

**‘The Landscape of Bank Credit Availability  
and Firm Leverage for European SMEs: An  
Evaluation of Country Characteristics’**

**Andrea Mc Namara**

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**QQI**

# **The Landscape of Bank Credit Availability and Firm Leverage for European SMEs: An Evaluation of Country Characteristics'**

Andrea Mc Namara BBS, MBS

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**School of Business**

**Waterford Institute of Technology**

**Dr Sheila O Donohoe B.Comm, MBS, PhD**

**Research Supervisor**

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## **Declaration**

The author hereby declares that, except where duly acknowledged, this thesis is entirely her own work.

Signed:-----

Andrea Mc Namara

July 2014

## Acknowledgements

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‘This is the line.  
The line between losing and winning,  
between failure and success,  
between good and great,  
between dreaming and believing,  
between convention and innovation,  
between head and heart.

It’s a fine line.  
It challenges everything we do  
And we live it every day’

Oursameway (2014)

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## **Dedication**

To Mam, Dad, Alec, John and to my late granny, Brigid Conway who passed away  
on the 16<sup>th</sup> February 2014

## Abstract

Small and medium sized enterprises (SMEs) are a fundamental source of economic growth across much of Europe and are perceived as key drivers of employment (European Commission, 2010). Indeed SME finance has received considerable attention where high information opacity defines much of its idiosyncratic nature. Moreover, concerns surrounding the availability of external finance in particular bank credit are an integral feature of SME finance where such concerns have intensified given the recent economic and financial crisis. Issues surrounding bank credit availability are further heightened for SMEs given their dependency on this external source of finance (Popov and Udell, 2012). Furthermore, given the idiosyncratic nature of SME finance, much attention is placed on their capital structure.

This study seeks to evaluate in a European context the impact of country characteristics on SME bank credit availability and on SMEs capital structure. The country characteristics evaluated include that of the information, legal, judicial, bankruptcy, social, tax and regulatory environments, derived from the US conceptual model of Berger and Udell (2006). Indeed, this study utilises its own conceptual framework which incorporates much of that of Berger and Udell (2006) and reflects the impact of these country characteristics in both dimensions of the research questions.

Employing a quantitative approach, two datasets are employed, namely the EC/ECB Survey on Access to Finance of SMEs over the time period, 2010-2011 and the Bureau Van Dijk Amadeus database over the time period, 2005-2011. Moreover, a comprehensive set of proxies are employed to represent the country characteristics, obtained mainly from the World Bank and the European Social Survey (ESS). The findings indicate that country characteristics are important, namely those of the information, legal, judicial, bankruptcy and regulatory environments.

In terms of availability, SMEs appear more likely to secure bank credit when there is less sharing of credit information, greater private property protection, lower costs to enforcing a contract, higher costs in resolving a debt and more stringent capital requirements. Furthermore, bank size appears to matter for SME bank credit availability regardless of domicile. Similarly, in the context of SME firm leverage, country characteristics also prove influential having controlled for firm and industry characteristics and macroeconomic and credit supply conditions. In particular, SME debt levels appear higher when the greater the sharing of credit information, the greater the extent of private property protection, the more time required to enforce a contract, the less time needed to resolve a debt and when there are less stringent capital requirements.

This study adds to the existing body of knowledge, considering a time period when concerns surrounding the availability of SME bank credit and indeed the capital structure of SMEs have been heightened. Utilising Berger and Udell's (2006) conceptual model outside of its US origins, i.e. in a European context, this study devises a conceptual framework to test the impact of country characteristics on the landscape of SME bank credit availability and SME firm leverage.

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## **List of Figures**

Figure 1.1: The Distribution of Legal Origin (La Porta, Lopez-De-Silanes and Shleifer, 2008).....	23
Figure 1.2: ‘A More Complete Conceptual Model for SME Finance’ (Berger and Udell, 2006).....	30
Figure 5.1:‘Subjectivist/Objectivist Approach to Social Science’ (Burrell and Morgan, 1979).....	108
Figure 5.2: Four Paradigms Model of Social Theory (Burrell and Morgan, 1979).....	112
Figure 5.3: Steps underpinning the scientific method (Gregorio, 2000).....	120
Figure5.4: Conceptual Framework of this Study.....	128

