State and perspectives of Enterprise risk management system development - the case of Croatian companies

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Abstract

Enterprise Risk Management (ERM) encompasses activities and strategies which enable the company to identify, measure, reduce, or exploit, as well as to control and monitor the exposure to various types of corporate risks – strategic, financial, operational, and reporting, as well as compliance risks for the purpose of increasing the organization’s value to its stakeholders. The primary goal of ERM is to increase the likelihood that an organization will achieve its objectives, meaning that ERM should be created and implemented with the aim to protect and create shareholder value. For ERM to bring benefits, as it is well-explained in the existing ERM literature (e.g. see Beasley et al., 2005; Cumming and Hirtle, 2001; Lam, 2001, 2003; Liebenberg et Hoyt, 2003; Meulbroek, 2002; Nocco and Stulz 2006), it should be integrated in the most important business processes, such as strategic management, strategic planning, as well as in the finance and investment decisions in order to ensure the consistent evaluation and management of risks that arise from business initiatives and plans. This paper is both conceptual and empirical. It is aiming to (1) develop ERM Index that measures quality of ERM process within the company, (2) to explore level of ERM development in listed Croatian companies by employing ERM Index (3) to explore determinants of risk management system development in listed Croatian companies (4) to explore whether risk management decisions have different rationales in Croatian companies than among their western counterparts. Different theories of risk management derived from capital market imperfections are used to argue for the relevance of corporate risk management function. Empirical research was conducted on the listed Croatian non-financial companies. Data were collected from two sources; annual reports and notes to the financial statements and survey. Research results have revealed low levels of ERM development in listed Croatian companies. Managers are focused on financial and operative risk management, while strategic and other risks have been neglected. Regression analysis has indicated somewhat unexpected but important conclusion - the explored risk management rationales have weak predictive power in explaining corporate risk management decisions in Croatian companies. The level or risk management system development is dependent only on the size of the company and value of the growth options.

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1. Introduction

Enterprise Risk Management (ERM) is an important element of an effective corporate governance system. It is defined as a combination of activities and strategies that result in reduction of a negative impact of various types of risks - financial, operational and strategic - to the planned business results and value created to shareholders and other company’s stakeholders. According to Casualty Actuarial Society (2003) Enterprise Risk Management (ERM) is the discipline, by which an organization in an industry assesses, controls, exploits, finances, and monitors risks from all sources for the purpose of increasing the organization’s short and long-term value to its stakeholders. This novel and holistic approach to corporate risk management, entitled Integrated Risk Management, Strategic Risk Management, Enterprise Risk Management or just ERM, includes an assessment of the total exposure to all identified risks that directly or indirectly affect the value of the company as well as the implementation of a risk management strategy that is complementary to the business strategy of a corporation. ERM has been applied in financial institutions and corporations since the beginning of 21st century, and the number of users has increased significantly in recent years.

Effective risk management is considered to be a leading competitive advantage that determines the survival and success of the company in an uncertain global environment (Bartram, 2000). The global financial crisis has focused attention to the proper identification, analysis and management of key business risks because inadequate risk assessment has been identified as one of the main factors of a failure or financial difficulties of a large number of organizations worldwide. Hence, inadequate risk management has become a problem of broader social interests, resulting in recommendations of the OECD and the European Commission on the necessary changes in the existing risk management systems. As a result, an increasing number of companies are moving on from traditional silo-based risk management (TRM), where different corporate risks were managed on the individual basis without taking into account their correlations, toward ERM, where a holistic view of corporate risks is conducted and overall risk exposure is assessed (Hoyt and Liebenberg, 2011). There is a belief among increasing number of scholars (e.g., see Cumming and Hirtle, 2001; Lam, 2001; Meulbroek, 2002; Lam, 2003; Liebenberg and Hoyt, 2003; Nocco and Stulz, 2006; Beasley et al., 2005) that ERM offers companies a more comprehensive approach toward risk management in comparison to TRM. By adopting a systematic and consistent approach to managing all of the risks confronting an organization, ERM is presumed to lower a firm’s overall risk of a failure and thus increase the performance and, in turn, the value of the organization (Gordon et al., 2009). For ERM to bring benefits, as it is well-explained in the cited ERM literature, it should be integrated in the most important business processes, such as strategic management, strategic planning, as well as in the finance and investment decisions in order to ensure the consistent evaluation and management of risks that arise from business initiatives and plans.

