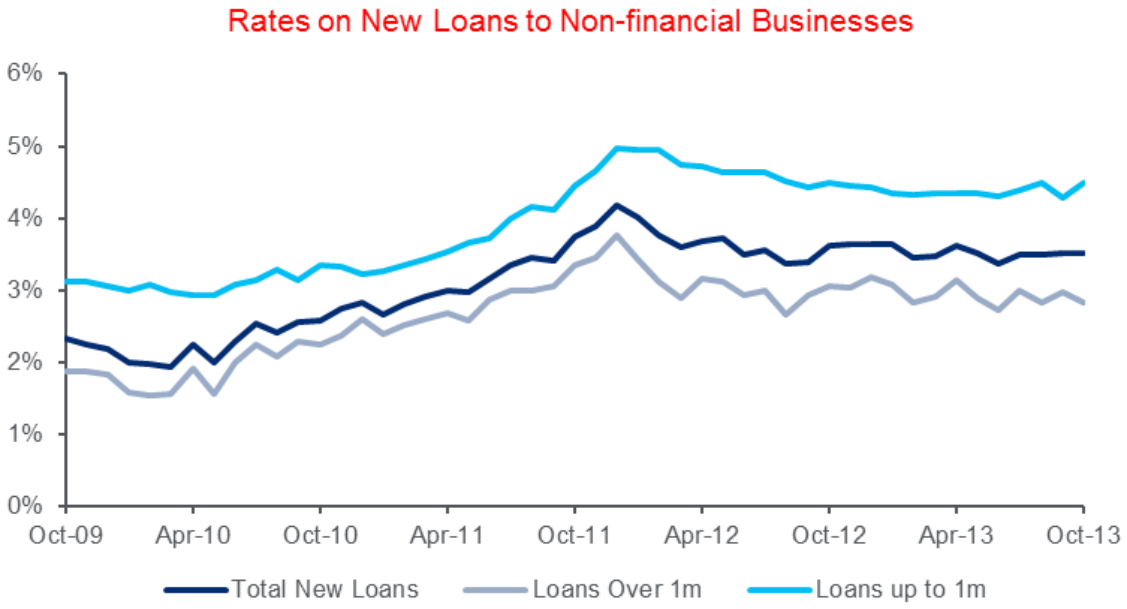
* Floating rate and up to 1 year initial rate fixation.

An index of volatility in the credit supply market is the coefficient of cross-country variation for rates on new loans, index provided by the ECB for each harmonised interest rate, and which measures the dispersion of rates applied in individual member countries compared with the Euro area average. The coefficient of variation is calculated as the weighted standard deviation of rates between countries over the average Euro area rate. As shown in the following graph, it has started to increase steadily since the end of 2011.



Source: ECB.

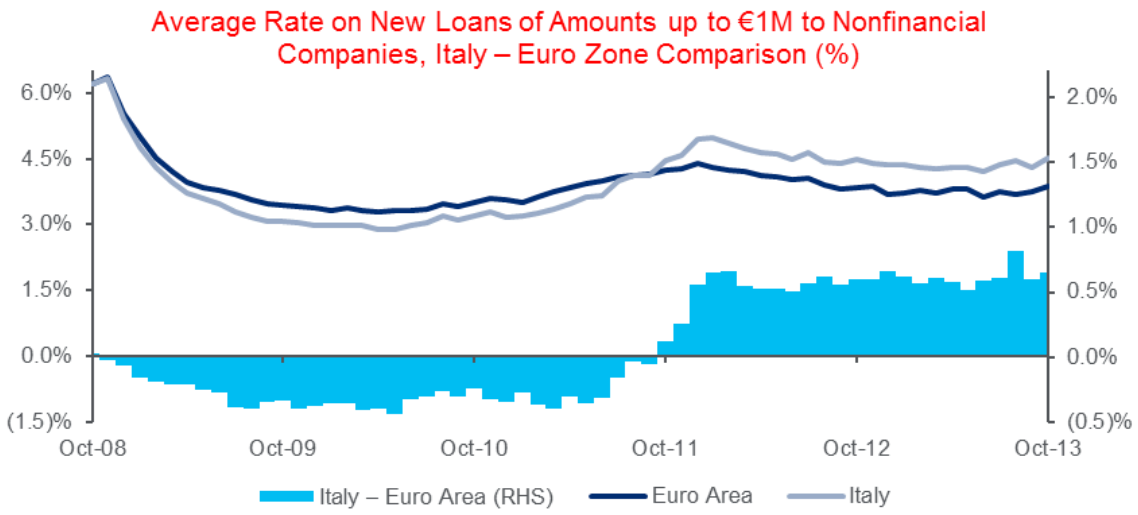
The rate of new loans to non- financial businesses in Italy shows an upward trend in 2011, while it is more stable in 2012, although at higher levels than in 2009 and in 2010.

