

# **The evolution and the prospects of contemporary financial instruments in Greece: The case of swaps**

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## **Abstract**

*This paper presents the results of a survey of derivatives and especially of swaps usage among Greek companies and Greek institutional investors in the context of a dissertation with a topic "The evolution and the prospects of contemporary financial instruments: The case of swaps". The paper starts giving the evolution of swaps, an overview of the swap market and its growth. On the other hand, it refers surveys of derivatives that carried out in other countries and their results. After this, the paper analyses the methodology that is used. The questionnaire instrument used in this research is mainly based upon the postal survey of Bodnar et al. (1995 cited by Mallin, Ow-Yong and Reynolds, 2001), but it is more specified on swaps. The target population consists of 292 companies. The total response rate was 21,92% (64 responses). Among institutional investors the response rate was 35,29% while for companies the response rate was 19,09%.*

*Among the key findings are the following:*

- (1) For companies' sample, only 34,78% of them use derivatives. The most important reasons that companies do not use derivatives are that exposures are more effectively managed by other means, exposures to exchange rate, interest rates or commodities are not significant and finally, costs of establishing and maintaining a derivatives programme exceed the expected benefits.*
- (2) Of those companies that permit derivative use, 68,75% use swaps. This translates into 23,91% of all companies responded to the survey. It must be noticed that the only swap products are used are interest rate swaps and currency swaps and swaps is the most popular derivative instrument in managing interest rate risk.*
- (3) For institutional investors' sample, it must be noticed that 100% of them use derivatives. Moreover, 66,67% of them use swaps and the most popular derivative products are interest rate and currency swaps from financial derivatives and credit default swaps from credit derivatives.*

Keywords: derivatives, swaps, risk

## **Introduction**

An amazing growth in the market for derivatives it is noticed the last thirty years (Stulz,2004). It is computed that the current size of the market for derivatives exceed \$200 trillion, which is more than 100 times what it was thirty years ago.

The most famous derivatives are swaps, futures, and options contracts (Reichert and Shyu,2003). Since the swap arrangement between the World Bank and IBM in 1981, swaps have evolved as one of the most significant instruments for corporations to improve their financial performance and as a result financial managers use swaps to diminish borrowing costs, to augment asset returns or to hedge risk (Yu, Pang, and Li,2004). Furthermore, according to Bodie and Merton (2002), during the past 25 years swaps have evolved to the basic financial adjusters, who connect different national systems to the global financial network. As a result and given its facility and pliability, the OTC swap market is appeared as the fastest-growing fragment of the derivatives industry (Reichert and Shyu,2003).

As a result of this increased use of derivatives more and more surveys are accomplished in many countries and especially in USA. Some of these surveys will be summarized briefly in literature review.

The objective of this article is to investigate the Greek swap market. For this reason it analyses two types of questionnaires. These from companies listed in Athens stockmarket and these from institutional investors and compare it with previous surveys.

## **Literature review**

### **Overview of the swaps market and its growth**

The international swap market started in the 1980s (Bodie and Merton,2002). It was developed from corresponding loan agreements that were popular in the 1970s (Saunders,1999). In the first years, there was little credit arbitrage between diverse bond markets, and swaps were used to exploit of the interest-rate differentials (Bodie and Merton,2002). It is characteristic that at the end of 1982, the sum of swap contracts outstanding was estimated at US\$5 billion, when by the end of 2001, contracts outstanding was more than US\$58 trillion. The augment annual growth rate was estimated about 60% during the past twenty years (Yu, Pang, and Li,2004). A new organization was established, the International Swap Dealers Association (ISDA), with the task of standardizing swap contracts across national jurisdictions. The ISDA standard document was finished in 1985 (Bodie and Merton,2002).

According to Yu, Pang, and Li (2004), in the swap market take a part commercial and investment banks, securities firms, savings and loan institutions, corporations, and government agencies. It is also considerable that around the world nowadays banks and investment companies use swaps to face currency, interest-rate, and equity-market risks and to reduce their transaction costs. (Bodie and Merton,2002).