## List of Tables

Table 4.1: Summary of hypotheses.....	101
Table 5.1: Real GDP Growth, 2007-2011 (%) (OECD, 2012) – World Development Indicators.....	131
Table 5.2: Countries and Time Frame of Research Question 1.....	133
Table 5.3: Sample Selection from the EC/ECB Survey on the Access to Finance of SMEs.....	134
Table 5.4: Countries and Time Frame of Research Question 2.....	136
Table 5.5: Sample Selection from the Bureau Van Dijk Amadeus Database.....	136
Table 5.6: Waves used for the dependent variable, Credit Denial.....	142
Table 5.7: Variables Used in Research Question 1.....	157
Table 5.8: Variables Used in Research Question 2.....	167
Table 5.9: Test-Retest Reliability for Research Question 1.....	172
Table 5.10: Test-Retest Reliability for Research Question 2.....	174
Table 6.01: Summary Statistics: Full Sample for Research Question 1.....	188
Table 6.02: Summary Statistics per Wave for Research Question 1.....	189
Table 6.03: Summary Statistics per Country for Research Question 1.....	191
Table 6.04: Descriptives across Industries per Country for Research Question 1.....	195
Table 6.05: Variance Inflation Factors and Tolerance for Research Question 1.....	198
Table 6.06: Correlation Matrix for Research Question 1.....	199
Table 6.07: Bank Size for Research Question 1.....	200
Table 6.08: Judicial Environment for Research Question 1.....	201
Table 6.09: Bankruptcy Environment for Research Question 1.....	201
Table 6.10: Social Environment for Research Question 1.....	202
Table 6.11: Economic Activity for Research Question 1.....	203
Table 6.12: Supply of Credit for Research Question 1.....	203

Table 6.13: Effects of Financial Crisis for Research Question 1.....	204
Table 6.14: Equations of Research Question 1.....	205
Table 6.15: Logit Coefficients for Research Question 1.....	207
Table 6.16: Marginal Effects for Research Question 1.....	208
Table 6.17: Odds Ratio for Research Question 1.....	209
Table 6.18: Logit Coefficients for Research Question 1.....	213
Table 6.19: Marginal Effects for Research Question 1.....	214
Table 6.20: Odds Ratio for Research Question 1.....	215
Table 6.21: Summary Statistics: Full Sample for Research Question 2.....	222
Table 6.22: Summary Statistics per Country for Research Question 2.....	223
Table 6.23: Descriptives across Industries per Country for Research Question 2.....	227
Table 6.24: Variance Inflation Factors and Tolerance for Research Question 2.....	230
Table 6.25: Correlation Matrix for the Research Question 2.....	232
Table 6.26: Judicial Environment for Research Question 2.....	234
Table 6.27: Bankruptcy Environment for Research Question 2.....	235
Table 6.28: Social Environment for Research Question 2.....	236
Table 6.29 (a): Equations (1-4c) of Research Question 2.....	238
Table 6.29 (b): Equations (4d-5b) of Research Question 2.....	239
Table 6.30: Fixed and Random Effects Models for Research Question 2.....	242
Table 6.31: Fixed and Random Effects Models for Research Question 2.....	244
Table 6.32: Fixed and Random Effects Models for Research Question 2.....	247
Table 6.33: Fixed and Random Effects Models for Research Question 2.....	248
Table 6.34: Fixed and Random Effects Models for Research Question 2.....	250
Table 7.1: Research Question 1- Summary of Empirical Findings.....	253
Table 7.2: Research Question 2 - Summary of Empirical Findings.....	267

### **List of Abbreviations**

SMEs	Small and Medium Sized Enterprises
EC	European Commission
ECB	European Central Bank
LLSV	La Porta, Lopez-De-Silanes, Shleifer and Vishny
HHI	Herfindahl-Hirschmann Index
TBSFs	Technology Based Small Firms
NTBFs	New Technology Based Small Firms
EBF	European Banking Federation
ESS	European Social Survey