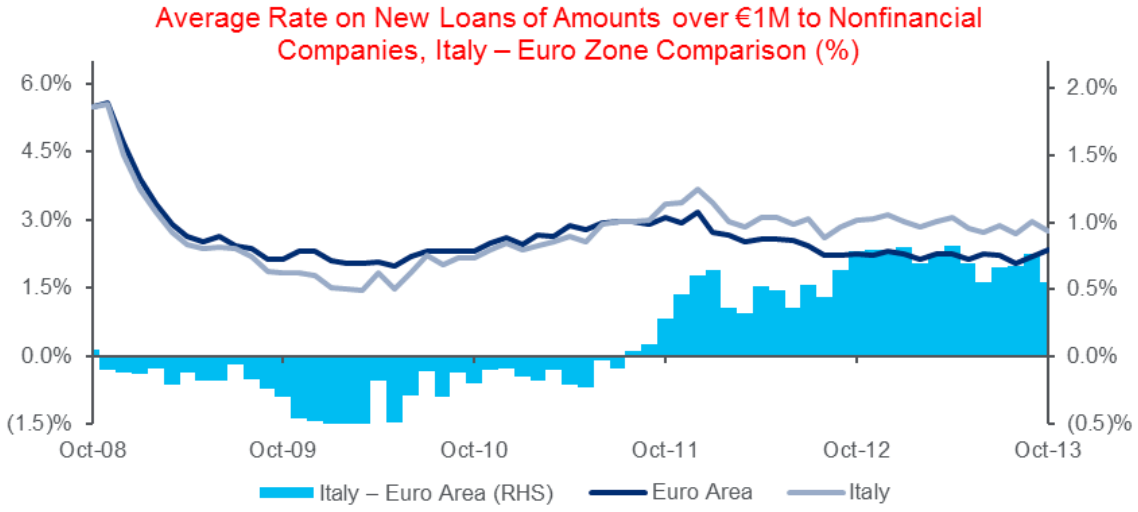


Source: Bank of Italy.

A comparison at European level shows how Italy, starting from September 2011, posted a positive spread against the European average in terms of interest rates applied to new loans to businesses both below €1 million and above €1

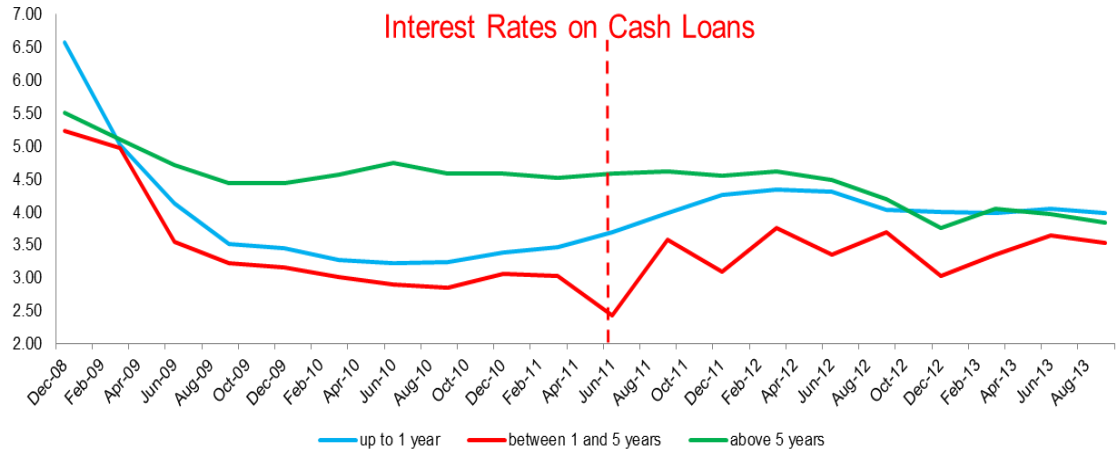
million.





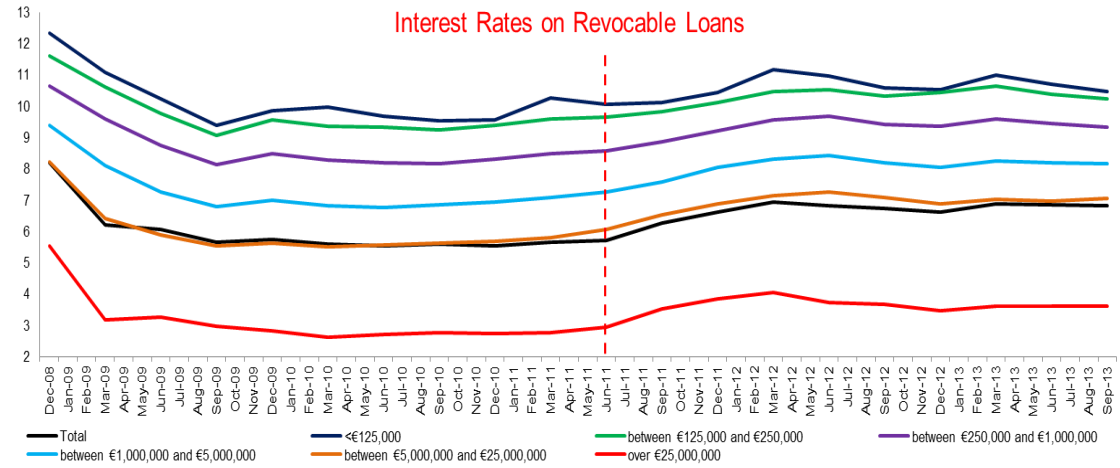
Source: Bank of Italy, ECB and Intesa Sanpaolo calculations.