This paper is both conceptual and empirical. It contributes to the existing literature in few ways. Firstly, we develop ERM Index that measures quality of ERM process within the company. Second, we explore level of ERM development in listed Croatian companies by employing ERM Index. Third, we explore determinants of risk management system development in listed Croatian companies, what has enabled us to study whether risk management decisions have different rationales in Croatian companies than among their western counterparts. Different theories of risk management derived from capital market imperfections are used to argue for the relevance of corporate risk management function. Empirical research was conducted on the listed Croatian non-financial companies. Data were collected from two sources; annual financial reports and survey. Research results have revealed low levels of ERM development in listed Croatian companies. Managers are focused on financial and operative risk management, while strategic and other risks have been neglected. Regression analysis has indicated somewhat

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unexpected but important conclusion - the explored risk management rationales have weak predictive power in explaining corporate risk management decisions in Croatian companies. The level or risk management system development is dependent only on the size of the company and value of the growth options.

2. Theorizing the framework

Positive theories of risk management, as a lever for shareholder value creation, are subject of research for more than three decades. Studies cited here mostly explored the effect of hedging to the company’s value or determinants of hedging decision in the company. Empirical evidence on what determines the enterprise risk management implementation, and how ERM affects company’s performance and value is very scarce (Bromiley et al., 2014) and will be analysed at the end of this section. However, to understand the rationales of risk management, in general, we provide an extensive analysis of the research done in the past 30 years, well before ERM emerged. It should be noted that research that will be presented in this section is mainly focused on quantifiable risks like financial risks that can be hedged by using derivatives. Therefore, hedging can be seen as a mean of Traditional risk management. In TRM research, various value-increasing benefits were found which can be classified as reduction in expected costs related to financial distress, asymmetric information and agency costs, underinvestment problem, tax costs and managerial utility.

Positive theories of risk management are related to the shareholders value maximization hypothesis, which argue that the firm value is a concave objective function because of capital market imperfections. The theories were born as an answer to the Modigliani and Miller’s (1958) “risk management irrelevance principle” created under perfect market conditions. The MM propositions were intended to hold only under a restrictive set of conditions, the most important of which are that there are no costs associated with bankruptcy or financial distress, no taxes or transactions costs, that corporate investment decisions are not influenced by financing choices, including decisions to hedge various price risks, that reliable information about the firm's future earnings prospects is costlessly available to all investors and managers alike, and that individuals and firms have equal access to all security markets, including the ability to issue identical securities on the same terms (Culp, 1994). Despite the fact that, in the basic MM world, hedging does not alter firm value, markets where derivatives are traded are dominated by corporations and institutions, not by individuals trading for their personal accounts. The positive import of the MM framework, and its main message to corporate practitioners, is presented by “positive risk management theories” or better called “risk management rationales” suggesting that hedging is a value-increasing strategy for the firm.

