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Does culture influence the implementation of Enterprise Risk Management?

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Abstract

Title: Does culture influence the implementation of Enterprise Risk Management?

Purpose: The primary purpose of this study is to investigate if culture influences a firm's decision to implement enterprise risk management (ERM). It will examine which factors influence this decision on a worldwide level, how ERM implementation varies across countries and to what extent these differences are influenced by cultural dimensions.

Methodology: The study is based on 380 firm observations from 19 countries. ERM implementation is examined with a keyword search on annual reports and culture is measured with Hofstede's dimensions power distance, uncertainty avoidance and individualism. Based on the 380 observations this deductive research will test four hypotheses on a firm-level ERM implementation and three hypotheses about cultural influence on a country-level.

Empirical Findings: This study shows a positive relation between ERM implementation and the cultural dimensions power distance and uncertainty avoidance. Additionally, it finds that firm size and industry are influencing a firm's decision to implement ERM on a worldwide level.

Conclusion: This study supports that culture has an influence on ERM implementation which shows that culture has to be taken into account when analysing and comparing ERM implementation across countries. Furthermore, this worldwide sample allows to compare ERM variation between the observed countries and it shows that influences which have been examined on a country-level can also be found on a worldwide-level.

Key words: Enterprise risk management, ERM implementation, cultural influence, cultural dimension, power distance, uncertainty avoidance, individualism

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Abbreviations

CRO	Chief Risk Officer
COSO	Committee of the Sponsoring Organizations of the Treadway Commission
ERM	Enterprise Risk Management
et al.	et alia = and others
H	Hypothesis
IND	Individualism
ISO	International Organization for Standardization
OLS	Ordinary Least Squares
p-value	Probability Value
PD	Power distance
UA	Uncertainty Avoidance

1. Introduction

This chapter explains the research background and presents a detailed problem discussion as the foundation for the research questions. This is followed by research limitations, the addressed target group and the outline for the following chapters.

1.1. Background

Recent financial scandals such as Volkswagen's falsification of emission-tests in 2015 (The Rushe & Farrell, 2015) revealed severe failures in corporate risk management. Similar to many other large multinational firms Volkswagen's Audit Committee was responsible for managing risk but failed to do so (Volkswagen Group, 2014; Carol, 2015). Even though the firm's management was committed to detect severe risks as early as possible, it could not avoid this emission scandal. As a result, the firm faced destroyed shareholder value, governmental let-downs and extensive environmental damages, which could have been prevented by the instalment of proper risk management. This event underlines the increasing importance and understanding of the most developed risk management that currently exists in the field: Enterprise Risk Management (ERM).

1.2. Problem Discussion

ERM is defined as an integrated and centralised risk management approach that is applied in strategic setting and supported by risk governance (COSO, 2004). This definition is recently reinforced by Lundqvist (2014a) who states that ERM is characterised more specifically by the holistic organisation of risk management or alternatively phrased: risk governance. Lundqvist (2014a) concludes that ERM broadens traditional risk management by addressing risks in a firm's different business units, the so-called silos. ERM instead allows firms to control risks on an enterprise-wide level and to create synergies between different risk management activities. Firms furthermore implement ERM to reduce volatility in earnings and stock prices which increases firm value (Hoyt & Liebenberg, 2011). Even though these benefits are widely acknowledged, the implementation and the reasons behind the adoption of ERM are still varying between diverse types of firms and firm sizes (Beasley, Branson & Hancock, 2012). As a consequence,

researchers recently started to make first contributions to the ERM field of study and common agreement exists that the driving forces behind ERM implementation are firm size, leverage, industry and the presence of a big four auditor (Deloitte, Ernst & Young, KPMG and PricewaterhouseCoopers).

The main drawback of existing research is, however, that the conclusions are fragmented and lacking a worldwide perspective (Lundqvist, 2015; Hoyt & Liebenberg, 2011; Pagach & Warr, 2011; Beasley, Pagach & Warr, 2008). This shortcoming can be explained by the fact that these studies are based on country- or region-specific observations, which limits the generalisation of the underlying research according to Lundqvist (2014b). Hoyt and Liebenberg (2011) and Beasley et al. (2008) examined for example US companies whereas other researchers such as Lundqvist (2014a, 2015) and Sekerci (2014) targeted their research on Nordic firms. ERM findings therefore differ significantly both regarding the driving factors behind ERM implementation and the country-specific degree of ERM adoption. Furthermore, there has not been any research so far in order to explain country or region-based variations in ERM implementation. However, existing research points towards cultural differences as an explanation for how individuals as well as companies manage and perceive risks (Hsee & Weber, 1998; Liu, Meng & Fellows 2015; Li, Griffin, Yue & Zhao, 2013; Kreiser, 2010). The most used approach to measure culture is based on the culture dimensions defined by Hofstede (2010) including power distance, individualism and uncertainty avoidance. In essence this study aims to contribute to the described research gap by creating a worldwide comparison of ERM implementation and its connection to culture.

1.3. Purpose & Research Questions

In the field of ERM, previous research examined firm characteristics that trigger firms to implement ERM including firm size, leverage, industry and presence of the big four auditors. These studies based their findings on country- or industry specific observations, which is why this study tests these characteristics on a worldwide data sample. In addition to that, this study suggests that a country's culture plays a major role in the firm's willingness to adopt ERM. With culture being the main focus of this study, a new field to existing ERM research is introduced by including the aspect of culture. Firms' increasing disclosure allows this study to make use of

public data and thus investigate annual reports in order to determine existing ERM implementation, an approach that has been used by Desender (2011) and Gordon, Loeb and Tseng (2009). To answer the main research question this study is divided into three sub-questions:

- Does culture influence ERM implementation?
  - What influences ERM implementation on a firm-level?
  - How does ERM implementation vary across countries?
  - To what extent are these differences influenced by cultural dimensions?

1.4. Delimitations

Delimitations of this study can be divided into three parts starting with the secondary data approach of using annual reports as data source. Thereby the main possible drawback is that firms can window-dress their annual reports, which might not reflect the truth. However, this approach is commonly used within existing literature (Hoyt & Liebenberg, 2011; Lundqvist & Vilhelmsson, 2016) since firms use their risk management disclosure as a way of signalling and building trust among shareholders. Secondly, since the aim of this study is to capture the country-specific ERM implementation it focuses on identifying if a firm has or has not implemented ERM rather than determining the degree of implementation. Finally, the timeframe only includes the year 2014, because the study is interested in capturing a snapshot of the existing ERM rather than putting focus on to when it was implemented.

1.5. Target Group

This study primarily aims to target academics wishing to further extend and advance in the ERM field of research. Secondly, it is relevant for investors and business people who benefit from considering enterprise-wide risk levels when analysing and investing in companies worldwide. While this research gives first insights on how country differences of ERM implementation can be explained by culture it is merely the steppingstone for further interesting research in the field.

1.6. Outline

The following chapter explains the theoretical foundation of this study by first introducing how risk management has developed over time into ERM and secondly how cultural differences between countries can be explained by Hofstede's dimensions. This chapter also includes the hypotheses, which are derived from previous research and aim to answer the stated research questions. This further leads into the third chapter where the chosen methodology is presented in detail including the research design, data sample, dependent and independent variables, econometric model and the reliability and validity of this research. In chapter four the results are presented followed by the final chapter, which contains the conclusion and further research implications.

2. Literature Review and Hypotheses Development

This chapter elaborates the theoretical background of this research and develops the hypotheses which will be tested in this study. It includes a definition of ERM to differentiate it from traditional risk management and gives an overview about the existing ERM literature. After motivating how this study complements existing literature, it explains Hofstede's cultural dimensions which will be used as the basis for measuring culture.

2.1. Enterprise Risk Management

The section below introduces the foundations of ERM followed by its characteristics and current research in its field.

2.1.1. Foundations of Enterprise Risk Management

When analysing enterprise risk management it is essential to derive its relevance from a historical standpoint starting from the origins of risk management as described by Culp (2006), which developed into traditional risk management and built the basis for enterprise risk management. The historical importance is also confirmed by recent studies stating that traditional risk management can be regarded as one of the strongest explanation for implementing enterprise risk management (Lundqvist, 2014b).

Risk management is most commonly defined as the "reaction to risk by individuals or businesses as they attempt to ensure that the risk to which they are exposed to is the risk to which they […] want to be exposed" (Culp, 2002, p.14). Ogden, Jen and O'Connor (2003) support this view by stating that a trade-off between risk and return exists and thus companies can take on more risk to retrieve higher return. This well-known theory, named trade-off theory, concludes that each firm has its own optimal level of risk which maximises returns due to possibilities of tax-shields from taking on more debt. This view is opposed by two other prominent researchers; Modigliani and Miller and their assumptions of perfect capital markets. According to them, incentives for engaging in risk management should not exist on perfect capital markets since investors can manage the risk themselves due to equal access and symmetric information (Ogden et al. 2003). Violations of these assumptions, which are present on most markets, however enable

opportunities for risk management to add value for firms. These include for example reduced information asymmetries and less conflict between managers and shareholders (Culp, 2006). The reasons for engaging in risk management vary in between firms. Among them are mitigating financial distress cost, lowering expected tax payments, enabling external financing, mitigating agency costs and managerial risk aversion as well as reducing the underinvestment problem (Mayers & Smith, 1987; Stulz, 1984; Smith & Stulz, 1985; Froot, Scharfstein & Stein, 1993; Myers, 1977). According to Hoyt and Liebenberg (2011) it is possible to realise these effects through traditional risk management activities including hedging and corporate insurance. Hedging activities are said to reduce bankruptcy costs since they lower the probability of financial distress. In addition, corporate insurance aims to reduce contracting costs and the tax burden of the firm (Hoyt & Liebenberg, 2011; Pagach & Warr, 2011). According to Culp (2006) traditional risk management divides risk in different categories, such as market risk, financial risk, liquidity risk, operational risk and legal risk and takes place in the various departments of a firm. Hence, this form of risk management is often called a silo approach since it lacks coordination between the different departments, which leads to complexity and waste of firm resources (Hoyt & Liebenberg, 2011).

One drawback of traditional risk management is the lack of transparent information of the targeted firm risk profile. Outsiders thus have a difficult time understanding the complex risk management system comprised by the different risk silos (Hoyt & Liebenberg, 2011). In addition to that, risk management departments often lack coordination between each other, which results in reduced efficiencies. By treating the different risks as a risk portfolio instead firms can achieve an enterprise-wide approach to risk management (Hoyt & Liebenberg, 2011; Nocco & Stultz, 2006; Gordon et al. 2009).

2.1.2. Characteristics of Enterprise Risk Management

The Committee of the Sponsoring Organizations of the Treadway Commission's (COSO) defines enterprise risk management as:

> *"a process, effected by an entity's board of directors, management and other personnel, applied in strategy and across the enterprise, designed to identify potential*

events that may affect the entity and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives." (COSO, 2004, p.4)

Entity objectives according to COSO (2004) can be categorised as strategic, operational, reporting- and compliance-specific. Furthermore, ERM is divided into eight components and includes for example risk assessment, risk response and monitoring. These actions are interrelated and applied throughout the entire firm. This integration thus takes place among subsidiaries, business units, divisions and all entity levels. Taken together, the four objective categories, the eight components and the different business levels form the so-called "COSO cube" (COSO, 2004), which is shown in Appendix A. Other frameworks in the field of risk management are the Basel III Framework (Bank for International Settlement, 2011) and the International Organization for Standardization's (ISO, 2009) guidelines and principles for risk management. Whereas the Basel III Framework (Bank for International Settlement, 2011) focuses on guidelines for the banking sector, the ISO (2009) builds a detailed foundation for risk management applicable for all types of organisations.

Researchers recently tried to narrow down these complex definitions and extensive frameworks. Lundqvist (2014b) divided ERM, based on the definition given by COSO (2004), into three essential pillars: the integration, the strategic and the governance dimension. By applying risk management "across the enterprise" firms move away from the silo approach and towards an integrated and enterprise-wide approach (COSO, 2004, p.4). Risks are instead analysed from a portfolio perspective and interactions are considered and managed. In addition to that, enterprise risk management is "applied in strategy" and used to achieve "entity goals" (COSO, 2004, p.4). In line with its corporate strategy the company needs to define its risk appetite and risk tolerance, meaning that it has to decide how much risk it is willing to take and how far it is accepting to vary from its set objectives. The third dimension refers to risk governance and how risk management involves "the board of directors, managers and other personnel" (COSO, 2004, p.4) of a company. Risk management is not only the task of one responsible manager, the Chief Risk Officer (CRO), but more an enterprise-wide task (COSO, 2004). Based on both the COSO and the ISO frameworks, the Association of Insurers and Risk Managers (The Association of Insurers

and Risk Managers, Alarm The Public Risk Management Association & The Institute of Risk Management, 2010) similarly divides enterprise risk management into three components: risk protocols, risk strategy and risk architecture. This shows in essence that Lundqvist's (2014b) three pillars, integration, strategic and governance are also supported from a practitioner's point of view.

