THE USE OF DERIVATIVES AS FINANCIAL RISK MANAGEMENT INSTRUMENTS: THE CASE OF CROATIAN AND SLOVENIAN NON-FINANCIAL COMPANIES

Danijela MILOŠ SPRČIĆ, PhD
Faculty of Business and Economic, Zagreb

Article*
UDC 65.012.4
JEL G32

Abstract

The paper analyses financial risk management practices and derivative usage in large Croatian and Slovenian non-financial companies and explores if the decision to use derivatives as risk management instruments in the analysed companies is a function of several firm's characteristics that have been proven as relevant in making financial risk management decisions. On the basis of the research results it can be concluded that forwards and swaps are by far the most important derivative instruments in both countries. Futures as representatives of standardised derivatives together with structured derivatives are more important in the Slovenian than in the Croatian companies, while exchange-traded and OTC options are unimportant means of financial risk management in both countries. A comparative analysis conducted to explore differences between risk management practices in Slovenian and Croatian companies has shown evidence that Slovenian companies use all types of derivatives, especially structured derivatives, more intensively than Croatian companies. The survey has revealed that the explored hedging rationales have little predictive power in explaining financial risk management decisions both in Croatian and Slovenian companies. The decision to use derivatives in Croatian non-financial companies is related only to the investment expenditures-to-assets ratio which controls for costly external financing hypothesis, while the decision to use derivatives in Slovenian companies is dependent only on the size of the company. It can be argued that the characteristics of the Croatian and Slovenian firms could be found in other South-eastern European countries and that findings of this research may act as a baseline from

* *Received:* June 1, 2007.
Accepted: December 4, 2007.

which to generalise. Therefore, the survey results analysed in this paper also suggest a broader comparison across countries in the region. The advantage of this work is that it provides an impetus for further research to move beyond the existing hedging rationales, which have proven inadequate in explaining financial risk management decisions in the Croatian and Slovenian companies.

Key words: financial risk management, financial risk management instruments, derivative instruments, derivative market development, hedging rationales, large non-financial companies

1 Introduction

Financial risks - the risks to a corporation which emerge from the price fluctuations - directly or indirectly influence the value of a company.[1] A combination of greater deregulation, international competition, interest rates and foreign exchange rate volatility, together with commodity price discontinuities starting in the late 1960s, heightened corporate concerns, which have resulted in increased importance of financial risk management in the decades that followed. Whether it is a multinational company and its exposure to exchange rate changes, a transportation company and the price of fuel, or a highly leveraged company and its interest rate exposure, the manner and extent of managing such risks has often played a major role in the success or failure of a business. Therefore, it could be argued that financial risk management is one of the most important corporate functions as it contributes to the realisation of the company's primary goal – stockholder wealth maximisation.

Financial risk management can be conducted in two rather distinct ways. The first approach is to employ a diversification strategy in the portfolio of businesses operated by the firm, while the second strategy is the firm's engagement in financial transactions. In the case of diversification, which was once a popular risk management strategy, firms that are concerned about the volatility of their earnings have turned to the financial markets. This is because the financial markets have developed more direct approaches to risk management that transcend the need to directly invest in activities that reduce volatility. The task of financial risk management has been facilitated by the increasing availability of a variety of derivative instruments to transfer financial price risks to other parties.

This paper explores whether large Croatian and Slovenian non-financial companies are aware of the importance of financial risk management, and if they are, what kind of risk management instruments they use in order to protect their earnings and cash-flows from the adverse price, interest-rate and exchange-rate fluctuations. This evidence is important for evaluating the overall risk characteristics of firms that use different hedging instruments, which is of interest to bankers, investors, the monetary authorities, and to scholars as well. The evidence is also important as it indicates the stage of development of derivative markets in countries under analysis. We have explored how many companies in both coun-

[1] The analysis of financial risks conducted in this paper includes interest-rate risk, exchange-rate risk and commodity price risk.

tries manage financial risks, whether they manage all three types of financial risks and what kind of risk management strategies they use. We have also investigated the reasons why Croatian and Slovenian companies do not hedge by using derivative instruments. Additionally, the paper analyses if the decision to use derivatives as risk management instruments in Croatian and Slovenian companies is a function of several firm's characteristics that have been proven as relevant in making financial risk management decisions.

We have also tested assumptions that refer to the differences in risk management practices between Croatia and Slovenia. These two countries have been chosen for a comparative analysis as they had followed similar economic and political patterns for more than 70 years. After declaring independence in 1991, they have started to develop their own economies. Since the break-up of Yugoslavia and the Wars of Yugoslav Succession that affected the country from 1991 to 1995, Croatia's economic performance has fallen short of its potential. The disruptions caused by the War and the lack of competitiveness in many export sectors led to a decline in traditional industries like base metals, textile, wood and food industries. Only in the recent past has the economy begun to show its potential, with tourism, banking and public investment leading the way (EIU, 2006). Progress in enterprise restructuring through the ending of the privatisation process, SMEs development and export promotion, together with the EU accession process should accelerate the future growth and prosperity of Croatia as well as the country's economic and structural reforms. Overall, it could be concluded that Croatia's economy remains vulnerable to external shocks, in view of its reliance on the tourism sector, and also the weakness of its merchandise export sectors. In contrast to Croatia, Slovenia was spared any significant involvement in ethnically-based conflicts. With Slovenia's strong economy and low unemployment rates, as well as the establishment of a stable democracy since its independence, the country was regarded as one of the better prepared EU candidate countries and one of the least corrupt countries in Europe. Today, it is one of the best economic performers in Central and Eastern Europe, with a GDP per capita estimated at 13 534 US dollars in 2005 (EIU, 2006). Regarding the economic relations between two countries, Slovenia is among Croatia's major export and import partners, whereas Croatia is only a major export partner to Slovenia but not a major import partner. Slovenia is more oriented towards trade with the EU members – roughly two-thirds of Slovenia's trade is with the EU – which makes Germany, Italy, France and Austria its major import partners. It can be seen from the analysis presented above that, in spite of a similar starting position after the dissolution of Yugoslavia, Slovenia has achieved much better results than Croatia during the last fifteen years. Therefore, besides other objectives, this research explores whether financial risk management, as one of the most important objectives of modern corporate strategy, is more developed among the Slovenian than among Croatian companies.

The results in this paper derive from written surveys including 49 Croatian and 41 Slovenian large non-financial companies. The paper focuses primarily on the demand side of derivative markets and does not cover the supply side. This could be seen as a limitation of our research, but it also indicates avenues for future research. Regarding the supply side of the market, the survey has revealed that commercial banks are by far the primary sources of derivatives transactions for 73.4 per cent of the Slovenian and 87.5 per cent of the Croatian respondents that hedge financial risks. Investment banks, insurance

companies and stock exchange/brokerage houses are not very important sources of derivative transactions, and very few analysed firms in both countries use them as counterparties. On the basis of this result it can be concluded that the exchange-traded derivative products have substantially smaller percentages of adoption. The greater use of over-the-counter products offered by commercial banks is probably attributable to their flexibility and convenience. Since the respondent firms are mostly large corporations that can trade in wholesale markets, custom-made over-the-counter products are likely to fit their specific needs better. We believe that companies' business needs are already well covered by the more common, plain-vanilla products such as forward contracts, over-the-counter options, and swaps. Additionally, an interesting finding revealed by managers that points out issues on the supply side of the market in Croatia regards the insufficient supply of risk management instruments offered by financial institutions. Respondents have marked this issue as a very important reason for not hedging financial risks in their companies. Therefore, it can be argued that, in spite of an increasing number of Croatian non-financial companies that are aware of the importance of financial risk management, a lack of suitable instruments offered to them by the domestic financial industry becomes the main reason why many companies do not use derivatives when managing risks. As already mentioned, the above mentioned issues provide a guideline for further research which will focus more on the supply side of derivative markets in Croatia and Slovenia.