### **Motivation for using swaps**

#### ***Hedging***

According to Smith and Stulz (1985 cited by Balsam and Kim,2001), hedging can be used to diminish the expected costs of financial danger associated with bankruptcy or technical default.

### **Comparative advantage**

Comparative advantage is a motivation for swaps, whereby certain companies can acquire certain types of financing more cheaply than others (Bicksler and Chen, 1986; Litzenberger, 1992 cited by Balsam and Kim, 2001). It is the most widely accepted explanation for the use of interest rate swaps because two firms arrive at a swap agreement in order to take advantage of rate spreads that exist between short- and long-term maturities (Reichert and Shyu, 2003).

### **Asymmetric information hypothesis**

Sharma's study (1995 cited by Reichert and Shyu, 2003) also discovers that information asymmetry may be a basic reason for the explosive development in swaps. Arak et al. (1988 cited by Balsam and Kim, 2001) claim that if companies anticipate their credit rating to better, those companies will issue short-term variable debt and swap into long-term fixed-rate debt. This method of financing gives the opportunity to companies to attain fixed interest payments and to exclude exposure to interest rate risk. Later, these companies could borrow short-term variable debt at a lower premium when the favorable information is revealed.

### **Size and leverage**

Companies, which have little long-term debt, have less motivation or ability to use swaps. According to Ben-Zion and Shalit (1975 cited by Balsam and Kim, 2001) this occurs because larger companies can enjoy larger relative amounts of debt because, larger firms have lower likelihood of unsuccessfulness, more diversified investments and economies of scale. Collins, Rozeff and Dhaliwal (1981 cited by Balsam and Kim, 2001), except the others, indicate that size is a broad variable that proxies for leverage and public debt. As a consequence, larger firms with a relatively higher level of long-term debt are anticipated to engage in swaps.

### **Risk of derivatives**

The risk appearing in transactions that conclude derivatives can be categorized in many ways and the most general categorization of risk is as market, credit, operational and legal (Morner, 1997).

### **Previous surveys**

The survey of Prevost, Rose and Miller (2000) renews previous New Zealand relied on derivatives usage surveys and discovers that the risk management patterns and objectives of firms in the small, open market of New Zealand have many similarities with the markets of US, UK and German. New Zealand firms of all size use derivatives and this occur because New Zealand is a small, export- and import-orientated economy, which faces considerable exposures to interest and exchange rate movements. New Zealand companies mainly use OTC forwards and options as well as swaps to hedge currency and interest rate risk as US, UK and German markets do. Furthermore, most companies use derivatives every month or week. The prevalent reason for hedging was to reduce fluctuation in real cash flows. Additionally, in contrast to US, the most important concerns for New Zealand firms are transaction costs as a limit to hedging. The concentration on control and reporting derivatives transactions in New Zealand presents common to that of firms in UK and US. There is centralization in decision-making.

The survey of Mallin, Ow-Yong and Reynolds (2001) presents that derivative use by larger UK companies is widespread, while more than

60% of firms admitted that they use at least one derivative instrument. The survey findings indicate that firms face low degrees of equity and commodity risks and derivatives being mainly used to hedge contractual obligations that lead in currency and interest rate risk. Swaps are the prevalent instruments to hedge interest rate risk. With the exception of some of the high profile cases of remarkable financial loss through derivatives usage, the specific survey points out that a small number of companies try to speculate or under take arbitrage action through derivatives usage. Most Financial Directors chose as the basic issue of concern in the use of derivatives the risk of the proposed derivative transactions. The survey indicates that most firms give significant importance to control derivatives usage. More than 70% of companies appeared to have some form of documented policy on the use of derivatives. It is also important to referred that more than half of the companies which participated to the survey point out that they do not use any method at all of evaluating the riskiness of their derivatives portfolio.