2.1.3. ERM Literature

Historical review over the existing ERM literature summarises over two decades of research pointing to inconsistent conclusions from diverse country- and region-specific observations (see Table 2.1). Initially, ERM research focused on North American markets and analysed both internal and external drivers behind the firm's decision for implementing this holistic approach to risk management. Kleffner, Lee and McGannon (2003) investigated Canadian firms and concluded through their survey that internal forces behind ERM implementation were related to the risk managers and the board of directors. Externally it was instead driven by guidelines from the Toronto Stock Exchange. Beasley et al. (2008) found similar results for the US market where internal factors were also related to the CRO and management's expectations for risk management. External factors for ERM implementation, however, were its industry, in particular if a firm was operating in the financial industry, and the presence of a big four auditor (Beasley, Clune & Hermanson, 2005). Later research in the field took a more international approach and it also derived different influences on ERM implementation including leverage (Liebenberg & Hoyt, 2003) and firm size (Pagach & Warr, 2011).

In the following, ERM research refocused and instead investigated the question if ERM creates value for firms (Beasley et al. 2008; Baxter, Bedard, Hoitash & Yezegel, 2013; Hoyt & Liebenberg, 2011; Paape & Speklé, 2012; Pagach & Warr, 2011; Gates, Nicolas & Walker, 2012; Grace, Leverty, Phillips & Shimpi, 2015). While the majority of conducted research found support for the value creation of ERM, other studies point to the fact that ERM actually erodes value (Lin et al. 2012). Lastly there are some studies that can neither support nor show upon the negative relation between ERM and firm value (McShane et al. 2011; Pagach & Warr, 2010; Quon et al. 2012).

Table 2.1 Summary of existing ERM literature

Authors	Year	Region	ERM Identifier	Research Method	Key Findings
Liebenberg & Hoyt	2003	US	CRO announcements	Public information search	No support for ERM signalling effect. Firms with higher leverage tend to hire a CRO.
Kleffner et al.	2003	Canada	ERM implementation	Survey and telephone interview	Results indicate that one third of the respondents had implemented ERM and that reasons for this were: influence from firm risk manager and board of directors as well as compliance with the Toronto Stock Exchange guidelines.
Beasley et al.	2005	US	ERM implementation	Survey	Stage of ERM implementation is positively related to having a CRO, board independence, management expectations, Big4, size, financial industry, education and insurance industries. US organizations have less-developed ERM processes than international organizations.
Beasley et al.	2008	International	CRO announcements	Public information search	No support that market reactions have a significant relation with hiring a CRO and support that shareholders with little cash on hand value ERM.
Gordon et al.	2009	US	ERM index (keywords)	Public information search	ERM index and firm performance is positively related.
Baxter et al.	2010	International (banking and insurance)	ERM quality	Survey data and public information search	Positive association between ERM quality and operating performance and earnings response as well as market performance during the market rebound.
Pagach & Warr	2010	International	ERM defined as senior risk officer	Public information search	No support for ERM creating firm value.
Desender	2011	US (pharmaceutical companies)	ERM implementation related to board composition	Public information search	CEO position within the board has influence on ERM implementation level.
Hoyt & Liebenberg	2011	US (insurance companies)	ERM keywords	Public information search	ERM premium is 17% of firm value.
McShane et al.	2011	International (insurance)	S&P risk management rating	Public information search	Firm value increases as firms engage in more extensive TRM but no support for added firm value from engaging in ERM.
Pagach & Warr	2011	International	ERM defined as senior risk officer	Public information search	Positive relationship between ERM and firms that are large, more volatile and have a greater institutional ownership.
Gates et al.	2012	International	Stage and benefits of ERM within firm	Survey	Main drivers and benefits of implementing ERM: better performance and enhanced management.
Lin et al.	2012	US property and insurance industry	ERM dummy and five insurance activities	Public information search	ERM implementation erodes firm value.
Paape et al.	2012	The Netherlands	ERM implementation	Survey	Positive relationship between ERM and the regulatory environment, internal factors, ownership structure, and firm and industry-related characteristics.
Quon et al.	2012	Canada (non-financial)	ERM implementation	S&P Composite Index	ERM does not have an effect and can not explain a firm's business performance.
Lundqvist	2014	Nordic firms	ERM implementation	Survey	ERM implementation can be identified especially by the pillar named "risk governance" (the "true" ERM identifier).
Sekerci	2014	Nordic firms	ERM implementation	Survey	No support that ERM implementation creates firm value.
Grace et al.	2015	International (insurance)	ERM program	Survey	Insurers experience both cost and revenue efficiency from implementing specific aspects of ERM (simple economic capital models).
Lundqvist	2015	Nordic firms	ERM implementation	Survey	No support. ERM implemented as a step of addressing corporate governance.
Lundqvist & Vilhelmsson	2016	International (banks)	ERM implementation	Public information search	ERM is negatively related to defaul risk measured by CDS spreads.

This table summarizes previuos ERM research from 2003 to 2016. It contains the observed region, the ERM identifier, the research method and the key findings.

Whereas most earlier ERM research investigated if ERM implementation adds firm value, current literature has instead shed some light on what components actually define ERM. Lundqvist's (2014a) research targets Nordic firms and she concludes that there are in total four parts creating the foundation for ERM implementation. One of them specifically separates ERM-firms from non-ERM firms, the risk governance part, which combines corporate governance and risk management.

Lundqvist's later research further describes risk governance as "encouraging a culture of risk-awareness throughout the firm" (Lundqvist, 2015, p. 442). This points to the importance of an integrated enterprise-wide approach and agreement upon the desired firm risk. By defining the so-called risk appetite, risks are not only identified but also prioritised in line with the firm's risk preferences, which were investigated by Hsee and Weber (1998). Their work analysed risk preferences in US, Germany and Poland and found that Hofstede's cultural dimension individualism could explain the varying results in cultural differences between the countries. Hsee and Weber (1998) emphasised that further research should continue to investigate cross-national differences in regards to other cultural dimensions. Furthermore, risk attitudes in-between countries have recently been studied. This research showed that risk preferences vary considerably across countries but very few differences could be found within a single country (Vieider, Chmura, Fisher, Kusakawa, Martinsson, Thompson & Sunday, 2014). Overall, although Lundqvist's (2014b) work is a step in the right direction towards understanding the true foundation of ERM implementation, the research lacks worldwide perspective. In the conclusion the author even acknowledges that the results could be influenced by region-specific influences and suggest further investigations across countries (Lundqvist, 2014b).

Before being able to compare how culture influences ERM implementation in different countries, it is necessary to study ERM implementation on a worldwide basis. This study connects to existing literature by including a worldwide scope of observations and examining if the firm-specific characteristics, that were shown to trigger ERM implementation on a national level, also hold on an international level. Thus this study will include the following firm characteristics: firm size, leverage, industry and the presence of one of the big four auditors, which are explained below.

One of the most acknowledged influences on a firm's likelihood to implement ERM is its size measured as the firm's total assets (Liebenberg & Hoyt, 2003; Pagach & Warr, 2011; Lundqvist, 2015). This can be explained by the fact that larger firms face more risks and thus have more incentive to employ ERM. In addition to that, larger firms can afford the costs for implementing ERM (Liebenberg & Hoyt, 2003). Due to the wide support for these findings, this study also expects to find the following within the observed worldwide sample:

Larger-sized firms are more likely to implement ERM. (H.1)

In addition, researchers also found statistical support for the relation between ERM implementation and leverage (Hoyt & Liebenberg, 2003; Pagach & Warr, 2011; Lundqvist, 2015). Leverage is defined as the book value of a firm's total debt divided by the book value of its total assets (Lundqvist, 2015). High-levered firms are in general riskier and thus more likely to suffer from financial distress. As a consequence, these firms have higher incentive to engage in ERM (Liebenberg & Hoyt, 2003) and the following relation is expected:

High-levered firms are more likely to implement ERM. (H.2)

There also exists strong support in current research that financial firms are more likely to have implemented ERM (Pagach & Warr, 2011; Beasley et al. 2005; Liebenberg & Hoyt, 2011; Lin et al. 2010). Beasley et al. (2005) explain this relation with regulations such as the Basel II, which creates firm incentive for signalling trust to investors and customers. In addition to that, Standard & Poor's has created its own ERM rating for financial firms, which emphasises the importance of why this specific industry is more likely to have implemented ERM (McShane, 2011). With this as the foundation, we form the following hypotheses:

Firms operating in the financial industry are more likely to implement ERM. (H.3)

Beasley et al. (2005) found evidence that being audited by one of the big four auditors influences the existence of ERM. The underlying reason for this is that the big four auditors focus their judgement on the quality of how a firm is committed to risk management. This implies that firms audited by these companies have a higher incentive to engage in ERM. Later studies also confirm this relationship (Desender, 2011; Sekerci, 2014). Hence, following relation is expected:

Firms audited by one of the big 4 auditors are more likely to implement ERM. (H.4)

With these hypotheses as the basis this study is able to compare what characteristics drive ERM implementation on a worldwide level. This creates the foundation for analysing how cultural differences influence ERM implementation on a worldwide level, which will be elaborated further in the section 2.2 explaining the cultural dimensions by Hofstede.

2.2. Cultural dimensions by Hofstede

In order to create the foundation for determining if culture has an effect on ERM implementation, this study will use the cultural dimensions as derived by Hofstede (1992, 2010) since these are the most used ones in existing literature. Hofstede defined culture as the way of thinking and acting that is shared with individuals who live in the same social environment. Individuals learn these underwritten rules during their childhood and follow them unconsciously throughout their lives. Transferred to a company setting, this implies that employees bring these cultural patterns with them to work and thus a company's way of conducting business is determined by the cultural background of its employees. This will naturally influence the firm's perception of risks and thus the way of managing risk (Hofstede, 2010).

In literature there exist various theories approaching cultural differences, among them the most famous ones from Hofstede (1991, 2010) and Schwartz (1999). Hofstede was pioneering with his approach of dividing culture into several dimensions: power distance, individualism, uncertainty avoidance and masculinity. He derived his findings from questionnaires including a sample of 116 000 IBM engineers from 66 countries. Based on the analysis of his results he assigned scores to each country, ranging from 1 to 100, on each of these dimensions. The scores are measured relatively, allowing for quantifying and deriving cultural differences (Hofstede, 1991, 2010).

Since Hofstede conducted his research in the late 1960s he later on decided to update his work by expanding the country scope as well as adding two dimensions: long-term orientation and indulgence. As a response to Hofstede, Schwartz (1999) defined three similar dimensions based on his survey about cultural values. The first one, autonomy, can be seen as an equivalent for Hofstede's individualism and the second one, hierarchy, can be interpreted the same way as Hofstede's power distance dimension. Schwartz (1999) extended Hofstede's work by deriving his third dimension, called mastery or respectively harmony, which refers to the degree to which a culture wants to proactively change its environment in order to achieve its organisational goals (Sagiv & Schwartz, 2007).

Both Hofstede and Schwartz decided to divide culture into dimensions and quantify these through assigning scores to different countries. Hofstede's work is so far the most used one, especially within business literature (Li et al, 2013; Soares, Farhangmehr & Shoham, 2006; Shao, Kwok & Zhang, 2013). Nevertheless, researchers also criticised his assumptions and the relevance of his work after almost 50 years (McSweeney, 2002; Taras, Steel & Kirkman, 2012). In defence of Hofstede's dimensions, it is argued that culture does not change over time (Licht et al, 2005) and recent studies also confirm today's relevance of his culture scores (Eringa, Caudron, Rieck, Xie & Gerhardt, 2015; Beugelsdijk, Maseland & Hoorn, 2015).

Three of Hofstede's dimensions are used frequently in the context of risk management, namely power distance, uncertainty avoidance and individualism (Griffin et al. 2013; Li et al. 2013; Kreiser, 2010). Current research also strengthens the fact that culture influences both how risks are perceived and how they are managed (Liu et al. 2015). In order to measure culture's effect on ERM, which is the specific target of this study, the three mentioned dimensions are therefore examined and explained below.

