



Munich Personal RePEc Archive

Derivatives Usage in Risk Management by Non-Financial Firms: Evidence from Greece

KAPITSINAS, SPYRIDON

National and Kapodistrian University of Athens

30 September 2008

Online at <https://mpra.ub.uni-muenchen.de/10945/>
MPRA Paper No. 10945, posted 08 Oct 2008 10:43 UTC

**Derivatives Usage in Risk Management
by Non-Financial Firms:
Evidence from Greece**

Spyridon K. Kapitsinas

PhD

*Center of Financial Studies,
Department of Economics, University of Athens, Greece*

*5, Stadiou Street, 2nd floor, 10562,
Athens, Greece*

e-mail: skapits@econ.uoa.gr

The author is grateful to his supervisor Mr. Manolis Xanthakis for his valuable comments and to the Athens Stock Exchange for its support. The author acknowledges financial support from the General Secretariat for Research and Technology and the European Union. This paper is part of the author's thesis.

**Derivatives Usage in Risk Management
by Non-Financial Firms:
Evidence from Greece**

Abstract

This paper presents evidence on the use of derivative contracts in the risk management process of Greek non-financial firms. The survey was conducted by sending a questionnaire to 110 non-financial firms and its results are compared with the findings of previous surveys: 33.9% of non-financial firms in Greece use derivatives, mainly to hedge their exposure to interest rate risk. The major source of concern for derivatives users is the accounting treatment of the contracts and the disclosure requirement. Non-financial firms in Greece use sophisticated methods of risk assessment and report having a documented corporate policy with respect to the use of derivatives, while at the same time consider the domestic economic environment not to be favorable of derivatives usage. Firms that chose not to use derivatives responded that they do so mainly because of insufficient exposure to risks.

Keywords: risk management, financial risk, derivatives, corporate finance, Greece.

JEL classification: G 32

I. Introduction

Despite the fact that derivatives are financial instruments with a long history, it is only the last two decades that a substantial increase in their application is observed. The recent worldwide concern about financial and capital markets' volatility and its effect on the activities and the profitability of firms make the identification and the management of exposure to sources of risk such as the foreign currencies, the interest rates, the stock prices and the commodity prices a necessity.

Although firms have been using financial derivatives for years, the information concerning the extent and the aspects of corporate derivatives usage is limited. The main reason is that the disclosure of the use of derivatives was not mandatory until recently¹, as well as that it has been considered for years a competitive corporate advantage of a strict, confidential character. In addition, whenever the financial press referred to the corporate use of derivatives this was related to huge losses or even bankruptcies that have been recorded by user-firms such as the Metallgesellschaft, Enron and others. This one-sided presentation of derivative contracts during the past, as well as the limited knowledge of the corporate hedging practices have increased the importance of this information to shareholders, creditors, regulators and other interested parties.

It was in the mid 90s when a significant differentiation in the degree of available information concerning derivatives usage emerged, as a series of surveys took place in the United States dealing with the use of derivatives by non-financial firms.² This type of survey based on a questionnaire was later undertaken in many European countries, allowing the comparison of hedging policies among firms in different countries and leading to certain conclusions as to the differences recorded.

In order to examine the extent and the methods that non-financial firms in Greece adopt in managing the risks they face and the consequent use of derivatives that hedging requires, a survey was undertaken based on a questionnaire. This survey sets questions concerning the motives of derivatives use, the risk management approach across risk classes, the major concerns of derivative users, as well as factors

¹ Significant exception has been the United States, where since 1990 firms are obliged to report the use of derivatives. (FASB, SFAS 105 "*Disclosure of Information about Financial Instruments with Off-Balance-Sheet Risk and Financial Instruments with Concentrations of Credit Risk*", June 1990).

² "1994/1995/1998 Wharton-CIBC World Markets Survey of derivatives usage by U.S. non-financial firms".

of the domestic economic environment that may affect the hedging policy of the firms.

The timing of the survey is not negligible, since it is directly related to the adoption on behalf of the firms listed in the Athens Stock Exchange of the International Financial Reporting Standards (IFRS) and the increased interest the IFRS generate in risk management, as part of the integrated corporate operation. According to IFRS 32 and IFRS 39³ which deal with the measurement and presentation of financial instruments, firms must declare whether they use derivatives for trading purposes or for hedging risks. At the same time in the notes to the financial statements firms must disclose the extent of risks they are exposed to and the amount of risk that has been shifted to third parties through hedging. The obligation of firms to publicly report derivatives use for the first time is considered to have played a significant role in motivating firms to participate in the survey and to achieve a satisfactory response rate.

This survey fills a gap of many years since the last published research of this kind in Europe, while the fact that it is conducted in Greece increases the degree of interest for the following reasons:

a) Greece is a small market of ten million inhabitants with firms that are much smaller in size compared to firms in United States or Germany, fact that affects the use of derivatives for reasons that will be explained,

b) due to the small size of the native market and the geographic proximity to the countries of the Balkans, Greek non-financial firms have a strong exporting orientation, which creates significant foreign currency exposures. Moreover, as many native firms chose to build new plants in these countries, they are exposed to even more risks due to the lack of financial and political stability in the Balkans and thus the need to use derivative contracts of any type is strengthened,

c) Greece is a member of the Eurozone and shares with the other European countries a common currency and a centralized policy with respect to the foreign exchange and the interest rates, fact that has limited the country's exposure to unexpected movements of these factors, compared to the past. Eurozone constitutes an integral and stable market for the Greek firms and in this way it may decrease the utility of derivatives as instruments of handling risk. No such survey concerning

³ IFRS 32. Financial Instruments: Disclosure and presentation. IFRS 39. Financial Instruments: Recognition and measurement.

derivatives has been conducted since the establishment of the common currency, in order to outline the drastic change of the financial conditions in Europe and

d) the relatively recent opening of the Athens Derivatives Exchange has not managed to familiarize the domestic firms with derivatives use, while the limited number of contracts available in the market induces them to appeal to the international market to hedge their risks.

In view of the above, it is more than obvious that any strict comparison of the evidence of the present survey with respect to previous results is arbitrary, not only because of differences in the size and the activity of the firms in the sample, but also because of the time deviation and the fundamental changes that have taken place in the financial markets meanwhile. However, where needed surveys such as those conducted by Bodnar and Marston [Bodnar/Marston, 1998] in the United States and Bodnar and Gebhardt [Bodnar/Gebhardt, 1998] in Germany are presented, in order to indicate if and to what extent derivatives usage is driven by certain firm characteristics and operational activities, irrespective of the economic environment of the country of origin.

In any case, the aim of this survey is to develop a database of the extent of derivatives usage and of the risk management practices of Greek non-financial firms suitable for academic use, while it is expected that this survey will be repeated in the near future in order to reveal similarities and differences in hedging with derivatives through time.

The remainder of this paper is organized as follows. A review of previous surveys is presented in section II, while section III discusses the sample and the methodology of research. Sections IV-XII present the survey results and the last section concludes.

II. Review of previous surveys.

The first evidence of derivatives use by non-financial firms is presented during 1995, in a survey conducted by Philips (1995) in a sample of 415 U.S. firms. 63.2% of the responding firms mention that they use derivatives to hedge their financial risk, 90.4% of which face interest rate risk, 75.4% face currency risk, while commodity risk faces just 36.6% of users. It is during the same year when the first of the three successive surveys of Wharton School conducted by Bodnar et al. (1995) is published.

In a wide sample of 2000 U.S. non-financial firms, it is revealed that only 35% of the responding firms use derivatives, result that comes into contrast to the authors' expectation of extensive use of derivatives, especially by small size firms. In addition, the evidence verifies that derivatives are not used for speculation against market movements, but mainly for hedging anticipated transactions and firm's commitments. According to the second of the series survey the fraction of derivatives users reaches 41% -despite the extensive losses that many firms suffered during fiscal year 1995 because of derivatives and which received great attention by the Press- and approaches 50% in the 1998 survey. In this last and more specialized research undertaken by Bodnar and Marston [Bodnar/Marston, 1998] the issue that concerns derivative users the most is the accounting treatment of the contracts -67% among users- the main objective of the hedging strategy is to reduce the cashflow volatility, while 76% of users report a documented policy concerning derivatives use.

Very interesting and useful are the results of the survey undertaken by Berkman et al (1997), where the hedging practices of the non-financial firms in New Zealand and U.S.A. are compared. The extent of derivatives usage is higher among firms in New Zealand, mainly due to the greater corporate exposure to financial risks and despite the higher transaction costs the local firms face, whereas the local firms also report their derivative positions to higher management more frequent than U.S. firms do. Comparing their conclusions drawn from the investigation of derivatives use by non-financial firms in Sweden to the previous survey in New Zealand and U.S., Alkeback and Hagelin [Alkeback/Hagelin, 1999] find that derivatives usage is more common among large firms, that the main objective of Swedish firms is also the hedging of risks and that the lack of sufficient knowledge is the main source of concern for firms in Sweden, contrary to U.S. firms where the lack of knowledge is a matter of least concern.

The more recent research of Bodnar and Gebhardt [Bodnar/Gebhardt, 1999] which took place in Germany, when compared to the 1998 Wharton Survey in the United States, reveals more extensive use of derivatives in Germany and outstanding differences in the hedging strategies among firms of the two countries. German non-financial firms seem to consider more important to hedge their accounting earnings relative to their corporate cashflows, perhaps due to the greater importance that accounting earnings have in the country, they incorporate to a greater extent their market view into their hedging decisions and they show lower concern about using

derivatives, fact that is attributed to the stricter internal control policies that German firms follow.

Finally, the survey by El-Masry (2006) in U.K. non-financial firms concerning fiscal year 2001 verifies that larger firms use derivatives more often than medium and small size firms, while derivatives usage is more extensive in multinational firms. Half of the derivatives non-users claim lack of sufficient exposure to risks and seem to worry about the perception of hedging by analysts and investors. Risk management activities of derivatives users appear to be a centralized issue, the foreign exchange risk seems to be a more common hedging objective compared to interest rate risk and the lack of sufficient knowledge concerning derivatives appears to create the most concern among contract users.

III. Sample and methodology.

The present survey was conducted through the use of a questionnaire, which has been sent to the treasury or the finance department of 110 non-financial⁴ firms based in Greece. Its main target has been the investigation of the use of derivatives in the risk management policy of non-financial firms and the identification of the factors that determine their hedging decisions. The structure of the questionnaire follows closely the “1998 Wharton/ CIBC World Market Survey of Derivative Usage by U.S. Non-Financial firms” and other related surveys [Bodnar et al. 1995:1996, Bodnar/Gebhardt 1998, Alkeback/Hagelin 1999, El-Masry 2006], aiming to make the comparison of the evidence and the drawing of conclusions easier, with the exception of the last section where issues of the domestic or “national” economic environment are only discussed.

The sample of the survey consists of 110 firms: the first 100 firms are listed in the Athens Stock Exchange and either belong to the large capitalization index or to other categories and have annual turnover of at least 100 millions Euro in fiscal year 2004, and the rest 10 firms are not listed, but still have annual turnover of 100 millions Euro at least. The criterion of the annual turnover has been set so that the sample comprises larger firms, as is usual in all related surveys. All of the firms have

⁴ According to the Athens Stock Exchange classification financial firms comprise banks, insurance companies, real estate firms, investment companies, leasing and fund corporations, which all have been excluded from the sample.

their headquarters in Greece and are not activated in the finance industry, since such firms usually act as market makers or counterparties in derivatives transactions and their behavior is not indicative of the behavior of non-financial firms.

The first mailing of the questionnaire took place in February 2006 and the second one during April of the same year. The questions concerned fiscal year 2005, firms were asked to identify themselves, an accompanying letter and a prepaid envelope were enclosed, but firms had also the choice of replying by e-mail. The participants to the survey were assured about the confidentiality of their replies and the exact answers are known only to the author.

Following the international bibliography the sample is divided into three size groups, according to the annual turnover of firms. The reason for this division is that size is expected to seriously affect the decision of firms to use derivatives and it is widely argued that the significant initial fixed costs of establishing a derivative position discourage small firms from using them⁵. Firms with annual turnover up to 150 millions Euro are considered small in size, firms with turnover between 150 and 350 millions are considered medium and those with turnover higher than 350 millions Euro belong to the large category. The sample is also divided into three groups in terms of industry sector, since activation in different industries is expected to influence some aspects of hedging activity⁶. The primary products sector includes agriculture, mining, energy and public utilities, the manufacturing sector includes all manufacturing firms and the third sector includes firms providing services, such as wholesale and retail trade, health services, information and communication services.

IV. Use of Derivatives.

Response rate and derivatives use.

In the total of 110 firms the questionnaires returned fully completed and suitable for evaluation reached 62, yielding a response rate of 56.36%. The response rate is considered adequately satisfying compared to previous surveys, where rates lie between 20.7% in U.S. firms [Bodnar et al, 1998] and 76.6% in Swedish firms

⁵ Haushalter (2000), Nance et al (1993) and Purnanandam (2005) among others find positive correlation between derivatives use and firm size, with larger firms facing economies-to-scale as to the initial costs of acting in derivatives. At the same time Alkeback/Hagelin (1999) mention that larger firms use more sophisticated risk management techniques.

⁶ In the whole article hedging is used alternatively to the term “derivatives usage”. Firms that use derivatives for other than hedging reasons are not considered derivatives users.

[Alkeback/Hagelin, 1999]. Among firms listed in the Athens Stock Exchange the response rate reaches 54% while non-listed firms responded at 80%, fact that creates some doubts about the eagerness of listed firms to provide additional information beside this they are obliged to publicly report.

Of the 62 firms that responded, 20 of them belong to the small category with annual turnover of up to 150 millions Euro, and 21 belong to the medium and large categories respectively. From the viewpoint of corporate activity, 11 of the responding firms belong to the primary product sector, 27 firms belong to the manufacturing sector and 24 firms to services. Table 1 displays these results.