The survey of Levich and Ripstone (1999) attempted to attain a better understanding of the use of derivative instruments and the risk management of derivatives activity among U.S. institutional investors. Their sample consists of these three populations across large, medium and small institutions, in order to create appreciations of survey responses for the entire population and not simply for those who chose to answer the survey. This survey indicates that the use of derivatives is well established by institutional investors, including all investor categories and sizes. From respondents 46% allow their asset managers to use derivatives. The appreciation about the frequency of derivative use among all institutional investors appears lower than the numbers referred above, because there are many small institutional investors where the possibility of derivative use is lower. Among institutions that allow derivatives, 68% have a written policy about their usage. Most institutions (80%) have set some constraints on the nature or extent of derivatives activity among internal or external managers. At the end, half of all institutions that allow derivative use have set a regular schedule for accepting reports on derivatives activity.

The survey of Bodnar and Marston (1998) referred that derivative use is not well established by US non-financial companies, because less than 50% of them use at least one derivative instrument. The most important concerns of these companies are accounting treatment, market risk and monitoring/evaluating hedge results. The prevalent derivatives are currency, interest rate, commodity, and equity derivatives.

## **Methodology**

In this study it is conducted an investigation based on Greek institutional investors and Greek companies from the stock market. The survey questionnaire was based on previous surveys, mainly on Bodnar et al. (1995 cited by Mallin, Ow-Yong and Reunolds, 2001) but it was specified on swaps. The analysis is based on the responses from companies and institutional investors that use swaps. Because we could not find previous surveys about the swap usage, we compare our results with surveys of derivatives usage.

We sent 292 questionnaires, 51 to institutional investors and 241 to companies listed to stockmarket and received 18 from institutional investors and 46 from companies. As a result, we have 21,92% responsiveness totally and specifically 35,29% for institutional

investors and 19,09% for companies. We sent the questionnaires by mail with an enclosed postage-paid envelope.

## **Analysis of companies**

### ***Derivatives use***

From 46 companies that respond, 30 said that they do not use derivatives. This means that only 34,78% of companies use derivatives. This percentage is much smaller from 67,1% of New Zealand companies that use derivatives (Prevost, Rose and Miller, 2000), 60% of non-financial UK companies (Mallin, Ow-Yong and Reunolds, 2001) and 50% of non-financial US companies (Bodnar and Marston, 1998). According to the responses of Greek companies, the prevalent reasons that companies do not use derivatives are that exposures are more effectively managed by other means, exposures to exchange rate, interest rates or commodities are not significant and costs of establishing and maintaining a derivatives programme exceed the expected benefits.

The results are consistence with the most prevalent for non-financial UK companies survey, where the prevalent reasons are lack of significant exposure to financial risk (51,6%), the cost of derivatives programme (16,1) and exposure can be managed by other means (14%).

### ***Swaps use***

From 16 that use derivatives 11 use swaps. This means that companies use swaps represent a percentage of 68,75% from companies that use derivatives and 23,91% from the initial sample.

### ***Concerns about derivatives***

Question 2 asks respondents to indicate their level of concern about a number of aspects regarding the use of derivatives. Companies indicate that the most important concerns are credit risk (34,78%), Liquidity risk (34,78%) and monitoring and evaluating hedge results (17,39%). In contrast, the main concerns for non-financial UK companies (Mallin, Ow-Yong and Reunolds, 2001) are evaluating risks of proposed derivative transactions, transaction fees payable to dealers and lack of knowledge about derivatives and for non-financial US companies (Bodnar and Marston, 1998) accounting treatment (37%), market risk (31%) and monitoring/evaluating hedge results (29%). Additionally, the issues causing the most concern among derivative users for New Zealand companies (Prevost, Rose and Miller, 2000) are transaction costs (48,1%) and credit risk (36,5%).

### ***Swap usage by exposure***

In Question 4 of the survey, it is asked from firms to point out their use of the main types of derivative instruments to manage their exposure to four categories of financial price risk: currency exposure, interest rate exposure, equity exposure, exposure of contractual commitments and exposure of anticipated cash flows.

All companies responded to the survey use swaps in order to manage interest rate (69,23%) and currency exposure (30,77%). Furthermore, it is indicated that swaps is the most popular derivative instrument in managing interest rate risk.