The first risk management rationale suggests that, by reducing the volatility of cash flows, firms can decrease costs of financial distress (Mayers and Smith, 1982; Myers, 1984; Stulz, 1984; Smith and Stulz, 1985; Shapiro and Titman, 1998). In the MM world, financial distress is assumed to be costless. Hence, altering the probability of financial distress does not affect firm value. If financial distress is costly, firms have incentives to reduce its probability, and hedging is one method by which a firm can reduce the volatility of its earnings. By reducing the variance of a firm’s cash flows or accounting profits, hedging decreases the probability, and thus the expected costs, of financial distress. Additionally, Smith and Stulz (1985) have argued that, while the reduction of financial distress costs increases firm value, it augments shareholder value even further by simultaneously raising the firm’s potential to carry debt. Corporate risk management lowers the cost of financial distress, which leads to a higher optimal debt ratio and the tax shields of the additional debt capital further increases the value of the firm. This theory has been empirically proven by, among others, Campbell and Kracaw (1987), Bessembinder (1991), Dolde (1995), Mian (1996) and Haushalter (2000).

The second rationale suggests that, by reducing the volatility of cash flows, firms can decrease agency costs (see: Jensen and Meckling, 1976). According to Dobson and Soenen (1993) there are three sound reasons based on agency costs why management should hedge corporate risk. First, hedging reduces uncertainty by smoothing the cash flow stream thereby lowering the firm’s cost of debt. Since the agency cost is borne by management, assuming informational asymmetry between management and bondholders, hedging will increase the value of the firm. Therefore, management will rationally choose to hedge. Second, given the existence of debt financing, cash flow smoothing through exchange risk hedging will tend to reduce the risk-shifting as well as the underinvestment problems. Finally, hedging reduces the probability of financial distress and thereby increases duration of contractual relations between...
stakeholders. By fostering corporate reputation acquisition, hedging contributes directly to the amelioration of the moral-hazard agency problem. Results of MacMinn and Han (1990), Bessembinder (1991), Minton and Schrand (1999) and Haushalter et al. (2002) support this hedging rationale.

The third hedging theory relates to the capital market imperfections and costly external financing. It argues that decreasing the expected cash flow volatility can improve the probability of having sufficient internal funds for planned investments eliminating the need either to cut profitable projects or bear the transaction costs of obtaining 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 their funds, which could precipitate a costly visit to the capital markets (Froot et al., 1993). Another perspective related to Froot et al. (1993) pertains to the Myers and Majluf (1984) "pecking order" concept of financing. Hedging, by its ability to decrease the variability of cash flow, enables the firm to reduce the number of states of nature where it must obtain external financing and thus hedging can help avoid sending a potentially negative signal to external investors. An interesting empirical insight based on this risk management theory is that firms which have substantial growth opportunities and face high costs when raising funds under financial distress will have an incentive to hedge more of their exposure than the average firm. This rationale has been empirically proven by numerous scholars, among others by Hoshi et al. (1991), Froot et al. (1993), Geczy, et al. (1997), Gay and Nam (1998), Graham and Rogers (1999), Minton and Schrand (1999), Haushalter (2000), Allayannis and Ofek (2001), Haushalter et al. (2002) and Miloš Sprčić and Šević (2012).

Nance et al. (1993) have also argued that firms can reduce the expected financial distress and agency costs associated with long-term debt by maintaining greater short-term liquidity, and have used current ratio and dividend price ratio as measures for this hypothesis. Geczy et al. (1997) have used two variables as proxies for a firm’s short-term liquidity: the quick ratio defined as cash and short-term investment divided by current liabilities, and the dividend payout ratio defined as the common dividend per share divided by earnings per share (used also by Haushalter (2000)). They have predicted that the greater a firm’s quick ratio and the lower its dividend payout ratio, the lower its need to hedge to reduce the expected financial distress and agency cost of straight debt. Mian (1996) has employed year-end ratio of current assets to current liabilities as a measure of corporate liquidity. Haushalter (2000) has calculated the level of cash holding using the ratio of cash and marketable securities to the market value of total assets. Mian (1996), Tufano (1996) and Haushalter (2000) have predicted a negative relation between numbered measures representing alternative financial policy and a decision to hedge. On the other hand, Froot et al. (1993) have predicted a positive association between liquidity and hedging, which results from the interpretation of liquidity not as a substitute for hedging, but as a measure of the availability of internal funds.