An overall analysis of the evolution of interest rates on cash loans shows an increased volatility for maturity up to 5 years in the years 2011 and 2012.



Source: Bank of Italy.

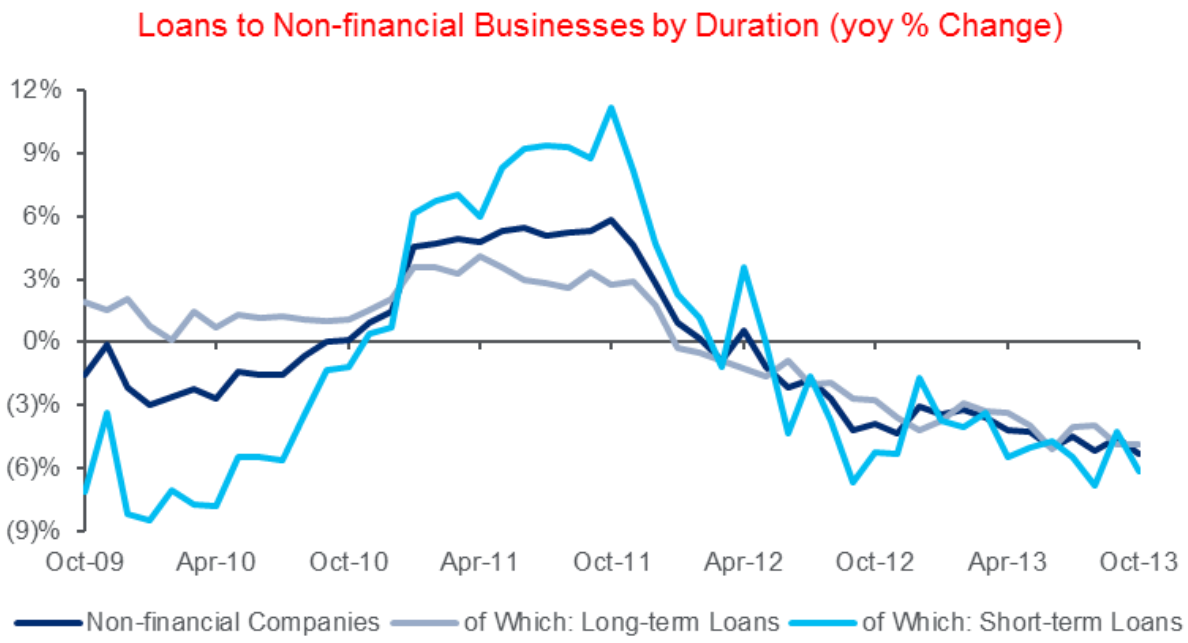
An upwards trend can be seen also in interest rates on revocable loans.

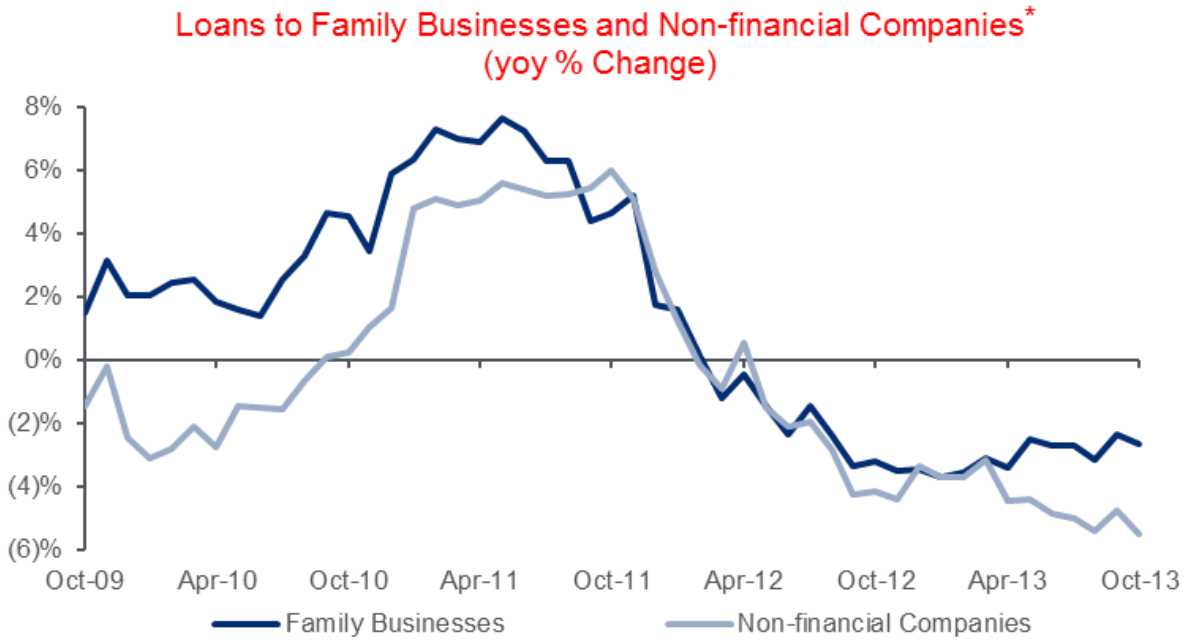


Source: Bank of Italy.