According to results from New Zealand companies (Prevost, Rose and Miller, 2000) swaps are bought very frequently by responders and come second in responders preferences. Moreover, non-financial UK firms

present a significant use of swaps (Mallin, Ow-Yong and Reunolds, 2001).

#### ***Companies preferences about buying and selling swaps products***

Question 5 wants to research if the most companies buy or sell swaps. Companies answered that they prefer to buy swap products and not to sell. Specifically, question 6 asks from companies to indicate what types of swaps they use. The only swap products that companies use are interest rate and currency swaps. It must be also referred that only one of them sell swaps.

#### ***Frequency of derivative use***

In question 7, how often a firm uses derivatives, most firms responded monthly (54,55%) and that they do not set schedule (18,18%). These elements agree with New Zealand companies, where almost 40% of companies use derivatives monthly while 17,8% have not set schedule (Prevost, Rose and Miller,2000).

#### ***Frequency of hedging***

Question 8 asked from responders to state how often they use derivatives to hedge the 5 following risks: contractual commitments, expected transaction (12 months or less), expected transaction (more than 12 months), the balance sheet, competitive exposure. It is very important to refer that the prevalent answers are not set schedule (44,83%) and monthly (34,48%).

#### ***Objectives for derivatives transactions***

The basic use of derivatives is anticipated to be managing against financial price risk (Mallin, Ow-Yong and Reunolds,2001). As a result, Question 9 asked companies what is their most important objective in risk management strategy. The first most important objective mentioned by responded companies is managing fluctuations in cash flows (50%). The second motivation is managing fluctuations in accounting earnings (31,25%). These results are consistence with the survey of non-financial UK companies (Mallon, Ow-Yong and Reunolds, 2001) because most important objectives of hedging strategy are managing fluctuations in accounting earnings (53%) and managing cash flows (38%).

#### ***Monitoring use of derivatives***

Question 10 asked respondents how often they monitor the use of derivatives. Most companies answered that they monitor the portfolio every day (36,36%), every month (36,36%) and every three months (18,18%). Results from New Zealand companies (Prevost, Rose and Miller, 2000) and US non-financial companies (Bodnar and Marston, 1998) indicate that they monitor derivatives portfolio every month at percentage 67,3% and 27% respectively. On the other hand, the survey of non-financial UK companies also points out that most companies monitor its portfolio as and when required (44%)(Mallon, Ow-Yong and Reunolds, 2001).

#### ***Evaluating risk of derivatives***

The last question in the questionnaire asked companies what method they use to evaluate the risk of derivatives. The sequence of methods preferred for evaluating risk is Value at Risk, Scenario analysis, Sensitivity analysis, Present Value of a basis point, Worst Case analysis, Monte Carlo simulation and Risk Adjusted Returns of Capital. This means that Value at Risk is the prevalent method. "Value at risk (VAR) is a technique for determining the value loss that the derivative portfolio could hypothetically suffer with some

given probability and assumptions about the statistical properties of the underlying price processes" (Bodnar and Marston, 1998).

In contrast, the survey for non-financial UK companies (Mallon, Ow-Yong and Reynolds, 2001) indicates that they prefer Scenario Analysis or Stress testing (42,3%) to Value at Risk (32,7%).

## **Analysis of institutional investors**

### ***Swap usage***

A very crucial point for the survey is the number of institutional investors that use swaps. This number is 12 and represents a percentage 66,67% of institutional investors.

### ***Concerns about derivatives***

Derivative users confront many issues that appear to be unique to the product (Levish and Ripston, 1999). Question 1 asked institutional investors to indicate the most important concerns for them. The sequence of most important concerns are ability to quantify the institution's underlying exposures, ability to monitor and control derivatives use of portfolio managers, counterparty credit risk, knowledge and experience, pricing and valuating, access to impassable markets and reactions of participants and investors.

The results are consistent with the survey of US institutional investors (Levish and Ripston, 1999) where the most important concerns are quantifying underlying exposures (more than 35%) and counterparty credit risk (almost 30%).