2 Literature review

Before derivatives markets were truly developed, the means for dealing with financial risks were few and financial risks were largely outside managerial control. Few exchange-traded derivatives did exist, but they allowed corporate users to hedge only against certain financial risks, in limited ways and over short time horizons. Companies were often forced to resort to operational alternatives like establishing plants abroad, in order to minimise exchange-rate risks, or to the natural hedging by trying to match currency structures of their assets and liabilities (Santomero, 1995). Allen and Santomero (1998) wrote that, during the 1980s and 1990s, commercial and investment banks introduced a broad selection of new products designed to help corporate managers in handling financial risks. At the same time, the derivatives exchanges, which successfully introduced interest rate and currency derivatives in the 1970s, have become vigorous innovators, continually adding new products, refining the existing ones, and finding new ways to increase their liquidity. Since than, markets for derivative instruments such as forwards and futures, swaps and options, and innovative combinations of these basic financial instruments, have been developing and growing at a breathtaking pace.[2] The range and quality of both exchange-traded and OTC derivatives, together with the depth of the market for such instruments, have expanded intensively. Consequently, the corporate use of derivatives in hedging interest rate, currency, and commodity price risks is widespread and growing. It could be said that the derivatives revolution has begun. The emergence of the modern and innovative derivative markets allows corporations to insulate themselves from financial risks, or to modify them (Hu, 1995; 1996). Therefore, under these new conditions, shareholders

[2] E.g. caps, floors, collars, cylinder options, synthetic options, synthetic forwards, participating forwards, etc.

and stakeholders increasingly expect company's management to be able to identify and manage exposures to financial risks.

It was long believed that corporate risk management was irrelevant to the value of the firm and the arguments in favour of the irrelevance were based on the Capital Asset Pricing Model (Sharpe, 1964; Lintner, 1965; Mossin, 1966) and the Modigliani-Miller theorem (Modigliani and Miller, 1958). One of the most important implications of CAPM is that diversified shareholders should care only about the systematic component of total risk. On the surface this may imply that managers of firms who are acting in the best interests of shareholders should be indifferent about the hedging of risks that are non-systematic. Miller and Modigliani's proposition supports the CAPM findings. The conditions underlying MM propositions also imply that decisions to hedge corporate exposures to interest rate, exchange rate and commodity price risks are completely irrelevant because stockholders already protect themselves against such risks by holding well-diversified portfolios.

However, it is apparent that managers are constantly engaged in hedging activities that are directed towards reduction of non-systematic risk. As an explanation for this clash between theory and practice, imperfections in the capital market are used to argue for the relevance of corporate risk management function. Studies that test the relevance of derivatives as risk management instruments generally support the expected relationships between the risks and firm's characteristics. Stulz (1984), Smith and Stulz (1985) and Froot, Scharfstein and Stein (1993) constructed the models of financial risk management. These models predicted that firms attempted to reduce the risks arising from large costs of potential bankruptcy, or had funding needs for future investment projects in the face of strongly asymmetric information. In many instances, such risk reduction can be achieved by the use of derivative instruments.

Campbell and Kracaw (1987), Bessembinder (1991), Nance, Smith and Smithson (1993), Dolde (1995), Mian (1996), as well as Getzy, Minton and Schrand (1997) and Haushalter (2000) found empirical evidence that firms with highly leveraged capital structures are more inclined to hedging by using derivatives. The probability of a firm to encounter financial distress is directly related to the size of the firm's fixed claims relative to the value of its assets. Hence, hedging will be more valuable the more indebted the firm, because financial distress can lead to bankruptcy and restructuring or liquidation - situations in which the firm faces direct costs of financial distress. By reducing the variance of a firm's cash flows or accounting profits, hedging decreases the likelihood, and thus the expected costs, of financial distress (see: Mayers and Smith, 1982; Myers, 1984; Stulz, 1984; Smith and Stulz, 1985; Shapiro and Titman, 1998). The argument of reducing the expected costs of financial distress implies that the benefits of risk management should be greater the larger the fraction of fixed claims in the firm's capital structure.

The results of the empirical studies suggest that the use of derivatives and risk management practices are broadly consistent with the predictions from the theoretical literature, which is based upon value-maximising behaviour. By hedging financial risks such as currency, interest rate and commodity risk, firms can decrease cash flow volatility. By reducing the cash flow volatility, firms can decrease the expected financial distress and agency costs, thereby enhancing the present value of expected future cash flows. In addition, reducing cash flow volatility can improve the probability of having

sufficient internal funds for planned investments, (e.g. see: Stulz, 1984; Smith and Stulz, 1985; Froot, Scharfstein and Stein, 1993; 1994) eliminating the need to either cut profitable projects or bear the transaction costs of external funding. The main hypothesis is that, if access to external financing (debt and/or equity) is costly, firms with investment projects requiring funding will hedge their cash flows to avoid a shortfall in own funds, which could precipitate a costly visit to the capital markets. An interesting empirical insight based on this rationale is that firms with substantial investment opportunities that are faced with high costs of raising funds under financial distress will be more motivated to hedge against risk exposure than average firms. This rationale has been explored by numerous scholars, among others by Hoshi, Kashyap and Scharfstein (1991), Bessembinder (1991), Dobson and Soenen (1993), Froot, Scharfstein and Stein (1993), Getzy, Minton and Schrand (1997), Gay and Nam (1998), Minton and Schrand (1999), Haushalter (2000), Mello and Parsons (2000), Allayannis and Ofek (2001) and Haushalter, Randall and Lie (2002). The results of the studies mentioned above confirm that companies using derivative instruments to manage financial risks are more likely to have larger investment opportunities.

The results of empirical studies have also proven that the benefits of risk management programs depend on the company size. Nance, Smith and Smithson (1993), Dolde (1995), Mian (1996), Getzy, Minton and Schrand (1997) and Hushalter (2000) argue that larger firms are more likely to hedge and use derivatives. One of the key factors in the corporate risk management rationale pertains to the costs of engaging in risk-management activities. The hedging costs include the direct transaction costs and the agency costs of ensuring that managers transact appropriately.[3] The assumption underlying this rationale is that there are substantial economies of scale or economically significant costs related to derivatives use. Indeed, for many firms (particularly smaller ones), the marginal benefits of hedging programs may be exceeded by marginal costs. This fact suggests that there may be sizable set-up costs related to operating a corporate risk-management program. Thus, numerous firms may not hedge at all, even though they are exposed to financial risks, simply because it is not an economically worthwhile activity. On the basis of empirical results, it can be argued that only large firms with sufficiently large risk exposures are likely to benefit from formal hedging programs.