Other line of reasoning that differs from the shareholders’ value maximization hypothesis refers to the managerial utility maximization hypothesis. It has been argued that firm managers have limited ability to diversify their own personal wealth position, associated with stock holdings and the capitalization of their career earnings associated with their own employment position. Therefore, they will have an incentive to hedge their own wealth on the expense of the shareholders. Usually that kind of hedging is not conducted to improve value of company’s stockholders but to improve managers own wealth. To avoid this problem, managerial compensation contract must be designed so that when managers increase the value of the firm, they also increase their expected utility. This can usually be obtained by adding option-like provisions to managerial contracts. This rationale was firstly proposed by Stulz (1984) and has been further explored by Smith and Stulz (1985). Results of some empirical studies have confirmed this hypothesis (e.g. see: Tufano (1996) and Gay and Nam (1998) while, in contrast, Geczy et al. (1997) and Haushalter (2000) have not found evidence that corporate hedging is affected by managerial shareholdings.

As it could be seen from the literature review, many authors explored effects of hedging as a risk management technique and found that hedging stabilizes expected earnings and cash flows reducing the probability of financial distress and agency cost of debt, increases the growth potential of the company and consequently increases the company’s value. Contrary to rich empirical evidence on the effects of hedging, only few studies explored the effect of ERM on the company’s performance and value. Gordon et al. (2009), Pagach and Warr (2010) and Bertinetti et al. (2013) conducted research on ERM effect on the financial performance of both financial and non-financial companies, while Hoyt and Liebenberg (2011), and McShane et al. (2011) explored ERM influence on the value of insurance
companies. The results of these studies are mixed in terms of ERM effect. Gordon et al. (2009), Hoyt and Liebenberg (2011) and Bertinetti et al. (2013) found positive effect of ERM implementation to the company’s market value measured by Tobin’s Q, while Pagach and Warr (2010) and McShane et al. (2011) found no evidence that ERM affects performance and market value.

Regarding the determinants of ERM implementation, Liebenberg and Hoyt (2003), Beasley et al. (2005), Hoyt and Liebenberg (2011) and Pagach and Warr (2011) found that larger companies are more inclined to implement ERM. Several previous empirical studies (e.g., Nance et al., 1993; Dolde, 1995; Mian, 1996; Géczy et al., 1997; Allayannis and Weston, 2001) have found that firms with more assets are more likely to hedge. These studies contend that the positive correlation between size and hedging can be attributed to significant economies of scale in information and transaction costs of hedging. The same explanation can be offered in the case of ERM level of development, as ERM is an expensive process, therefore it pays off for companies that can exploit benefits of this integrated risk management system. It can be claimed that larger companies have larger exposures to different types of corporate risks, and that these risks are, to a certain extent, mutually correlated, so the benefits of managing risks in an integrated way are expected to be larger. Beasley et al. (2005) revealed that the stage of ERM implementation is positively related to the presence of a Chief Risk Officer (CRO), board independence, CEO and CFO evident support for ERM, the presence of a Big Four auditor, as well as companies in the banking, education and insurance industry. Liebenberg and Hoyt (2003) and Pagach and Warr (2011) find that financial leverage is positively associated with ERM implementation, but Hoyt and Liebenberg (2011) find, using a broader set of indicators, that ERM has a negative relation to leverage. Because of the inconsistency of the results, the effect of leverage as a determinant of ERM should be further employed. Pagach and Warr (2011) also find that firms that are more volatile, and have greater institutional ownership are more likely to adopt ERM. In addition, when the CEO has incentives to take risk, the firm is also more likely to hire a CRO.