### ***Reasons use derivatives***

Question 2 asked from institutional investors to mention which are the most important reasons to create derivatives. The sequence of the most important reasons creating derivatives is risk reduction/hedging, asset allocation, short term market timing, increase capital base, service customers, reduce intermediation costs, reduce taxation and increase money rewards for managers.

The results are consistent with US institutional investors (Levish and Ripston, 1999) because its prevalent reasons are risk reduction/hedging (55%), asset allocation (26%) and incremental returns (15%).

### ***Limits on derivatives activity***

"Controlling derivative activity is a challenge in any organization, but perhaps particularly in institutional investing where multiple managers are involved" (Levish and Ripston, 1999). Question 3 asked those institutions that use derivatives to point out the types of constraints they employ. The prevalent constraints are Value at risk (33,33%), Constraints based on the market (33,33%) and Notional value as a percentage of the assets (14,81%). In contrast, the prevalent constraints for US institutional investors (Levish and Ripston, 1999) are constraints in the types of derivatives instruments that managers may use (55%), constraints on the type of derivative strategy (48%). Only the third constraint, notional value of derivatives as a percentage of assets under management (40%), is the same.

### ***Swap usage by exposure***

Question 4 asked Institutions were asked to indicate the derivatives they used most often in each five broad categories: currency exposure, interest rate exposure, equity exposure, contractual commitments exposure and anticipated cash flows exposures. Swaps are

mainly used to face interest rate exposure (47,37%) and currency exposure (31,58%).

#### ***Institutions' preferences about buying and selling swaps***

Question 5 asked institutional investors to state which derivatives products they use and especially which of them buy and which sell. The answers point out that there is a balance in buy and sell swap because nearly all companies both buy and sell swaps.

#### ***Institutions' preferences about buying and selling swap products***

Question 6 asked from these 12 institutional investors to indicate what swap products they use. According to respondents, the most preferable swaps products are interest rate and currency swaps from financial derivatives and credit default swaps from credit derivatives. Specifically, from companies that buy swap products 41,67% buy interest rate swaps, 20,83% currency swaps and 20,83% credit default swaps. On the other hand, from companies that sell swap products 37,50% sell interest rate swaps, 25% currency swaps and 16,67% credit default swaps. It must be also referred that the frequency of commodity swaps, equity swaps and swaptions is very small because only one institutional investor uses each one of them.

#### ***Monitoring of derivatives***

Question 7 asked respondents who are responsible for the monitor of derivatives. The answers were only two. The first is portfolio managers (61,11%) and auditors control risk (38,89%).

#### ***Risk management reporting***

"The frequency that derivatives activity is reported to the board of directors has important monitoring implications" indeed Grant and Marshall (1997 cited by Prevost, Rose and Miller, 2000) indicate that since the widely published derivative losses, one of the most important aspects of derivative control appears to be broad-level approval. Question 8 asked companies to state how frequently derivatives activity is reported to the board of directors. Respondents answered that most of firms (61,54%) select the survey's most frequent reporting interval (monthly). However, 23,08% of respondents stated that they report to the board of directors about derivatives activity every day (using the option "another interval"). The third choice is as needed (15,38%).

In contrast, most US institutional investors (Levish and Ripston, 1999) choose to report about derivatives activities mainly every 3 months (27%) while only 18% of them report about derivatives activities every month.

#### ***Estimation of risk***

Question 9 asked institutional investors to indicate who estimate the risk. Half of them answered portfolio managers. The second popular answer is auditors control risk (43,75%) and only 6,25% said counselors of firms.

#### ***Methods to evaluate risk***

The last question of institutional investors' questionnaire refers to what methods institutional investors use to estimate risk. The sequence of methods preferred for evaluating risk is Value at Risk, Sensitivity analysis, Scenario analysis, Worst Case analysis, Present Value of a basis point, Monte Carlo simulation and Risk Adjusted Returns of Capital.