3 Methodology and Data Collection

Empirical research was conducted on the largest Croatian and Slovenian non-financial companies and the criteria for selecting companies in the sample were similar for both countries. The Croatian companies needed to meet two out of three conditions re-

[3] Transaction costs of hedging include the costs of trading, as well as substantial costs of information systems needed to provide the data necessary to decide on the appropriate hedging methods. For forwards, futures, options, and swaps, this cost consists of out-of-pocket costs such as brokerage fees and the implicit cost of bid-ask spreads. Then, there are agency costs involved in such activities, which include the costs of internal control systems to run the hedging program. These include the problems associated with the speculation opportunities offered to participants in derivative and other markets. Scandals that have occurred in Metalgesellschaft, Barings Bank and other firms where large amounts of money were lost are extreme examples of these agency costs. Due to these scandals, there is more oversight at the corporate board level, and companies have been devoting more resources to ensure that hedging programs are better controlled (Allen and Santomero, 1998).

quired by the Croatian Accounting Act[4] that related to large companies, while the Slovenian companies were included in the sample if they met two out of three conditions required by the Slovenian Company Act[5] related also to large companies. A list of the largest 400 Croatian companies in the year 2005[6] has been used and 157 companies meeting the required criteria were selected in the sample. In the case of the Slovenian companies, GVIN[7] electronic database was used and, on the basis of selected criteria, 189 companies were chosen for further analysis. The primary advantage of these samples was that the evidence could be generalised to a broad class of firms in different industries. Research was conducted on large non-financial companies because such companies were supposed to have developed their risk management functions. Financial firms were excluded from the sample because most of them were also market makers, hence their motivation to use derivatives might be different from the motivations of non-financial firms.

Data were collected from two sources: annual reports and notes to the financial statements for the fiscal year 2005, and through the survey. At the beginning of September 2006, a questionnaire was mailed to Croatian and Slovenian managers involved in making decisions on financial risk management. It was constructed to explore how many companies managed financial risks by using derivatives and which types of derivatives instrument were employed by the analysed companies. Additionally, a part of the questionnaire referred to those companies that classified themselves as non-users of derivatives in order to find the reasons for not managing financial risks. In the case of Croatia, only 19 companies responded by the end of September, so that a follow-up letter was sent to the non-respondents. Sending a follow-up letter encouraged an increase in the response rate from 12 to 31 percent. In the case of Slovenian companies, 41 companies responded to the questionnaire without any additional contact with potential respondents, creating a response rate of 22 percent. An adequate response rate is a problem that has often occurred in survey-based studies. The accomplished response rates regarding both the Croatian and Slovenian samples were sufficient for statistical generalisation (e.g. the response rate of the 1998 Wharton survey of derivative usage, as reported in Bodnar, Hayt and Marston (1998) was 21 per cent). However, it is important to mention that the inability to compare the survey results to the data of non-responding companies should be treated as a limitation of this research.

The survey data were statistically analysed by using both univariate and multivariate analysis. Descriptive statistics has been presented giving an insight into risk management practices of firms in both samples. Then, by using independent sample t-test, the differences between means for Slovenian and Croatian derivative users and nonusers have been explored. Independent sample t-test enables a calculation of statistically

[4] In Croatian: Zakon o računovodstvu, NN 146/05.

[5] In Slovene: Zakon o gospodarskih družbah, UL 15/05.

[6] The list has been published in a special edition of Privredni vjesnik.

[7] www.GVIN.com is intended for both synthetic business overview of individual companies or industries and for extremely sophisticated analysis. GVIN.com data cover 3 main information domains: market information, Slovenian companies, and management and governance. In this research the domain "Slovenian companies" has been used, which enabled the analysis of more than 220,000 companies and selection of a research sample.

significant differences between small and mutually unrelated parametric samples (Bryman and Cramer, 1997). Both Slovenian and Croatian research samples were small, unrelated and parametric. In addition, research data were of a non-categorical nature (interval/ratio data); therefore the t-test was found as the most suitable for univariate analysis. Additionally, correlation analysis was conducted by calculating Pearson's correlation coefficient as the most common measure of linear correlation when variables are of an interval/ratio nature. Regarding the multivariate analysis, binominal logistic regression was estimated to distinguish between the possible explanations for the decision to use derivatives. Binomial (or binary) logistic regression has been selected because this form of regression is used when the dependent variable is a dichotomy (limited, discrete and not continuous) and the independents are of any type (Hosmer and Lemeshow, 1989; Rice, 1994; Allison, 1999; Menard, 2002). Besides the fact that the dependent variable in this research is discrete and non-continuous, logistic regression has been chosen because it enables the researcher to overcome many restrictive assumptions of the OLS regression[8]. A comparative analysis has also been employed as a method used to compare the results of empirical research conducted on the Croatian and Slovenian companies. The comparative analysis has been designed as compare-and-contrast work (Walk, 1998) in which results for both countries were weighted equally trying to find crucial differences as well as commonalities in financial risk management practices employed by the Croatian and Slovenian companies.

3.1 Research Hypothesis

Based on the arguments arising from the literature review, several hypotheses have been proposed. Firstly, it is argued that derivatives use can increase the value of the firm by reducing the costs associated with financial distress and costly external financing. The argument of reducing the expected costs of financial distress implies that the benefits of hedging should be greater the larger the fraction of fixed claims in the firm's capital structure. Additionally, the informational and transactional scale economies argument implies that larger firms will be more likely to hedge. The argument of costly external financing implies that the benefits of hedging should be greater the more growth options are in the firm's investment opportunity set. Therefore, a positive relation between derivatives use and a company's size, leverage and investment (growth) opportunities has been predicted.

Regarding risk management practices in Croatia vs. Slovenia, the hypothesis that financial risk management, as one of the most important objectives of modern corporate strategy, is more developed or has different rationales among Slovenian than among Croatian companies has been explored. On the basis of the comparison of countries under analysis presented in the introduction, it has been argued that Slovenian companies have more advanced risk management practices than Croatian companies, measured by the percentage of analysed companies using derivatives and by implementation of the more sophisticated risk management instruments like structured derivatives.

[8] Unlike the OLS regression, logistic regression does not assume linearity of relationship between the independent variables and the dependent vriable, does not require normally distributed variables, does not assume homoscedasticity, normally distributed error terms are not assumed, does not require that the independents be interval or unbounded, and in general has less stringent requirements.

3.2 Research Variables

A dependent variable has been created in the form of a binary (dichotomous) measure and was coded as "1" for the firms managing any one of the three types of financial risks by using derivative instruments and "0" for those not using derivatives as financial risk management instruments. Nance, Smith and Smithson (1993), Mian (1996), Geczy, Minton and Schrand (1997), Allayannis and Weston (2001) and Cummins, Phillips and Smith (2001) used a dichotomous variable that equalled one for firms using derivatives and zero for those that did not use derivatives.

To examine the hypothesis regarding the reduction of the expected financial distress cost and the informational and transactional scale economies argument, the company size and its leverage have been employed. The size of a company was measured by using two alternative proxies: 1) the book value of assets (Haushalter, 2000; Hoyt and Khang, 2000; Allayannis and Weston, 2001; Allayannis and Ofek, 2001); and 2) the book value of total sales revenues (Allayannis and Weston, 2001). Leverage was also used as a proxy for the impact of fixed claims on the decision to use derivatives. Three different measures were constructed for the degree of a firm's financial leverage. First, the financial leverage was defined as the ratio of the book value of long-term debt to the book value of assets (Tufano, 1996; Nance, Smith and Smithson, 1993; Geczy, Minton and Schrand, 1997), while the other measures were the ratio of the book value of long-term debt to the book value of equity (Hoyt and Khang, 2000; Allayannis and Weston, 2001; Mian, 1996) and the interest cover ratio defined as earnings before interest and taxes to the total interest expense (Geczy, Minton and Schrand, 1997; Nance, Smith and Smithson, 1993).

Investment opportunities were measured as the ratio of investment expenditures to the book value of assets (Haushalter, 2000; Froot, Scharfstein and Stein, 1993; DeMarzo and Duffie, 1991; Geczy, Minton and Schrand, 1997; Smith and Stulz, 1985). Investment (growth) opportunities were also measured as the ratio of investment expenditures to the value of total sales (Froot, Scharfstein and Stein 1993; DeMarzo and Duffie, 1991; Geczy, Minton and Schrand, 1997; Smith and Stulz, 1985; Dolde, 1995).