Power distance refers to the degree to which inequality and hierarchy are accepted within a society. Countries with a low score are characterised by low hierarchies whereas countries with a high score feel comfortable with high hierarchies (Hofstede, 2010). This influences the way of how a firm's management and employees work together and how well informed the management is about all actions undertaken within its company. This could indicate that high power distance

countries are more likely to adapt ERM so that the management can monitor employees further down in the hierarchies. However, current research by Kreiser (2010) suggests the opposite by detecting a negative relation between entrepreneurial risk-taking and national culture. This implies that the higher the hierarchies within a country, the less freedom an entrepreneur has to take on risk and thus risk management becomes less important. In line with Kreiser (2010) this study expects high power distance countries to have less incentive to implement ERM.

Countries with high power distance are less likely to implement ERM (H.5)

The second dimension, uncertainty avoidance, relates to the acceptance of uncertain events. Countries with high uncertainty avoidance are risk-averse and fear unexpected situations. On the other hand, low uncertainty avoidance implies the acceptance of these uncertain events (Hofstede, 2010). This could imply that countries with high uncertainty avoidance fear to take on risks and thus have less incentive to engage in ERM. Li et al. (2013) also support this view by showing a negative relation between uncertainty avoidance and corporate risk-taking. In other words, this indicates that the higher the prevailing uncertainty avoidance within a firm is, the less risk a company is willing to take on. In line with Li et al. (2013) this study suggests that countries with high uncertainty avoidance engage less in ERM.

Countries with high uncertainty avoidance are less likely to implement ERM (H.6)

Finally, individualism and collectivism describe the extent to which people identify themselves with their group. Collectivism refers to the "power of the group" (Hofstede, 2010, p.91) meaning that decisions are made within a collective and group work is highly valued. Individualistic countries, however, focus on individual achievements and prefer working individually rather than with their peers (Hofstede, 2010). Whereas collectivistic countries rely on the group and its prevailing rules, individualistic countries are prone to take action and are thus likely to take on risks in order to achieve individual goals. This would create an incentive for firms to engage in risk management.

Connected to this, Li et al. (2013) examined how national culture influences corporate risk-taking by studying 35 countries and found a significant relationship between the level of individualism and the amount of risk a company is willing to take on. This means that the authors support that individualistic countries are more likely to take on risk than collectivistic ones (Li et al. 2013). This study thus expects a higher incentive for firms within individualistic countries to limit the total amount of risk and thus to engage in ERM.

Individualistic countries are more likely to implement ERM (H.7)

These cultural dimensions describe how individuals think and act differently. Since companies are managed and run by individuals, the cultural backgrounds of their employees shape company structures and decisions. Li et al. concluded that "even in a highly globalized world with sophisticated manager culture matters" (Li et al. 2013, p.1). Thus, based on the above described research findings, this research expects the three cultural dimensions power distance, uncertainty avoidance and individualism to have an influence on a firm's implementation of ERM.

3. Methodology

In this chapter the research methodology is presented and it introduces the chosen research design followed by the data scope and sources used within this study. In addition, this study divides its research into two regressions. For both regressions the underlying variables, the econometric model and tests for potential biases are described before finalising with considerations about the reliability, the replicability and the validity of the chosen method.

3.1. Research Design

This study investigates if culture influences ERM implementation through testing the above described hypotheses. Thus a deductive research is used based on firm-specific ERM observations. This type of quantitative research is best approached with a cross-sectional research design, which by definition entails the collection of different observations at a single point in time to detect patterns within data (Bryman & Bell, 2015).

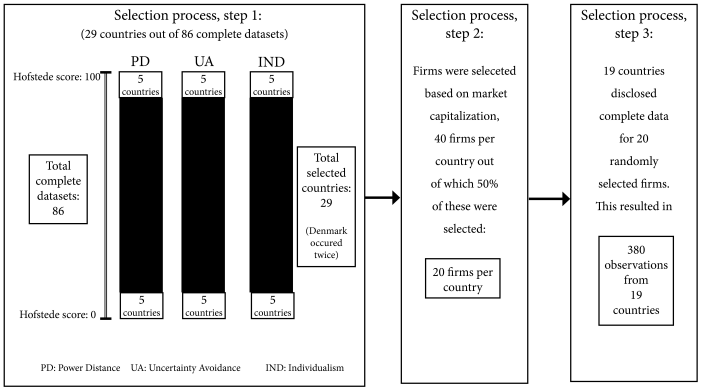
In existing literature mainly five approaches are used for investigating ERM (Sekerci, 2014) and the best fit for this research is the keyword search. To contrast the reason behind this decision all five approaches will be described further. The first approach, used by Hoyt and Liebenberg (2011) and Beasley et al. (2008), is based on the identification of a CRO as an indicator for ERM implementation. Since the CRO's position only covers one of the three ERM pillars, the governance pillar, this study does not proceed with this procedure. The second approach is based on the ERM ratings provided by Standard & Poor's which measures ERM adoption mainly through: credit risk, risk governance, market risk, operational risk and lastly liquidity and funding (Lundqvist & Vilhelmsson, 2016). Since these ratings are only available for insurance companies it would limit the scope of this study to specific industries (Baxter et al. 2013; McShane et al. 2011). Gordon et al. (2009) developed another approach to derive an ERM index based on the firm's ability to reach the four ERM objectives, which are stated within the COSO (2004) framework and also explained in chapter 2.2. The aim of this index is to measure the effectiveness of the ERM implementation rather than the fact if ERM is present or not, which is why this study does not make use of this method. The fourth and most common approach is to gather first hand data by conducting surveys which are used to derive the degree of ERM

implementation (Lundqvist, 2014a; Sekerci, 2014; Lundqvist, 2015). To highlight again, this study focuses on a firm's decision to adopt ERM rather than the degree of implementation, which is why the fifth method, the keyword search on annual reports of observed firms, will be used. Even though it is not mandatory for firms to disclose their risk management activities, companies have a strong incentive to reveal them in order to create shareholder confidence. Hence, it is a trustworthy method that captures if a firm has implemented ERM (Desender, 2011). Lundqvist (2014b) confirms this approach and also emphasises on the need for future research to investigate ERM based on publicly available data. By using the keyword approach to determine ERM implementation in the first step, this study is based on data analysis. The second step includes a quantitative data analysis in order to find a significant relationship between culture and ERM implementation. This research method thus combines content analysis and qualitative data analysis.

3.2. Data Sample

Hofstede's research provides 102 country-specific datasets out of which 86 serve as sufficient input needed for this study. Out of the complete datasets 19 countries were chosen (see Figure 3.1), by firstly sorting the datasets based on high and low scores on the three observed cultural dimensions (see Appendix B). The reason for this was to capture the broad spectrum of cultural differences (Hofstede, 2010). Secondly the 5%-tails of both the high and low scores were chosen, which equals 5 countries per tail and thus 10 countries per dimension. In addition, Denmark scored in the lower 5%-tail both on the dimensions power distance and uncertainty avoidance but was only included once in the total sample. This resulted in a total number of 29 countries.

Figure 3.1 Country selection process



In order to retrieve a representative sample of firms, the largest and publicly listed firms of each country were chosen which is in line with previous research (Lundqvist, 2014b). In the first step a list of the countries' 40 largest firms based on market capitalisation was retrieved from Thomson Reuters Datastream. In the second step 50% of these 40 firms were chosen based on a random-selected algorithm, which resulted in 20 firms per country. Firms that did not disclose an English version of their annual report were excluded. The final data sample consisted of 19 countries and thus 380 observations (see Appendix C). Finally, the time perspective of one year, 2014, was chosen as this study aims to analyse existing or non-existing implementation of ERM rather than to focus on when ERM was implemented.

3.3. Regression 1: Firm-level influences on ERM implementation

The section below describes the variables, econometric model and tests for regression 1, which covers firm-level influences on ERM implementation.

3.3.1. Firm-level variables

Before analysing if ERM is influenced by culture, this study starts by determining if ERM is present or not among the observed firms. This is achieved by applying a keyword framework, which is specifically designed by the authors based on Hoyt and Liebenberg's (2011) keyword search strings. After conducting a pilot test on firms from Australia and Hong Kong, additional keywords are incorporated to fully capture ERM implementation (Table 3.1, 3.2, 3.3). The additional keywords are based on COSO (2004), ISO (2011) and Lundqvist (2015) and in line with previous research the keywords respective acronyms are also used (see Appendix D). Whereas Hoyt and Liebenberg (2011) conclude that ERM was present when one of the keyword is found, other researchers claim that a more complex framework is necessary to adequately assess ERM implementation (Lundqvist & Vilhelmsson, 2016). Thus this study uses a framework based on three pillars derived from Lundqvist (2015), namely *integration*, *strategy* and *governance* (see Figure 3.2). This requires firms to cover all essential areas of ERM by fulfilling a minimum of one keyword hit per pillar in order to be classified as having implemented ERM. This will result in a score of (1) or (0) if a firm does not capture all three pillars.

Figure 3.2 Keywords structured by pillars

Integration	Strategy	Governance
• Integrated risk management	• Strategic risk management	• Risk committee
• Risk management framework	• Risk appetite	• Chief risk officer
• Risk management across businesses	• Risk tolerance	• Risk governance
• Risk management policy	• Key risk indicators	• Risk manager
• Risk management principles	• Risk management culture	• Risk management committee
• Risk management plan	• Risk management objectives	• Risk management function

This table presents the keywords used in this study and divided into the three ERM-pillars. The following keywords are supported by Hoyt & Liebenberg (2011): integrated risk management, strategic risk management, risk committee and chief risk officer. The keyword risk governance is supported by Lundqvist (2014) and the remaining keywords have been created by the authors themselves supported by the COSO (2004) framework and the ISO (2011).

Table 3.1 Additional keywords in detail, Integration

Risk management framework	ISO (2009) defines risk management framework as a "set of components that provide the foundations and organizational arrangements for designing, implementing, monitoring, reviewing and continually improving risk management throughout the organization".
Risk management across businesses	The extended definition of ERM stated by COSO (2004) explains that enterprise risk management is applied across business units within a firm. When viewing risks across business units the firm takes on a portfolio approach toward its risks. Through this the firm is able to assess them across all different business levels to manage the risks by categories (p.53, 50).
Risk management policy	Risk management policy is defined as the "statement of the overall intentions and direction of an organization related to risk management" (ISO, 2009). This statement is necessary in order to efficiently communicate risk management throughout a firm. (COSO, 2004).
Risk management principles	Principles in the context of risk management are an important aspect of enterprise risk management since it points to key risk concepts of a firm selected out to in the best way direct firm risks on every firm level (in foreword of COSO 2004, 117).
Risk management plan	A risk management plan is part of the risk management framework and incorporates the approach, the responsibilities and the principles of risk management (ISO, 2009).

This table explains the additional keywords for the pillar integration.

Table 3.2 Additional keywords in detail, Strategy

Risk appetite	According to COSO's ERM framework (2004) risk appetite is defined as "the broad-based amount of risk a company is willing to accept in pursuit of its vision". It guides resource allocation and aligns the whole organisation towards its set strategy.
Risk tolerance	Risk tolerance is defined as "the acceptable variation relative to the achievement of an objective". (COSO, 2004) Firms elaborating their risk tolerance are aware of their risks and have defined the degree to which they accept to differ from their set objectives.
Key risk indicator (key risk)	According to COSO (2010) key risk indicators are metrics that "provide an early signal of increasing risk exposures in various areas of the enterprise". The purpose is to identify potential events that could influence the achievement of the company-specific goals. When firms use key risk indicators they extend their traditional risk management from only identifying risk categories towards analyzing these and their interactions. This allows to rank risks and align risk management with the company's overall strategy, one of the main purposes of ERM.
Risk management culture (risk culture)	According to the COSO framework (2004) it is the chief executive officer's and senior officers' responsibility to determine the company's risk management philosophy as well as its risk management culture. This describes how risks are perceived and managed within the whole entity.
Strategic risk	The COSO frameworks strengthens the importance of key risk indicators since these forward-looking metrics allow proactive and strategic risk management. (COSO, 2010) If a company identifies its strategic risks this implies that it has already determined its key risks and aligned these with their risk strategy.
Risk management objectives (risk objectives)	One important component of ERM is the setting of objectives. (COSO, 2004) In line with the overall strategy, the company has to set risk management objectives which support its mission and are consistent with its risk appetite.

This table explains the additional keywords for the pillar strategy.