The impact of the sovereign debt crisis on bank loans is evident not only in the enhanced volatility of interest rates, but also in the worsened conditions of credit supply and demand.

As a matter of facts a decrease in the duration of contracts and in the loans granted started in the last quarter of 2011.

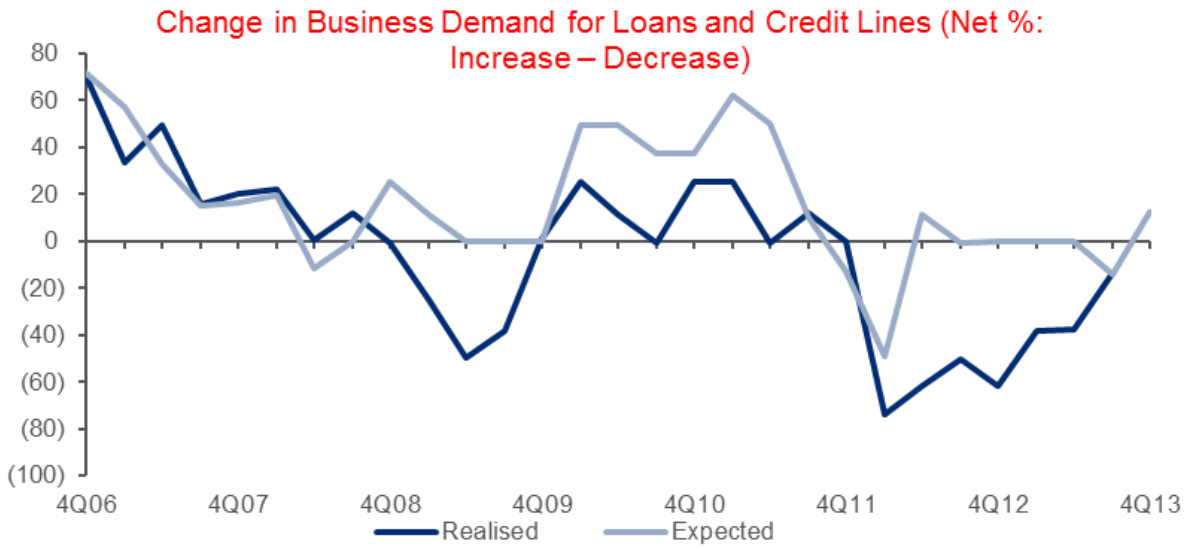




Source: Bank of Italy and Intesa Sanpaolo Research Department calculations.

*From June 2010 to May 2011, data adjusted to take account of the statistical discontinuity, due to re-recognition in bank financial statements of assets sold or securitised.

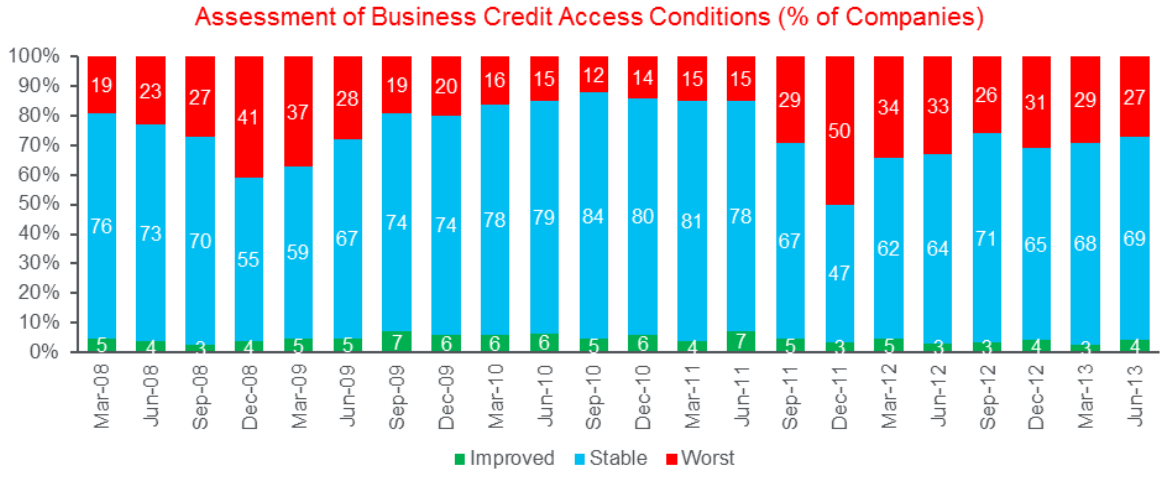
Moreover the demand for loans fell below banks' expectations from the last quarter of 2011.