4 Research Results

4.1 Descriptive Statistics

The survey results have revealed that 65.9 per cent of the analysed Slovenian companies use derivatives as risk management instruments, while in Croatia only 43 per cent of respondents declare themselves as derivatives users. It can be concluded that the Slovenian companies use derivatives more frequently than their counterparts in Croatia. Therefore, the research hypothesis, arguing that Slovenian companies have more advanced risk management practices than Croatian companies, measured by the percentage of analysed companies using derivative instruments to manage their risk exposures, is accepted. In respect to this result, it should be mentioned that the result could be biased on account of the data collection process. As explained in the methodology section, a follow-up letter was sent to the non-responding Croatian companies in order to increase the originally small response rate, while no such action has been performed in the case of Slovenian companies. Unfortunately, we were not able to test the influence of "the late respondents' answers" to the analysed results as the size of the two Croatian sub-samples – the original and late respondents – was too small.

Table 1 Summary information - Croatian sample

	N	Minimum	Maximum	Mean	Std. Deviation
Total assets	49	3,117	3,796,086	262,189.67	599,929.59
Total sales revenues	49	162	1,304,680	129,032.61	213,620.29
Long-term debt-to-assets ratio	48	0	0.7240	0.217236	0.182465
Long-term debt-to-equity ratio	48	-3.1860	22.9220	1.592013	4.072219
Interest cover ratio	44	-13.7689	120.2259	9.966513	23.660138
Share owned by institutional investors	48	0	0.7250	0.06776	0.145301
Investment expenditures-to-assets ratio	49	0	0.5642	0.0885203	0.0105411
Investment expenditures-to-sales ratio	49	0	4.1468	0.229198	0.609356
Value of equity owned by managers	49	0	108,566.0	7,010,596	18,523,473
Share of the company owned by management	49	0	1.000	0.19263	0.33858
Managers tenure	49	2	38	12.35	10.36
Dividend pay-out ratio	43	0	0.98	0.1550	0.2663
Quick ratio	48	0.0009	6.2500	0.547654	1.044173
Liquidity ratio	49	0.0216	25.6076	2.680185	3.959613

Note: Variables that are presented in absolute values are in Euro 000

Source: Croatian survey data

Table 2 Summary information - Slovenian sample

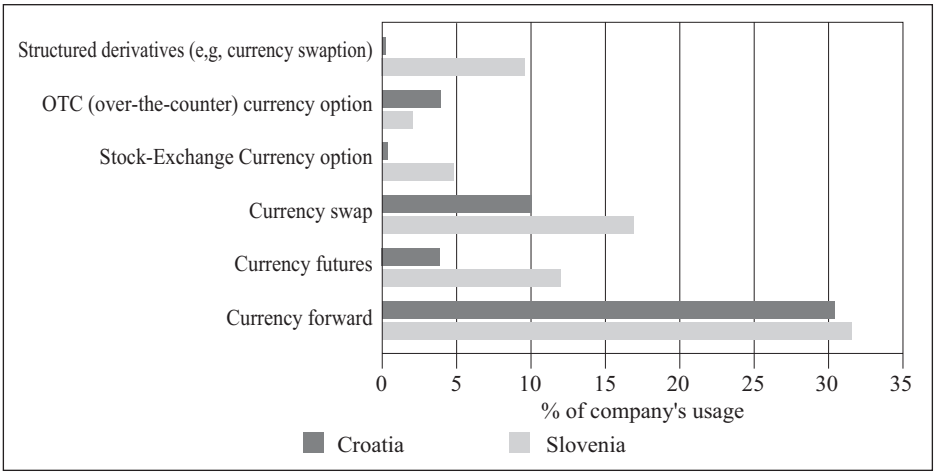
	N	Minimum	Maximum	Mean	Std. Deviation
Total assets	41	12,194	1,179,145	151,221.51	236,982.42
Total sales revenues	41	14,094	1,754,016	141,072.39	275,470.64
Long-term debt-to-assets ratio	41	0.0000	0.3069	0.121320	9.21496E-02
Long-term debt-to-equity ratio	41	0.0000	0.8407	0.280353	0.261797
Interest cover ratio	40	-95.0833	564.3571	19.742316	91.284027
Share owned by institutional investors	40	0	100.00	17.6833	28.3987
Investment expenditures-to-assets ratio	41	0	0.2336	7.19644E-02	5.62824E-02
Investment expenditures-to-sales ratio	41	0	0.7295	8.43506E-02	0.119113
Value of equity owned by managers	41	0	78,375	2,505,265	12,247,611
Share of the company owned by management	39	0	100.00	4.8815	17.9650
Managers age	40	2	5	3.25	0.95
Managers tenure	38	3	37	15.14	9.73
Dividend pay-out ratio	38	0	160.00	23.7161	38.0949
Quick ratio	41	-0.5976	3.0000	0.221750	0.534335
Liquidity ratio	41	-10.8570	20.0000	1.896927	3.696341

Note: Variables that are presented in absolute values are in Euro 000

Source: Slovenian survey data

Regarding the risk management instruments that companies use in managing currency risk, currency forward is the most important and most frequently used instrument, followed by currency swap as the second most important derivative instrument. The use of currency futures and structured derivatives in the Slovenian companies has gained importance in comparison with the Croatian companies. Other derivatives, such as stock-exchange and OTC options, are not important currency risk management instruments among both Croatian and Slovenian companies. However, it should be emphasised that the importance of the currency risk management instruments used by Slovenian companies is expected to decrease sharply, especially of those having their value attached to the euro or Slovenian tolar. The exposure to the foreign-exchange risk is expected to decrease in 2007 as Slovenia adopted the euro as its official currency. Slovenia's major trade partners are Germany, Italy, France and Austria, so the majority of transactions have been denominated in one currency since Slovenia entered the eurozone (The Economist Intelligence Unit Limited publications, 2006).

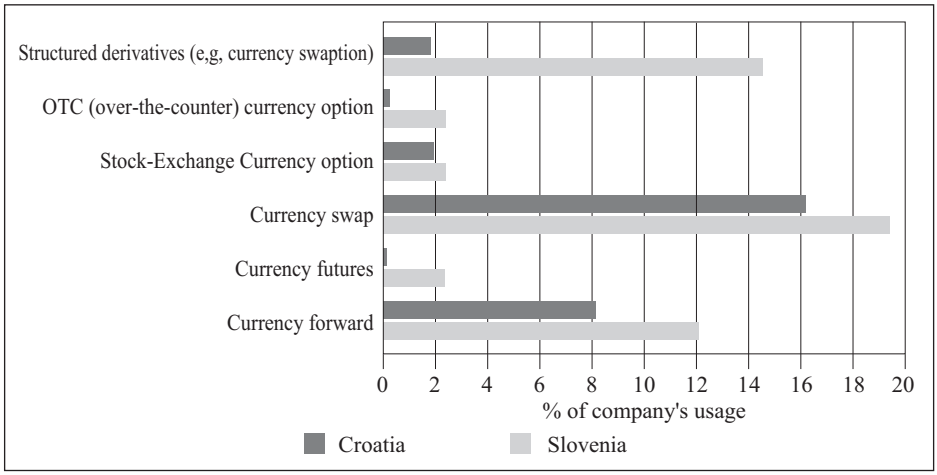
Graph 1 Currency risk management instruments used by Croatian and Slovenian companies



Source: Survey data

Regarding the interest rate risk in the Slovenian as well as in the Croatian companies, forward contracts and swaps are again the most important derivative instruments in the risk management strategy, but in contrast to currency risk management, interest rate swap is more important than interest rate forward. Contrary to the findings of the Croatian analysis, structured derivatives are important instruments of interest-rate risk management among the Slovenian respondents. In comparison with other instruments, structured derivatives are even more important than interest-rate forwards. Regarding the use of other derivative instruments like interest-rate options and futures, the risk management practices in both countries show that they do not play an important role in interest rate risk management.