# Contents

Declaration.....	III
Acknowledgement.....	IV
Dedication.....	V
Abstract.....	VI
List of Figures.....	VIII
List of Tables.....	IX
List of Abbreviations.....	XI
Chapter One: Introduction .....	5
1.1 Introduction.....	6
1.2 Contextual Setting.....	6
1.3 Motivation of the Study .....	8
1.4 Research Objective and Research Questions .....	10
1.5 Research Methodology .....	12
1.6 Contribution of the Study.....	12
1.7 Structure of the thesis.....	14
1.8 Conclusion .....	15
Chapter Two: Theoretical Framework.....	16
2.1 Introduction.....	17
2.2 Capital Structure Theories .....	19
2.3 Legal Origin Theory (Availability of External Finance) .....	21
2.4 Small Bank Advantage Hypothesis (Availability of External Finance) .....	27
2.5 ‘A More Complete Conceptual Model for SME Finance’ (Berger and Udell, 2006) (Availability of External Finance) .....	29
2.6 Conclusion .....	31
Chapter Three: Literature Review.....	33
3.1 Introduction.....	34
3.2 Determinants of SME Capital Structure Proposition.....	35
3.2.1 Firm and Owner Characteristics .....	35
3.2.2 Industry Characteristics.....	38
3.2.3 Country Characteristics.....	42
3.2.3.1 Country Characteristics in the Capital Structure of Large Firms.....	42
3.2.3.2 Country Characteristics in the Capital Structure of SMEs.....	50

3.3 Empirical Evidence of Berger and Udell's Conceptual Model (2006) <sup>4</sup> (Availability of External Finance).....	55
3.3.1 Government Policy .....	55
3.3.2 Financial Institution Structure.....	56
3.3.3 Lending Infrastructure.....	65
3.3.4 Lending Technologies.....	83
3.4 Conclusion .....	85
Chapter Four: Hypotheses.....	88
4.1 Introduction.....	89
4.2 Hypotheses under Research Question 1 .....	90
4.2.1 Information Environment under a More Complete Conceptual Framework for SME Finance.....	90
4.2.2 Legal environment under a More Complete Conceptual Framework for SME Finance.....	91
4.2.3 Judicial/Bankruptcy Environment under a More Complete Conceptual Framework for SME Finance .....	91
4.2.4 Social Environment under a More Complete Conceptual Framework for SME Finance.....	92
4.2.5 Regulation Environment under a More Complete Conceptual Framework for SME Finance.....	93
4.3 Hypotheses under Research Question 2.....	94
4.3.1 Information environment under the Pecking Order Theory.....	94
4.3.2 Information environment under the Agency Theory.....	95
4.3.3 Legal environment under the Agency Theory .....	95
4.3.4 Judicial/Bankruptcy environment under the Agency Theory .....	97
4.3.5 Bankruptcy environment under the Trade off Theory .....	97
4.3.6 Social environment under the Agency Theory.....	98
4.3.7 Tax environment under the Trade off Theory.....	99
4.3.8 Regulatory environment under the Agency Theory.....	100
4.4 Conclusion .....	101
Chapter Five: Methodology .....	103
5.1 Introduction.....	104
5.2 Philosophical Orientation of the Study .....	105
5.2.1 Philosophy of Business and Management Research.....	107
5.2.2 Philosophy of Financial Theory.....	116
5.2.3 Philosophy and Capital Structure.....	118
5.2.4 Philosophical Orientation Adopted by this Study.....	123

5.3 Methodologies Used in Previous Studies.....	123
5.4 Research Design.....	124
5.5 Conceptual Framework.....	125
5.6 Data Collection.....	129
5.7 Selection of the Sample Frame.....	130
5.8 Method of Analysis.....	137
5.9 Description of Data.....	141
5.9.1 Description of Data for Research Question 1.....	141
5.9.2 Description of Data for Research Question 2.....	161
5.10 Reliability, Replication and Validity of Research.....	170
5.10.1 Reliability.....	170
5.10.2 Replication.....	175
5.10.3 Validity.....	175
5.11 Conclusion.....	182
Chapter Six (Part A): Findings for Research Question 1.....	183
6.1 Introduction.....	184
6.2 Descriptive Statistics.....	184
6.3 Empirical Results.....	195
Chapter Six (Part B): Findings for Research Question 2.....	218
6.4 Introduction.....	219
6.5 Descriptive Statistics.....	219
6.6 Empirical Results.....	227
Chapter Seven: Discussion.....	252
7.1 Introduction.....	253
7.2 Country Characteristics and ‘A More Complete Conceptual Framework for SME Finance’ (Berger and Udell, 2006). .....	253
7.2.1 Information Environment.....	254
7.2.2 Legal Environment.....	258
7.2.3 Judicial Environment.....	259
7.2.4 Bankruptcy Environment.....	261
7.2.5 Social Environment.....	262
7.2.6 Regulatory Environment.....	263
7.3 Bank Structure and ‘A More Complete Conceptual Framework for SME Finance’ (Berger and Udell, 2006). .....	264
7.4 Macroeconomic Controls, Supply Controls and Firm Size and ‘A More Complete Conceptual Framework for SME Finance’ (Berger and Udell, 2006). .....	266