* Source: Bank of Italy, Quarterly Bank Lending Survey (BLS).

Debt restructuring became the most important reason for demand of new financing. Organic and inorganic growth, respectively through fixed investments and M&A and corporate restructuring, had a negative contribution on the demand of new loans.

According to the results of the quarterly Bank of Italy – Il Sole 24 Ore "Survey on Inflation and Growth Expectations", the overall assessment of business credit access conditions sharply declined in the second half of 2011 keeping afterwards higher levels than in 2010.



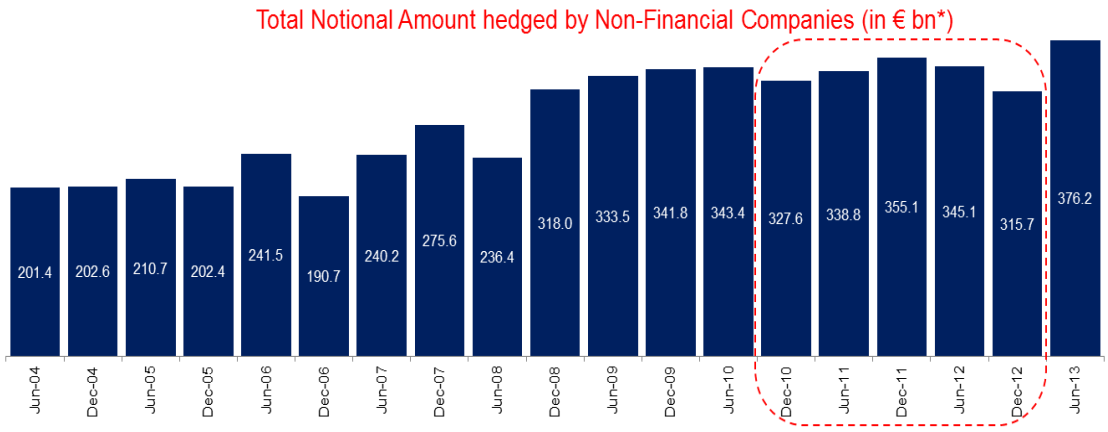
* Source: Bank of Italy—Il Sole 24 Ore.

3.14 Interpretation of the intercept in the regression.

As a consequence of the enhanced volatility in the interest rate evolution, companies should have signed more derivative contracts.

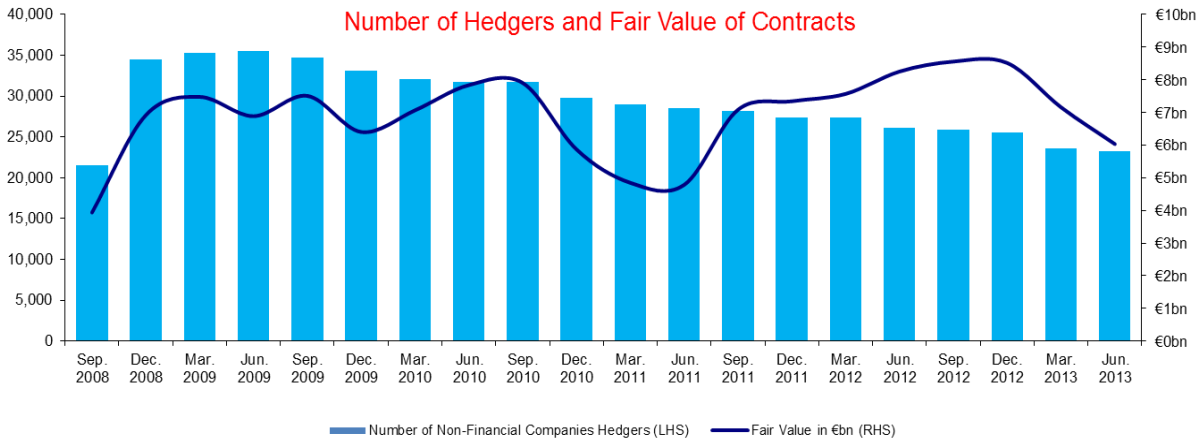
Counter wisely, the notional amount hedged had a CAGR of (8%) in the years from 2009 to 2012.