Table 3.3 Additional keywords in detail, Governance

Risk management committee (risk committee)	In addition to the Chief Risk Officer, the board of directors is also responsible for the enterprise-wide risk management. The COSO framework states that the board of directors' responsibility is to have oversight of ERM and to align risk management with the company's strategy in particular. In line with Hoyt and Liebenberg (2011) "risk committee" as well as "risk management committee" are included as keywords.
Risk management function (risk function)	Lundqvist (2014) stats that ERM does not necessarily require the implementation of a chief risk officer. Companies can also assign this role to another senior level manager or even a separate function.

This table explains the additional keywords for the pillar governance.

The independent variables are measured as described in Table 3.4 and explained further in the econometric model below. The hypothesis *H.1*, *H.2*, *H.3* and *H.4* derived in chapter 2.1 aim to examine if firm characteristics matter for the decision to implement ERM, including firm size, leverage, industry and big four auditors.

Table 3.4 Independent firm-specific variables

Variable	Expected Relation	Measured as
Firm Size	+	Natural logarithm of the book value of total firm assets in USD (Liebenberg & Hoyt, 2003).
Leverage	+	Book value of debt divided by the book value of total assets (Lundqvist, 2015).
Industry	+	Financial firms (1) and non-financial firms (0) (Pagach & Warr, 2011; Lundqvist, 2015).
Big 4 Auditor	+	Seraching annual report to find out external auditor. All the following are assigned with (1), otherwise (0): KPMG, Deloitte, PricewaterhouseCoopers, Ernst&Young (Beasley et al., 2005).

This table shows the independent variables of regression 1: firm value, leverage, industry and big 4 auditor.

3.3.2. Firm-level econometric model

With the dependent variable being the ERM dummy, which takes on a value of (1) when a firm has adopted ERM and (0) if not, and independent variables being firm size, leverage, industry and big four auditor, regression 1 aims to answer the following sub-research question:

- What influences ERM implementation on a firm-level?

Since ERM implementation is not measured as a degree but as a simple "yes" or "no" answer, the dependent variable needs to be analysed with a logit model. This limited-dependent variable model considers the binary outcome by transforming the regression output into the interval (0,1) (Brooks, 2008, pp.514).

Further the model is based on the cumulative logistic probability distribution function *F*, defined as:

$$F(z_i) = \frac{1}{1 + e(-z_i)}$$

The *e* is the exponential function and the variable *z,* as used in this study, contains the firm characteristics and thus equals:

$$z_i = \beta_0 + \beta_1 Country_i + \beta_2 size_i + \beta_3 leverage_i + \beta_4 industry_i + \beta_5 big\ 4\ auditor_i$$

This leads to the logit model with *P* as the probability of that ERM equals 1:

$$P(ERM_i = 1) = F(\beta_0 + \beta_1 size_i + \beta_2 leverage_i + \beta_3 industry_i + \beta_4 big\ 4\ auditor_i)$$

The *i* denotes the company index which ranges from 1 to 380 covering the total amount of observed companies. Further the beta $\beta_k$represents the regression coefficient, where k ranges from 0 to 5, indicating the influence of the independent variables on the ERM dummy variable. Since the independent variables are not linearly related to the probability of ERM, the regression coefficients cannot be interpreted directly. Thus the coefficients need to be translated into marginal effects as follows:

$$m_k{}^{logic} = \beta_k F(z)(1 - F(z))$$

3.3.3. Firm-level statistical tests

The logit model requires testing for multicollinearity between the independent variables. The correlation matrix in Table 3.5 shows that multicollinearity is not present within the underlying four independent variables since no correlation coefficient exceeds 0.8 (Brooks, 2014). Furthermore, no additional assumptions have to be fulfilled for the logit model and thus no additional tests are necessary.

Table 3.5 Correlation matrix, regression 1

Correlation matrix	*ln_total_assets*	*leverage*	*industry*	*big_4_auditor*
ln_total_assets	1.000			
	------			
leverage	0.055	1.000		
	1.079	------		
industry	0.334	-0.234	1.000	
	6.879	-4.680	------	
big_4_auditor	0.069	-0.075	0.017	1.000
	1.353	-1.455	0.324	------

This table shows the correlation between the independent variables *ln_total_assets, leverage, industry and big_4_auditor* for regression 1 and the corresponding probabilities (below value).

3.4. Regression 2: Cultural influences on country-level ERM implementation

The section below describes the variables, econometric model and tests for regression 2, which covers cultural influences on country-level on ERM implementation.

3.4.1. Country-level variables

Based on the data and the results from regression 1, it is possible to determine ERM implementation on a country-level, which is used as the dependent variable in this regression. Since every country contributes with 20 observations, the ERM scores can range between 0 and 20. For better comparison, these absolute scores are transformed into percentages.

The independent variables for the country-specific regression 2 are Hofstede's cultural dimensions: power distance (PD), uncertainty avoidance (UA) and individualism (IND). Hofstede assigned country-specific scores from 1 to 100 on each dimension, where 1 is considered low and 100 high. The three country-specific scores are all taken into consideration as independent variables and the expected effect on ERM implementation is further explained below in Table 3.6.

Table 3.6 Independent country-specific variables

Variable	Expected Relation	Definition
Power Distance	-	Cultural dimensions measured with scores ranging from 1-100 (Hofstede, 2010).
Uncertainty Avoidance	-	
Individualism	+	

This table explains the definition of the independent variables and their expected relation for regression 2: *Power Distance, Uncertainty Avoidance and Individualism.*

3.4.2. Country-level econometric model

With the country-specific ERM implementation percentage as the dependent and Hofstede's (2010) cultural dimensions as the independent variables, regression 2 aims to answer the remaining two sub-questions:

- How does ERM implementation vary across countries?
- To what extent are these differences influenced by cultural dimensions?

Since a linear relation is expected, an ordinary least squares (OLS) model is used for regression 2, which is defined as follows:

$$y_c = \delta_1 + \delta_2 x_{2c} + \delta_3 x_{3c} + \delta_4 x_{4c} + \varepsilon$$

In the context of this study, the final regression 2 specification is:

$$ERMpercent_c = \delta_1 + \delta_2 PD_c + \delta_3 UA_c + \delta_4 IND_c + \varepsilon$$

The *c* denotes the country index, ranging *from c* =1 *to c* =19*,* covering all 19 countries observed in the data sample. The delta (δ) ranging from 1 to 4 represents the regression coefficients and indicates the influence of the three cultural dimensions on the country-specific ERM implementation percentage.

3.4.3. Country-level statistical tests

According to Brooks (2014) OLS regressions have to fulfil five assumptions in order to assure unbiased and correct inferences. The chosen cross-sectional data used in this research thus has to be tested for possible violations of these assumptions by checking for heteroscedasticity, non-normality, multicollinearity and non-linearity.

Heteroscedasticity is present when the variance of the error terms is not constant over time which leads to wrong standard errors and incorrect inferences. When testing for this through the White test, the variables *power_distance* and *individualism* reveal heteroscedasticity and thus adjustments of these two variables are necessary. Applying White's robust standard errors corrects for heteroscedasticity within *power_distance*. Further, the variable *individualism* has to be transformed into a natural logarithm to become homoscedastic, which implies that *ln_individualism* is used onwards. Finally, *uncertainty avoidance* shows no sign of heteroscedasticity, which is why no transformation is needed. As the correlation matrix in Table 3.7 shows, no sign of multicollinearity is present between the variables. By running the remaining test no problem is detected for neither non-normality nor non-linearity (see Appendix E).

Table 3.7 Correlation matrix, regression 2

Correlation matrix	*power_distance*	*uncertainty_avoidance*	*ln_individualism*
power_distance	1.000		
	------		
uncertainty_avoidance	0.052	1.000	
	0.833	------	
ln_individualism	-0.689	-0.137	1.000
	0.001	0.576	------

This table shows correlations between the independet variables *power_distance, uncertainty_avoidance and ln_individualism* and the corresponding probabilities.

3.4.4. Reliability, Replicability and Validity

In order to derive correct inferences from both regressions this research has to be reliable, replicable and valid (Bryman & Bell, 2015). Reliability addresses whether the results are repeatable and consistent. Since the same keywords are used for every observed firm, the results are consistent and thus reliability can be assured. Furthermore, due to the detailed process of data sampling and gathering, as described above, the study can be replicated by other researchers. Validity however, can be analysed from the following three perspectives: the measurement

validity, internal validity and external validity. Measurement validity answers the question if the keyword approach used in this study really measures ERM implementation. Although this approach could be subject to window-dressing (Lundqvist, 2015), this way of measuring ERM implementation has been used in previous research (Hoyt & Liebenberg, 2011; Lundqvist & Vilhelmsson, 2016). After conducting a pilot test on the observed data sample, additional keywords are added in order to truly capture ERM implementation. Secondly these are divided into three pillars in order to cover the three essential ERM pillars and to minimise potential window-dressing bias (Lundqvist, 2014b; COSO, 2004). Furthermore, internal validity is given since the results are statistically significant and confirm causality.

External validity allows results to be generalised beyond the sample used in the underlying research. Thus researchers have to ensure that the data selection is appropriate, representative and unbiased (Ryan, Scapens & Theobald, 2002). In the first step of data sampling countries are chosen based on Hofstede's cultural dimension scores and in order to capture extreme cultural differences, both high and low scoring countries are included consisting of the 5%-tails of each dimension. In the second step the selection bias is mitigated by randomly choosing firms from the list of the largest market capitalisation within each country, which reflect the whole population. If firms do not disclose an English version of their annual report, additional firms are included from the randomised list. By pursuing the goal of including 20 firms per country to ensure comparability between the observed countries, this part of the data gathering is exposed to potential selection bias.

Another possible issue related to the external validity could stem from the chosen data sources, whereof the first one is Thomson Reuters Datastream, which is a worldwide acknowledged database used for economic research (Brooks, 2014). The second data source is the companies' individual annual reports, which are published by the companies themselves. This data source is commonly used in research since firms tend to have a high incentive to disclose their risk management activities in order to send positive signals to their shareholders (Lundqvist & Vilhelmsson, 2016; Hoyt and Liebenberg, 2011). Even though the information content varies across countries and companies, all of the annual reports contain information about the company's risk exposure and management, which ensures comparability.

4. Empirical results and analysis

This chapter presents empirical results and an analysis divided into two parts, based on the two regressions. The first part analyses the ERM implementation on a firm-level and the second part examines the influence of culture on ERM implementation on a country-level. Both analyses introduce the data through descriptive statistics and discuss the regression results in relation to the presented literature. This chapter ends with examining the robustness of results.

4.1. Regression 1: Results from firm-level ERM implementation

This analysis starts with scrutinising the 380 observations retrieved from the data collection including 19 different countries. As this analysis aims to examine the influences of ERM implementation on a firm-level, it begins with an overview of the retrieved data.

4.1.1. Firm level descriptive statistics

For each of the observed firms this study includes its firm size (*total_assets*), its leverage (*leverage*), its industry (*industry*) and the presence of one of the big four auditors (*big_4_auditor)*. As it can be seen in Table 4.1 the average size, measured as the total assets, of the included firms is 40.2 bn USD. However, the median of 6.4 bn USD indicates that there is a high variation within the data. This is also supported by the standard deviation of 104.3 bn USD and the data range between the maximum of 873.2 bn USD and the minimum of 16.5 bn USD. This large variation makes comparison more difficult and thus this study standardises the results by transforming the variable into its natural logarithm (*ln_total_assets*), which is in line with previous research (Lundqvist, 2014a). By applying the natural logarithm, the standard deviation is reduced to 2.1 with mean of 8.8. In the following, only the variable *ln_total_assets* is included in the final regression.

The mean of the variable *leverage*, measured as the long-term debt divided by total assets, is 26.4 with a median of 25.4 and a standard deviation of 18.4. Compared to similar studies with the same measurement, for example Lundqvist (2015) who finds a leverage mean of 0.17, this average is quite high. The reason could be the usage of a worldwide sample with countries that favour high levered operations, in comparison to the Nordic firms studied by Lundqvist (2015).

The considerably high variation of 18.4 could also be explained by the heterogeneous sample including countries that to a large extent differ from each other.

The *industry dummy* variable in the data sample is measured with (1) for financial firms and (0) otherwise. Within the underlying data sample the mean of the variable *industry* is 0.19, indicating that 19% of the observed firms operate within the financial sector and 81% within the non-financial sector. This shows that the data sample captures a variety of industries and is able to expand previous studies that focus only on financial companies (Baxter et al. 2013; Hoyt & Liebenberg, 2011; Grace et al. 2015).

The dummy variable, *big_4_auditor*, which takes on a value of (1) if one of the big four auditors is present, reveals a mean of 0.863. Since 86.3% of the observed firms are audited by one of these auditors, this shows the high presence of these four companies within the observed firms, which is in line with previous research (Beasley et al. 2005).