7.5 Country Characteristics and the Capital Structure Theories .....	267
7.5.1 Information Environment.....	267
7.5.2 Legal Environment.....	269
7.5.3 Judicial Environment .....	271
7.5.4 Bankruptcy Environment .....	272
7.5.5 Social Environment.....	273
7.5.6 Tax Environment.....	273
7.5.7 Regulatory Environment .....	274
7.6 Firm Characteristics and the Capital Structure Theories .....	275
7.7 Macroeconomic Controls, Supply Controls and the Capital Structure Theories .....	276
Chapter Eight: Conclusion.....	278
8.1 Introduction.....	279
8.2 Research Objective and Research Questions .....	279
8.3 Main Conclusions of the Study.....	279
8.4 Contribution of Research .....	280
8.5 Implications for Policy.....	281
8.6 Limitations of this Study.....	282
8.7 Future Research .....	283
8.8 Conclusion .....	284
References.....	285
Appendix 1: Definitions and Sources of Dependent and Independent Variables .....	313
Appendix 2: Group Mean and Sample Mean of Credit Denial (Research Question 1) ...	318
Appendix 3: The Logit Coefficients, Marginal Effects and the Odds Ratio of the 4 Equations Conducted in Research Question 1 before Tests of Multicollinearity. ....	319
Appendix 4: Heading Abbreviations in the Correlation Matrices .....	323
Appendix 5: Group Mean and Sample Mean of the Total Debt Ratio.....	324
Appendix 6: Fixed and Random Effect Models (Initial Equations).....	325
Appendix 7: Robustness Testing Probit Model .....	333
Appendix 8: Questionnaires to the Public Credit Registry and Private Credit Bureau....	334
Appendix 9: Robustness Testing (Average Number of Credit Reports).....	338
Appendix 10: Robustness Testing (Law and Order).....	338
Appendix 11: Robustness Testing (Long Term Debt Ratio and Short Term Debt Ratio).....	339
Appendix 12: Robustness Testing (Average Number of Credit Reports).....	344
Appendix 13: Robustness Testing (Law and Order).....	344

# **Chapter One: Introduction**

*'From small beginnings come great things'*

*Proverb*

## **1.1 Introduction**

The aim of this chapter is to provide a synopsis of the study. Firstly, the contextual setting is presented, framing the background of this study. Secondly, the research motivation is outlined which thirdly leads to the research objective and research questions. Fourthly, the methodology is presented lending credence to the quantitative approach adopted. Fifthly, the contribution of this study is defined. Finally, the chapter concludes with the structure of the thesis. Collectively, the arrangement of all these sections plays the sonata of this study, the composition of which defines its musical form.

## **1.2 Contextual Setting**

Small and medium sized enterprises (SMEs) can be defined as firms with less than 250 employees, a turnover of less than or equal to €50m and/or a balance sheet total of less than or equal to €43m (European Commission, 2011). Since their inception, small and medium sized enterprises have been perceived as a fundamental source of economic dynamism where they remain at the core of economic growth for many countries (OECD, 2009). Around the world, 95 per cent of enterprises are classified as small and medium sized enterprises (Beck, 2013). Indeed, SMEs provide jobs for more than half of the labour force in the private sector of the OECD area (OECD, 2009). In developing economies, SMEs (less than 99 employees) are comparable to large firms in terms of aggregate employment (Ayyagari, Demirgüç-Kunt and Maksimovic, 2011).

Perceived as drivers of innovation and flexibility, these firms account for over 99 per cent of all enterprises within the European Union, providing two out of three of the private sector jobs and generating more than half of the total value added created by businesses in the EU (European Commission, 2010). Defined as ‘the true back bone

of the European economy’...SMEs are ‘primarily responsible for wealth and economic growth, next to their role in innovation and R and D’ (European Commission, 2010).