	Frequency	Percent %
<u>Response rate</u>		
Responding firms	62	56.36
Non-responding firms	48	43.64
Total	110	100
<u>Size of responding firms</u>		
Small (annual turnover \leq 150 millions Euro)	20	32.20
Medium (annual turnover of 150-350 millions Euro)	21	33.90
Large (annual turnover $>$ 350 millions Euro)	21	33.90
Total	62	100
<u>Industry sector of responding firms</u>		
Primary products	11	17.74
Manufacturing	27	43.55
Services	24	38.71
Total	62	100

Table 1: Response rate by size and sector.

From the above table it is clear that the responding firms are almost equally distributed among size classes and thus there is no sign of skewness, which might lead to the conclusion that the results are not representative of all the population. In order to exclude any suspicion of non-response bias, a comparison of equality of mean and median of total assets between responding and non-responding firms was performed and no statistical significance in the size of the variable between the two subsamples is recorded.

The first question of the survey asks firm representatives whether they use derivatives or not. Among the 62 responding firms 21 firms reported using derivatives compared to 41 firms that reported non-users, leading to a derivatives usage rate of 33.9%, as displayed in Figure 1.

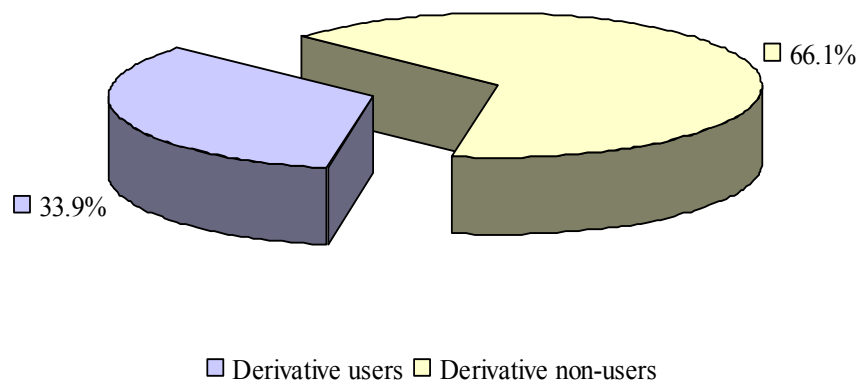


Figure 1: Derivatives usage rate in current survey.

This usage rate is considered relative low when compared to the rates observed in other surveys⁷. Derivatives usage rate of that height - 35% - is only observed in the “1994 Wharton Survey” in U.S. non-financial firms, which increases to 50% among responding firms in the “1998 Wharton Survey”. In Europe, survey of the same type in Sweden in 1996 [Alkeback/Hagelin, 1999] reveals that 53% of the responding firms use derivatives, in Germany [Bodnar/Gebhardt, 1998] derivatives usage reaches 77.8% and according to the most recent survey in U.K. non-financial firms during 2001 derivatives usage amounts 67% [El-Masry, 2006].

This distinguishing difference in the degree of derivatives use among firms in U.S.A. and Europe during the past can be attributed to the more extent exposure to the foreign exchange risk that European firms faced, when having to use different currencies even for intra-Europe commerce. As this exposure has vanished since the establishment of Euro as a common currency, it is estimated that the amount of foreign exchange derivatives used by non-financial firms in Europe has declined relative to the past, fact that influences the overall derivatives usage rate of these firms.

Focusing on the current survey, even though the derivatives usage rate among Greek non-financial firms may reflect this drastic change that has taken place in the european financial environment after the establishment of Euro, it still discloses a

⁷ Except for the derivatives usage rate in Slovenian non-financial firms which amounts 22.2%, according to a survey conducted in 2004 [Berk, 2005].

deficiency concerning the use of derivatives as part of a corporate hedging policy. Unfortunately, lack of historical data does not allow drawing conclusions about the evolution of the degree in which Greek firms use derivatives. At the same time, it is quite important to know the reasons for which Greek firms chose not to use derivatives, analysis that will be presented in the last section.

From the size perspective the responses indicate that large firms use derivatives more often at 52.38%, relative to 30% usage in small firms and just 19.04% in medium size firms. The greater proportion of large firms that are derivatives users is supportive of the argument that there are economies-of-scale in hedging, which allow larger firms to bear more easily the initial cost of establishing a derivatives position compared to small firms, an observation which is present in almost all surveys. The only difference in the current survey is that derivatives usage is not decreased comparably as firm size becomes smaller and medium size firms appear to have surprisingly low rates of use.

Attempting to verify the argument that there is a positive relation between firm size and derivatives use, firms were asked to report their annual turnover and their total assets for fiscal year 2005. A t-test comparison of the mean of these two variables was held between users and non-users by using the economic software Eviews and the results are presented in Table 2. According to the test derivative users have significantly higher mean in both annual turnover and total assets, with statistical significance of 1% and 5% in total assets and annual turnover respectively, result that confirms the expected positive relationship between derivatives use and firm size.

Variable	(1) Firms Users (21 obs.)	(2) Firms Non-users (41 obs)	(3)= (1)- (2) Difference	tstat	(p- value)
Total Assets in millions Euro (mean value)	2114.34	438.00	1676.34	2.976	0.004
Total Sales in millions Euro (mean value)	1324.00	443.63	880.37	2.492	0.015

This table presents the difference in the mean value of total assets and total sales between firms users and non-users of derivatives. The econometric software Eviews has been used for the test, which gives a t-statistic value for the comparison of means and the corresponding probability (p-value).

Table 2: Comparison of means between users and non-users.

As far as the industry of the user-firms is concerned, the highest derivatives usage rate is recorded in the primary product sector as expected, where 72.72% of the firms of that sector hedge with derivatives. Since derivative markets were first developed to manage the risk from price movements in commodities such as coffee, sugar, oil and metals, it is quite reasonable a large proportion of the primary products firms to use derivatives for this cause. Among manufacturing firms derivatives usage rate approaches 33.33% and in services usage is even more limited at 16.66%. Figure 2 shows the differences in use, depending on firm size and industry.

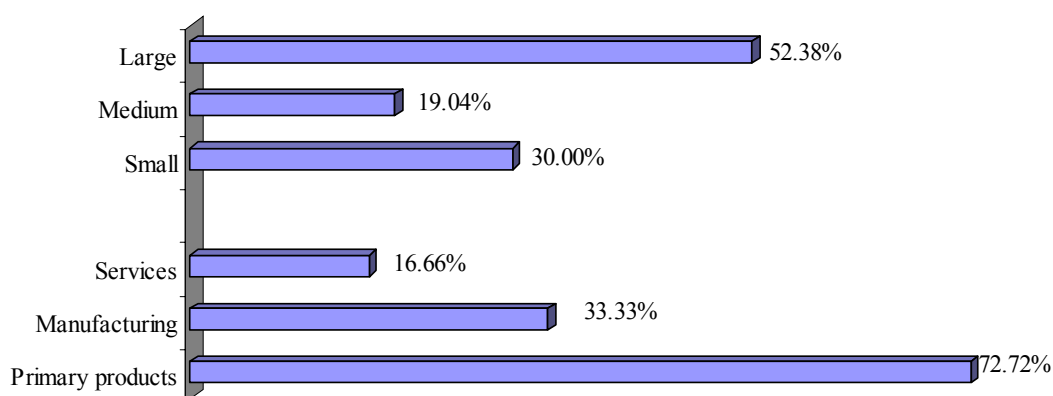


Figure 2: Derivatives usage rate conditional on sector and size.

Change in usage intensity and hedging conditional on risk classes.

From this point on only firms that reported using derivatives are asked to reply to a number of questions that concern aspects of hedging activities. Intending to examine whether there has been any change in usage intensity of derivatives among users, firms are asked to describe their use of derivatives in terms of notional value compared to the previous year. Results are presented in Figure 3, where more than half of the user-firms (52.38%) indicate that their usage has increased compared to the previous year, 38.09% report that has remain constant and only 9.53% of users indicate that usage has decreased.

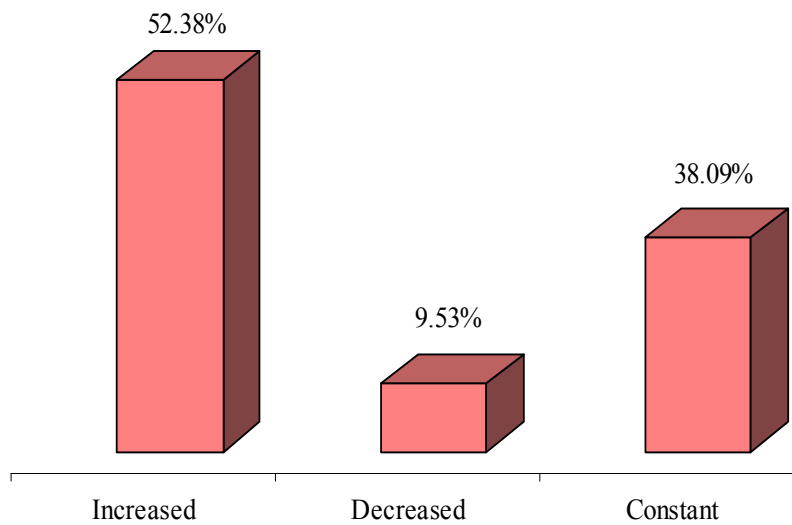


Figure 3: Derivatives use compared to previous year.

These results are more than encouraging, since they reveal that firms that selected to use derivatives in order to manage their risks appreciate the benefits of these contracts enough to preserve or even widen their derivative position during the current year, at a very large percent. In addition, attention must be paid to the obligation of the firms to publicly report the use of derivatives according to the International Financial Reporting Standards for the first time in their history and to the consequent disorder that this event may create to firms' behaviour. The fraction of the decision of firms to decrease their use that may be attributed to this coincidence is evaluated in a later section.

Hedging of different classes of financial risk is the next research objective. By setting the question of which type of risk they manage by using derivatives, firms are given the ability to make a multiple choice among foreign exchange risk, interest rate risk, commodity risk and equity risk⁸. Figure 4 displays that the risk most commonly managed with derivatives is the interest rate risk, being done so by 71.42% of all derivative users, followed by the foreign exchange risk at 66.66% and commodity risk which is managed by 23.8% of users, whereas the equity risk is not managed by any firm at all⁹.

⁸ Equity price risk can only be faced by firms listed in a Stock Exchange.

⁹ Examples of equity price risk that is commonly hedged with equity derivatives by non-financial firms, include using equity puts as part of a share repurchase program or using total return swaps to monetize equity positions in other companies [Bodnar et al., 1998]

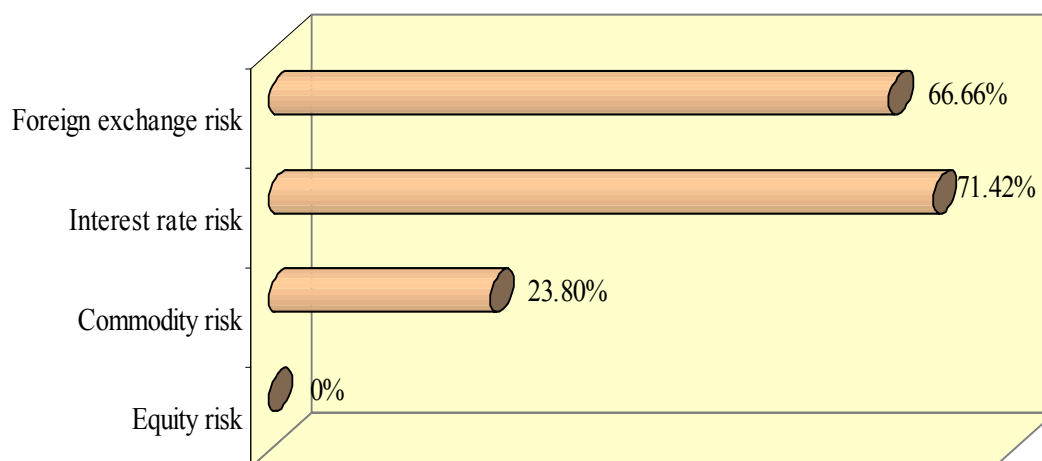


Figure 4: Risk management approach according to risk classes.

According to the vast majority of surveys foreign currency is the risk most commonly hedged compared to the interest rate risk -with commodity risk always third in the row-, while equity risk attracts always little attention but is never ignored as in the present survey. The lower percent of firms observed to hedge their foreign exchange risk can be attributed to the lower foreign exchange exposure that Greek non-financial firms may face, due to their activation in the Eurozone. As to the lack of any hedging activity concerning the equity risk, this can be attributed:

a) to the limited number of derivative contracts on equities available in the Athens Derivative Exchange,

b) to the less sophisticated risk management techniques that native firms use,
or

c) to the disregard or weakness of Greek firms to establish over the counter (OTC) derivative contracts on their equities, because of lack of international interest.

Furthermore, many are the firms that chose to hedge more than one risk. According to the evidence, 38.09% of derivatives users hedge both their foreign exchange and interest rate risk, 4.76% of users hedge their foreign exchange and commodity risk in parallel, while 9.52% prefer a more extensive hedge against risk through the use of foreign exchange, interest rate and commodity derivatives at the same time.

Examining the tendency of firms to hedge certain risks conditional on the industry they belong to, in order to determine the type of risk that is related to specific activities, is another interesting issue. Derivatives users that belong to the primary products sector hedge currency risk at 50%, 75% of those firms hedge the interest rate risk and the commodity risk is managed by 37.5% of such firms. In contrast, among manufacturing firms the most common risk hedged is the foreign exchange risk with 77.77%, versus 66.66% of the interest rate risk and 22% of the commodity risk, while in the service sector the commodity risk is not managed at all as was expected, due to the immaterial nature of services. Firms that provide services use derivatives to manage the foreign exchange and interest rate risk they face equally at 75%, as displayed in Figure 5.