3. Corporate risk management rationales in Croatian companies

3.1. Methodology and data collection

Empirical research was conducted on the listed Croatian non-financial companies. We focus our research on a population of 149 Croatian companies listed on the Zagreb Stock Exchange. Financial firms were excluded from the population. We believe that financial and non-financial companies should not be taken together in one sample as most of financial companies are also market makers for risk management instruments; hence their motivation and strategies in managing risks may be different in comparison to non-financial firms. Additionally, financial performance cannot be explored for both financial and non-financial firms by applying the identical set of measures we propose in this study. We believe that, by analysing only non-financial companies, results on ERM effect are more reliable. Managers of 61 companies answered to the questionnaire creating a response rate of 41 per cent, what is considered as satisfactory for statistical generalisation. The response rate of the 1998 Wharton survey of derivative usage, as reported in Bodnar et al. (1998) was 21 per cent. Therefore, obtained research results can be generalized to the whole population. 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.

Data were collected from two sources: from annual reports and notes to the financial statements and through the survey. Survey questionnaire was mailed to the firm’s chief risk officer (CRO) or, more often, to the financial director, controller or chief executive officer (CEO). Survey data were analysed by using multivariate analysis. Ordinal logistic regression was estimated as it is a form of multiple logistic regression used when the dependent variable is ordinal and the independents are of any type. Besides the fact that the dependent variable in this research is ordinal, logistic regression has been chosen because it enables the researcher to overcome many of the restrictive assumptions of OLS regression. E.g. unlike OLS regression, logistic regression does not assume linearity of relationship between the independent variables and the dependent, does not require normally distributed variables, does not assume

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2 Bertinetti, Cavezzali, Gardenal (2013) and Pagach and Warr (2010) are published only in the form of working papers.
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 Hypothesis

Based on the arguments that arise from the presented literature survey, several hypotheses have been proposed in this paper. We argue that following companies’ characteristics – size, financial distress, agency costs and asymmetric information problem, investment opportunities, risk substitutes, managerial utility maximization and geographic orientation - may be relevant for a decision to implement Enterprise Risk Management.

Hypothesis 1: Larger firms are more likely to hedge due to larger exposures to risks and economies of scale related to costs of ERM implementation. Hypothesis is supported by findings of Nance et al. (1993), Dolde (1995), Mian (1996), Geczy et al. (1997), Haushalter (2000), Liebenberg and Hoyt (2003), Beasley et al. (2005), Hoyt and Liebenberg (2011) and Pagach and Warr (2011).


Hypothesis 3: Benefits of risk management are greater the bigger is the asymmetric information problem. Hypothesis is supported by findings of Mayers and Smith (1982) MacMinn and Han (1990), Bessembinder (1991), Dobson and Soenen (1993), Minton and Schrand (1999), Haushalter et al. (2002).

Hypothesis 4: Benefits of risk management are greater the more growth options are in the firm’s investment opportunity set due to the costly external financing. Hypothesis is supported by findings of Froot et al. (1993), Geczy et al. (1997), Gay and Nam (1998), Minton and Schrand (1999), Allayannis and Ofek (2001), Haushalter et al. (2002).

Hypothesis 5: Development of risk management system is lower the more liquid the firm’s assets are, and the lower the leverage. Hypothesis is supported by findings of Froot et al. (1993), Nance et al. (1993), Pagach and Warr (2010), Hoyt and Liebenberg (2011).

Hypothesis 6: Managers have limited ability to diversify their own personal wealth position associated with the stock holdings and the capitalization of their career earnings, therefore they have strong incentives to manage corporate risks. Hypothesis is supported by findings of Stulz (1984), Smith and Stulz (1985), Tufano (1996).

Hypothesis 7: Companies that are oriented to the international market are exposed to more risks, hence should be motivated to develop efficient risk management system. Hypothesis is supported by findings of Beasley et al. (2005).

3.3. Research variables

A dependent variable has been designed in the form of an ordinal measure of an ERM index that can take the value from 0 to 14, depending on the number of ERM characteristics listed below that are present within the company.