Table 4.1 Descriptive statistics, regression 1

	Mean	Median	Maximum	Minimum	Std.Dev
total_assets	40201.0	6394.9	873187.9	16.540	104323.5
ln_total_assets	8.740	8.763	13.680	2.806	2.099
leverage	26.383	25.400	93.740	0.000	18.398
industry	0.189	0.000	1.000	0.000	0.392
big_4_auditor	0.863	1.000	1.000	0.000	0.344
ERM	0.518	1.000	1.000	0.000	0.500

This table shows the descriptives for regression 1 explaining the mean, median, maximum, minimum and standard deviation for the independet variables: *total_assets, ln_total_assets, leverage, industry* and *big_4_auditor* as well as the dependet variable *ERM*.

Regarding the dependent variable, the *ERM implementation*, the data reveals a mean of 0.52 indicating that approximately half of the observed firms engage in ERM, which is visualised in Table 4.2 with 197 ERM firms compared to 183 non-ERM firms. This shows that ERM implementation is still quite heterogeneous and varies between the observed firms and countries, as it can be seen in Table 4.2 countries with a high ERM implementation are for example Australia, Singapore and Malaysia whereas countries with low ERM implementation are Pakistan, United States and Greece.

Table 4.2 ERM firms versus non-ERM firms on a country-level

Country	ERM	non-ERM	% ERM	% non-ERM
Australia	19	1	95%	5%
Austria	9	11	45%	55%
Canada	14	6	70%	30%
Denmark	10	10	50%	50%
Greece	3	17	15%	85%
Hong Kong	13	7	65%	35%
Indonesia	13	7	65%	35%
Ireland	11	9	55%	45%
Israel	5	15	25%	75%
Malasia	17	3	85%	15%
New Zealand	10	10	50%	50%
Pakistan	1	19	5%	95%
Philippines	11	9	55%	45%
Portugal	9	11	45%	55%
Russia	10	10	50%	50%
Singapore	18	2	90%	10%
Sweden	8	12	40%	60%
United Kingdom	15	5	75%	25%
United States	1	19	5%	95%
Total 380 observations	197	183	52%	48%

This table shows ERM firms versus non-ERM firms on a country-level.

4.1.2. Firm level results

Based on the data described above, it is possible to firstly run univariate regressions for each of the included variables and secondly a multivariate regression, which is the focus of this study. The results in Table 4.3 show that the variables which are significant in the univariate regression are also significant in the multivariate regression, namely the *ln_total_assets* (firm size) and the *industry*. Furthermore, Table 4.3 shows the retrieved regression coefficients, which due to the logit model cannot be interpreted directly, and their corresponding probabilities. In order to allow for an interpretation of the relations between the dependent and independent variables, the marginal effects are also included.

Table 4.3 Univariate and Multivariate analyses, firm-level

	Univariate *ln_total_assets*	Univariate *leverage*	Univariate *industry*	Univariate *big_4_auditor*	Multivariate
constant	-2.736***	0.250	-0.182	-0.310	-2.672
	(0.000)	(0.165)	(0.111)	(0.269)	(0.000)
ln_total_assets	0.322***				0.271***
	(0.000)				(0.000)
	[0.080]				[0.068]
leverage		-0.007			-0.004
		(0.233)			(0.544)
		[0.000]			[-0.001]
industry			1.517***		1.101***
			(0.000)		(0.001)
			[0.378]		[0.274]
big_4_auditor				0.445	0.358
				(0.141)	(0.269)
				[0.111]	[0.089]
McFadden R-squared	0.072	0.003	0.054	0.004	0.100

This table shows the results of the univariate and multivariate analyses for regression 1 including *ln_total_assets, leverage, industry and big_4_auditor* as independent variables. The first value represents the regression coefficient with the * indicating the statistical significance on a 10%-level and *** indicating the statistical significance on a 1%-level. The second value represents the probability and the thrid value represents the marginal effects. The R-squared and Adjusted R-squared shows the goodness of fit.

4.1.3. Firm level univariate analyses

The univariate analysis results in a regression coefficient for *ln_total_assets* of 0.322, which is significant on a 1% significance level and indicates that the firm size has a positive influence on a firm's decision to implement ERM. In order to determine the strength of its influence, it is necessary to derive the marginal effects of the independent variables. With a marginal effect of 0.080 the relation between firm size and ERM implementation can be described as follows: if the firm size measured as *ln_total_assets* increases by one unit the likelihood that a firm has implemented ERM increases by 8.0%. The next univariate regression examines the variable *leverage*. Based on the regression coefficient of -0.0038 and the probability of 0.54, *leverage* shows no significant influence on ERM implementation and thus the marginal effect is neglectable.

Regarding the univariate analysis for *industry*, the regression shows a significant regression coefficient of 0.517 revealing a positive relation between industry and ERM implementation. This implies that firms operating in the financial industry are more likely to have implemented ERM. In addition, the marginal effect of 0.378 indicates that a firm operating in the financial industry has a 38% higher likelihood of having implemented ERM. Finally, the univariate analysis for the variable *big_four_auditor* shows no significant relation between the

big_four_auditor and *ERM implementation* since the regression coefficient of 0.445 has a probability of 0.14 which also means that the marginal effect is neglectable.

4.1.4. Firm level multivariate analysis

In addition to the four univariate analyses, the variables can be tested jointly within a multivariate regression. These results are shown in the last column of Table 4.3. In line with the univariate regressions both the firm size, defined as the *ln_total_assets*, and the *industry* reveal a significant influence on ERM implementation, whereas no support is found for the variables *leverage* and *big_four_auditor*.

The first independent variable, *ln_total_assets*, has a coefficient of 0.271 in the joint regression, which is significant on a 1%-level. The marginal effect of 0.068 implies that if the firm size increases by one unit, the likelihood that a firm engages in ERM increases by 6.8%. This positive relation, together with the results from the univariate analysis, supports the first hypothesis (H.1) since it shows that the larger the firm size the more likely that a firm has implemented ERM. This result is in line with previous research claiming that firm size has a strong influence on ERM implementation (Liebenberg & Hoyt, 2003; Pagach & Warr, 2011; Lundqvist, 2015). One reason for this positive relation could be, as also stated by Liebenberg & Hoyt (2003), that larger firms to a higher extent have the resources for investing in implementing ERM. Another explanation for this result could be that larger firms are exposed to more risks and thus have a higher incentive to engage in ERM.

The second independent variable, *leverage,* is insignificant since the probability for the coefficient of -0.004 is 0.544. This shows that there is no support for the second hypothesis (H.2) from neither the univariate nor the multivariate regression and thus cannot confirm previous research which implies that leverage has a positive influence on ERM implementation (Liebenberg & Hoyt, 2003; Pagach & Warr, 2011; Lundqvist, 2015). Although it was expected that high-levered firms engage more in ERM in order to avoid financial distress (Liebenberg & Hoyt, 2003), this study is unable to find significant support for this relation. A possible explanation could be that high-levered firms want to be exposed to a higher amount of risk in

order to realise higher returns, which relates to the trade-off theory described by Ogden et al. (2003). This implies that firms pursuing this strategy would not engage in ERM.

Moreover, the third independent variable, *industry*, shows a significant result on a 1%-level which strengthens the result from the univariate analysis. The multivariate regression reveals a coefficient of 1.101 for this variable and due to the corresponding probability this implies a significant and positive relation between industry and ERM implementation. The marginal effect of 0.274 shows that firms in financial industries are 27.4% more likely to have implemented ERM. This positive relation supports the third hypothesis (H.3) stating that financial firms are more likely to implement ERM and thereby follows previous research findings (Pagach & Warr, 2011; Beasley et al. 2005; Hoyt & Liebenberg, 2011; Lin et al. 2010). This relation could be the result of the strong regulation within the financial sector, as it is for example imposed by the Basel Framework (Basel, 2011), which puts pressure on financial firms to adapt ERM in order to signal trustworthiness to their shareholders and customers. Moreover, also rating agencies, for example Standard and Poor's, pay considerable attention to firm's engagement in ERM and thus this could explain the positive relation between the financial industry and ERM implementation.

The final independent variable *big_four_auditor* has an insignificant result in both the univariate and multivariate regression. With a regression coefficient of 0.358 and a probability of 0.269 this study cannot support the fourth hypothesis (H.4) about a positive relation between the presence of a big four auditor and the implementation of ERM, which has been claimed by existing research (Beasley et al., 2005; Desender, 2011; Sekerci, 2014). Although it was hypothesised that auditors pressure firms to implement ERM one reason for the observed insignificance could be that auditors focus on risk management but not specifically on ERM.

To conclude, the multivariate analysis finds support for firm size and industry, whereas leverage, big four auditor presence and the included constant are insignificant. The overall goodness of fit can be analysed with the pseudo R-squared, which in this case is given as the McFadden R-squared. The retrieved R-squared is 10%, which according to Brooks (2014) is in line with typical logit model outcomes. Furthermore, the Expectation-Prediction Evaluation Table (see Appendix F) indicates that the model predicts 63% of the observations correctly.

4.2. Regression 2: Results from cultural influences on country-level ERM implementation

Based on the results of regression 1, the second regression tests the cultural influence on country-specific ERM implementation. Since the data sample includes 19 countries, this regression is based on 19 observations.

4.2.1. Country-level descriptive statistics

The independent variables used within this regression are the three cultural dimensions *power_distance*, *uncertainty_avoidance* and *ln_individualism* as defined by Hofstede (2010).

Table 4.4 Country-level descriptive statistics

	Mean	Median	Maximum	Minimum	Std.Dev
power_distance	50.474	40.000	100.000	11.000	28.414
uncertainty_avoidance	52.421	48.000	100.000	8.000	26.519
individualism	51.842	54.000	91.000	14.000	27.717
ln_individualism	3.779	3.989	4.511	2.639	0.636
ERM_percent	0.537	0.550	0.950	0.050	0.257

This table shows the descriptives for regression 1 explaining the mean, median, maximum, minimum and standard deviation for the independet variables: *power_distance, uncertainty_avoidance, individualism* and *ln_indivudualism* as well as the dependet variable *ERM_percent*.

As can be seen in Table 4.4 the first dimension, *power_distance*, has a standard deviation of 28.4 and a mean of 50.5 ranging between a minimum of 11 and the maximum a 100. The second dimension, *uncertainty avoidance*, reveals similar results with a mean of 52.4 and a standard deviation of 26.5. Finally, the third dimension, *individualism*, has a mean of 51.8 and a standard deviation of 27.717. After the transformation to *ln_individualism*, which is necessary due to the heteroscedasticity that was detected in chapter 3.4, the variable has a mean of 3.77 with a standard deviation of 0.646. In conclusion, *power distance*, *uncertainty avoidance* and *individualism* have means close to 50 between a range of 1 and 100, which could be explained by choosing the extreme tails from Hofstede's cultural dimensions. The standard deviation of approximately 27 in addition shows that the data captures a variety of cultural differences and thus allows for comparison.

The average ERM implementation across the observed countries is 0.537 which implies that on average 53.7% of the firms within these countries have implemented ERM. The observed range

in the data lies between 0.05 and 0.95, which equals 5% and 95%. Within the 20 observed firms per country, the maximum of ERM firms is 19 which transformed into a percentage equals the 95%. Accordingly, the 5% represent the one ERM firm per country, which was the minimum retrieved score. The standard deviation of 0.256 indicates a variety of ERM implementation.

4.2.2. Country-level results

Based on the observed data it is possible to test whether culture, measured with Hofstede's dimensions, has an influence on the country-specific ERM implementation. This study will firstly analyse the individual effect of each of the cultural dimensions and secondly test the dimensions jointly. As it can be seen in Table 4.5. *power_distance* shows a significant influence within the multivariate regression, whereas *uncertainty_avoidance* is statistically significant both in the univariate and the multivariate regression. Furthermore, no significant support for *individualism* can be detected. Since the focus of this study is on the final regression, which includes all independent variables, this is analysed in more detail.