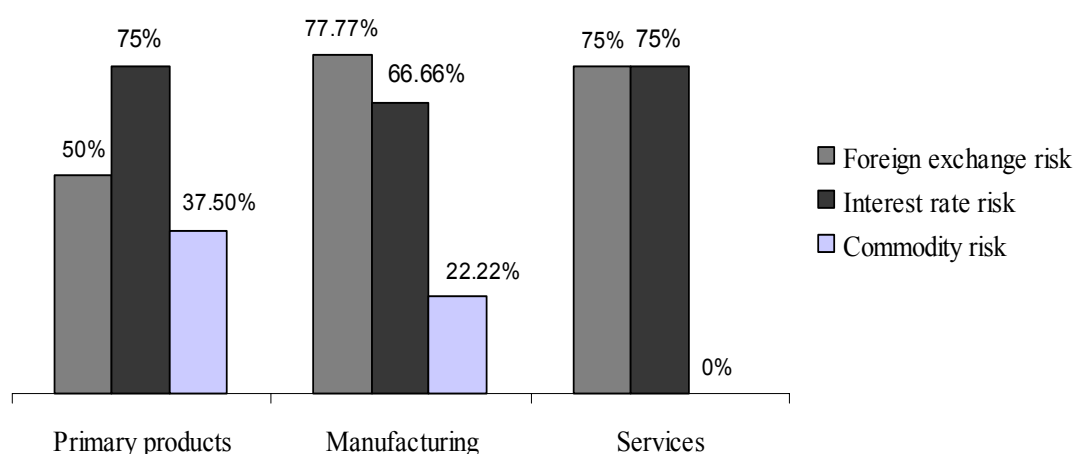


Figure 5: Management of types of risk conditional on industry.

This evidence is in line with other surveys that reveal the same hedging priorities per sector but with different rates, with only exception the primary product sector where commodity risk should be the first hedging priority. But even so, a direct relationship between the primary product sector and commodity risk is obvious, as the amount of firms activated in this industry that hedge commodity risk approaches 37.5%, while in manufacturing firms this rate reduces to 22.22% and becomes zero in the service industry.

Degree of concentration in risk management decision making and concerns about the use of derivatives.

The structure of the decision making process at the corporate level that determines the use of derivatives is being examined in the immediately next question. The different nature of the financial risks that firms nowadays have to deal with and the need for specialization in treating them, often urge firms to manage them separately across different departments or across subsidiaries, versus an integrated management at central level. Such a behaviour is not supported by the evidence of Greek firms (Figure 6): 76.19% of firms indicate that their risk management decisions are primarily centralised, 19.04% of them claim that the risk management decisions are primarily decentralized but there exists a centralized coordination, while only the rest of them report that risk management activities are decentralized. Thus the centralized decision making is the most common practice among firms, as is observed in most relative research.

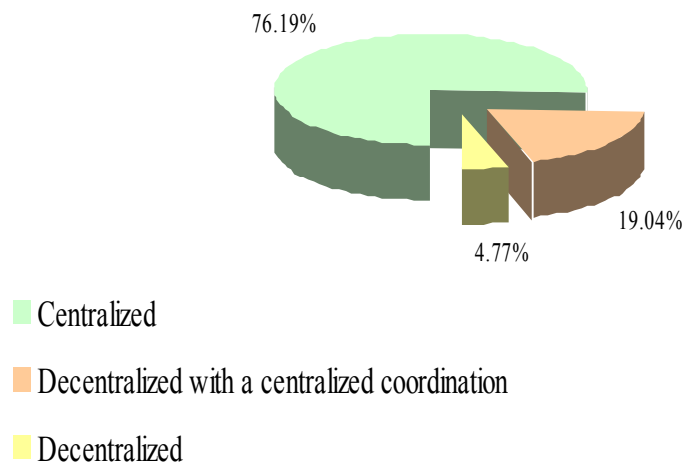


Figure 6: Concentration in risk management decision making.

Corporate use of derivatives can in no way be described as a one-dimensional process since it usually involves different markets and complicated objectives, fact that leads many of the derivatives users to express some or great concern about certain aspects of derivatives use. In the current survey firms that use derivatives are asked to express their concern about the following issues, which are displayed in Figure 7 and are the accounting treatment of the contracts, the credit risk of the contracts, the market risk, the monitoring and evaluation of hedge results, the reaction by analysts and investors, the liquidity of the market, the transaction costs, tax and legal issues,

the pricing and valuing of derivatives, the lack of knowledge, the disclosure requirement and the difficulty in quantifying firm's exposures.

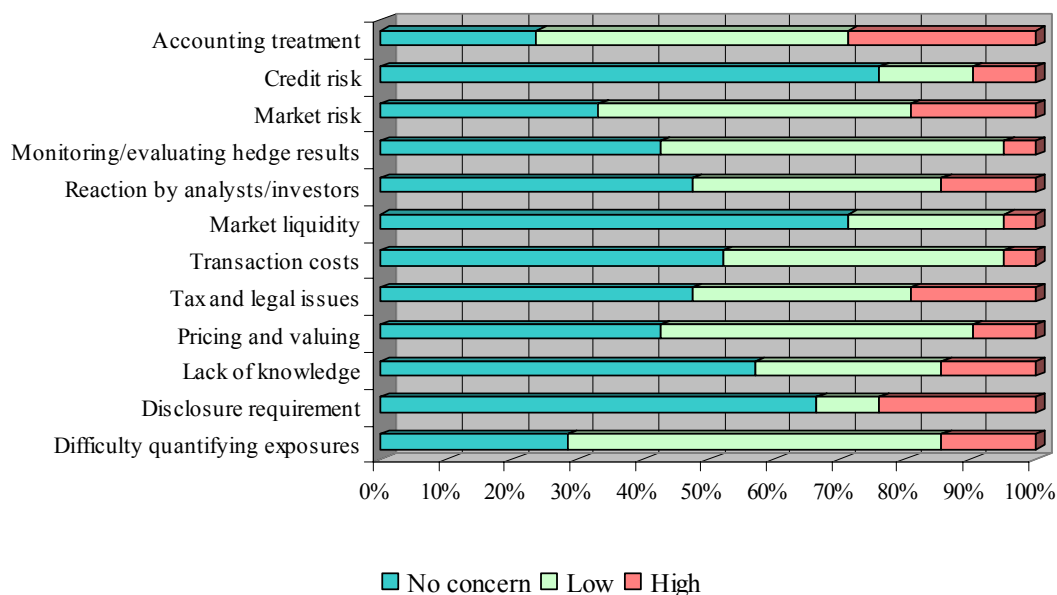


Figure 7: Levels of concern regarding derivatives.

The results are quite deserve as they show derivatives users to express a limited degree of concern about the issues set to them. In all issues firms that express high degree of concern do not exceed 20% among users, with only exception the accounting treatment of the contracts which is an issue of high concern for 28.58% of derivatives users (47.62% and 23.8% indicate low and no concern respectively) and the disclosure requirement, which concerns intensely 23.81% of users. Both of these exceptions are totally justifiable and are indicative of the disturbance that has been created to the financial community by the introduction of the International Financial Reporting Standards in the examined fiscal year of 2005 and by the changes in the accounting treatment of derivatives that IFRS enforce. As this disturbance is expected to be eliminated in the following corporate financial statements, it would be interesting to examine whether accounting treatment will still be a matter of high concern in the future. As far as the disclosure requirement is concerned, even if 23.81% of users consider it a matter of great concern the rest 66.66% ignore it, a contradiction that verifies the limited and coincidental nature of concern. The issues

that follow in terms of great concern are the risk from market movements at 19.5% and the tax and legal treatment of derivatives at exactly the same rate, while the perception by analysts and investors concerns enough 14.29% of users.

Issues of low concern that exceed the rate of 50% among users is the monitoring and evaluating of hedging with 52.38% and the difficulty in quantifying the corporate exposure to risks at 57.14%, while close enough is the pricing and evaluation of derivatives with 47.62%. All these are internal matters of the procedure of corporate use of derivatives and reveal a small, but worth mentioning lack of acquaintance with derivatives on firms' behalf.

On the other hand, the factors that firms seem to be indifferent to are the risk of default on contracts (credit risk) at 76.19% among users, the liquidity of the market at 71.43% and the transaction costs that firms face when taking positions in derivatives at 52.38%. These results are indicative of the trust that users attribute to derivatives as financial instruments, but contradict the results of previously conducted surveys. Really remarkable is the total lack of concern relative to the adequacy of knowledge about derivatives that is expressed by the 57.14% of users, since this factor has attracted the greatest concern in surveys conducted in countries such as the UK [El-Masry, 2006] or Sweden [Alkeback/Hagelin, 1999], where non-financial firms are much more familiarized with derivatives than Greek firms are. Finally, it should be mentioned that European firms systematically and through time show lower degree of concern compared to the U.S. firms according to the international bibliography, attitude that is attributed by many researchers to the more conservative nature of derivatives use on behalf of the European firms (more frequent report of derivative transactions to higher management, higher creditability of the counterparty, etc.).¹⁰

Objective of hedging with derivatives.

In this section firms are asked to identify the objective they try to achieve by using derivatives and they can make a multiple choice among minimizing the volatility in accounting earnings, minimizing the volatility in cashflows, managing the balance sheet accounts, minimizing the variation in the market value of the firm or

¹⁰ Berk (2005), Bodnar/Gebhardt (1999).

indicating any other reason that is not mentioned above. According to the extensive bibliography concerning corporate derivatives usage, managing the volatility of corporate cashflows should be managers' first priority, as it increases firm value by reducing the expected taxes and the cost of financial distress, ensures that the firm will have adequate internal funds to accomplish its investment program and reduces the agency costs among shareholders and creditors and shareholders and managers¹¹. The responses of the firms are displayed in Figure 8.

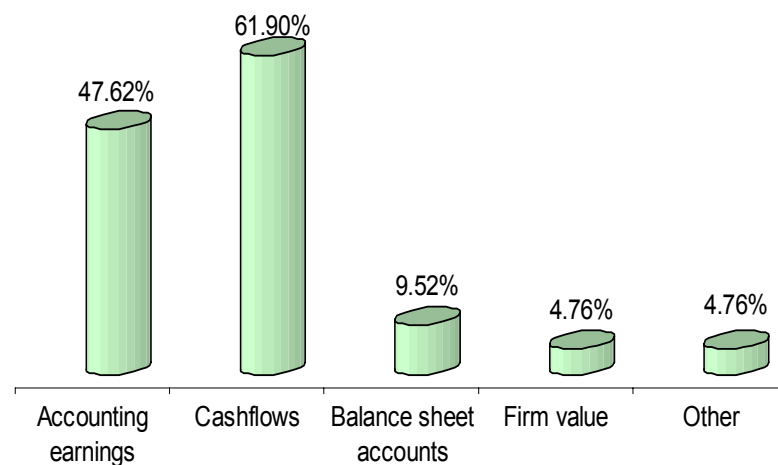


Figure 8: Most important objective of hedging.

For 61.90% of users the main objective of corporate derivatives activity is the minimization of the volatility in cash flows, outcome that is in line both with the hedging theory and the empirical evidence in U.S and U.K. Second most popular objective is the management of the variability in accounting earnings at 47.62%, which however is considered as the most important one in the survey conducted in Germany [Bodnar/Gebhardt, 1998]. The high frequency of the management of accounting earnings that Greek firms report is attributed to the importance that managers give to corporate earnings, as these a) affect analysts' expectations of the future corporate profitability, b) determine the dividend policy and the corporate taxation and c) most probably influence management remuneration.

Hedging the balance sheet accounts is a goal for only 9.52% of users, while the management of the variation in firm market value is chosen by 4.76% of firms. The same amount of firms reveals that uses derivatives not for one of the above

¹¹ Mian (1996), Ross, (1996), Geczy et al. (1997), Bartram (2000), Adam (2002).

reasons but because it has been obliged to, as this is a condition of a debt covenant the firm has signed when entering a long-term loan agreement.

Impact of the International Financial Reporting Standards and methods of evaluating the risk of derivatives.

As has already been obvious by the previous analysis, the introduction of IFRS and the changes in the accounting methods that the Standards dictate have increased the concern of firms about derivatives usage. In an attempt to further clarify this issue, firms were asked if they believe that the implementation of IFRS will affect their risk management activities. It should be underlined that the question was addressed to all firms that use derivatives, both listed in the Athens Stock Exchange and non-listed, as it has been observed that non-listed firms have already implemented or are planning to voluntarily implement the IFRS for reasons of comparability of their financial statements or because they have been asked to do so by international Houses they have appealed to, in order to be rated or financed.

Firms' responses are reported in Table 3, where 71.43% of users indicate that IFRS will have no effect on derivative use and risk management strategy, 4.76% state that IFRS will lead to a reduction in the use of derivatives on their behalf, 23.81% reveal that they will lead to a change in the type of derivative contracts used, while 4.76% of users expect IFRS to lead to a significant change in the integrated corporate risk management approach.

	Percentage %
No effect on derivatives usage or risk management strategy	71.43
Reduction in derivatives use	4.76
Increase in derivatives use	0
Change in the types of instruments used	23.81
Change in the timing of hedging transactions	0
Significant change in the firm's overall approach to risk management	4.76

Table 3: Impact of International Financial Reporting Standards.

The methods used by native firms to evaluate the risk created by the activation in derivatives are examined in the next question, in order to illustrate whether firms follow the latest developments in this area. The methods that have been cited are: a) stress testing/scenario analysis, b) Value at Risk (VaR), c) option sensitivity measures or otherwise called 'the greeks', which are the delta, gamma, vega, etc., of the portfolio and d) the duration/basis point value. Firms could make a multiple choice

among them or state any other method of risk assessment they implement and the results are displayed in the following Figure.