- Is there a Chief Risk Officer (CRO) in your company, responsible for risk management?
- Is there a special department/division in your company dedicated to risk management?
- Does your company have a written statement of the firm’s risk appetite?
- Are there official risk management policy and procedures in your company?
- Do you apply COSO Integrated Framework for ERM in your company?
- Do you apply ISO 31000 risk management standard in your company?
- Is risk managed with an integrated analysis and management of all identified corporate risks (e.g. financial, strategic, operational, compliance and reporting risks)?
- Do you determine correlations and portfolio risks effects of combined risks?
- Do you determine quantitative impacts risks may have on key performance indicators?
- Do you organize workshops in your company where managers discuss exposures to different types of risks and risk management strategies (so-called Risk management workshops)?
- Does your company create a risk map indicating position of risks the company is exposed to, considering probability of occurrence and significance of identified risk to the business activity?
- Do you have a risk response plan for all significant events?
- Do you submit formal report on risk and risk management to the management board at least annually?
- Do you monitor key risk indicators aimed at emerging risks (not past performance)?

By conducting a thorough ERM literature review, we recognised these characteristic as integral components of a mature ERM systems. The more of them characterises the risk management system in one company, ERM system is more developed. We used a complex ERM measure that enabled us to assess the level of ERM development in analysed companies. Other ERM studies (Eckles et al. (2014), Bertinetti et al. (2013); Hoyt and Liebenberg (2011) and Pagach and Warr (2010) used a dummy variable, where ERM use is measured as 1 if the company implemented ERM and 0 otherwise. This measure does not take into account the level of ERM development, it just takes into account the fact that ERM exist or it does not exist.

We measure company size with natural logarithm of total assets to correct for the effect of different magnitudes of variables and to reduce the effect of skewness in the distribution. We predict positive relation between ERM level of development and size of the company due to the economies of scale exploitation. To examine the hypothesis regarding the reduction of the financial distress cost, the firm’s leverage have been employed. Leverage was used as a proxy for the impact of fixed claims on the decision to hedge. Numerous previous studies have used total debt to the book value of assets (Tufano, 1996; Nance et. al., 1993; Mian, 1996; Geczy et al., 1997; Allayannis and Ofek, 2001) as a measure for company indebtedness. The percentage of firm’s stocks owned by institutional investors was a proxy for the asymmetric information and agency problem. DeMarzo and Duffie (1995), Tufano (1996) and Geczy et. al. (1997) have predicted that a greater share of institutional investors’ ownership is positively related to the availability of information, and thus negatively related to the probability of hedging as it is proven that firms with greater informational asymmetry benefit greatly from risk management activity. The coefficient on this variable was predicted to be negative. Investment (growth) opportunities were measured as the ratio of investment expenditures to the book value of assets (Haushalter, 2000; Froot et al., 1993); DeMarzo and Duffie, 1995; Geczy et al., 1997; Smith and Stulz, 1985). The coefficient on this variable was predicted to be positive. Risk management substitutes were measured as cash and marketable securities to the value of current liabilities, while manager’s utility was proxied by manager’s tenure or duration of his career spent in the company (DeMarzo et al., 1995). Geographic orientation was measured by the binary variable coded “1” of the company operates on the international market and “0” if it is oriented only on the domestic market (Beasley et al., 2005).

4. Research Results

By using methods of descriptive statistics, we analysed the value of ERM Index in Croatian companies, which indicate the level of ERM development in Croatian companies. Graph 1 shows the structure of ERM Index according to the value of the Index. Even 38 per cent of analysed companies have no elements of ERM system, from which 22 per cent do not manage corporate risks at all.
We categorised companies into three groups according to the value of the Index. Companies with the value from 0 to 4 were in the category “ERM is not developed”, from 5 to 9 “ERM is moderately developed, while these with the value from 10 to 14 are in the group “ERM is highly developed”. Structure of companies are presented in the graph 2 where it is clearly shown that even 77 per cent of analysed companies have underdeveloped ERM system or corporate risk management in general. This argument is confirmed with the result that only 2 per cent (one analysed company) have the value of the Index 10 or higher.