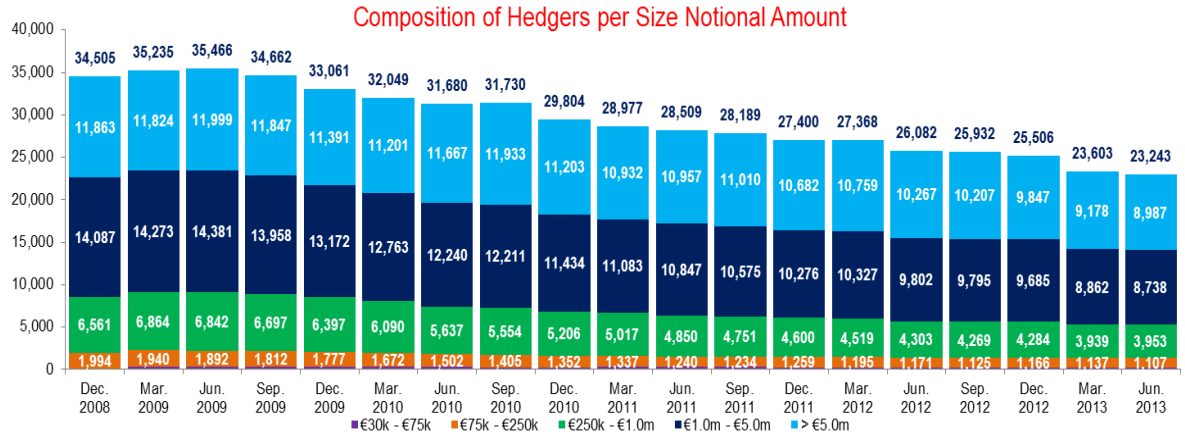
An analysis of the data disclosed by the Bank of Italy and concerning the total notional amount of interest rate derivative contracts held by non-financial companies from 2004, does not show any particular increasing trend in 2011 and 2012. If the crisis had caused the choice by companies to increase hedging, the notional amounts should have changed by a much higher percentage. For instance, with reference to the financial crisis of 2007-2008, there was an increase in notional amount of about 34% from June 2008 to December 2008.



Source: Bank of Italy.
* Data as of Bank of Italy's press releases are expressed in $. In order to simplify comparisons, they were converted in €. The exchange rate refers to 30 June and 31 December of each reference year. Average six-month exchange rates were not used as notional amounts are stock data and not flows accruing over time.

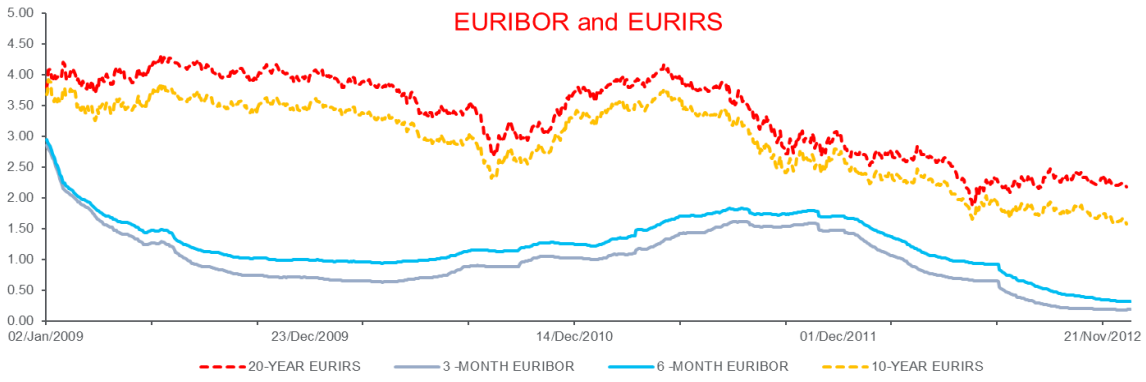
Moreover according to data retrieved through the Bank of Italy Bulletins, the number of non-financial companies using financial derivative contracts (including also hedgers of exchange rate risk and commodity price risk) steadily decreased from the second half of 2009, while the fair value of the contracts exhibited big swings, with a prominent upward trend after June 2011.





Source: Bank of Italy and Central Credit Register.

The increase in the fair value of contracts might be partially justified by the increase in the spread between EURIBOR and EURIRS, which started to mount since the beginning of 2009. At the end of 2011 the spread was minimized, while it started to rise again during 2012.



Source: FactSet.

Therefore the evidence collected suggests that both the choice to use derivatives and the decision of the level of debt to be hedged are potentially uncorrelated with the sovereign debt crisis. This might justify the outcome of both the direct and the indirect channels of propagation of the shock within the model.

Moreover, by looking at data disclosed by the Bank of Italy last June 2013, it can be detected how the total notional amount held by Italian non-financial companies reached €376 billion, about 18% up from December 2012, while the number of hedgers decreased from 25,506 units to 23,243.

There is no particular correlation with macroeconomic trends and sovereign debt crisis. The time fixed effect observed in this study could rather consist in other external factors originated for instance by the market sentiment towards derivative instruments. Even if all the economic and financial theory is based on the concept of rational investors, in practice individuals take decisions which are influenced by several factors, including recent events which might cause trust or distrust. The relevance that some derivative disasters have gained on mass media in the last years might have influenced the choice of several companies to decrease their exposure in derivative instruments. Even if the aim of IRS is to minimize the volatility of financing costs, managers could have tried to decrease the use of derivatives to please shareholders. It cannot indeed be assumed *at priori* that all the shareholders have an adequate understanding of the derivative market fundamentals.

Future studies should be finalized to understand the factors influencing the sign and the meaning of the intercept within the model.

Chapter 4: Summary and closing remarks

In the last 20 years some empirical studies have been carried out with the aim to detect the drivers of the use of derivatives by Italian non-financial listed companies.

Before 2002 the main factor influencing the use of derivatives was size, as only bigger companies used sophisticated hedging strategies.

Despite the formulation of different theories concerning the potential causality effect of leverage on the use of derivatives, no particular evidences supporting this hypothesis were found in the 90's.