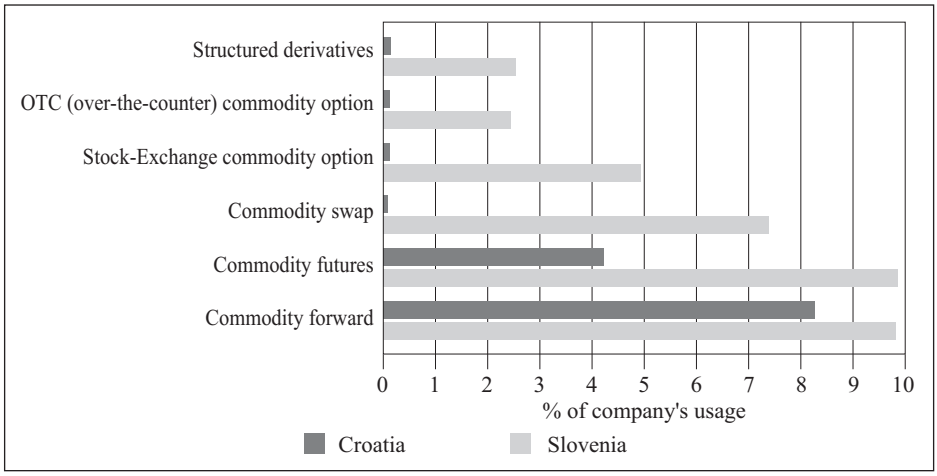
Graph 2 Interest-rate risk management instruments used by Croatian and Slovenian companies



Source: Survey data

Commodity price risk in both Slovenian and Croatian companies is usually hedged by commodity forwards and commodity futures. For the first time, futures contracts are used as representatives of standardised derivative instruments traded on the financial market. In Slovenia, futures and forwards are followed by commodity swap and standardised options, while in Croatia, contrary to the findings of the currency and interest-rate risk analyses, commodity swap is not used at all, nor are the other derivative instruments like structured derivatives or OTC options.

Graph 3 Commodity price risk management instruments used by Croatian and Slovenian companies



Source: Survey data

Table 3 Independent samples t-test -comparative analysis of Croatian and Slovenian financial risk management practices

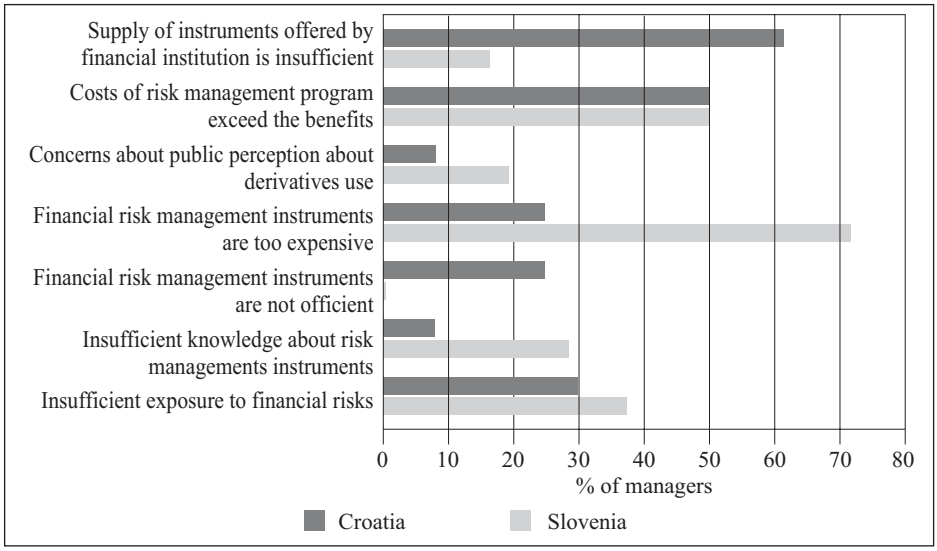
		Levene's Test for Equality of Variances		t-test for Equality of Means		Group Statistics					
		F	Sig.	t	Sig. (2-tailed)		Country	N	Mean	Std. Deviation	Std. Error Mean
Structured Derivatives –Currency Risk	Equal variances assumed	29.860	0.000	-2.295	0.025	Structured Derivatives –Currency Risk	Croatia	34	0.00	0.00	0.00
	Equal variances not assumed			-2.117	0.043		Slovenia	29	0.14	0.35	6.52E-02
Structured Derivatives –Interest rate risk	Equal variances assumed	21.357	0.000	-2.003	0.050	Structured Derivatives –Interest rate risk	Croatia	28	3.57E-02	0.19	3.57E-02
	Equal variances not assumed			-2.026	0.049		Slovenia	29	0.21	0.41	7.66E-02
Derivative users	Equal variances assumed	3.783	0.055	-2.367	0.020	Derivative users	Croatia	49	0.43	0.50	7.14E-02
	Equal variances not assumed			-2.379	0.020		Slovenia	40	0.68	0.47	7.50E-02

Source: Survey data

On the basis of the survey results it can be concluded that forwards and swaps are by far the most important instruments in both countries. Futures as representatives of standardised derivatives, together with structured derivatives, are more important in the Slovenian than Croatian companies, while exchange-traded and OTC options are unimportant means of financial risk management in both countries. The results of t-test conducted to explore statistically significant differences between risk management practices in the Slovenian and Croatian companies provide statistically significant evidence that the Slovenian companies use all types of derivatives, especially structured derivatives like swaptions, caps, floors, collars or corridors, as instruments for managing currency and interest-rate risk more intensively than the Croatian companies (see Table 3). These findings are consistent with the research prediction that Slovenian companies have more advanced risk management practices than Croatian companies, measured by the implementation of more sophisticated risk management strategies. Therefore, with respect to the use of structured derivative instruments, the research hypothesis is accepted.

Amongst the most important reasons why companies do not use derivatives, both Slovenian and Croatian financial managers have indicated the high costs of establishing and maintaining risk management programs that exceed the resulting benefits. This finding can be related to the informational and transactional scale economies argument which implies that larger firms will be more likely to hedge due to the economically significant costs of hedging (see: Froot, Scharfstein and Stein, 1993; Haushalter, 2000; Hoyt and Khang, 2000).

Graph 4 The most important reasons why companies do not use derivatives as risk management instruments



Source: Survey data

Apart from this problem, the Slovenian managers have numbered two additional reasons that stop them from hedging. The first is the high cost of financial risk management instruments (e.g. see: Mian, 1996; Getzy, Minton and Schrand, 1997; Hushalter, 2000). Such cost includes the transaction costs like the costs of trading as well as the internal control system costs associated with the speculation opportunities with derivative instruments. It can be concluded that, regardless of the fact that the transaction costs have fallen with the growth of the derivatives markets, both Slovenian and Croatian derivative markets are still small and shallow, so the high cost of risk management instruments remains the problem for a substantial number of analysed companies. Another problem that has prevented Slovenian companies from using derivatives is insufficient exposure to financial risks. It is closely connected with the problems of the high costs of establishing and maintaining risk management programs and the costs of risk management instruments discussed above. It has been argued that only firms with sufficiently large risk exposures are likely to benefit from formal hedging programs, because organising the Treasury for risk management involves significant fixed costs (Dolde, 1995). Therefore, it can be concluded that numerous analysed companies do not manage financial risks simply because it is not an economically worthwhile activity.