Regarding the types of risk managed, graph 3 shows that financial type of risks like currency risk, interest rate risk, credit risk, liquidity risk, are taken care of in more than 50 per cent of analysed companies. The same situation is with operational risks. Concerning result is related to the negligence of strategic risks such as customer loss risks, which is the core risk for every profit organization, risks related to product innovation, reputational risk, legal/regulatory risks and political risks. One must ask how is it possible that the business operates successfully if managers do not analyze, measure and manage risks that can negatively affect strategic plans and strategic goals. We believe results presented in the graph 3 confirm the finding that ERM system is not developed in Croatian listed companies. If ERM exist, all corporate risks would be equally important and the total risk exposure would be a relevant measure for risk management decision making.
Furthermore, ordinal logistic regression was estimated to distinguish among the possible explanations for the level of ERM development in Croatian companies. Logistic model has tested whether the value of ERM index is a function of the seven factors - the size, financial distress costs, agency costs, growth options, managerial utility, risk management substitutes and geographic orientation.

\[
ERM_{index} = \beta_1 SZ + \beta_2 FD + \beta_3 AC + \beta_4 GRO + \beta_5 MU + \beta_6 RMS + \beta_7 OR + \varepsilon(R)
\]  

(1)

The multivariate regression model presented in Table 1 has revealed that the level of ERM development is only related to the company’s size and investment opportunities. Several previous empirical studies (e.g., Nance et al., 1993; Dolde, 1995; Mian, 1996; Géczy et al., 1997; Allayannis and Weston, 2001) have found that firms with more assets are more likely to hedge. These studies contend that the positive correlation between size and hedging can be attributed to significant economies of scale in information and transaction costs of hedging. The same explanation can be offered in the case of ERM level of development, as ERM is an expensive process, therefore it pays off for companies that can exploit benefits of this integrated risk management system. It can be claimed that larger companies have larger exposures to different types of corporate risks, and that these risks are, to a certain extent, mutually correlated, so the benefits of managing risks in an integrated way are expected to be larger.

The investment expenditures to assets ratio, which controls for company’s investment (growth) opportunities, tests our prediction that companies with more developed ERM (i.e. higher value of ERM index) are more likely to have larger investment opportunities. 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 their funds, which could precipitate a costly visit to the capital markets. The results of our logistic model marginally support this prediction \((p = 0.052)\) and show a positive relation between the value of ERM index and investment expenditures to assets ratio.

Fig. 3. Types of risk managed by Croatian companies (in%)
Table 1. Results of multivariate regression analysis

<table>
<thead>
<tr>
<th>Threshold</th>
<th>Estimate</th>
<th>Std. Error</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ERMcharacter = 0]</td>
<td>14,118</td>
<td>3,767</td>
<td>14,049</td>
<td>1</td>
<td>0</td>
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<tr>
<td>[ERMcharacter = 1]</td>
<td>14,902</td>
<td>3,814</td>
<td>15,268</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>[ERMcharacter = 2]</td>
<td>15,085</td>
<td>3,825</td>
<td>15,55</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>[ERMcharacter = 3]</td>
<td>15,743</td>
<td>3,869</td>
<td>16,55</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>[ERMcharacter = 4]</td>
<td>16,409</td>
<td>3,914</td>
<td>17,57</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>[ERMcharacter = 6]</td>
<td>17,134</td>
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<td>18,69</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>[ERMcharacter = 7]</td>
<td>17,518</td>
<td>3,988</td>
<td>19,29</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>[ERMcharacter = 8]</td>
<td>18,012</td>
<td>4,02</td>
<td>20,07</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>[ERMcharacter = 9]</td>
<td>19,484</td>
<td>4,14</td>
<td>22,14</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Location</th>
<th>Estimate</th>
<th>Std. Error</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size1</td>
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<td>0,164</td>
<td>15,485</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>LEV2</td>
<td>0,209</td>
<td>1,087</td>
<td>0,037</td>
<td>1</td>
<td>0,848</td>
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<tr>
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<td>3,76</td>
<td>1</td>
<td>0,052</td>
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<tr>
<td>LIQ2</td>
<td>-0,062</td>
<td>0,051</td>
<td>1,463</td>
<td>1</td>
<td>0,226</td>
</tr>
<tr>
<td>Orientation</td>
<td>0,958</td>
<td>0,65</td>
<td>2,174</td>
<td>1</td>
<td>0,14</td>
</tr>
<tr>
<td>OwnlINSTINV</td>
<td>-0,016</td>
<td>0,011</td>
<td>2,053</td>
<td>1</td>
<td>0,152</td>
</tr>
<tr>
<td>EMPLYQ43</td>
<td>0,043</td>
<td>0,025</td>
<td>2,961</td>
<td>1</td>
<td>0,085</td>
</tr>
</tbody>
</table>