Contradictory and mixed results characterized also expected taxes, which theoretically should be lower when the expected earnings before taxes are less volatile, assuming a convex relationship between EBT and marginal tax rate. Under this perspective hedging should contribute to stabilize EBT and decrease taxes.

Underinvestment, defined in terms of R&D expenses, did not show empirically any particular impact on the use of derivatives. However some scholars found out that the introduction and growth stages of a company's life cycle are the most exposed to the derivative use.

After 2002 companies started to adopt more hedging strategies due to the macroeconomic instability in both interest rate and exchange rate markets.

A study by the Bank of Italy on a sample composed by large size, medium size and small size companies found out that in recent years financial derivatives have become a widespread hedging instrument among Italian non-financial companies. Users have more total assets, higher exposure to risks, lower earnings and commit more funds for Capex compared to non-users. Moreover

the analysis of the financial statements revealed that there is a correlation between financial distress and derivative exposure.

The literature analysed shows that exchange rate risk was the primary concern before the introduction of the Euro, whilst afterwards interest rate risk hedge became the most relevant issue. As a matter of facts, the press releases published by the Bank of Italy in the years from 2008 to 2012 show how interest rate derivative contracts represented the most common instruments, averaging over the period approximately $9,913 billion in terms of total notional amount hedged. However only about a 6% share was held by a non-financial counterparty, implying that non-financial companies play a marginal role in the Italian derivative market. In particular interest rate swaps represent 70% of the total interest rate hedging instruments.

The empirical analysis developed in this dissertation is based on a sample of 175 non-financial listed companies, representing about 78% of the total capitalization of the Italian stock exchange as at the end of 2012. In particular 52 companies are in the Industrials sector, 41 in the Telecoms, Media and Technology sector, 23 in the Consumer sector and 15 in Energy and Power.

The number of total hedgers was quite stable in the years from 2009 to 2012, ca. 124 units. The first risk hedged is interest rate volatility and it counts a number of derivative users going from 101 in 2009 to 110 in 2012. Exchange rate risk is hedged on average by 75 companies, while commodity price risk by 20 companies.

The most common instrument is the interest rate swap converting the variable into fixed interest rate (it is used by more than 55% of the companies in the sample). Options are quite rarely mentioned in the financial statements analysed, while there are a few cases of cross-currency interest rate swap (15 in

2012) and interest rate caps (11 in 2012).

The net change in the number of interest rate derivative users is positive, but quite low, for an overall 9% in the years from 2009 to 2012.

Hedgers have on average more total assets and revenues than non-hedgers. They exhibit higher leverage and commit more funds for capital expenditures.

In the context of this experiment size and leverage have a positive impact on the probability to use derivatives. Market capitalization, as expected, is instead negatively correlated with risk hedging. Indeed controlling for size, companies with lower market capitalization tend to be hedgers probably in an effort to offset the higher risk perceived by the market.

Taxes do not exhibit any particular relevance. This might be due to the fact that Italy has a fixed tax rate regime which does not provide any specific incentives to stabilize the EBT through the use of hedging policies.

When controlling for size and leverage, capital expenditures do not exhibit any relevant impact on the use of derivatives. In other words, even if hedgers commit on average more funds for capital expenditures, it is likely to assume that within a regression, most of the impact of higher Capex is incorporated into size, as biggest companies can spend more on property, plant and equipment.

The pseudo-R^2 associated to the model falls from over 20% in 2010 to a range of 11%-15% (according to the number and type of variables included in the regressions) in 2011. Part of this decrease might be caused by the sovereign debt crisis, which depleted the market capitalization of Italian companies with a subsequent increase in leverage. So part of this decrease in fit ability of the model could be justified by the presence of an external macroeconomic shock introducing more variability. To verify whether this hypothesis is correct, one should include also a regression with data referring to 2013, as the total market

capitalization of the Italian Stock Exchange at the end of December 2013 was €447 billion, 22% higher than in December 2012.

One of the limits of the proposed probit model is the low level of the pseudo-R^2, which could be overcome by looking for other potential factors influencing the decision to hedge.

One of these might be the sophistication of management, as more qualified managers might ask for complicated hedging strategies.

Another factor could be the average duration of financial liabilities, expressed as years to maturity. Assuming indeed that two companies have the same size it might be the case that the company with more proportion of long-term debt is more likely to use interest rate derivatives to limit the potential adverse impact related to unexpected unfavourable movements in the interest rate curve.

Since Italian companies use primarily fixed-for-floating interest rate swaps, another interesting analysis would be finalized to understand whether the percentage of variable interest rate debt over total debt has an impact on the probability to sign derivative contracts.

Furthermore the decision to use sophisticated hedging policies might be linked to the composition of shareholdings. A company whose majority of shareholding positions is held by institutional investors might be more incentivized to use sophisticated hedging policies.