The Croatian managers have argued that the insufficient supply of risk management instruments offered by financial institutions is a very important reason why they do not hedge. On the basis of the respondents' replies and informal interviews conducted at the 3rd Annual Conference of the Croatian Association of Corporate Treasurers held in September 2006, it can be concluded that, despite the increasing number of Croatian non-financial companies that are aware of the importance of financial risk management, a lack of suitable instruments offered to them by the domestic financial industry becomes the main reason why many companies do not use derivatives in risk management. Other reasons such as concerns about the perceptions of derivatives by investors, regulators and the public, or insufficient knowledge about financial risk management instruments are less important reasons why the Slovenian and Croatian companies refrain from hedging.

4.2 Multivariate Analysis

In the employed logistic regression we have tested the hypothesis that the decision to use derivatives as risk management instruments is a function of the following factors - financial distress costs, size and costly external financing. The variables tested in our multivariate regression model are based on the determinants presented in the literature review as the key rationales for the corporate use of derivative instruments. The relationship can be expressed in the form of a general function as follows:

$$\text{Derivative use} = f(S, FC, CEF) \tag{1}$$

where:

• Derivative use is a binary variable which takes on a value of "1" if the firm use derivatives and "0" if the firm does not hedge by these instruments

• S is the size of the company

• FC is the likelihood of a firm's financial distress or bankruptcy, and

• CEF is the costly external financing.

The multivariate analysis conducted for Croatian companies showed that the use of derivative instruments is only related to costly external financing measured by the investment expenditures-to-assets ratio. The investment expenditures-to-assets ratio has a statistically significant positive relation to the decision to use derivatives (see table 4), which is supported by both the independent sample t-test and Pearson correlation coefficient (tables 5 and 6). This result is consistent with the findings of Bessembinder (1991), Froot, Scharfstein and Stein (1993), Dobson and Soenen (1993), Nance, Smith and Smithson (1993), Getzy, Minton and Schrand (1997) and Allayannis and Ofek (2001), as well as with the research prediction that a firm's decision to hedge is positively related to the measures of investment (growth) opportunities. It has been proven that the benefits of hedging and derivatives use should be greater the more growth options are in the firm's investment opportunity set, because the reduction of cash flow volatility by hedging can improve the probability of having sufficient internal funds for planned investments eliminating the need to either cut profitable projects or bear the transaction costs of obtaining external funding. It should be noted that the other variable (investment expenditures-to-total sales ratio) that has been used to test the capital market imperfection hypothesis has not shown statistically significant difference between analysed derivative users and non-users. These findings suggest that the correlation between hedging by using derivative instruments and capital market imperfection is not robust. Therefore, this result should be interpreted with care. Other tested hypotheses regarding the size of the company and expected cost of financial distress have not proved to be relevant in explaining corporate decisions to use derivatives as hedging instruments in Croatian companies.

Table 4 Multivariate logistic regression results (Croatian companies)

-2 Log Likelihood	49.782
Goodness-of-fit	44.751
Cox & Snell – R^2	0.284
Nagelkerke – R^2	0.380

Hosmer and Lemeshow Goodness-of-fit test

Goodness-of-fit test	Chi-Square	df	Significance
	4.9827	8	0.7594

Variable	B	S.E.	Wald	df	Sig.	R
CMI2	14.7145	5.9310	6.1552	1	0.0131	0.2513
FINCOST4	1.6496	1.9781	0.6955	1	0.4043	0.0000
SIZE2	5.39E-06	3.446E-06	2.4440	1	0.1180	0.0822
Constant	-2.3510	0.8248	8.1254	1	0.0044	

No outliers found.

Number of cases included in the analysis: 48
Independent variables: CMI2 – Investment expenditures-to-assets ratio,
FINCOST4 – Long-term debt-to-assets ratio, SIZE2 – Total sales revenues

Source: Survey data

Table 5 Independent samples t-test (Croatian companies)

		Levene's Test for Equality of Variances		t-test for Equality of Means		Group Statistics				
		F	Sig.	t	Sig. (2-tailed)		Derivative users	N	Mean	Std. Deviation	Std. Error Mean
Investment expenditures -to-assets ratio	Equal variances assumed	16.318	0.000	-2.940	0.005	Investment expenditures -to-assets ratio	No	27	5.26694E-02	4.82036E-02	9.27678E-03
	Equal variances not assumed			-2.602	0.016		Yes	20	0.139020	0.142482	3.18599E-02

Source: Survey data

Table 6 Pearson correlation coefficient (Croatian companies)

		Derivative users	Investment expenditures--to-assets ratio
Derivative users	Pearson Correlation	1.000	0.384[a]
	Sig. (2-tailed)	–	0.006
	N	49	49
Investment expenditures-to-assets ratio	Pearson Correlation	0.384[a]	1.000
	Sig. (2-tailed)	0.006	–
	N	49	49

[a] *Correlation is significant at the 0.01 level (2-tailed).*

Source: Survey data

Regarding the corporate decision to use derivative instruments in the Slovenian companies, the regression model has shown that this decision is only related to the total sales revenues (see table 7). Total sales revenues are a proxy for the effect of the company's size on the decision to use derivatives as risk management instruments. The regression model has revealed a positive relation between the decision to use derivatives and the company's size implying that larger Slovenian companies are more likely to use derivatives. This result is confirmed by the independent sample t-test (see table 8), but not by the correlation analysis. Several previous empirical studies (e.g. Nance, Smith and Smithson, 1993; Dolde, 1995; Mian, 1996; Géczy, Minton and Schrand, 1997; Allayannis and Weston, 2001) have found that firms with more assets are more likely to hedge. These studies have contended that the positive correlation between the company's size and derivatives use can be attributed to the economically significant costs related to hedging discussed in the literature review section of the paper. A positive relation between the company's size and decision to use derivative instruments is also predicted in this paper. The results of both bivariate and multivariate analyses support this hypothesis for the Slovenian companies. However, the robustness test carried out by replacing the total sales revenues with the other variable (the value of total assets) that has been used as a proxy for the effect of the company's size has not shown statistically significant results. This finding suggests that the analysis does not provide a strong support for the prediction of the tested hypothesis. Other hypotheses, regarding the costly external financing and the expected cost of financial distress tested in the regression model, have not proved to be relevant in explaining corporate decisions to use derivatives as hedging instruments in Slovenian companies.

A positive relation between the company's size and the decision to use derivatives can be considered as one of the main reasons why Slovenian companies do not use derivatives, which were discussed earlier. Slovenian financial managers have indicated the high costs of establishing and maintaining risk management programs that exceed their benefits together with the high cost of financial risk management instruments as major reasons for not using derivatives. These facts suggest that a substantial number of the analysed Slovenian companies do not use derivatives, despite being exposed to financial risks, simply

because it is not an economically worthwhile activity. It can be concluded that these companies are not large enough, as it is proven that the company's size is a relevant factor in taking decisions to use derivative instruments.

Table 7 Multivariate logistic regression results (Slovenian companies)

-2 Log Likelihood	37.506
Goodness-of-fit	35.025
Cox & Snell – R^2	0.258
Nagelkerke – R^2	0.356

Hosmer and Lemeshow Goodness-of-fit test

Goodness-of-fit test	Chi-Square	df	Significance
	4.8421	8	0.7743

Variable	B	S.E.	Wald	df	Sig.	R
SIZE2	1,97E-05	9.524E-06	4,2924	1	0,0383	0,2167
CMI2	-10.6180	7.7012	1.9010	1	0.1680	0.0000
FINCOST6	0.0045	0.0093	0.2308	1	0.6309	0.0000
Konstanta	-0.2255	0.7414	0.0925	1	0.7610	

No outliers found.