Table 4.5 Univariate and Multivariate analyses, country-level

	Univariate *power_distance*	Univariate *uncertainty_avoidance*	Univariate *ln_individualism*	Multivariate
constant	0.418***	0.807***	0.448	0.012
	(0.000)	(0.000)	(0.347)	(0.982)
power_distance	0.002			0.005*
	(0.105)			(0.065)
uncertainty_avoidance		-0.005***		-0.005**
		(0.012)		(0.020)
ln_individualism			0.024	0.143
			(0.845)	(0.209)
R-squared	0.068	0.285	0.003	0.434
Adjusted R-squared	0.014	0.243	-0.055	0.321

This table shows the results of the univariate and multivariate analyses for regression 2 including *power_distance, uncertainty_avoidance, individualism* as independent variables. The first value represents the regression coefficient with the * indicating the statistical significance on a 10%-level, ** indicating the statistical significance on a 5%-level and *** indicating the statistical significance on a 1%-level. The second value represents the p-value. The R-squared and Adjusted R-squared shows the goodness of fit.

4.2.3. Country-level univariate analyses

On a univariate level, the first dimension *power_distance* has a regression coefficient of 0.02 with a corresponding p-value of 0.105. This implies that the variable slightly misses to be significant on a 10% significance level and thus no inferences about a relation between *power_distance* and ERM implementation can be made from this univariate analysis. The second dimension, *uncertainty_avoidance*, is significant on a 1%-level with a regression coefficient of -

0.005, which implies that a one unit increase in uncertainty avoidance leads to a 0.5% decrease in ERM implementation within the observed countries. Finally, the univariate analysis of the third dimension, measured as *ln_individualism*, reveals no significant relation. With a p-value of 0.845 the regression coefficient of 0.024 is unable to explain any variation across the country-specific ERM implementation. Furthermore, it does not harm the results that the constant varies significantly over the different univariate regressions which is the result of the different specifications.

4.2.4. Country-level multivariate analysis

In the multivariate regression including the independent variables *power_distance*, *uncertainty_avoidance* and *ln_individualism*, both *power_distance* and *uncertainty_avoidance* reveal significant influences on ERM implementation.

Contrary to its univariate regression, the dimension *power_distance* is significant on a 10%-significance level in the multivariate analysis. The difference between these significance outcomes could indicate that the univariate specification suffers from an omitted variable bias, which is solved within the multivariate regression. This emphasises the superiority of the multivariate regression, which is the focus of this study. The multivariate regression coefficient of 0.005 implies that a one unit increase in power distance leads to a 0.5% increase in ERM implementation within the observed countries. This result contradicts the fifth hypothesis (H.5) which was based on existing research (Kreiser, 2010) stating that high hierarchies lead to less risk taking and thus less incentive for risk management. The results of this study, however, show a positive relation between power distance and ERM implementation. Therefore, it can be inferred that power distance increases the incentive for enterprise-wide risk management. A possible explanation could be that high hierarchies result in difficulties for management to monitor their entire operations and thus firms have a higher incentive to implement enterprise-wide risk management.

The second independent variable, *uncertainty_avoidance,* results in a regression coefficient of -0.005, this time at a significance level of 5%, which is in line with the univariate analysis. This negative relation also supports the sixth hypothesis (H.6), which is based on previous research (Li

et al., 2013) and confirms that firms within high uncertainty avoidance countries are more likely to manage these uncertain situation, which involve risks, in advance (Hofstede, 2010). In line with Li et al. (2013), who finds support that these countries take on less risk, this study shows that these countries have less incentive to engage in ERM.

Finally, the independent variable, *individualism*, has a coefficient of 0.143 and a p-value of 0.209 in the multivariate regression. Hence, this variable is insignificant both within its univariate and the multivariate regression, which means that there is no support for a relation between *individualism* and ERM implementation. Consequently, the corresponding hypothesis (H.7) cannot be supported and no relation can be confirmed. These results imply that this study cannot expand previous research by Li et al. (2013) who found a significant relation between individualism and corporate risk-taking. Based on their findings this study expected to find a positive relation between individualistic countries and ERM implementation to limit the total amount of risk. The lack of relation between individualism and ERM implementation could be explained by the trade-off theory, in the way that individualistic countries take on risks with the intent of keeping these in order to realise high returns. This strategy might not create incentive to engage in ERM and could be a reason for the insignificant regression coefficient within this study.

In conclusion, the second multivariate regression finds significant results for the independent variables *power_distance* and *uncertainty_avoidance* whereas *individualism* is insignificant. Furthermore, the results confirm the hypothesis for *uncertainty_avoidance* (H.6) while the opposite relation was revealed for the hypothesis regarding power distance (H.5). Overall this results in a goodness of fit, measured as the adjusted R-squared, of 0.321, which indicates that the two significant independent variables are able to explain 32.1% of the variation across the country-specific ERM implementation.

4.3. Robustness

The following section will examine robustness of the retrieved results showing the influence of *power_distance* and *uncertainty_avoidance* on country-specific ERM implementation (see Table 4.6). Robustness can be tested in various ways, where of this study chose to capture country differences by including the legal origins of the observed countries, as explained in detail below.

The theory about legal origins as advocated by La Porta (La Porta, Lopez-de-Silanes, Shleifer & Vishny, 1998) states that the origin of a country's law has an influence and shapes its existing legal rules and legislation, including investor protection (La Porta et al. 1998). This could eventually result in different risk management regulations, which could influence the implementation of ERM. Legal origins mainly divide countries into Common and Civil law countries. A more detailed analysis divides them into Common law, English Civil law, German Civil law and Scandinavian Civil law countries. This study will make use of both classifications to test whether the significant influence of the cultural dimensions as defined by Hofstede are still present. The variable *legal_origin_2* thereby is a dummy variable; taking on a value of (1) if the observed country is classified as a Civil law country and respectively a value of (2) for a Common law country. A more extended variable is the *legal_origin_4*, which classifies legal origin as Common law, French civil law, German civil law and Scandinavian civil law.

Table 4.6 Robustness tests

	Multivariate (excl. robustness)	Robustness Test 1	Robustness Test 2
constant	0.012	0.060	0.104
	(0.982)	(0.915)	(0.853)
power_distance	0.005*	0.005*	0.005*
	(0.065)	(0.070)	(0.092)
uncertainty_avoidance	-0.005**	-0.005**	-0.005**
	(0.020)	(0.043)	(0.022)
ln_individualism	0.143	0.142	0.140
	(0.209)	(0.227)	(0.226)
legal_origin_2		-0.0448	
		(0.690)	
legal_origin_4			-0.0389
			(0.462)
R-squared	0.434	0.441	0.456
Adjusted R-squared	0.321	0.281	0.301

This table shows the results of the multivariate regressions and the two robustness tests including *legal_origin_2* and *legal_origin_4* and the independent variables *power_distance, uncertainty_avoidance*, *individualism* as independent variables. The first value represents the regression coefficient with the * indicating the statistical significance on a 10%-level and ** indicating the statistical significance on a 5%-level. The second value represents the p-value. The R-squared and Adjusted R-squared show the goodness of fit.

As shown in Table 4.6, even when including legal origins, the independent variables *power_distance* and *uncertainty_avoidance* show significant results. The variables *legal_origin_2* and *legal_origin_4* are on their own not able to explain any variation in the underlying ERM implementation. This test supports the robustness of the significant results regarding the influence of *power_distance* and *uncertainty_avoidance*.

4.4. Summary of results

When analysing the results from the two regressions, this research finds statistical support both for the influences on ERM implementation on a firm-level as well as on a country-level (see Table 4.7). From the suggested independent variables of regression 1, firm size and industry have a statistically significant influence on ERM implementation. Contrary to the existing literature and the derived hypotheses, this study does not find support for the fact that leverage and the presence of one of the big four auditors have an effect on ERM implementation. In the second regression the results show statistical support for two out of the three hypothesised variables. Firstly, this research finds strong support for the influence of uncertainty avoidance on ERM implementation. In addition, power distance also a shows significant result, however only on a 10%-significance level within the multivariate analysis. Finally, there is only one dimension, the individualism, which cannot be supported by the observed data and consequently cannot explain ERM implementation within the data sample. These results are also strengthened by robustness tests including dummy variables for the legal origins of the observed countries.

Table 4.7 Summary of results

No.	Variable	Expected relation	Result
H.1	Firm size	+	Positive relation on a 1% significance level
H.2	Leverage	+	No support
H.3	Industry	+	Positive relation on a 1% significance level
H.4	Big 4 Auditor	+	No support
H.5	Power Distance	-	Positive relation on a 10% significance level
H.6	Uncertainty Avoidance	-	Negative relation on a 5% significance level
H.7	Individualism	+	No support

This table shows the summary of all hypotheses including both regression outputs.

5. Concluding Discussion

This chapter summarises the results of this study and discusses the main findings in relation to the research question. Furthermore, the findings will be critically discussed and concluded by giving suggestions about future research topics.

5.1. Conclusion

The purpose of this study was to answer if culture influences ERM implementation, which was addressed through three sub-questions. Firstly, the conducted research examined what influenced ERM implementation across a worldwide sample of firms. Secondly, it answered how ERM implementation varied across the observed countries and finally to what extent these differences could be explained by cultural dimensions.

By analysing a worldwide sample, this study confirmed that culture has an influence on ERM implementation. Based on the observed data it showed the statistically significant effect of Hofstede's cultural dimensions uncertainty avoidance and power distance on ERM implementation. However, no support for individualism was found. Opposite to what was suggested by existing literature, this study found a positive relation rather than a negative relation for power distance. In addition, this study strengthened previous studies about uncertainty avoidance. Overall, this study showed that culture has to be taken into account when analysing and comparing ERM implementation across countries. Furthermore, it found statistical support for the influence of firm size and industry on ERM implementation, which is in line with the hypotheses derived from previous research and answered the first sub-question. As a conclusion, influences which have been examined on a country-level can also be found on a worldwide level.

This study contributes and extends existing ERM research by basing its research on a worldwide sample, including a total of 380 firm observations from 19 countries. The gathered data sample shows ERM variation across the observed countries, which provides the foundation for the second sub-question. The observed differences allow to examine the third sub-question: to what extent culture influences varying ERM implementation across countries. The fact that this research supports that power distance and uncertainty avoidance have an influence on ERM

implementation also answers the research question by confirming that culture has an influence on ERM implementation.

5.2. Future Research & Practical Implications

One possible limitation of this study could be that the number of countries represented in the data sample is just partially reflecting the worldwide amount of countries. Initially the aim was to include more countries but due to lack of disclosure, especially in the regions of Africa and South America, data access was limited and thus these observations had to be excluded from the sample. Further studies should try to capture more observations from these areas to ensure even better comparison. Another limitation of this study could be that the second regression of this study focuses on cultural influences measured with Hofstede's dimensions. Although Hofstede's dimensions are primarily used within existing research, other cultural measurement could also be of great interest. For instance, further research could include the cultural dimensions developed by Schwartz (1999) to capture an even broader range of cultural differences. On a country level it could be also interesting to include additional country characteristics, namely the risk management regulation or country classification. This could further explain differences in country-specific ERM implementation and even more define what influences firms within their decision for engaging in enterprise-wide risk management. Nevertheless, the results of this research are statistically significant even when controlling for legal origins of the observed countries, which shows the robustness of the used model.

This study contributes to existing research by presenting a new angle to analyse ERM. It shows that culture is also relevant when analysing ERM implementation, which has not been investigated before. Furthermore, it draws attention to the importance of a deeper understanding of cultural influences on a firm's risk management. Practitioners and investors, who on a daily basis analyse and invest into a portfolio of international companies, should consider these differences in order to be able to better manage these portfolios. In essence, this study combines two important fields of research, namely ERM and cultural studies and provides first insights for further research topics.

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Appendix A: The COSO-cube

Source: COSO, 2004

Appendix B: Full table reviewing Hofstede's Cultural Dimensions

Country	Power Distance	Uncertainty Avoidance	Individualism
Australia	36	51	90
Austria	11	70	55
Canada	39	48	80
Denmark	18	23	74
Greece	60	100	35
Hong Kong	68	29	25
Indonesia	78	48	14
Ireland	28	35	70
Israel	13	81	54
Malaysia	100	36	26
New Zealand	22	49	79
Pakistan	55	70	14
Philippines	95	44	32
Portugal	63	99	27
Russia	93	95	39
Singapore	74	8	20
Sweden	31	29	71
United Kingdom	35	35	89
United States	40	46	91

Source: Hofstede, 2010

Appendix C: Overview of selected firms

Australia

AGL ENERGY
AMCOR
APA GROUP
ASX
BHP BILLITON
BRAMBLES
CALTEX AUSTRALIA
CIMIC GROUP
GOODMAN GROUP
INSURANCE AUS.GROUP
NEWCREST MINING
ORIGIN ENERGY
QANTAS AIRWAYS
QBE INSURANCE GROUP
RAMSAY HEALTH CARE
TELSTRA
TRANSURBAN GROUP
WESFARMERS
WOODSIDE PETROLEUM
WOOLWORTHS

Austria

ANDRITZ
BK.FUR TIROL UND VBG.
BKS BANK
CONWERT IM.INVEST
KTM
MAYR-MELNHOF KARTON
OBERBANK
OMV
PALFINGER
ROSENBAUER INTL.
S IMMO
SCHOELLER-BLECKMANN
STRABAG SE
TELEKOM AUSTRIA
UNIQA INSU GR AG
VERBUND
VIENNA INSURANCE GROUP
VOESTALPINE
WIENERBERGER
ZUMTOBEL

Canada

BK.OF NOVA SCOTIA
BROOKFIELD ASSET MAN
CANADIAN PACIFIC RY.
CENOVUS ENERGY
FRANCO-NEVADA
GREAT WEST LIFECO
INTACT FINANCIAL
MAGNA INTL.
NAT.BK.OF CANADA
PEMBINA PIPELINE
POTASH CORPORATION OF
POWER CORP.CANADA
ROGERS COMMS
ROYAL BANK OF CANADA
SAPUTO
SUN LIFE FINL.
TELUS
TORONTO-DOMINION BANK
TRANSCANADA
VALEANT PHARMS.INTL.