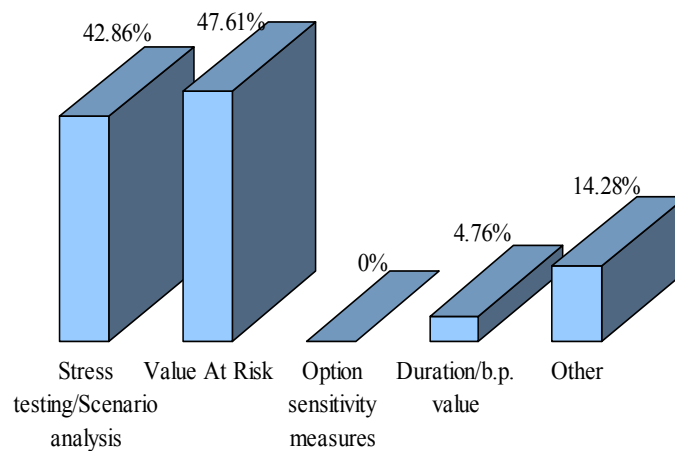


Figure 9: Methods used for the evaluation of derivatives' risk.

The responses reveal that Value at Risk is the most popular method of risk assessment among users since 47.61% of them adopt it, with stress testing/scenario analysis a close second at 42.86%. Both of these processes are “state of the art” in the calculation of risk and despite the fact they had initially been applied in banks and insurance companies, they have now find application also in non-financial firms. Next method in frequency is the duration/basis point value which is used by 4.76% of firms, whereas no firm claims to use the option sensitivity measures for the assessment of its derivative portfolio risk. Finally, at 14.28% users chose alternative methods to evaluate the risk of their derivative position, such as the evaluation of the fair value of the contracts or other firm-specific techniques which are not clarified. The only disconcerting finding is that concurrent use of more than one method of risk assessment make just 9.52% of firms that use derivatives, when the corresponding rate in other surveys reaches 93.4% [Bodnar et al., 1996].

V. Foreign Exchange Risk Management.

Foreign exchange risk exposure and derivative instruments used.

This section focuses on the foreign currency derivatives use, which is held by 66.66% of all derivatives users. Only firms that replied using currency derivatives answered this section and were initially asked to reveal the amount of their total operating revenues in foreign currency, in order to assess the foreign exchange risk

exposure they face¹². Table 4 shows that firms using currency derivatives have relative low foreign exchange exposure.

	Percent %	Cumulative Percent %
0% of total operating revenues	14.28	14.28
5 % of total operating revenues	28.58	42.86
10% of total operating revenues	28.58	71.44
15% of total operating revenues	0	71.44
20% of total operating revenues	14.28	85.72
25% of total operating revenues	0	85.72
30% of total operating revenues	0	85.72
40% of total operating revenues	0	85.72
50+ % of total operating revenues	14.28	100

Table 4: Foreign currency operating revenues among currency derivatives users.

In particular, 71.44% of currency derivatives users indicate that they have foreign currency revenues that are less than or equal to 10% of their total operating revenues, while just 14.28% of currency derivatives users report that 20% of their total revenues are in foreign currency. On the other hand, 14.28% of users report that 50% or more of their total revenues are in foreign currency and thus for such firms the foreign exchange exposure actually determines the corporate profitability and the hedging of it becomes crucial.

Meanwhile, the progress that has been recorded in identifying and managing risks has induced firms to use specialized risk management techniques across different risk classes, against a homogeneous strategy that treats all risks in the same way. As a result, firms worldwide chose to use particular derivative contracts in order to hedge each type of risk, due to the individual characteristics of the contracts and the ability to adjust them as needed. In order to confirm this argument firms are asked to determine the contracts they use for hedging their foreign exchange risk and to evaluate them as their first, second or third choice. Results are displayed in Figure 10 and the derivative contracts cited are: forwards, futures, swaps, over the counter and exchange-traded options, structured derivatives and hybrid debt, all based on currencies.

¹² Foreign exchange exposure can also be created through incoming competition.

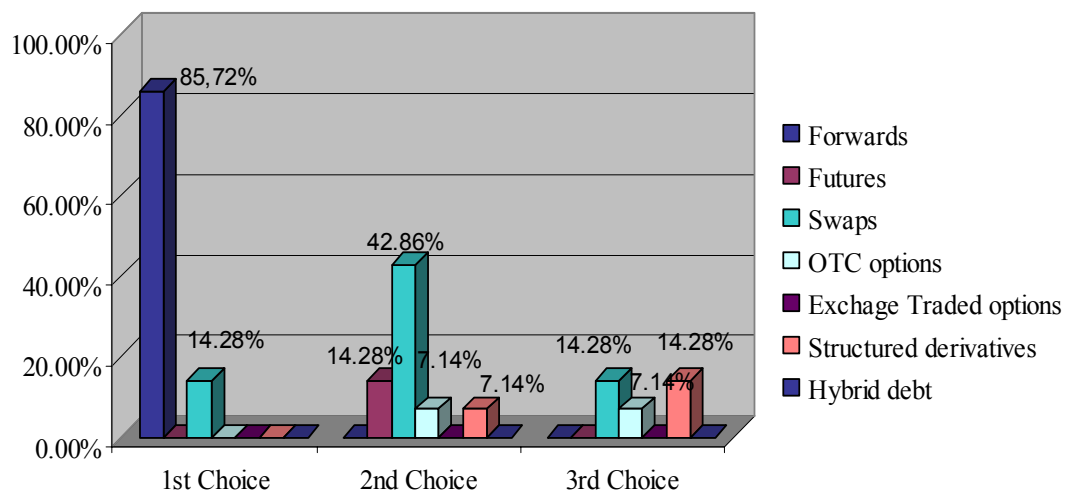


Figure 10: Preference among Foreign Exchange Derivative Instruments.

In accordance with the international practice, Greek firms prefer at 85.72% the forward contracts as the most important instrument in handling foreign exchange risk, with swaps chosen as first choice by the 14.28% of currency derivatives users. As their second choice swaps are preferred by 42.86% of firms, followed by futures and OTC options at 14.28% and 7.14% among currency derivatives users respectively. It is obvious that native firms show greater preference for the simple versus the complicated derivative contracts, as well as for the over the counter (OTC) versus the exchange-traded ones, fact that can be attributed either to the limited availability of currency derivatives in the Athens Derivatives Exchange or to firms' desire to select derivatives that are adjusted to their needs. A counter-argument to the preference towards the use of non-exchange traded contracts and particularly the forwards is that these derivatives do not affect the balance sheet and thus are less "visible" to higher management or to the internal control mechanism of the firm [Bodnar/Gebhardt, 1998].

Intensity of hedging different sources of currency risk and extent of hedge.

In this question eight different factors that constitute foreign exchange risk exposure are presented and currency derivatives users are asked to report how frequent they act with derivatives in order to hedge these factors. Firms may chose among never, sometimes and often so as to describe whether they hedge: a) foreign repatriations such as dividends, royalties and interest payments, b) contractual

commitments both on balance sheet and off balance sheet (payables/receivables and pending signed contracts respectively), c) anticipated transactions of one year or less, d) anticipated transactions of more than a year, e) economic exposure (competition) and f) translation of foreign accounts in native currency, or whether they engage in arbitrage among currencies. Figure 11 graphically presents the percentage of currency derivatives users that reported hedging the above factors sometimes or frequently.

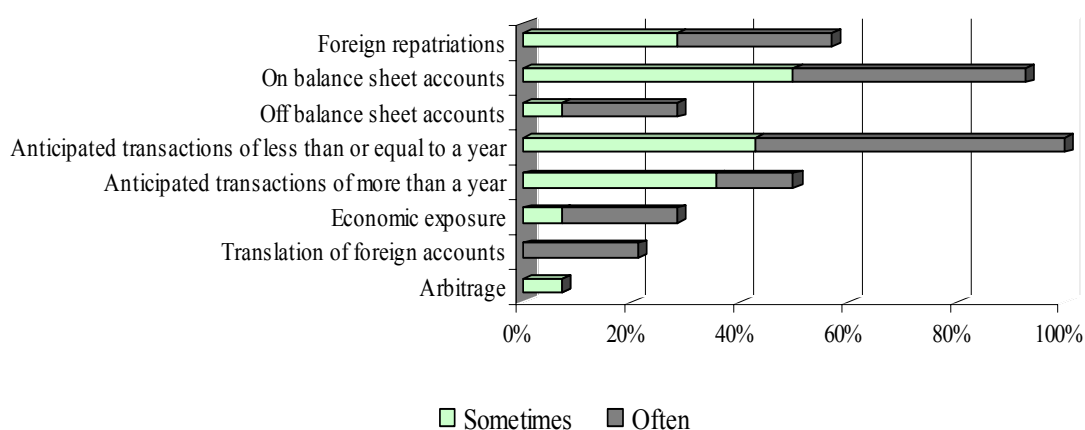


Figure 11: Intensity of hedging currency risk exposures.

According to the diagram, the most frequent transaction concerns the hedging of firm's anticipated transactions of less than or equal to a year, which is conducted sometimes and often by all firms using currency derivatives, while the on balance sheet accounts are hedged at 92.86%. The high frequency at which firms hedge their near-term and directly observable exposure to currency risk is a common corporate attitude, also observed by Bodnar [Bodnar et al., 1998].

The hedging of foreign repatriations is sometimes and often conducted by 28.57% of firms in both cases, though interesting is the observation that as the time horizon and the incoherence of the exposure increase, the frequency of hedging is reduced. The corporate anticipated transactions of more than a year are managed sometimes by 35.71% and often by 14.29% of firms, whereas the off balance sheet accounts are hedged by 28.57% of currency derivatives users (sometimes 7.14%, often 21.43% of firms). Firm's economic exposure and the translation of foreign accounts are often hedged at a rate lower than 22% and no firm reports often transactions in derivatives in order to arbitrage among currencies but only occasional

ones -7.14% of firms report such activity-, also in accordance with international practice.

As an extension to the previous question and aiming to determine the extent of the hedge of foreign exchange risk, the same factors of exposure to currency risk were cited to firms, with only exception the arbitrage which was not included. The question involved the amount of currency risk per type of exposure that each firm hedges and firms were given the ability to chose between the spaces of 1-25%, 25-50%, 50-75% and 75-100%, only in the case that they actually hedged each exposure (percent of hedge different than zero). Evidence is presented in Table 5.

	1-25% of exposure	25-50% of exposure	50-75% of exposure	75-100% of exposure
On balance sheet transactions.	28.57%	14.29%	28.57%	14.29%
Off balance sheet transactions.	14.29%	7.14%	14.29%	7.14%
Anticipated transactions ≤ 1 year.	28.57%	14.29%	21.43%	14.29%
Anticipated transactions > 1 year.	28.57%	7.14%	0%	14.29%
Economic exposure.	14.29%	0%	7.14%	14.29%
Translation of foreign accounts.	14.29%	7.14%	0%	7.14%
Foreign repatriations.	21.43%	7.14%	0%	7.14%

Table 5: Percentage of hedge of currency exposures.

According to the results, besides the on balance sheet transactions and the anticipated transactions of less than or equal to a year that show high hedge rates in all cases, the rest types of exposure to foreign exchange risk are only partially and inadequately hedged. For example, off balance sheet transactions are hedged above 50% by only 21.43% of firms using currency derivatives, while very low hedge rates are observed in the translation of foreign accounts which is not hedged by the majority of 71.43% of users and in foreign repatriations which are not hedged by 64.29% of firms. These data confirm the argument that firms hedge their foreign exchange risk not in order to eliminate their exposure but to reduce the size of it, leaving the firm itself the ability to take advantage of any potential favourable price movement in currencies.

Time horizon and maturity structure of hedging with currency derivatives.

The time dimension of the hedge of foreign exchange risk is examined in this section, trying to disclose whether firms adjust their derivative position to the duration

of the exposure and if they hedge in short-term or long-term view. Firms were initially asked to point out which of the following expressions best fit their corporate approach relative to the time dimension of the hedge: a) the hedging horizon is shorter than the maturity of the exposure, b) the hedging horizon is exactly equal to the maturity of the exposure, c) the hedging horizon is longer than the maturity of the exposure and d) the hedging horizon extends to the end of the current fiscal year.

In vast majority and at 78.57% currency derivatives users chose their hedging horizon to be exactly equal to the maturity of the exposure and thus adjust their derivative position according to the time length of the exposure. Furthermore, 14.29% of firms report hedging their currency exposure only up to the end of the current fiscal year, partly for accounting reasons, and 7.14% of firms state that hedging should have duration shorter than the exposure, irrespective of it. Firms' replies disclose an underlying preference for short term hedge which is supported by the fact that no firm hedges beyond the length of the risk exposure, attitude that potentially exposes firms to additional risk and costs, since in this way they may have either to remain unhedged for a period or to roll over their derivative positions at regular intervals.

In addition firms were asked to indicate the percentage of currency derivatives they hold -in terms of notional value- that belong to each one of the following categories of original maturity, as displayed in Table 6.

	0%	1-25%	25-50%	50-75%	75-100%
90 days or less	28.57%	14.29%	14.29%	35.71%	7.14%
91-180 days	28.57%	14.29%	35.71%	14.29%	7.14%
181 days to 1 year	35.71%	42.86%	7.14%	7.14%	7.14%
1-3 years	78.57%	14.29%	7.14%	0%	0%
More than 3 years	85.71%	0%	0%	7.14%	7.14%

Table 6: Percentage of currency derivatives of various maturities.