Number of cases included in the analysis: 38
Independent variables: CMI2 – Investment expenditures-to-assets ratio,
FINCOST4 – Long-term debt-to-assets ratio, SIZE2 – Total sales revenues

Source: Survey data

On the basis of the obtained results it can be concluded that the explored hedging rationales have little predictive power in explaining financial risk management decisions both in Croatian and Slovenian companies. We also argue that the characteristics of the Croatian and Slovenian firms could also be found in other South-Eastern European countries and that the findings of this research may act as a baseline from which to generalise. Therefore, the survey results analysed in this paper also suggest a broader comparison across the countries in the region. We believe that similar conclusion regarding the risk management practices and rationales in the Slovenian and Croatian companies could be made for countries like Poland, Czech Republic, Slovakia, Hungary, Rumania, Bulgaria or Serbia. We argue that the non-financial companies in these countries manage financial risks primarily by applying simple risk management instruments such as natural hedging, while in the case of derivatives usage, "plain-vanilla" instruments like forwards and swaps are by far the most important instruments. However, exchange-traded derivatives and structured derivatives are more important in countries that have entered the eurozone, as the European financial market and derivatives market as one of its segments, have developed significantly in recent years.

Table 8: Independent samples t-test (Slovenian companies)

		Levene's Test for Equality of Variances		t-test for Equality of Means		Group Statistics				
		F	Sig.	t	Sig. (2-tailed)		Use of derivatives	N	Mean	Std. Deviation	Std. Error Mean
Total sales Revenues	Equal variances assumed	3.221	0.081	-1.462	0.152	Total sales revenues	No	13	52559.23	40195.72	11148.29
	Equal variances not assumed			-2.060	0.049		Yes	26	190610.81	336974.04	66086.05

Source: Survey data

One of the most important factors that strongly influenced the European financial market development was the introduction of the euro as one of the last phases of the monetary and economic integration of the European Union. The financial system of the European Union, traditionally described as a bank-based system, is transforming toward a more market-oriented system, much like that in the USA. After the introduction of the euro, individual financial markets merged their powers and transformed the way of doing business (Batten, Fetherston and Szilagyi, 2004). The euro has had a synergic effect on capital that was dispersed in numerous currencies and created one large financial market attractive to investors all around the world. Corporations have started to finance themselves by issuing securities, as the united European financial market has enabled corporations to raise higher amounts of capital than they used to do, due to a broader investors' base (Holder, Sinha and Severiens, 2001). These trends have had a positive effect on the development of the derivative instruments market which has introduced a wider range of new risk management products designed to help corporate managers handle financial risks. In addition to the development of exchange-traded derivatives, there has also been an increase in the volume of OTC derivatives introduced by commercial and investment banks (Foreign Exchange and Derivatives Market in 2004, BIS, 2004; Monetary and Economic Development, OTC derivatives Market Activity, BIS, 2000; 2002; 2005). Therefore, it can be expected that countries like Croatia will develop their own derivative instruments markets and increase the range of financial risk management instruments after they become members of the European Union. This should improve risk the management practices in non-financial companies. Further growth and development of derivative markets will have an impact on the decrease of transaction costs related to the use of derivative instruments, which should make these instruments more available to and feasible for a broader class of companies in different industries. However, it should be mentioned that both Slovenia and especially Croatia are still not integrated enough into the European financial markets. Therefore, it will take time before the EU membership brings positive effects to the financial markets as well as derivative markets development in these countries.

5 Conclusion

On the basis of the survey results, it could be concluded that forwards and swaps are by far the most important derivative instruments in analysed countries. Futures, as representatives of standardised derivatives, together with structured derivatives are more important in the Slovenian than in Croatian companies, and in managing commodity price risk than in managing currency and interest rate risks, while exchange-traded and OTC options are unimportant financial risk management instruments in both countries. The comparative analysis conducted to explore differences between risk management practices in Slovenian and Croatian companies has shown statistically significant evidence that Slovenian companies use all types of derivatives, especially structured derivatives, more intensively than Croatian companies. These findings are consistent with the research prediction that Slovenian companies have more advanced risk management practices than Croatian companies. Amongst the most important reasons why companies do not use derivatives in financial risk management, the Slovenian and Croatian financial managers

have indicated the high costs of establishing and maintaining risk management programs that exceed the their benefits. Slovenian managers are also troubled by the high cost of financial risk management instruments and insufficient exposure to financial risks, while Croatian managers claim that the insufficient and inadequate supply of risk management instruments offered by domestic financial industry is a very important reason why they do not use derivatives.

Research results have also revealed that the explored hedging rationales have little predictive power in explaining financial risk management decisions both in Croatian and Slovenian companies. The evidence based on bivariate and multivariate empirical relations between the decision to use derivatives in Croatian non-financial companies and the expected financial distress costs, costly external financing and company's size, does not support any of the tested hypotheses but one - costly external financing measured by the investment expenditures-to-assets ratio. The statistical analysis conducted for the Slovenian companies has revealed that the decision to use derivatives is only dependent on the size of the company, since a positive relation between the use of derivatives and the size of Slovenian companies has been proven. This supports the informational and transactional scale economies argument that larger firms will be more likely to use derivatives. We also argue that the characteristics of the Croatian and Slovenian firms could also be found in other South-Eastern European countries and that findings of this research may act as a baseline from which to generalise. Therefore, the survey results analysed in this paper also suggest a broader comparison across countries in the region.

Directions for further research stem from the research findings as well as from missed opportunities that indicate avenues for future research. This paper contributes to the existing theory as it indicates the weak predictive power of well-known and accepted hedging rationales for financial risk management behaviour in the Croatian and Slovenian companies. These rationales are deduced from the existing studies conducted in American or Western- European companies. The advantage of this work is that it provides an impetus for further research to move beyond the existing hedging rationales, which have proven inadequate in explaining financial risk management decisions in the Croatian and Slovenian companies. This cannot be accomplished by using the same research methods as those used in this paper. Qualitative methods, such as an in-depth explanatory case study type of research, need to be employed because they enable scholars to expand the existing theories or test new ones, and to produce results that can be generalised. As discussed by Spicer (1992), the objective of a case study research is not to draw inferences to a larger population based on sample evidence, but rather to generalise back to the theory. By using the explanatory case study research, new theories which provide a convincing explanation of hedging behaviour should be retained and used in other case studies, while theories offering no such explanations should be modified or abandoned. This kind of approach provides scholars with a deeper understanding of the research problem and offers possible solutions. We believe that the in-depth explanatory case study type of research would enable a more comprehensive analysis of the financial risk management rationales and derivatives usage in the Croatian and Slovenian companies and consequently offer the answers to the questions this paper has left open.

REFERENCES

Allayannis, G. and Ofek, E., 2001. "Exchange Rate Exposure, Hedging, and the Use of Foreign Currency Derivatives." *Journal of International Money and Finance*, 20 (2), 273-296.

Allayannis, G. and Weston, J., 2001. "The Use of Foreign Currency Derivatives and Firm Market Value." *The Review of Financial Studies,* 14 (1), 243-276.

Allen, F. and Santomero, A. M., 1998. "The Theory of Financial Intermediation." *Journal of Banking & Finance*, 21 (11), 1461-1485.

Allison, P. D., 1999. "Comparing Logit and Probit Coefficients across Groups." *Sociological Methods and Research*, 28 (2), 186-208.