## **Comparison of companies with institutional investors in relation with swap usage**

Using the results of t-test we find that the mean of swap products that used by companies ( $M=1,09$  ,  $SD=0,539$ ) is one unit smaller than the mean of swap products that used by institutional investors ( $M=2,17$  ,  $SD=1,030$ ) but there is big difference in standard deviation. The price of t is ( $-3,093$ ) and degree of freedom 21. It is obvious that institutional investors use on the average more swaps products than companies but there is big difference.

The use of  $X^2$  (appendix) indicate that there is an important correlation between type of enterprise and derivatives and especially swaps usage ( $X^2=22,118$  ,  $DF=2$  ,  $p=0,001$ ). Additionally, it is concluded that institutional investors use derivatives and swaps more than companies.

## **Conclusion**

The results of this survey indicate that the use of swaps and generally for derivatives to hedge financial price risk is not well established amongst larger Greek companies; only 34,78% of companies reported using at least one derivative instrument. The prevalent reasons that companies do not use derivatives are that exposures are more effectively managed by other means, exposures to exchange rate, interest rates or commodities are not significant and costs of establishing and maintaining a derivatives programme exceed the expected benefits.

On the other hand, the most important concerns for companies, which use swaps, are credit risk, liquidity risk and monitoring and evaluating hedge results. Swaps are used only to manage interest rate and currency exposure and it is characterized as the most popular derivative instrument in managing interest rate risk. Unfortunately, they use only interest rate and currency swaps and most companies prefer to buy swaps and not to sell.

The use of swaps by Greek institutional investors is much widespread than by companies. Both of 18 institutional investors use at least one derivative instrument and 11 of them use swaps. The most prevalent concern for them is ability to quantify the institution's underlying exposures and the most prevalent reason to create derivatives is risk reduction/hedging. Swaps are mainly used for interest rate exposure and the most preferable swaps products for institutional investors are interest rate and currency swaps from financial derivatives and credit default swaps from credit derivatives.

## **References**

- Arak, M., Estrella, A., Goodman, L., & Silver, A. (1988). "Interest rate swaps: an alternative explanation", *Financial Management*, 17, 12-18 cited by Balsam, St. and Kim, S. (2001), "Effects of interest rate swaps", *Journal of Economics and Business*, 53 p.547-562
- Balsam, St. and Kim, S. (2001), "Effects of interest rate swaps", *Journal of Economics and Business*, 53 p.547-562
- Ben-Zion, U., & Shalit, S. (1975) "Size, leverage, and dividend records as determinant of equity risk", *Journal of Finance*, 1015-