Table 2. Model Fitting Information

<table>
<thead>
<tr>
<th>Model</th>
<th>-2 Log Likelihood</th>
<th>Chi-Square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept Only</td>
<td>221,987</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>198,28</td>
<td>23,707</td>
<td>7</td>
<td>0,001</td>
</tr>
</tbody>
</table>

Table 3. Goodness-of-Fit

<table>
<thead>
<tr>
<th>Chi-Square</th>
<th>df</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson</td>
<td>477,418</td>
<td>506</td>
</tr>
<tr>
<td>Deviance</td>
<td>198,28</td>
<td>506</td>
</tr>
</tbody>
</table>

Table 4. Pseudo R-Square

| Cox and Snell | 0,336 |
| Nagelkerke | 0,343 |
| McFadden | 0,107 |

We also employed alternative measures of firm’s characteristics to check robustness of our results. We used following measures in our regression model:

- Size was measured as natural logarithm of the firm’s total sales;
- Leverage was measured as the book value of the long-term debt to the book value of equity;
- Growth opportunities was measured as investment expenditures to the book value of total assets;
- Managerial utility was measured as the percentage of the firm’s outstanding shares held by officers and directors;
- Hedge substitutes was measured by current assets to the value of current liabilities;
- Geographic orientation was measured as the percentage of the firm’s outstanding shares held by international investors.

Results are substantively similar: only size was significant, while growth opportunities were not significant in the
model (tables with robustness checks are available on request).

5. Conclusion

Research results have revealed low levels of ERM development in listed Croatian companies. 38 per cent of analysed companies have no elements of ERM system, from which 22 per cent do not manage corporate risks at all. Even 77 per cent of analysed companies have underdeveloped ERM system or corporate risk management in general. This argument is confirmed with the result that one analysed company (out of 61) have highly developed ERM with the value of ERM Index 10 or higher. The focus of managers is skewed on financial and operative risk management, while strategic risks have been neglected, what opens the question how is it possible that the business operates successfully if managers do not analyze, measure and manage risks that can negatively affect strategic plans and strategic goals.

Regression analysis has indicated somewhat unexpected but important conclusion. The explored risk management rationales have weak predictive power in explaining corporate risk management decisions in Croatian companies. Multivariate regression conducted for Croatian companies shows that the level or risk management system development is dependent only on the size of the company (robust) and value of the growth options (not robust), what support the scale economies argument that larger firms have more developed risk management system due to the high expenses of its implementation and due to larger risk exposures, and that firms with investment opportunities requiring funding manage risk exposure of their cash flows to avoid a shortfall in internal funds.

Contribution of our study stems from the creation of ERM Index, which could be tested on different markets. We also tested risk management theories on the emerging market and concluded that risk management system development in Croatian companies is primarily driven by other influential factors then those suggested by the risk management literature and explored in this research, which will be explored in our future research.

References