Denmark

A P MOLLER - MAERSK
ALK-ABELLO
ALM BRAND
BAVARIAN NORDIC
CARLSBERG
CHR HANSEN HOLDING
DSV
FLSMIDTH & CO.
GN STORE NORD
JYSKE BANK
KOBENHAVNS LUFTHAVNE
NKT
NOVO NORDISK
PANDORA
RINGKJOBING LANDBOBANK
ROCKWOOL
SPAR NORD BANK
SYDBANK
VESTAS WINDSYSTEMS
WILLIAM DEMANT HLDG.

Greece

ATTICA BANK
BANK OF PIRAEUS
CORINTH PIPE WORKS
ELLAKTOR
FOLLI FOLLIE
FOURLIS HOLDING
GRIVALIA PROPERTIES REIC
HELLENIC PETROLEUM
HELLENIC TELECOM.ORG.
INTRALOT INTGRTD.SYSV.
KARELIA TOBACCO
LAMDA DEVELOPMENT
METKA
MINOAN LINES
MOTOR OIL
NATIONAL BK.OF GREECE
NBG PANGAEA REIC
OPAP
THESSALONIKI WATER SUPP.
TITAN CEMENT CR

Hong Kong

AAC TECHNOLOGIES HDG.
AIA GROUP
BANK OF EAST ASIA
CHINA OS.LD.& INV.
CHINA RES.POWER HDG.
CHINA UNICOM (HONG KONG)
CK HUTCHISON HOLDINGS
CNOOC
EVERGRANDE REAL EST.GP.
GALAXY ENTERTAINMENT GP.
HANG SENG BANK
HENDERSON LD.DEV.
HKT TRUST & HKT
HONG KONG AND CHINA GAS
HSBC HOLDINGS HONGKONG
LINK RL.EST.INV.TST.
NEW WORLD CHINA LD.
POWER ASSETS HOLDINGS
SUN HUNG KAI PROPERTIES
SWIRE PROPERTIES

Indonesia

AKR CORPORINDO
ASTRA AGRO LESTARI
BANK DANAMON INDONESIA
BAYAN RESOURCES
BUMI SERPONG DAMAI
ELANG MAHKOTA TEKNOLOGI
GUDANG GARAM
ICT.TUNGGAL PRAKARSA
INDOFOOD CBP SUKSES MKM.
INDOSAT
JASA MARGA
LIPPO KARAWACI
MATAHARI DEPARTMENT SOE.
MEDIA NUSNT.CITRA
PAKUWON JATI
PERUSAHAAN GAS NEGARA
SEMEN GRESIK
SUMBER ALFARIA TRIJAYA
SURYA CITRA MEDIA
TOWER BERSAMA INFR.

Ireland

ALLIED IRISH BANKS
BANK OF IRELAND
CONROY GD.& NATRES.
CPL RESOURCES
DATALEX
DONEGAL INVESTMENT GROUP
FBD HOLDINGS
FYFFES
GLANBIA
IFG GROUP
IRISH CONT.GP.UNT.
KERRY GROUP
KINGSPAN GROUP
PADDY POWER BETFAIR
PERMANENT TSB GHG.
PETROCELTIC INTL.
PETRONEFT RESOURCES
SMURFIT KAPPA GROUP
TOTAL PRODUCE
ZAMANO

Israel

AZRIELI GROUP
BANK HAPOALIM B M
BEZEQ THE ISRAELI TELECM
CELLCOM
DELEK GROUP
DELTA
ELBIT SYSTEMS
FIRST INTERNATIONAL BANK OF ISRAEL
FRUTAROM
GAZIT GLOBE
ICL
MIZRAHI TEFAHOT
OIL REFINERIES
PARTNER COMMUNICATIONS
PAZ OIL
SHIKUN & BINUI
STRAUSS GROUP
SUPERSOL
TEVA PHARMACEUTICAL
TOWER

Malaysia

AMMB HOLDINGS
GAMUDA
GENTING PLANTATIONS
HAP SENG
HONG LEONG BANK
IJM
IOI
KUALA LUMPUR KEPONG
MALAYAN BANKING
MALAYSIA AIRPORTS HDG.
PETRONAS DAGANGAN
PETRONAS GAS
PPB GROUP
RHB CAP.
SIME DARBY
SP SETIA
TELEKOM MALAYSIA
TENAGA NASIONAL
UMW HOLDINGS
YTL

New Zealand

A2 MILK
AIR NEW ZEALAND
BRISCOE GROUP
DELEGAT GROUP
DNZ PROPERTY FUND
FISHER & PAYKEL HLTHCR.
FONTERRA COOPERATIVE GP.
FREIGHTWAYS
HEARTLAND BANK
MAINFREIGHT
MERIDIAN ENERGY
NEW ZEALAND REFINING
NUPLEX INDUSTRIES
PRECINCT PROPS.NZ.
PROPERTY FOR INDUSTRY
RYMAN HEALTHCARE
SKY CITY ENTM.GP.
SKY NETWORK TELEVISION
SPARK NEW ZEALAND
XERO

Pakistan

ADAMJEE INSURANCE
ATTOCK CEMENT PAKISTAN
ATTOCK PETROLEUM
BATA PAKISTAN
BYCO PETROLEUM PAKISTAN
CHEARAT CEMENT COMPANY
EFU LIFE ASSURANCE
FEROZE1888 MILLS
FEROZSONS LAB
GHANI GLASS
ICI PAKISTAN
JDW SUGAR MILLS
KOHINOOR TEX.MILLS
NISHAT CHUNIAN POWER
NISHAT MILLS
NISHAT POWER
PAK ELEKTRON
PAKISTAN INTL.AIRLINES
PAKISTAN INTL.CTNR.TERM.
PIONEER CEMENT

Philippines

CHINA BANKING
COSCO CAPITAL
D&L INDUSTRIES
DMCI HOLDINGS
EMPERADOR
FIRST GEN
GT CAPITAL HOLDINGS
JG SUMMIT HDG.
JOLLIBEE FOODS
MANILA ELECTRIC
METRO PACIFIC INVS.
METROPOLITAN BK.& TST.
PETRON
PHILIPPINE SEVEN
PHILP.LONG DSN.TEL.
PHILTRUST BANK
SEMIRARA MINING &.PWR.
TOP FRONTIER INV.HDG.
UNION BK.OF THE PHILPS.
VISTA LAND & LIFESCAPES

Portugal

BANCO BPI
BANCO COMR.PORTUGUES
CIMENTOS DE PORTL.SGPS
COFINA
CORTICEIRA AMORIM
EDP ENERGIAS DE PORTU-
GAL
ESTORIL SOL
F RAMADA INVESTIMENTOS
FUTEBOL CLUBE DO PORTO
GALP ENERGIA SGPS
IBERSOL - SGPS
MARTIFER
MEDIA CAPITAL
NOS SGPS
PHAROL SGPS
PORTUCEL EMPRESA
REN
SONAE COM
SONAE INDUSTRIA SGPS
SONAE SGPS

Russia

ACRON
ALROSA
BASHNEFT
E ON RUSSIA
FED.GRID CO.OF UNG.SY.
GAZPROM
MEGAFON
MMC NORILSK NICKEL
MOBILE TELESYSTEMS
NIZHNEKAMSKNEFTEKHIM
OC ROSNEFT
OIL COMPANY LUKOIL
ROSTELECOM
RUSHYDRO
SBERBANK OF RUSSIA
SEVERSTAL
SISTEMA JSFC
SURGUTNEFTEGAS
TATNEFT
UNITED AIRCRAFT CORP.

Singapore

ASCENDAS REAL ESTATE IT.
CAPITALAND
CITY DEVELOPMENTS
COMFORTDELGRO
DBS GROUP HOLDINGS
FIRST RESOURCES
GENTING SINGAPORE
GLOBAL LOGISTIC PROPS.
GREAT EASTERN HDG.
HUTCHISON PORT HDG.TRUST
KEPPEL
OLAM INTERNATIONAL
SATS
SEMBCORP INDUSTRIES
SEMBCORP MARINE
SINGAPORE AIRLINES
SINGAPORE POST
SINGAPORE PRESS HDG.
SINGAPORE TECHS.ENGR.
SUNTEC RLST.IT.

Sweden

ALFA LAVAL
ASSA ABLOY
ATLAS COPCO
ERICSSON
FINGERPRINT CARDS
HENNES & MAURITZ
HEXPOL
HUSQVARNA
INDUSTRIVARDEN
INVESTOR
LATOUR INVESTMENT
LUNDIN PETROLEUM
SANDVIK
SCA
SVENSKA HANDBKN.
SWEDBANK
SWEDISH MATCH
SWEDISH ORPHAN BIOVITRUM
TRELLEBORG
VOLVO

UK

ASSOCIATED BRIT.FOODS
ASTRAZENECA
AVIVA
BAE SYSTEMS
BT GROUP
DIAGEO
EXPERIAN
GLAXOSMITHKLINE
NATIONAL GRID
PRUDENTIAL
RECKITT BENCKISER GROUP
RECKITT BENCKISER GROUP
RELX
RIO TINTO
ROLLS-ROYCE HOLDINGS
ROYAL DUTCH SHELL B
SMITH & NEPHEW
SSE
VODAFONE GROUP
WPP

US

ALTRIA GROUP
AMAZON.COM
AT&T
BERKSHIRE HATHAWAY (A+B)
BRISTOL MYERS SQUIBB
CISCO SYSTEMS
COCA COLA
COMCAST
FACEBOOK CLASS A
GENERAL ELECTRIC
HOME DEPOT
INTEL
JOHNSON & JOHNSON
MASTERCARD
MCDONALDS
MERCK & COMPANY
SCHLUMBERGER
UNITEDHEALTH GROUP
WAL MART STORES
WALT DISNEY

Source: Thomson Reuters Datastream

Appendix D: Enterprise Risk Management Keywords and Respective Search Combinations

Enterprise Risk Management Keywords	Additional search strings
Integration	
Integrated risk management	Integrated+risk
Risk management framework	Risk+framework
Risk management across businesses	Risk+management+across
Risk management policy	Risk+policy, Risk+policies
Risk management principles	Risk+principle
Risk management plan	Risk+plan
Strategy	
Strategic risk management	Strategic+risk, Risk+strategy
Risk appetite	
Risk tolerance	
Key risk indicators	KRI, Key+risk
Risk management culture	Risk+culture
Risk management objectives	Risk+objective
Governance	
Risk committee	
Chief risk office	CRO, Risk+officer
Risk governance	
Risk manager	
Risk management committee	
Risk management function	Risk+function

Source: Andersson and Langhans, 2016

Appendix E: Statistical tests

Heteroskedasticity Test: White

F-statistic	4.174892	Prob. F(2,16)	0.0348
Obs*R-squared	6.515290	Prob. Chi-Square(2)	0.0385
Scaled explained SS	2.914919	Prob. Chi-Square(2)	0.2328

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/28/16 Time: 10:00
Sample: 1 19
Included observations: 19

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.233880	0.062047	3.769383	0.0017
INDIVIDUALISM^2	7.50E-05	2.67E-05	2.803401	0.0128
INDIVIDUALISM	-0.008259	0.002866	-2.881969	0.0108