Even the attitude of shareholders towards risk might influence the management's decisions on derivative use. If the shareholders with the biggest stakes in the company are mostly risk-averse, the use of derivatives could provide investors with more insurance about the stability of cash flows. A proxy for shareholders' preference for risk might be the level of dividend per share paid by the company during the reference year. Evidence indicates that risk-

averse investors prefer investing in companies granting a fairly high dividend per share level, whilst risk lovers prefer investing in those companies whose share price is characterized by higher volatility in order to increase their payoff.

This thesis also investigates possible factors influencing the level of notional amounts (on interest rate derivative contracts), chosen by the companies within the sample.

Through the use of a regression based on panel data and controlling for entity fixed effects, it was possible to find out that companies' notional amount is directly correlated with total assets and negatively correlated with cash.

A possible explanation follows below:

- If a company is more liquid than others having a similar level of leverage, it should be able to have access to better contractual terms for financial loans, so companies with less cash should hedge a higher amount of debt.
- Bigger companies need more funds to finance their assets.

In the context of this regression it was assumed that the sovereign debt crisis could impact the results through two channels:

- A direct one, characterized by the intercept, as a sort of time fixed effect. To this purpose a dummy variable to differentiate data referring to 2009 and 2010 from data referring to 2011 and 2012 was introduced.
- An indirect one, expressed as leverage. Indeed, due to the inverse correlation between market capitalization and sovereign bond returns, after controlling for cash and size, a positive correlation between leverage and notional amount could imply that companies hedge more during a period of macroeconomic shock, when the leverage increases as a consequence of an exogenous factor.

Contrary to expectations, neither the intercept nor leverage confirm the

hypothesis of a correlation between notional amount and sovereign debt shock.

Indeed, when controlling for size and cash, leverage does not exhibit any particular significance inside the model.

The intercept instead is significant, however its impact shows that controlling for size and cash, companies tend to hedge lower notional amounts during the crisis than in the years before.

An analysis of the statistics disclosed by the ECB shows that the volatility of interest rates on new loans to non-financial companies increased from the second half of 2011. Moreover, a comparison with Germany, Spain and France, reveals how Italy imposed on average the highest floating interest rates on loans up to €1 million. Generally speaking, average rates on new loans in Italy increased above the Euro area average from the second half of 2011. Moreover access to credit conditions worsened consistently.

Instability in the macroeconomic and financial market should cause higher demand for hedging instruments. However the experiment led in this dissertation provides an evidence which is opposite to expectations.

To try to solve this issue, a more detailed analysis of the statistics disclosed by the Bank of Italy was carried out. Data related to the total notional amount of interest rate derivative contracts held by non-financial companies from 2004 do not show any particular increasing trend in 2011 and 2012. If the crisis had caused the choice by companies to increase hedging, the notional amounts should have changed by a much higher percentage. For instance, with reference to the financial crisis of 2007-2008, there was an increase in notional amount of about 34% from June 2008 to December 2008.

Moreover, an analysis of the number of financial derivative users from September 2008 to June 2013 reveals a gradual decrease in the number of

hedgers, rather than an increase.

Therefore the evidence collected through the panel data model and the Bank of Italy databases suggests that the decision of the level of debt to be hedged is potentially uncorrelated with the sovereign debt crisis. This might justify the outcome of both the direct and the indirect channels of propagation of the shock within the panel data model.

There is no evident correlation with macroeconomic trends and sovereign debt crisis. The time fixed effect observed in this study could rather consist in other external factors originated for instance by the market sentiment towards derivative instruments. Even if most of the economic and financial theory is based on the concept of rational investors, in practice individuals take decisions which are influenced by several factors, including recent events which might cause trust or distrust towards these instruments. The relevance that some derivative disasters have gained on mass media in the last years might have influenced the choice of several companies to decrease their exposure in derivative instruments. Even if the aim of IRS is to minimize the volatility of financing costs, managers could have tried to decrease the use of derivatives to please shareholders. It cannot indeed be assumed *at priori* that all the shareholders have an adequate understanding of the derivative market fundamentals.

Future studies should be finalized to understand the factors influencing the sign and the meaning of the intercept within the model.

The aim of this dissertation was to introduce to readers with and adequate financial understanding a preliminary snapshot of the evolution of the derivative use in the last years as well as an accurate description of the main features of Italian non-financial listed companies in relation with their risk hedging common

practices. A further objective was to create a starting point for present and future discussion on the drivers which determine the choice to hedge against risk and the level of debt hedged. Although these last aspects require further research, this thesis points out both the big portrait of the Italian non-financial listed companies and the structure of the Italian stock exchange, which should be taken into account as a basis for the development of future models.

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- Microsoft Excel
- FactSet
- Bloomberg

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4	Acque Potabili	28	Biesse
5	ACSM - AGAM	29	Bioera
6	AEDES	30	Bolzoni Auramo
7	AEFFE	31	Bonifiche Ferraresi
8	Aeroporto di Firenze	32	Borgosesia
9	Alerion Clean Power	33	Brembo
10	Ambienthesis	34	Brioschi Sviluppo Immobiliare
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145 Safilo Group
146 Saipem
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149 SAT
150 SAVE
151 Seat Pagine Gialle
152 Servizi Italia

153 SIAS

154 SNAI

155 SNAM

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164 Terna

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