The evidence shows that derivative contracts of shorter maturity are more commonly used than those extending to one or more years. In particular, 71.43% of currency derivatives users select contracts with maturity of ninety days or less, while exactly the same amount of users selects contracts with maturity of ninety one to one hundred eighty days. The only difference lies to the fact that the percentage of users stating that the contracts with maturity of ninety days or less capture a larger part of their derivative portfolio is higher, whereas as the maturity of the contracts prolongs their use is limited: contracts with maturity of one hundred eighty days to one year are

used by 64.29% of firms, of one to three years by 21.43% of currency derivatives users and derivatives expiring after three years are selected by just 14.29% of firms. Impressive is the 7.14% of firms indicating that derivative contracts with maturity longer than three years constitute the 75% to 100% of their currency derivatives portfolio, as all such firms belong to the large category as expected. The tendency of firms worldwide to prefer derivatives with short maturity¹³, mainly due to the flexibility they offer and to their greater availability, is totally confirmed by the current results.

Impact of market view on foreign exchange risk management and evaluation of its effectiveness compared to a benchmark.

The extent at which the personal opinion and the expectations of managers concerning the market movements influence or even determine the hedging policy of the firm is questioned in this point of the survey. Even if extensive research has proven that it is impossible to systematically outperform the market –in this case the expectations of future rates embedded in the market rates- it is quite common managers’ view of the currency market to influence factors of the currency hedging policy. The question set to firms concerned if and how frequently managers’ market view urges firms to alter the timing or the size of hedge or to actively take positions in the currency derivatives market and the results are presented in Figure 12.

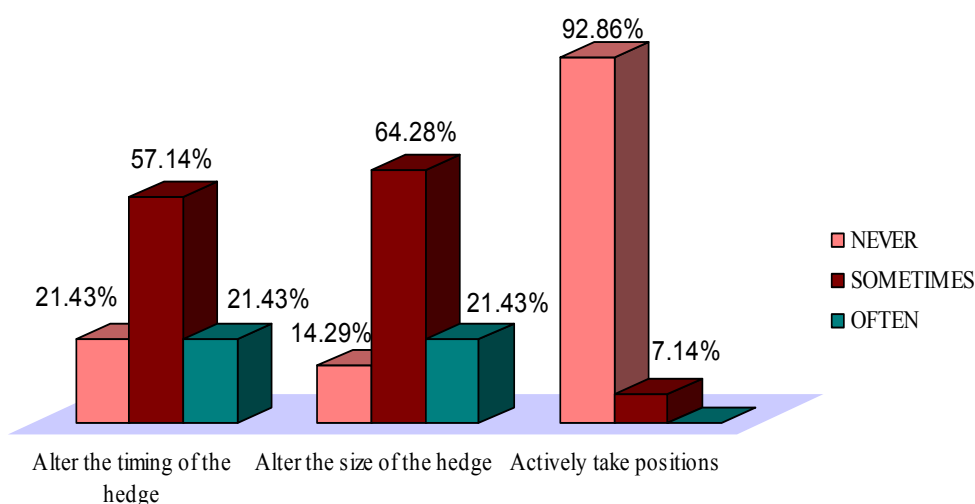


Figure 12: Impact of incorporation of market expectations into currency risk management.

¹³ El-Masry (2006).

At 21.43% firms frequently alter the timing and the size of their hedge based on their managers' expectations, rate that is considerable high but is in accordance with corresponding surveys. Firms sometimes incorporate their market view on foreign exchange rates and alter the timing and the size of the hedge at 57.14% and 64.28% respectively, results that when combined with the previous conclusions raise doubts about the pure hedging nature of the derivative activity and reveal potential speculative motives. Taking active positions in the currency derivatives market is an attitude that is condemned by 92.86% of firms, with only 7.14% of them reporting that they sometimes take active positions in derivatives depending on their market view, even though a confession of speculative activity in derivatives on firms' behalf would be a surprise.

The last question of this section deals with the benchmark firms use to evaluate their foreign exchange risk management process and firms can chose among the forward rates and the spot rates at the beginning of the period, a baseline percent hedged strategy, any other benchmark not already mentioned and lack of use of any benchmark. Results are presented in Figure 13.

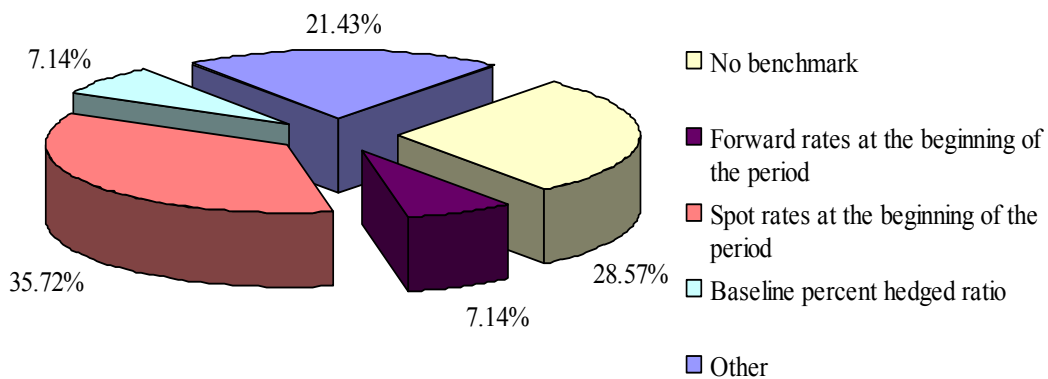


Figure 13: Benchmark for currency risk management evaluation.

An issue of great importance and concern is the proportion of firms that report no use of any kind of benchmark for risk management evaluation which amounts 28.57%, as it is obvious that for these firms the evaluation of the utility and effectiveness of their derivative positions is pointless. The most popular benchmark is the spot rates at the beginning of the period which is preferred by 35.72% of firms,

result that is in line with a survey of the same type in U.K., but lacks any theoretical and scientific basis. This happens as the current spot rates do in no way incorporate any market expectations of future movements in foreign exchange rates [El-Masry, 2006].

The 7.14% of currency derivatives users chose forward rates at the beginning of the period as a benchmark, which is the most popular and established method in most surveys, while the same proportion of firms use the baseline percent hedged strategy for hedging evaluation. Finally at a rate of 21.43% native firms prefer other benchmarks for currency risk management evaluation, such as the average annual foreign exchange rate or exchange rates that emerge as a worst case scenario of huge unexpected market movements.

VI. Interest rate risk management.

Interest rate derivative contracts, reasons for transactions with them and the extent of exposure of users of these contracts.

This part of the questionnaire records the behavior of firms that hedge the interest rate risk they face, which amount 71.42% of all firms using derivatives. The first question is related to the derivative contracts that firms chose in order to hedge the risk from interest rate variations and firms are asked to classify them as their first, second or third choice. These contracts are forwards, futures, swaps, over the counter (OTC) and exchange traded options and structured derivatives, all having as underlying value interest rates. The results are displayed in Figure 14.

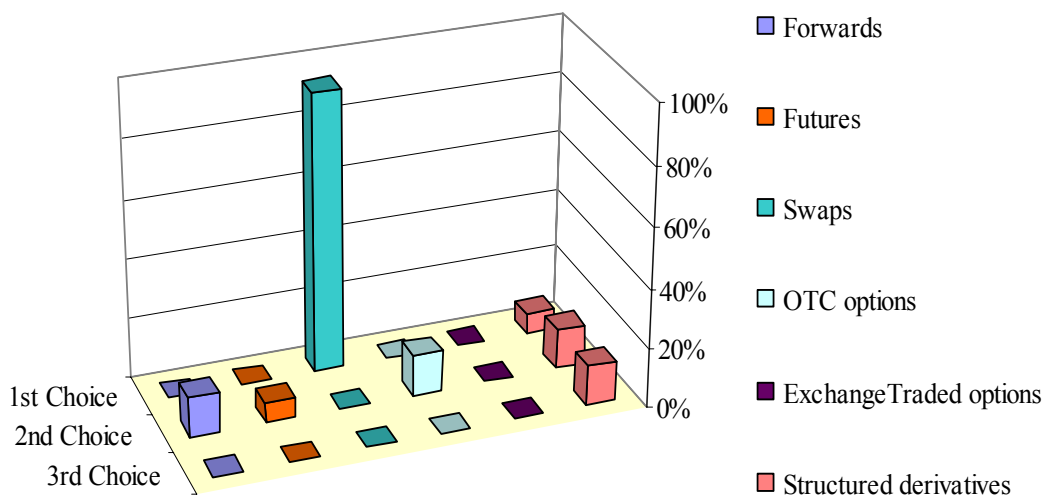


Figure 14: Preference among interest rate derivatives.

As displayed, the most popular instrument for hedging interest rate risk are swaps, which are selected as first choice by 93.33% of firms, while the rest of the firms chose the structured derivatives (6.67%). The great popularity of swaps is recorded in all surveys and is usually that high. As a second choice interest rate derivatives users prefer forwards, OTC options and structured derivatives equally at 13.33% each, while the proportion of firms replying that actually have a second choice is low, fact that is attributed to the satisfaction that firms enjoy from employing swaps for hedging interest rate variations. Finally, structured derivatives and no other instrument are preferred by 13.33% of firms as third choice. All of the replies converge into the conclusion that firms prefer to use non-exchange traded interest rate derivative contracts, attitude that has also been observed earlier in the foreign exchange derivatives section.

The frequency of activation in the interest rate derivatives market for certain objectives is examined immediately after, when firms are asked to indicate whether they use interest rate derivatives never, sometimes or often in order to: a) swap from fixed rate debt to floating rate debt, b) to swap from floating rate debt to fixed rate debt, c) to fix in advance the spread on new or forthcoming debt and d) to reduce cost of debt by taking positions based on their market view. The results are presented in Figure 15.

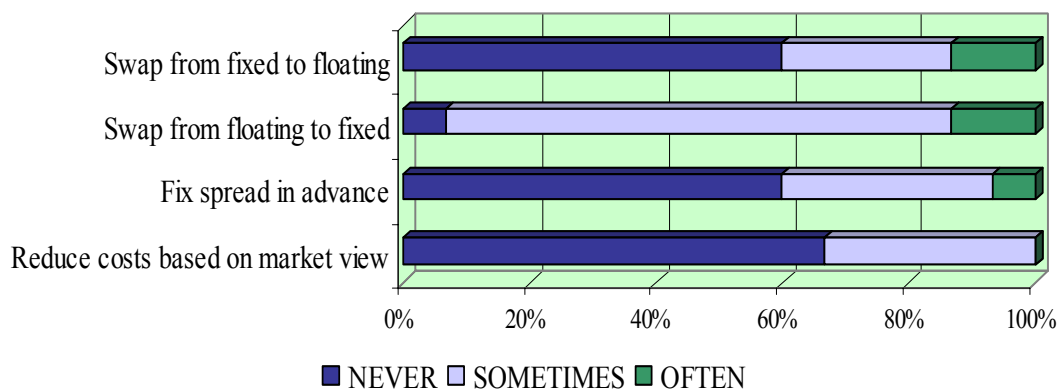


Figure 15: Frequency of interest rate derivatives usage for certain objectives.

According to the evidence, almost all interest rate derivatives users indicate that they use derivatives to swap from floating rate debt to fixed, sometimes at 80% and often at 13.33%. This dominant approach is recorded in all surveys and it may be related to the reduction in interest rates that has taken place during the last years both

in U.S.A. and Europe and to the desire of firms to take advantage of the unusually low interest rates. Since the conditions in interest rate markets worldwide seems to change, it would be interesting to examine whether there will be any differentiation in corporate hedging strategy. Swapping from fixed to floating debt is occasionally conducted by 26.67% of users and often by 13.33% of them, whereas fixing in advance the spread of new debt is performed by 40% of firms (sometimes 33.33%, often 6.67%). Finally at 66.67% interest rate derivatives users do not act in order to reduce costs or to “lock in” rates, based on their market views.

The intensity with which firms use interest rate derivatives is determined by the extent of their exposure to the interest rate volatility. In order to estimate the corporate exposure to interest rate risk the amount of users’ leverage is used, which is given by each firm’s ratio of total debt to total assets, as stated at their publicized annual report of the fiscal year under examination.

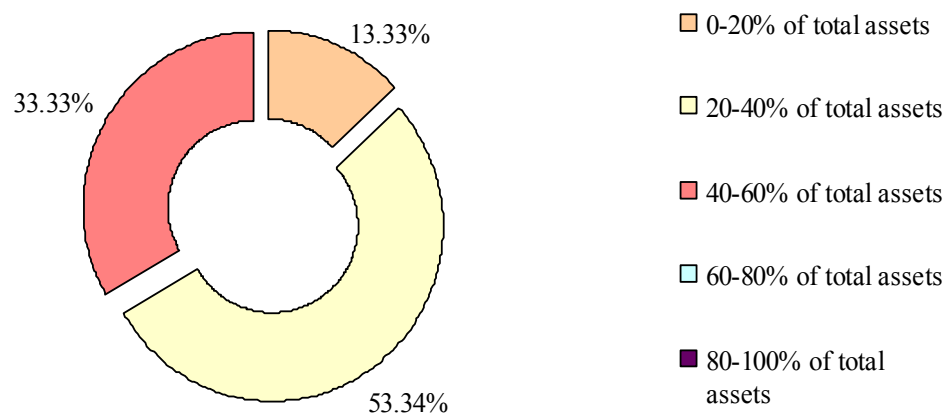


Figure 16: Amount of leverage of interest rate derivatives users as percentage of their total assets.

Figure 16 demonstrates that the amount of users’ leverage and consequently their exposure to interest rate risk is not remarkably high. 13.33% of users have total debt that does not exceed 20% of their assets which is considered low, while 53.34% of users keep their leverage at levels lower than 40%. Only one out of three firms report amount of debt between 40% and 60% of their assets and the highest amount of leverage recorded is equal to 52%. This evidence does not verify the arguments of only a few previous studies, which have found that firms hedge their interest rate risk

in order to take advantage of their excessive debt capacity and to substantially increase their leverage.