R-squared	0.342910	Mean dependent var	0.061823
Adjusted R-squared	0.260774	S.D. dependent var	0.067151
S.E. of regression	0.057735	Akaike info criterion	-2.721951
Sum squared resid	0.053334	Schwarz criterion	-2.572829
Log likelihood	28.85854	Hannan-Quinn criter.	-2.696714
F-statistic	4.174892	Durbin-Watson stat	2.127128
Prob(F-statistic)	0.034754		

Heteroskedasticity Test: White

F-statistic	2.297881	Prob. F(2,16)	0.1327
Obs*R-squared	4.239681	Prob. Chi-Square(2)	0.1201
Scaled explained SS	1.923086	Prob. Chi-Square(2)	0.3823

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/28/16 Time: 10:30
Sample: 1 19
Included observations: 19
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.259956	0.785792	1.603422	0.1284
LN_INDIVIDUALISM^2	0.085757	0.057490	1.491703	0.1552
LN_INDIVIDUALISM	-0.649757	0.429216	-1.513825	0.1496

R-squared	0.223141	Mean dependent var	0.062114
Adjusted R-squared	0.126034	S.D. dependent var	0.067934
S.E. of regression	0.063508	Akaike info criterion	-2.531347
Sum squared resid	0.064533	Schwarz criterion	-2.382225
Log likelihood	27.04780	Hannan-Quinn criter.	-2.506110
F-statistic	2.297881	Durbin-Watson stat	2.136131
Prob(F-statistic)	0.132659		

Heteroskedasticity Test: White

F-statistic	2.855335	Prob. F(2,16)	0.0870
Obs*R-squared	4.997668	Prob. Chi-Square(2)	0.0822
Scaled explained SS	3.235689	Prob. Chi-Square(2)	0.1983

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/28/16 Time: 10:47
Sample: 1 19
Included observations: 19

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.067262	0.061905	-1.086542	0.2933
POWER_DISTANCE^2	-5.61E-05	2.35E-05	-2.389696	0.0295
POWER_DISTANCE	0.006165	0.002641	2.333775	0.0330

R-squared	0.263035	Mean dependent var	0.058062
Adjusted R-squared	0.170915	S.D. dependent var	0.075866
S.E. of regression	0.069079	Akaike info criterion	-2.363184
Sum squared resid	0.076351	Schwarz criterion	-2.214062
Log likelihood	25.45025	Hannan-Quinn criter.	-2.337946
F-statistic	2.855335	Durbin-Watson stat	2.005661
Prob(F-statistic)	0.087011		

Heteroskedasticity Test: White

F-statistic	1.457396	Prob. F(9,9)	0.2919
Obs*R-squared	11.26824	Prob. Chi-Square(9)	0.2578
Scaled explained SS	6.150459	Prob. Chi-Square(9)	0.7248

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/28/16 Time: 10:34
Sample: 1 19
Included observations: 19
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.917462	0.791890	2.421374	0.0385
POWER_DISTANCE^2	6.21E-06	1.75E-05	0.355120	0.7307
POWER_DISTANCE*UNCERTAINTY_AVO	-3.52E-05	1.96E-05	-1.798150	0.1057
POWER_DISTANCE*LN_INDIVIDUALISM	0.002786	0.001442	1.932025	0.0854
POWER_DISTANCE	-0.008085	0.005579	-1.449185	0.1812
UNCERTAINTY_AVOIDANCE^2	1.34E-05	1.90E-05	0.705105	0.4986
UNCERTAINTY_AVOIDANCE*LN_INDIVID	-0.000583	0.001049	-0.556102	0.5917
UNCERTAINTY_AVOIDANCE	0.002758	0.002919	0.944687	0.3695
LN_INDIVIDUALISM^2	0.138997	0.058127	2.391273	0.0405
LN_INDIVIDUALISM	-1.061921	0.426802	-2.488089	0.0345

R-squared	0.593065	Mean dependent var	0.035281
Adjusted R-squared	0.186130	S.D. dependent var	0.047972
S.E. of regression	0.043278	Akaike info criterion	-3.136930
Sum squared resid	0.016857	Schwarz criterion	-2.639857
Log likelihood	39.80083	Hannan-Quinn criter.	-3.052805
F-statistic	1.457396	Durbin-Watson stat	2.322493
Prob(F-statistic)	0.291858		

Series: POWER_DISTANCE
Sample 1 19
Observations 19

Mean	50.47368
Median	40.00000
Maximum	100.0000
Minimum	11.00000
Std. Dev.	28.41433
Skewness	0.321601
Kurtosis	1.882421
Jarque-Bera	1.316298
Probability	0.517809

Series: UNCERTAINTY_AVOIDANCE
Sample 1 19
Observations 19

Mean	52.42105
Median	48.00000
Maximum	100.0000
Minimum	8.000000
Std. Dev.	26.51900
Skewness	0.505816
Kurtosis	2.310476
Jarque-Bera	1.186584
Probability	0.552505

Series: LN_INDIVIDUALISM
Sample 1 19
Observations 19

Mean	3.778613
Median	3.988984
Maximum	4.510860
Minimum	2.639057
Std. Dev.	0.636387
Skewness	-0.437721
Kurtosis	1.872659
Jarque-Bera	1.612859
Probability	0.446449

Ramsey RESET Test
Equation: UNTITLED
Specification: ERM_PERCENT C POWER_DISTANCE
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.399851	16	0.6946
F-statistic	0.159881	(1, 16)	0.6946
Likelihood ratio	0.188916	1	0.6638

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.010914	1	0.010914
Restricted SSR	1.103169	17	0.064892
Unrestricted SSR	1.092255	16	0.068266
Unrestricted SSR	1.092255	16	0.068266

LR test summary:

	Value	df
Restricted LogL	0.079561	17
Unrestricted LogL	0.174020	16

Unrestricted Test Equation:
Dependent Variable: ERM_PERCENT
Method: Least Squares
Date: 05/28/16 Time: 10:43
Sample: 1 19
Included observations: 19

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.613648	2.582220	-0.237644	0.8152
POWER_DISTANCE	-0.014096	0.041217	-0.342005	0.7368
FITTED^2	6.366536	15.92226	0.399851	0.6946

R-squared	0.077652	Mean dependent var	0.536842
Adjusted R-squared	-0.037642	S.D. dependent var	0.256495
S.E. of regression	0.261277	Akaike info criterion	0.297472
Sum squared resid	1.092255	Schwarz criterion	0.446594
Log likelihood	0.174020	Hannan-Quinn criter.	0.322709
F-statistic	0.673512	Durbin-Watson stat	2.135235
Prob(F-statistic)	0.523793		

Ramsey RESET Test
Equation: HETEROSCEDASTICITY_UA
Specification: ERM_PERCENT C UNCERTAINTY_AVOIDANCE
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.366351	16	0.7189
F-statistic	0.134213	(1, 16)	0.7189
Likelihood ratio	0.158713	1	0.6903

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.007045	1	0.007045
Restricted SSR	0.846896	17	0.049817
Unrestricted SSR	0.839852	16	0.052491
Unrestricted SSR	0.839852	16	0.052491

LR test summary:

	Value	df
Restricted LogL	2.591018	17
Unrestricted LogL	2.670375	16

Unrestricted Test Equation:
Dependent Variable: ERM_PERCENT
Method: Least Squares
Date: 05/28/16 Time: 10:42
Sample: 1 19
Included observations: 19

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.196710	1.671312	0.117698	0.9078
UNCERTAINTY_AVOIDANC	0.000324	0.015113	0.021452	0.9832
FITTED^2	1.056166	2.882932	0.366351	0.7189

R-squared	0.290792	Mean dependent var	0.536842
Adjusted R-squared	0.202141	S.D. dependent var	0.256495
S.E. of regression	0.229109	Akaike info criterion	0.034697
Sum squared resid	0.839852	Schwarz criterion	0.183819
Log likelihood	2.670375	Hannan-Quinn criter.	0.059935
F-statistic	3.280190	Durbin-Watson stat	1.933763
Prob(F-statistic)	0.064001		

Ramsey RESET Test
Equation: HETEROSCEDASTICITY_LN_IN
Specification: ERM_PERCENT C LN_INDIVIDUALISM
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.302713	16	0.7660
F-statistic	0.091635	(1, 16)	0.7660
Likelihood ratio	0.108506	1	0.7419

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.006721	1	0.006721
Restricted SSR	1.180171	17	0.069422
Unrestricted SSR	1.173451	16	0.073341
Unrestricted SSR	1.173451	16	0.073341

LR test summary:

	Value	df
Restricted LogL	-0.561428	17
Unrestricted LogL	-0.507175	16

Unrestricted Test Equation:
Dependent Variable: ERM_PERCENT
Method: Least Squares
Date: 05/28/16 Time: 10:43
Sample: 1 19
Included observations: 19
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-20.29321	83.60377	-0.242731	0.8113
LN_INDIVIDUALISM	-2.669675	10.89902	-0.244946	0.8096
FITTED^2	107.1998	432.7409	0.247723	0.8075

R-squared	0.009086	Mean dependent var	0.536842
Adjusted R-squared	-0.114778	S.D. dependent var	0.256495
S.E. of regression	0.270815	Akaike info criterion	0.369176
Sum squared resid	1.173451	Schwarz criterion	0.518298
Log likelihood	-0.507175	Hannan-Quinn criter.	0.394414
F-statistic	0.073355	Durbin-Watson stat	2.362273
Prob(F-statistic)	0.929582	Wald F-statistic	0.061460
Prob(Wald F-statistic)	0.940611		

Ramsey RESET Test
Equation: FNAL_HETEROSCEDASTITCY
Specification: ERM_PERCENT C POWER_DISTANCE UNCERTAINTY_AV OIDANCE LN_INDIVIDUALISM
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.138133	14	0.8921
F-statistic	0.019081	(1, 14)	0.8921
Likelihood ratio	0.025878	1	0.8722

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000912	1	0.000912
Restricted SSR	0.670346	15	0.044690
Unrestricted SSR	0.669434	14	0.047817
Unrestricted SSR	0.669434	14	0.047817

LR test summary:

	Value	df
Restricted LogL	4.811965	15
Unrestricted LogL	4.824904	14

Unrestricted Test Equation:
Dependent Variable: ERM_PERCENT
Method: Least Squares
Date: 05/28/16 Time: 11:11
Sample: 1 19
Included observations: 19
White heteroskedasticity-consistent standard errors & covariance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.035275	0.614725	-0.057383	0.9551
POWER_DISTANCE	0.006329	0.006976	0.907158	0.3797
UNCERTAINTY_AVOIDANC	-0.006516	0.007435	-0.876387	0.3956
LN_INDIVIDUALISM	0.183236	0.224530	0.816087	0.4281
FITTED^2	-0.311301	1.469355	-0.211862	0.8353

R-squared	0.434700	Mean dependent var	0.536842
Adjusted R-squared	0.273186	S.D. dependent var	0.256495
S.E. of regression	0.218670	Akaike info criterion	0.018431
Sum squared resid	0.669434	Schwarz criterion	0.266968
Log likelihood	4.824904	Hannan-Quinn criter.	0.060493
F-statistic	2.691405	Durbin-Watson stat	1.699189
Prob(F-statistic)	0.074584	Wald F-statistic	4.792402
Prob(Wald F-statistic)	0.012040		

Appendix F: Evaluation-Prediction Matrix

Expectation-Prediction Evaluation for Binary Specification
Equation: EQUATION1LOGITFINAL
Date: 05/10/16 Time: 13:49
Success cutoff: C = 0.5

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
P(Dep=1)<=C	120	74	194	0	0	0
P(Dep=1)>C	63	123	186	183	197	380
Total	183	197	380	183	197	380
Correct	120	123	243	0	197	197
% Correct	65.57	62.44	63.95	0.00	100.00	51.84
% Incorrect	34.43	37.56	36.05	100.00	0.00	48.16
Total Gain*	65.57	-37.56	12.11			
Percent Gain**	65.57	NA	25.14			

	Estimated Equation			Constant Probability		
	Dep=0	Dep=1	Total	Dep=0	Dep=1	Total
E(# of Dep=0)	100.44	82.56	183.00	88.13	94.87	183.00
E(# of Dep=1)	82.56	114.44	197.00	94.87	102.13	197.00
Total	183.00	197.00	380.00	183.00	197.00	380.00
Correct	100.44	114.44	214.88	88.13	102.13	190.26
% Correct	54.89	58.09	56.55	48.16	51.84	50.07
% Incorrect	45.11	41.91	43.45	51.84	48.16	49.93
Total Gain*	6.73	6.25	6.48			
Percent Gain**	12.98	12.98	12.98			

*Change in "% Correct" from default (constant probability) specification
**Percent of incorrect (default) prediction corrected by equation