Batten, J. A., Fetherston, T. A. and Szilagyi, P. G., 2004. *European Fixed Income Markets: Money, Bond and Interest Rate Derivatives.* New York: John Wiley & Sons, Ltd.

Bessembinder, H., 1991. "Forward Contracts and Firm Value: Investment Incentive and Contracting Effects." *The Journal of Financial and Quantitative Analysis,* 26 (4), 519-532.

Bodnar, G. M., Hayt, G. S. and Marston, R. C., 1998. "1998 Wharton Survey of Derivatives Usage by US Non-Financial Firms." *Financial Management*, 27 (4), 70-91.

Bryman, A. and Cramer, D., 1997. *Quantitative Data Analysis.* London; New York: Routledge.

Campbell, T. S. and Kracaw, W. A., 1987. "Optimal Managerial Incentive Contracts and the Value of Corporate Insurance." *Journal Of Financial And Quantitative Analysis*, 22 (3), 315-328.

Cummins, J. D., Phillips, R. D. and Smith, S. D., 2001. "Derivatives and Corporate Risk Management: Participation and Volume Decisions in the Insurance Industry." *The Journal of Risk and Insurance*, 68 (1), 51-91.

DeMarzo, P. M. and Duffie, D., 1991. "Corporate Incentives for Hedging and Hedge Accounting." *Review of Financial Studies*, 8 (3), 743-771.

Dobson, J. and Soenen, L., 1993. "Three Agency-Cost Reasons for Hedging Foreign Exchange Risk." *Managerial Finance,* 19 (6), 35-44.

Dolde, W., 1995. "Hedging, leverage and primitive risk." *Journal of Financial Engineering*, 4 (2), 187-216.

EIU, 2006. *The Economist Intelligence Unit Limited Publications: Slovenia Review 2005.* [online]. Available from: [http://www.eiu.com].

Froot, K. A., Scharfstein, D. S. and Stein, J. C., 1993. "Risk Management: Coordinating Corporate Investment and Financing Policies." *Journal of Finance*, 48 (5), 1629-1658.

Froot, K. A., Scharfstein, D. S. and Stein, J. C., 1994. "A framework for risk management." *Harvard Business Review,* 72 (6), 91-102.

Gay, G. D. and Nam, J., 1998. "The underinvestment problem and corporate derivatives use." *Financial Management*, 27 (4), 53-69.

Geczy, C., Minton, B. A. and Schrand, C., 1997. "Why Firms Use Currency Derivatives." *Journal of Finance*, 52 (4), 1323-1354.

Haushalter, D., Randall, H. A. and Lie, E., 2002. "Price Uncertainty and Corporate Value." *Journal of Corporate Finance: Contracting, Governance and Organization*, 8 (3), 271-86.

Haushalter, G. D., 2000. "Financing Policy, Basis Risk, and Corporate Hedging: Evidence from Oil and Gas Producers." *The Journal of Finance*, 55 (1), 107-152.

Holder, M., Sinha, A. K. and Severiens, J. T., 2001. "The Euro and Capital Market Integration: Are We There Yet?" *Managerial Finance*, 27 (9), 18-28.

Hoshi, T., Kashyap, A. and Scharfstein, D., 1991. "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups." *Quarterly Journal of Economics*, 106 (1), 33-60.

Hosmer, D. and Lemeshow, S., 1989. *Applied Logistic Regression*. New York: John Wiley & Sons, Ltd.

Hoyt, R. E. and Khang, H., 2000. "On the Demand for Corporate Property Insurance." *The Journal of Risk and Insurance*, 67 (1), 91-107.

Hu, H. T. C., 1995. "Hedging expectations: 'Derivatives reality' and the law and finance of corporate objectives." *Texas Law Review*, 73 (3), 985-1040.

Hu, H. T. C., 1996. "Behind the Corporate Hedge: Information and the Limits of "Shareholder Wealth Maximization". *Bank of America, Journal of Applied Corporate Finance,* 9 (3), 39-53.

Lintner, J., 1965. "Security prices, risk and maximal gains from diversification." *Journal of Finance*, 20 (4), 587-615.

Mayers, D. and Smith, C. W. Jr., 1982. "On the Corporate Demand for Insurance." *The Journal of Business*, 55 (2), 281-296.

Mello, A. S. and Parsons, J. E., 2000. "Hedging and Liquidity." *The Review of Financial Studies*, 13 (1), 127-153.

Menard, S., 2001. *Applied Logistic Regression Analysis.* Thousand Oaks, CA: Sage Publications.

Mian, S., 1996. "Evidence on Corporate Hedging Policy." *Journal of Financial and Quantitative Analysis*, 31 (3), 419-439.

Minton, B. A. and Schrand, C., 1999. "The impact of cash flow volatility on discretionary investment and the cost of debt and equity financing." *Journal of Financial Economics*, 54 (3), 423-460.

Modigliani, M. and Miler, M., 1958. "The Cost of Capital, Corporate Finance and Theory of Investment." *The American Economic Review*, 48 (3), 261-297.

Monetary and Economic Development, OTC Derivatives Market Activity, 2000, 2002, 2005. Basel: Bank for International Settlements.

Mossin, J., 1966. "Equilibrium in a Capital Asset Market." *Econometrica*, 34 (4), 768-783.

Myers, C. S., 1984. "The Capital Structure Puzzle." *Journal of Finance*, 39 (3), 575-592.

Nance, D. R., Smith, C.W. and Smithson, C., 1993. "On the determinants of corporate hedging." *Journal of Finance*, 48 (1), 267-284.

Privredni vjesnik, 2006. *400 najvećih hrvatskih tvrtki*. Zagreb: Privredni Vjesnik.

Rice, J. C., 1994. "Logistic regression: An introduction." in B. Thompson, ed. *Advances in social science methodology* 3. Greenwich, CT: JAI Press, 191-245.

Santomero, A. M., 1995. "Financial Risk Management: The Whys and Hows." *Financial Markets, Institutions and Instruments,* 4 (5), 1-14.

Shapiro, A. C. and Titman, S., 1998. "An Integrated Approach to Corporate Risk Management" in: J. M. Stern and D. H Chew Jr., eds. *The revolution in corporate finance.* 3rd Edition. Malden, Mass and Oxford: Blackwell Business, 251-265.

Sharpe, W. F., 1964. "Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk." *Journal of Finance*, 19 (3), 425-442

Smith, C. W. and Stulz, R. M., 1985. "The Determinants of Firms Hedging Policies." *Journal of Financial and Quantitative Analysis*, 20 (4), 391-405.

Spicer, B. H, 1992. "The resurgence of cost and management accounting: a review of some recent developments in practice, theories and case research methods." *Management Accounting Research,* 3 (1), 1-37.

Stulz, R., 1984. "Optimal Hedging Policies." *Journal of Financial and Quantitative Analysis*, 19 (2), 127-140.

Triennial Central Bank Survey, Foreign Exchange and Derivatives Market in 2004, 2005. Basel: Bank for International Settlements.

Tufano, P., 1996. "Who Manages Risk? An Empirical Examination of Risk Management Practices in the Gold Mining Industry." *Journal of Finance*, 51 (4), 1097-1137.

Walk, K. 1998. For the Writing Center at Harvard University [online]. Available from: [http://www.fas.harvard.edu/~wricntr/documents/CompAnalysis.html].

www.dol.gov/wb/stats/main.htm.

www.GVIN.com

Zakon o gospodarskih družbah, UL 15/05. Ljubljana: Uradni list Republike Slovenije.

Zakon o računovodstvu, NN 146/05. Zagreb: Narodne novine