Evaluation of interest rate risk management and the effect of market view on hedging.

In order to determine the most common benchmark that firms use for the evaluation of the effectiveness of their derivative position in interest rates, firms were asked to choose among a) the volatility of interest expenses relative to a specific portfolio, b) the realized cost of funds relative to a market index (e.g. Libor), c) the realized cost of funds relative to a duration portfolio, d) the realized cost of funds relative to a bond portfolio with a specific ratio of fixed/floating debt, e) any other benchmark not mentioned above and f) non-use of any kind of benchmark (Figure 17).

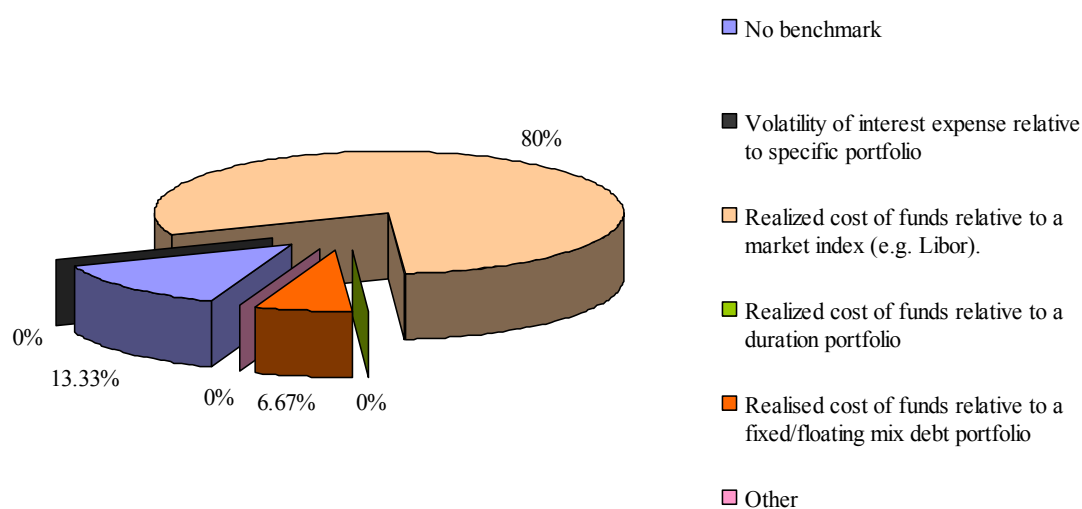


Figure 17: Benchmark for the evaluation of interest rate risk management.

The proportion of interest rate derivative users that evaluate the effectiveness of their hedging policy with a benchmark approaches 86.67%, 6.67% of whom make use of the realized cost of funds relative to a bond portfolio with a specific ratio of fixed/floating debt and the rest 80% compare the realized cost of funds relative to a market index, such as Libor. The consensus that appears among native firms towards the use of a market index as a benchmark is a distinctiveness not observed in any other survey, as well as that no firm responded of using any benchmark alternative to those cited.

The final question that concerns firms hedging their interest rate risk deals with the incorporation of management’s market view into the hedging strategy and whether it leads to the altering of the timing or size of the hedge, or to active positions in interest rate derivatives. Evidence is presented in the following Figure.

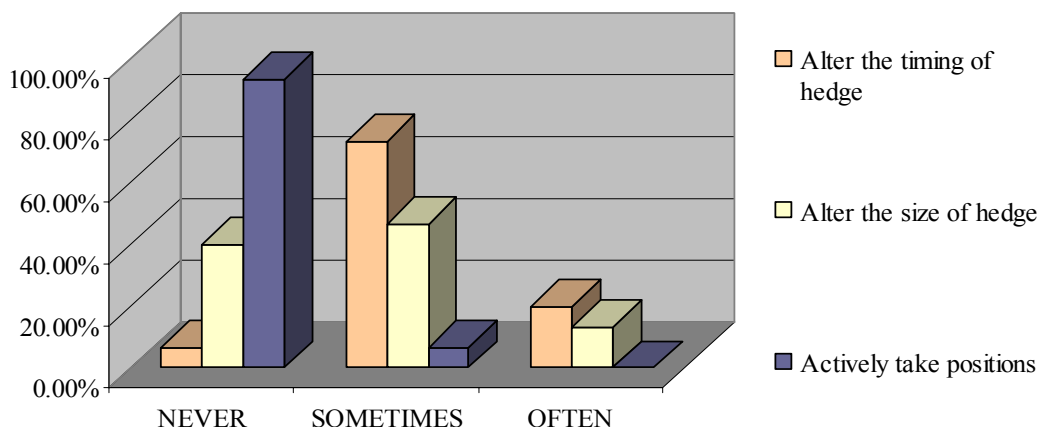


Figure 18: Impact of market view on interest rate hedge.

Among interest rate derivatives users 93.33% of firms deny that their market view urge them to actively take positions in derivatives, while 40% of them deny any impact on the size of the hedge. In contrast, they argue that their market view may alter the timing of the hedge either occasionally at 73.33% or often at 20%. Last but not least the expectations of market movements in interest rates sometimes influence the size of hedge at 46.67% among firms. In conclusion, native firms appear not to convert their expectations into aggressive derivative positions at a percent which is higher than in any other survey, but definitely their estimations of future interest rates has an impact on the size and timing of their derivative activity.

VII. Commodity risk management.

Types of derivatives used to manage commodity risk.

Only firms replying hedging their exposure to commodity risk were expected to fill in this section, which amount 23.80% of all derivative users, percentage that is estimated as limited. On that account, there has been set only one question to such firms concerning the type of contracts they use for hedging commodity risk and the level of priority - first, second or third – they attribute to these contracts. The derivative instruments cited in the question are exactly the same with the ones cited in

respective questions of previous sections, with only difference that in this case the underlying value is commodity prices. The responses to the question are presented in Figure 19.

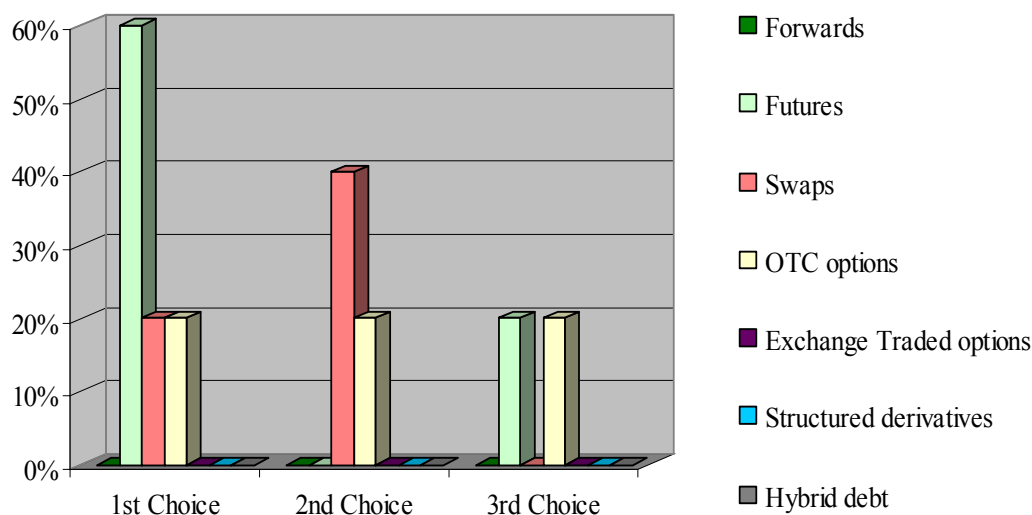


Figure 19: Preference among commodity derivative contracts.

The most popular derivative contracts used for hedging commodity risk are futures, as revealed by the 60% of commodity derivatives users who selected them as their first choice, with swaps and OTC options selected as first choice by 20% of firms respectively. These results show that Greek non-financial firms follow the “U.S. pattern” in hedging commodity risk, which dictates the use of futures for hedging commodity price volatility, relative to the “German pattern” which promotes the use of forward contracts for this type of risk. As a second choice domestic firms make more frequent use of swaps at 40% and OTC options at 20%, whereas as third choice futures and OTC options are equally selected by firms (20%).

VIII. Equity risk management.

Since among firms using derivatives there appears to be no firm that hedges the risk from the volatility of equity prices, conclusions about this type of risk management cannot be drawn. The questions set to firms concerned the type of contracts they use for hedging equity risk and the policies that firms implement when using equity derivatives, but they remain unanswered as no firm manages equity risk. According to the international bibliography firms most commonly use options to

hedge their equity risk, while the most popular policy is to use equity puts in a share repurchase program [Bodnar et al., 1996].

IX. Options.

The use of options by Greek non-financial firms is the next subject of investigation and on that account firms were asked to indicate which type of option they have used during the last twelve months and for hedging which risk class. The mass of options that is nowadays available across derivative markets worldwide has increased compared to the past, as so has done their complexity. Beside the standard European and American options there have been created average rate options, basket options and combinations of options, which are traded mainly in over the counter markets. In an attempt to clarify whether native firms follow this evolution, we asked them to reveal their usage of options and replies are provided in Table 7.

	Foreign Exchange risk	Interest rate risk	Commodity risk
Standard European options	9.52%	0%	0%
Standard American options	4.76%	0%	0%
Average rate options	4.76%	0%	0%
Basket options	0%	0%	0%
Barrier options	9.52%	4.76%	0%
Options combinations (collars, straddles, etc.)	4.76%	14.28%	0%
Other options	0%	4.76%	4.76%

Table 7: Options usage across risk classes.

The proportion of native derivatives users that have used any type of option during last year is 28.57%, percentage that is very low compared to 69% of firms that used options in the most recent survey, which was conducted in UK [El-Masry, 2006]. 19.07% of firms in the sample used options to hedge their foreign exchange risk, at the same rate firms used options to hedge interest rate risk, while just 4.76% hedged commodity risk with options during this year.

For hedging the currency risk the most popular option contract is the Standard European one and the barrier option, as the international practice also is, while for the interest rate risk firms prefer option combinations and structured derivatives including

options, which have been stated as alternative choice of users in the provided field. As far as commodity risk is concerned, none of the available types of options was selected, as all firms used over the counter options for that purpose.

As to the size of the firms that used options, it is noticed that half of them belong to the large size category and the rest to the small one with annual turnover of less than 150 millions Euro. Thus the theoretical argument that the degree of option usage is an increasing function of firm size is not supported by the evidence. From the viewpoint of firm's industry, firms belong to the primary products sector as much as to the manufacturing sector, where high rates of options usage are traditionally observed in both cases.

Finally, aiming to disclose the motives that led 71.43% of derivatives users not to use options, they were asked to justify this decision of theirs. Although the firms that expressed their opinion were few, the most common excuse for not using options was that they were too expensive –as in Bodnar et al. (1998) - or that their use was not found necessary.

X. Decision making and reporting procedures.

Corporate derivative policy and frequency of reporting.

In this section aspects of derivatives use that are related to the internal procedure of decision making, reporting and control are presented and examined. Since a great part of losses in derivative markets that have been recorded worldwide have been caused by insufficient control, inadequate implementation of regulation and overreaction of the participants in the hedging procedure, the need for the development and application of an integrated and well-documented corporate policy concerning derivatives is more than imperative. This issue has been the subject of the first question, where 85.71% of native firms claim that they have a documented corporate policy concerning derivatives use, rate that exceeds the world average by few.

In the question that follows derivatives users are expected to indicate the frequency with which they report their derivative activity to the board of directors, which can be monthly, quarterly, annually, as needed or any other schedule and the responses are displayed in Figure 20.

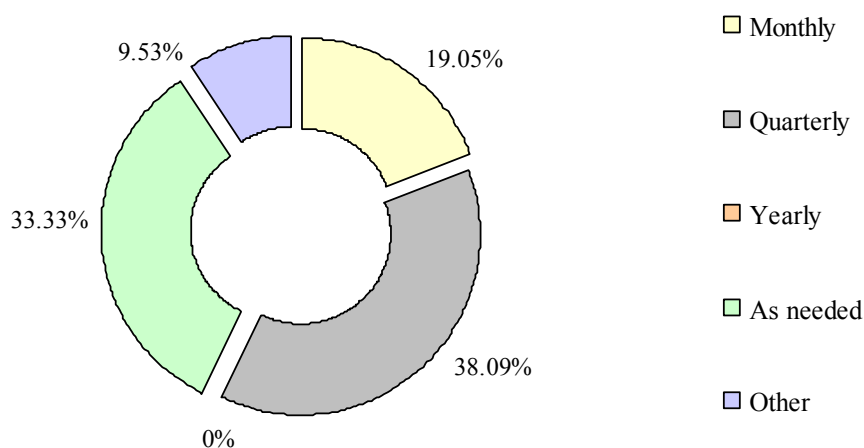


Figure 20: Frequency of report to board of directors.

Firms' major tendency at 38.09% is to report on derivatives quarterly, whereas 19.05% of derivatives users report more often than that, per month. The 9.53% of firms that selected other schedule mentioned that they report on a weekly basis and thus the cumulative percentage of firms reporting derivatives activity as often as quarterly or better approaches 66.67%. These results create some concern as the time distance of the quarter is long and the variations in the value of the derivatives position that can meanwhile take place may become irreversible. In countries with stricter internal audit regulation such as Germany, 80% of derivatives users report to the board of directors monthly, but quite common is also the policy of daily report. Equally worrying is the fact that one out of three native firms report on their derivative position as needed and at no predefined schedule, a result that reveals an existing deficit of internal audit in derivatives use and leads to significant exposure to various dangers.

Counterparties in derivatives transactions and their risk.

Firms at this point are requested to reveal what kind of firms or organizations chose as counterparties in order to transact with them in derivative contracts and the requirements they have with respect to their creditability. As to the first question, the most common counterparty for native firms is the commercial banks at 71.43%, with investment banks close second at 28.57%. Commercial and investment banks are also chosen by native firms as the second more common counterparty in derivative

transactions according to Table 8, contrary to the exchanges, insurance companies and special purposes vehicles, with whom no transaction is recorded.