- 1026 cited by Balsam, St. and Kim, S. (2001), "Effects of interest rate swaps", *Journal of Economics and Business*, 53 p.547-562
- Bicksler, J., & Chen, A. H. (1986), "An economic analysis of interest rate swaps", *Journal of Finance*, 645-656 cited by Balsam, St. and Kim, S. (2001), "Effects of interest rate swaps", *Journal of Economics and Business*, 53 p.547-562
- Bodie, ZVI and MERTON, R. C. (2002), "International pension swaps: Available from: <http://www.people.hbs.edu/rmerton/internationalpensionswaps.pdf> (Accessed 10 May 2006)
- Bodnar, G. M., Hayt, G. S., Marston, R. C. and Smithson, C. W. (1996) "Wharton survey of derivatives usage by US non-financial firms", *Financial Management*, 24, 104-114 cited by Mallin, Chr., Ow-Yong, K. and Reynolds, M. (2001), "Derivatives usage in UK non-financial listed companies", *The European Journal of Finance*, 7, p.63-91
- Bodnar, G. and Marston, R. (1998), "1998 Survey of Financial Risk Management by U.S. Non-Financial Firms"
- Collins, D., Rozeff, M., & Dhaliwal, D. (1981), "The economic determination of the market reaction to proposed mandatory accounting changes in the oil and gas industry: a cross-sectional analysis", *Journal of Accounting and Economics*, 33-71 cited by Balsam, St. and Kim, S. (2001), "Effects of interest rate swaps", *Journal of Economics and Business*, 53 p.547-562
- Grant, K. and Marshall, A. P. (1997), "Large UK companies and derivatives", *European Financial Management*, 3 p.191-208 cited by Prevost, A., Rose, L. and Miller, G. (2000), "Derivative Usage and Financial Risk Management in Large and Small Economies: A Comparative Analysis", *Journal of Business Finance & Accounting*, 25 (5&6).
- Mallin, Chr., Ow-Yong, K. and Reynolds, M. (2001), "Derivatives usage in UK non-financial listed companies", *The European Journal of Finance*, 7, p.63-91
- Levish, R. and Ripston, B. (1999), "1998 Survey of Derivatives and Risk Management Practices by U.S. Institutional Investors"
- Litzenberger, R. H. (1992), "Swaps: plain and fanciful", *The Journal of Finance*, 831-850 cited by Balsam, St. and Kim, S. (2001), "Effects of interest rate swaps", *Journal of Economics and Business*, 53 p.547-562
- Morner, A. (1997), "SWAPS AND NETTING: SOME RECENT DEVELOPMENTS", *ESSAYS IN INTERNATIONAL FINANCIAL & ECONOMIC LAW*, (8)
- Prevost, A., Rose, L. and Miller, G. (2000), "Derivative Usage and Financial Risk Management in Large and Small Economies: A Comparative Analysis", *Journal of Business Finance & Accounting*, 25 (5&6)
- Reichert, Al. and Shyu, Y.-W. (2003), "Derivative activities and the risk of international banks: A market index and VaR approach", *International Review of Financial Analysis*, 12 p.489-511
- Saunders, K. T. (1999), "The interest rate swap: Theory and evidence", *Journal of Corporate Finance*, 5 p.55-78
- Sharma, M. (1995), "Interest rate swaps and shareholder wealth: Are they consistent?", *International Journal of Management*, 12, 428-436 cited by Reichert, Al. and Shyu, Y.-W. (2003), "Derivative activities and the risk of international banks: A market index and VaR approach", *International Review of Financial Analysis*, 12 p.489-511
- Smith, C. W., & Stulz, R. M. (1985), "The determinants of firms' hedging policies", *Journal of Financial and Quantitative Analysis*, 20, 391-405 cited by Balsam, St. and Kim, S. (2001), "Effects of interest rate swaps", *Journal of Economics and Business*, 53 p.547-562

Stulz, R. M. (2004), "Should we fear derivatives?" Available from: <http://www.cob.ohio-state.edu/fin/dice/papers/2004/2004-5.pdf> (Accessed 2 May 2006)

Yu, W.T., Pang, W.K. and Li, L.K. (2004), "Borrowing cost reduction by interest rate swaps--an option pricing analysis", *European Journal of Operational Research*, 154 p.764-778

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### Appendix

#### T-Test

#### Group Statistics

	Enterprises	N	Mean	Std. Deviation	Std. Error Mean
Swap products	Companies	11	1,09	,539	,163
	Institutional investors	12	2,17	1,030	,297

#### Independent Samples Test

		Levene's Test for Equality of Variances		T-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Swap products	Equal variances assumed	1,067	,313	-3,093	21	,006	-1,076	,348	-1,799	-,353
	Equal variances not assumed			-3,175	16,903	,006	-1,076	,339		



**Crosstabs**

**Case Processing Summary**

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Type of enterprise * Having	64	100,0%		100,0%		

**Type\_of\_enterprise \* Having Crosstabulation**

			Having			Total
			Not having derivatives	Having derivatives except swaps	Having swaps	
Type of enterprise	Companies	Count	30	5	11	46
		Expected Count	21,6	7,9	16,5	46,0
		Residual	8,4	-2,9	-5,5	
	Institutional investors	Count	0	6	12	18
		Expected Count	8,4	3,1	6,5	18,0
		Residual	-8,4	2,9	5,5	
Total		Count	30	11	23	64
		Expected Count	30,0	11,0	23,0	64,0

**Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	22,118 (a)	2	,000
Likelihood Ratio	29,049	2	,000
Linear-by-Linear Association	18,191	1	,000
N of Valid Cases	64		

a.1 cells (16,7%) have expected count less than 5. The minimum expected count is 3,09.