	1 st most common	2 nd most common
Commercial banks	71.43%	4.76%
Investment banks	28.57%	28.57%
Exchanges	0%	0%
Special purpose vehicles	0%	0%
Insurance companies	0%	0%

Table 8: Most common counterparty in derivative transactions.

As far as the creditability of the counterparty is concerned, firms are asked to indicate the lowest rate of credit rating they require by their counterparty for transactions with maturity of less than or equal to twelve months and for transactions of more than a year and their responses are presented in Figure 21.

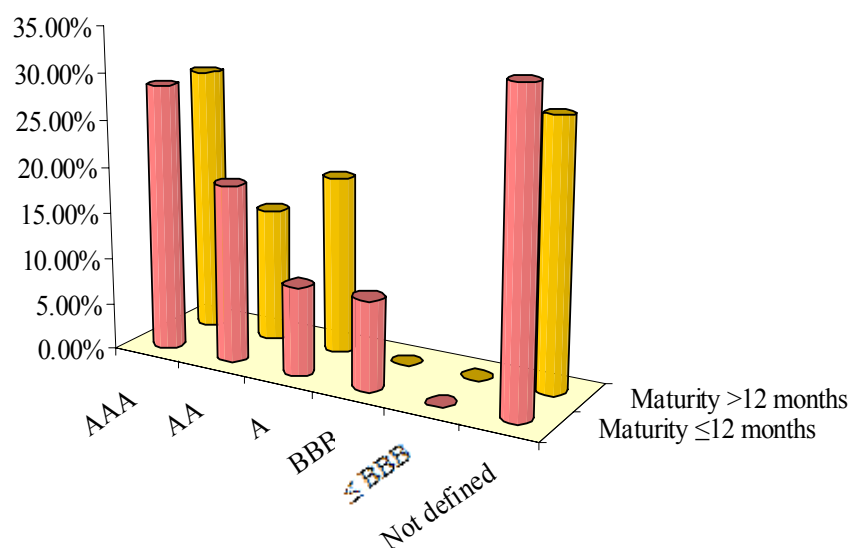


Figure 21: Lowest rated counterparty.

For derivative contracts with maturity of less than a year native firms require their counterparty to have been rated with an A or better at 57.15%, while only 9.52% of firms accept counterparty rating of BBB, evidence that shows the importance native firms give to the safety of their transaction relative to a potential default. This argument is further supported by the fact that no firm is willing to transact with a party that is rated with lower than BBB, as well as that 28.57% of firms demand the highest possible rating of AAA. For derivatives with a maturity of more than a year the requirements become stricter, since the risk involved increases. The figure shows

a shift of the creditworthiness of the counterparty required to higher rates, leading 61.9% of firms to demand A rating or better and no firm to accept transaction with a party rated with BBB or lower. These data verify the shift toward higher creditworthiness as the maturity of the derivative contract prolongs which is supported by the financial theory and nominate the native non-financial firms to be the more demanding ones of the highest available credit rate in order to transact with a party in derivatives, among all other surveys.

However, where this survey significantly differentiates to the expected conclusions is the proportion of firms stating that they don't have any predefined policy relative to the lowest acceptable counterparty risk when entering a derivative transaction. Firms with no such predefined policy amount 33.33% and 28.57% of derivative users for contracts with maturity of less than or equal and more than a year respectively, percentage that is almost triple of that observed in other countries' firms [Bodnar/Gebhardt, 1998]. This observation raises doubts about the adequacy of the level of internal audit that firms using derivatives have, concerning the default danger of their derivative transactions.

Monitoring and evaluation of the risk management process.

The monitoring of the corporate risk management procedure through the systematic evaluation of the derivative portfolio and its risk profile constitutes a determinative factor of hedging. Paying constantly attention to the derivative positions allows a quick response to adverse market movements that potentially reduce the adequacy of protection relative to the examined risk and prevents from undesirable exposure. From this viewpoint it has been asked from firms to report the frequency with which they value their derivative portfolio, being able to select among daily, weekly, monthly, quarterly, yearly or not predetermined evaluation of it and the responses are shown in Figure 22.

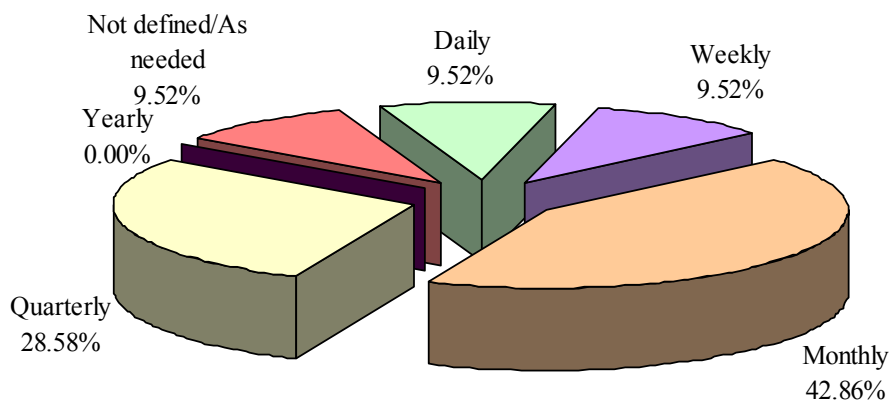


Figure 22: Frequency of evaluation of derivative portfolio.

According to the replies, the most popular policy is the monthly evaluation of the derivatives portfolio, being held by 42.86% of firms, while very encouraging is the proportion of firms who revalue their derivative position on a daily basis and which amount 9.52%. Altogether, revaluation of the derivatives portfolio with frequency shorter or equally to a month is undertaken by 61.9% of firms and on a quarterly basis by 28.58% of firms. The frequency of the evaluation of the derivatives portfolio that is conducted by native firms is enough satisfying, while relative low is the percentage of firms that has no scheduled revaluation policy, compared to other surveys [El-Masry, 2006].

Moreover, of great interest are derivatives users' responses when asked to reveal the source to which they appeal for the evaluation of their derivatives portfolio. Such an evaluation can be conducted either internally by the treasury or risk management department of the firm with the use of in-house software, or externally by a) the original dealer of the transaction, b) a consulting firm, c) an auditing firm, d) a market quote service such as Bloomberg and d) other derivatives dealers. Evidence is presented in Figure 23.

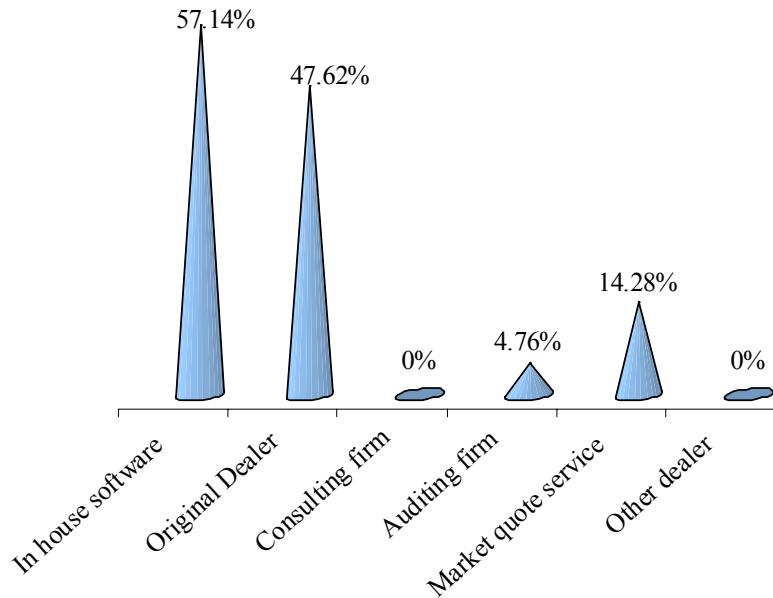


Figure 23: Source of derivatives evaluation.

Native firms appeal to their risk management department and make use of in house software they have in order to revalue their portfolio at a rate greater than 57%, while at 47.62% the portfolio evaluation is conducted by the original dealer of the transaction. These elements verify the switch observed in many surveys in the evaluation method that firms nowadays use, which has been converted into an internal procedure of the firm conducted by the risk management department. According to Bodnar [Bodnar et al., 1998] this switch is attributed to the fast development and the wide spread of the software required for the evaluation of the derivatives portfolio, which is now much cheaper and user friendlier. On that account the use of this specialized software is not limited to large firms only, as had been highlighted in previous surveys [Alkeback/Hagelin, 1999], but is now common to firms of all sizes according to the current survey. At the same time 14.28% of firms use market quote services for the evaluation of their derivatives position and 19.04% of all firms make use of at least two different sources of information.

As far as the assessment of the effectiveness of risk management is concerned, firms were asked to choose one of the following expressions that is closer to their corporate policy. The criteria for assessing effectiveness are: a) the reduced volatility relative to a benchmark, b) the increase of profit/reduction in costs relative to a benchmark, c) the comparison of absolute profit/loss and d) the risk adjusted performance.

Table 9 indicates that 61.9% of all derivatives users make use of the absolute profit/loss policy for assessing the effectiveness of their risk management practice and additional 4.76% of firms act on the basis of profit, by selecting the profit increase/loss reduction relative to a benchmark. Achieving a predefined risk adjusted performance is used by 19.05% of firms, while the anticipation of reduced volatility relative to a benchmark follow 9.52% of firms. The association of risk management effectiveness to profit comes into contrast with the basic philosophy of hedging, which is the reduction in risk through the limitation of volatility. The cumulative percentage of firms whose risk management philosophy is profit-based reaches 66.67%, it is significantly higher than the corresponding rate (40%) at Bodnar's et al. (1998) survey and creates some concern, as such an approach could urge firm's managers to build derivative positions that may increase the total risk of the firm, in an attempt to make a profit.

	Percentage %
Reduced volatility relative to a benchmark	9.52
Increased profit/ reduced cost relative to a benchmark	4.76
Absolute profit/loss	61.90
Risk adjusted performance	19.05

Table 9: Criterion for evaluation of risk management.

XI. Issues of domestic financial environment.

Factors influencing derivatives usage, access to international derivative markets and degree of acquaintance with derivatives.

In an attempt to define the extent at which domestic financial and other conditions affect the derivative policy of the Greek non-financial firms, we asked firms to consider some factors and indicate whether they receive a positive, negative or no effect by them. These factors are associated to the domestic macroeconomic environment and are the economic size and the geographical position of the country, the political, financial and economic risk of the country, the size and liquidity of the domestic derivatives market and the legal environment of the country. Responses are displayed in Figure 24.

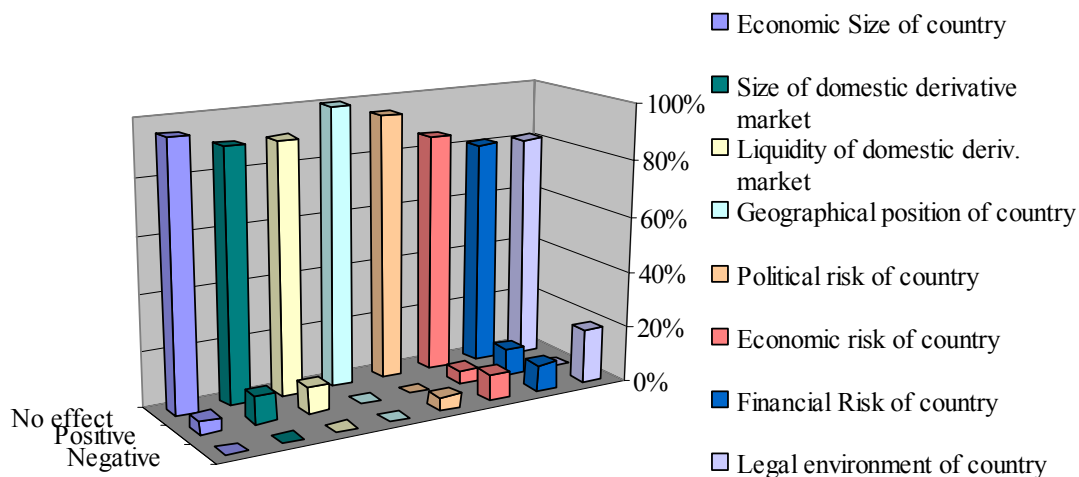


Figure 24: Effect of domestic factors on derivatives usage.

The vast majority of firms -at a rate higher than 80% in each case- state that the above mentioned factors do not influence their hedging policy and the extent of derivatives usage. An exception to this consensus is the legal environment of the country which has a negative effect on 19.05% of derivatives users and the economic and financial risk of the country with a negative effect on 9.52% of users respectively. Positive effect on their derivative policy firms face from the size and the liquidity of the domestic derivative market at 9.52% in both cases, as well as from the financial risk of the country at the same rate, while impressive is that all firms consider that the geographical position of the country has no effect on their decision to use derivatives. Since Greece is a “crossway” among different continents and neighbours the Balkans which is a favourable region of operation for domestic firms, its geographical position should positively affect firms’ decision to use derivatives. Greek firms face greater exposures to many kinds of risk as they have to sell their products or activate themselves in markets outside of the country’s borders, and thus derivative instruments could be proven really useful.

As a sequel to the previous question and aiming to determine whether native firms feel they have any drawback in derivatives usage compared to other countries’ firms, they were asked to evaluate their access to the international derivative markets. Firms could make a multiple choice among the expressions easy, difficult, cheap or expensive, quick or time consuming, functional or non-functional and the evidence is presented in Figure 25.

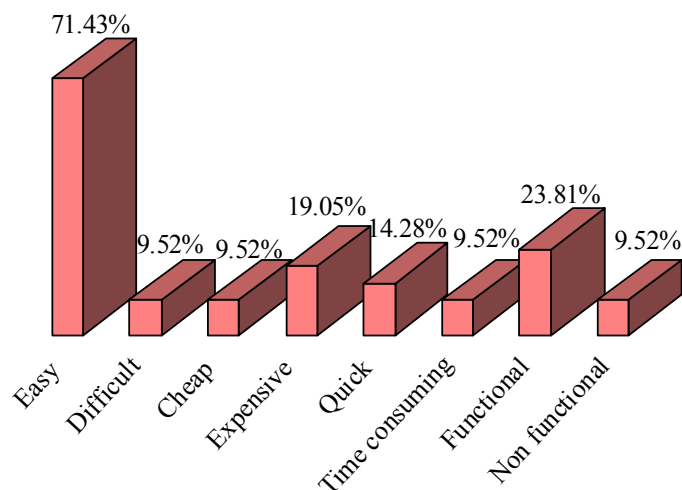


Figure 25: Access to international derivative markets.

At 71.43% firms consider their access to international derivative markets easy, 14.28% of them consider it quick and 23.81% of them functional. These results highlight that firms do not face any problems in using derivative contracts that are not exchanged in the domestic market, although 19.05% of firms find it expensive to trade in international markets. However, the proportion of firms expressing a negative opinion about the access to international markets does not exceed 10% in all cases.

The next question concerned firms' view about the domestic business environment and if it favours derivatives usage by non-financial firms. The percentage of firms that considers the business environment of the country not to be favourable of derivatives use amounts 47.62%, while 38.1% of firms consider it not to influence the corporate use of derivatives. Positive contribution to derivatives use is supported only by 14.28% of firms, rate that is low and which reveals that native firms maintain some cautiousness relative to derivatives use.

Finally, firms were asked to express their opinion about the degree of acquaintance of the domestic business community with respect to the management of risks with derivatives. The proportion of firms estimating that the business community is very familiar with derivatives amounts 9.52%, while less familiar is estimated by 76.19% of firms and no familiarity of the business community with derivatives is supported by 14.29% of firms. Once more the evidence supports the lack of acquaintance with derivatives among domestic firms, which is also verified by the low proportion of firms that reported any use of derivatives and which amounts 33.9%, as has been initially stated. The hesitation of firms to use derivatives is

examined in the immediately next section, where the factors that led firms not to use derivatives are mentioned.

XII. Non use of derivatives.

This part of the questionnaire has been filled in only by firms reporting no use of derivative contracts for hedging corporate risk, their number is 41 and they amount 66.1% of all firms replying to this survey. The proportion of Greek non-financial firms that do not use derivatives is one of the highest recorded among all surveys and on that account it is important to explain the motives that urged them not to use derivatives.

Firms have been asked to indicate the three most important reasons that contributed to their decision not to use derivatives. These reasons were: a) insufficient exposure to risk, b) exposures managed by other means, c) difficulty in pricing and valuing derivatives, d) the accounting treatment of derivatives, e) concern about the perception of derivatives use by investors, regulators and the public, f) the cost of establishing a hedging position exceeds the expected benefits, g) lack of sufficient knowledge concerning derivatives and h) any other reason not mentioned above, which firms had to declare. The results are presented in Table 10.

	1st	2nd	3rd
Insufficient exposure to risk	78.05%	0%	0%
Exposures managed by other means	2.44%	26.83%	0%
Difficulty in pricing and valuing derivatives	0%	2.44%	4.88%
Accounting treatment of derivatives	0%	0%	0%
Concerns about perception of derivatives use	4.88%	4.88%	0%
Costs of hedging exceeds the expected benefit	0%	19.51%	4.88%
Lack of sufficient knowledge concerning derivatives	0%	2.44%	12.19%
Other reasons	14.63%	2.44%	2.44%

Table 10: Importance of factors in the decision not to use derivatives.

The most important reason for not using derivatives according to 78.05% of derivative non-users is the insufficient exposure to financial risks, while 14.63% of non-users select as the most important reason one of the following factors that are not mentioned above and which are: a) the non-use of derivatives by competing firms, b)

that derivatives use is not among the group policies, c) that derivatives use is conducted at group level and d) the use of derivatives is not allowed by the debt covenants that are part of corporate debt. The insufficient exposure to risks has been cited as the most important reason for not using derivatives in many surveys [Bodnar et al. 1998, El-Masry 2006, Bodnar/Gebhardt 1998, Bodnar et al. 1996], contrary to the concern about the perception of derivatives use by investors, regulation authorities and the public which is not very common (cited by 4.88% of firms in the current survey).

As the second most important reason for not using derivatives firms indicate the hedging of exposures by other means at 26.83% and at 19.51% the argument that the costs of establishing a derivative position exceeds the expected benefit. Finally, as third most important reason for not using derivatives firms at 12.19% consider the lack of sufficient knowledge concerning derivatives, argument that in other surveys has been cited as the major motive for not using them [Bodnar et al., 1996]. As a whole, native firms' responses are in accordance with international practice, but the dominance of the argument of insufficient exposure to risk may contain an illusion of safety against financial risk, which might not be valid.

In order to determine if firms that responded not using derivatives actually have limited or no exposure to financial risks, they were asked to report the amount of their aggregate operational revenues that are in foreign currency. Zero operational revenues in foreign currency reported 63.41% of firms not using derivatives, whereas 21.95% and 7.32% of them reported that 5% and 10% of their operating revenues are in foreign currency respectively. A percentage of operating revenues in foreign currency as high as 15%, 30% and 50+% reported 2.44% of firms respectively, evidence that shows that at least the foreign exchange exposure of firms not using derivatives is substantially low.

XIII. Conclusions- Suggestions for future research.

The main objective of the current research was to record the extent at which non-financial firms in Greece manage their risks with the use of derivatives and to analyze all the parameters of this particular corporate activity. The research was conducted through the use of a questionnaire and was based on previous surveys with

the same objective. The way it was built made it possible to examine the common properties of derivatives users and to reveal their hedging practices across risk classes.

The results of the survey indicate that the use of derivatives in risk management is not wide spread among domestic firms, while it is observed that large firms are more likely to use derivatives contrary to the small-size ones. Firms use derivatives mainly to manage their interest rate risk and secondary their foreign exchange risk, though no firm seems to manage its equity risk. The major sources of concern for derivatives users are the accounting treatment of derivatives and the requirement to disclose their use, fact that is potentially associated to the implementation of the International Financial Reporting Standards for the first time.

Moreover, the main purpose of the hedging policy of domestic firms is to reduce the volatility in cashflows, while firms appear to use sophisticated risk assessment methods, such as value at risk (VaR). The risk management activities are conducted mostly at central level and native firms seem to incorporate rather often their market view into the corporate hedging strategy, but not to take offensive positions in derivatives. The use of options by firms is limited and the more common excuse for this behavior is their high cost.

At the same time a great proportion of users reveal that they have a documented policy concerning derivatives, however their frequency of report to the board of directors- which converges to three months- is not satisfying relative to the international practice. Very interesting is the conclusion that most firms develop an internal risk management department to which they appeal for the evaluation of their derivative position, as well as that the evaluation of the effectiveness of risk management is more profit based than risk reduction based.

Finally firms using derivatives state that their hedging policy is not influenced by any domestic macroeconomic factor, they consider the business environment of the country not to be favorable of derivatives use and they estimate that the business community in Greece is not familiar with derivatives for hedging purposes. On the other hand most of the firms replying that they do not use derivatives claim that they base this decision of theirs either on their insufficient exposure to risk, or on the hedging of their risk exposure by other means.

In conclusion, the approach of the domestic non-financial firms that use derivatives is in line with the international hedging practices. This convergence is verified by the comparative evidence of different surveys that is presented, even

though these surveys have been conducted under different conditions and there has been a time distance among them. On that account it can be argued that the factors that determine the corporate use of derivatives are common and diachronic and they are driven by economic issues such as the operational activities and firm characteristics, and not by the corporate culture or the peculiarities of the country under examination.

The results of this survey are expected to lighten many of the aspects of corporate derivatives use, contributing to the familiarization of the domestic business community with derivatives. Furthermore, the repetition of this survey in the near future is expected to lead to valuable conclusions as to the evolution of risk management by Greek non-financial firms through time, both in quantitative and qualitative terms.

References

- Adam, T., 2002. Do Firms Use Derivatives to Reduce their Dependence on External Capital Markets? *European Finance Review*, 6, 163-187.
- Alkeback, P., Hagelin, N., 1999. Derivative Usage by Nonfinancial Firms in Sweden with an International Comparison. *Journal of International Financial Management and Accounting*, 10 (2), 105-120.
- Bartram, S.M. 2000. Corporate Risk Management as a Lever for Shareholder Value Creation. *Financial Markets, Institutions and Instruments*, 9 (5), 279-324.
- Bartram, S., Brown, G., Fehle, F., 2003. International Evidence on Financial Derivatives Usage, Working paper, Lancaster University, University of North Carolina, University of Berk, A., 2005. The Use of Derivatives in Slovenian Non-Financial Firms: Is Financial Risk Already Well Managed? Working Paper, University of Ljubljana.
- Berkman, H., Bradbury, M., 1996. Empirical Evidence on the Corporate Use of Derivatives. *Financial Management*, 25 (2), 5-13.
- Berkman, H., Bradbury, M., Magan, S., 1997. An International Comparison of Derivatives Use. *Financial Management*, 26 (4), 69-73.
- Bodnar, G., Gebhart, G., 1998. Derivative Usage in Risk Management by U.S. and German Non-Financial Firms: A Comparative Survey. *Journal of International Financial Management and Accounting*, 10 (3), 153-187.
- Bodnar, G., Hayt, G., Marston, R., Smithson, C., 1995. 1994 Wharton Survey of Derivatives Usage by US Non-Financial Firms. *Financial Management, Contemporary Issues* 24 (2), 104-114.
- Bodnar, G., Hayt, G., Marston, R., 1996. 1995 Wharton Survey of Derivatives Usage by US Non-Financial Firms. *Financial Management, Contemporary Issues* 25 (4), 113-133.
- Bodnar, G., Hayt, G., Marston, R., 1998. 1998 Wharton Survey of Financial Risk Management by U.S. Non-Financial Firms. *Financial Management*, 27 (4), 70-91.
- Brown, G., Crabb, P., and Haushalter, D., 2006. Are firms successful at Selective Hedging? *Journal of Business*, 79, 2925-2950.
- El-Masry, A., 2006. Derivatives use and risk management practices by UK non-financial companies. *Managerial Finance*, 32 (2), 137-159.
- Fatemi, A., Glaum, M., 2000. Risk Management Practices of German Firms. *Managerial Finance* 26 (3), 1-16.
- Fatemi, A., Luft, C., 2002. Corporate Risk Management. Costs and Benefits. *Global Finance Journal*, 13 (1), 29-38.

- Geczy, C., Minton, B., Schrand C., 1997. Why Firms Use Currency Derivatives. *Journal of Finance*, 52 (4), 1323-1354.
- Grant Thornton, 2004. I.F.R.S, Greek edition. 5-1211.
- Guay, W., 1999. The impact of derivatives on firm risk: An empirical examination of new derivative users. *Journal of Accounting and Economics*, 26, 319-351.
- Guay, W., Kothari S., 2003. How much do firms hedge with derivatives? *Journal of Financial Economics*, 70, 423-461.
- Haushalter, G., 2000. Financing Policy, Basis Risk and Corporate Hedging: Evidence from Oil and Gas Producers. *Journal of Finance*, 55, 107-152.
- Heaney, R., Koga, C., Oliver, B., Tran, A., 1999. The Size Effect and Derivative Usage in Japan. Working Paper, The Australian National University.
- Howton, S., Perfect, S., 1999. Currency and interest rate derivatives use in US firms. *Financial Management*, 27 (4), 111-121.
- Joseph, N., Hewins, R., 1997. The Motives for Corporate Hedging among UK Multinationals. *International Journal of Finance and Economic*, 2 (2), 151-171.
- Judge, A., 2002. The Determinants of Foreign Currency Hedging by UK Non-Financial Firms. Working Paper, Middlesex University.
- Mian, S., 1996. Evidence on Corporate Hedging Policy. *Journal of Financial and Quantitative Analysis*, 31 (3), 419-439.
- Nance, D., Smith, C., Smithson, C., 1993. On the Determinants of Corporate Hedging. *Journal of Finance*, 48 (1), 267-284.
- Nguyen, H., Faff, R., 2003. Further Evidence on the Corporate use of Derivatives in Australia: The Case of Foreign Currency and Interest Rate Instruments. *Australian Journal of Management*, 28 (3), 307-317.
- Oosterhof, C., 2001. Corporate Risk Management: An Overview. Working Paper, Research Institute SOM, 01E06, University of Groningen.
- Phillips, A., 1995. 1995 Derivatives practices and instruments surveys. *Financial Management*, 24 (2), 115-125.
- Purnanandam, A., 2005. Financial Distress and Corporate Risk Management: Theory and Evidence. Working Paper. Cornell University, Ithaca, NY.
- Rogers, D.A., 2005. Does Executive Portfolio Structure Affect Risk Management? CEO Risk-Taking Incentives and Corporate Derivatives Usage. *Journal of Banking and Finance*, 26, 271-295.
- Ross, M., 1996. Corporate Hedging: What, Why and How? Working Paper, University of California, Berkeley.
- Smith, C., Stulz, R., 1985. The Determinants of Firm's Hedging Policies. *Journal of Financial and Quantitative Analysis*, 20 (3), 391-405.

Stulz, R., 1996, Rethinking Risk Management. *Bank of America, Journal of Applied Corporate Finance*, 9 (3), 8-24.

Tufano, P., 1998. Agency Costs of Corporate Risk Management. *Financial Management*, 27 (1), 67-77.