The capital structure of small and medium sized enterprises has received notable attention, where emphasis on the nature and behaviour of financial markets, the availability and substitutability between sources of financing coupled with the idiosyncratic nature of SME finance has further heightened interest within the field (Berger and Udell, 1998)<sup>1</sup>. Indeed, informational opacity is a fundamental characteristic of SME finance, defining much of its idiosyncrasy (Berger and Udell, 1998). More specifically, Binks and Ennew (1996) depict the provision of debt to small businesses under the realm of the agency problem where information asymmetries heighten issues of adverse selection and moral hazard. Whilst information opacity is not confined solely to small businesses, it is more ubiquitous (Binks and Ennew, 1996). Moreover, the availability of external finance has remained the Achilles’ heel of small and medium sized enterprises where conventional wisdom advocates the presence of stringent financial constraints facing the sector (Hyytinen and Pajarinen, 2008).

Financial concerns in particular surrounding the availability of external financial sources remains integral to SME finance, the significance of which increases with their fundamental economic contribution (OECD, 2009). Indeed, the financial and economic crisis of recent times has intensified these challenges (OECD, 2009).

<sup>1</sup>Much of the theoretical and empirical work particularly in the US focuses on small businesses as opposed to small and medium enterprises. This study perceives small businesses and small and medium sized enterprises to be homogenous.

During times of crisis, SMEs are acutely more vulnerable given their minimal financing options and weakened financial structure in terms of lower capitalisation (OECD, 2009). In particular, the European Commission/European Central Bank EC/ECB Survey on Access to Finance of SMEs (ECB, 2012) highlights deterioration in access to bank loans by SMEs where the probability of credit denial remains significant for these firms (ECB, 2012). Capturing the effects of the recent crisis, Laeven and Valencia (2012) have classified many European countries as having a systemic banking crisis. Acknowledging this severity, issues surrounding bank credit availability are thus heightened for SMEs given their dependency on this external source of finance (Popov and Udell, 2012). The European Central Bank report 75 per cent of corporate financing in the EU is from banks in comparison to 30 per cent in the US (European Banking Federation, 2013).

### **1.3 Motivation of the Study**

The theoretical and empirical contributions surrounding SME finance centres predominately on two fundamental areas namely, the capital structure determination and external finance availability in particular bank credit availability. Under the capital structure determination, many studies refer to the capital structure theories, highlighting firm, owner and industry characteristics as key determinants (Hamilton and Fox, 1998; Michaelas, Chittenden and Poutziouris, 1999; Hall, Hutchinson and Michaelas, 2000; Giudici and Paleari, 2000; Cassar and Holmes, 2003; Hogan and Hutson, 2005; Sogorb-Mira, 2005; Heyman, Deloof and Ooghe, 2008; López-Gracia and Sogorb-Mira, 2008; Mac an Bhaird and Lucey, 2009; Degryse, De Geoij and Kappert 2012). Further studies consider country characteristics, evaluating whether a firm's financing behaviour is shaped by country specific factors (Hall, Hutchinson

and Michaelas, 2004; Daskalakis and Psillaki, 2008; Beck, Demirgüç-Kunt and Maksimovic, 2008; Psillaki and Daskalakis, 2009; Jõeveer, 2013a: 2013b).

Yet despite the focus on country characteristics, SME studies in this area are minimal. Furthermore, specific country characteristics that dominate in the literature include proxies for the legal environment (Beck *et al.* 2008; Jõeveer, 2013a: 2013b). Emphasis is also placed on corruption, credit ratings, bank structure, macroeconomic conditions and the financial development of a country (Beck *et al.* 2008; Jõeveer, 2013a: 2013b). The limited number of studies coupled with a focus on only a few country characteristics represents a research gap. *Ipsa facto*, there is a need to extend the existing literature, to provide a more in depth analysis of country characteristics. This is largely motivated by the plethora of international comparisons on the capital structure of larger, listed firms (Rajan and Zingales, 1995; La Porta, Lopez-De-Silanes, Shleifer and Vishny, 1997:1998 ; Demirgüç-Kunt and Maksimovic, 1998: 1999; Booth, Demirgüç-Kunt and Maksimovic, 2001; Claessens, Djankov and Nenova, 2001; Bancel and Mittoo, 2004; Deesomsak, Paudyal and Pescetto, 2004; De Jong, Kabir and Nguyen, 2008; Antoniou, Guney and Paudyal, 2008; López-Iturriaga and Rodríguez-Sanz, 2008; Alves and Ferreira, 2011; Kayo and Kimura, 2011; Fan, Titman and Twite, 2012). Fan *et al.* (2012, pp.23) posits ‘corporate financing choices are determined by a combination of factors that are related to the characteristics of the firm as well as to their institutional environment’.

Considering the availability of external finance, much empirical evidence prevails where under a more complete conceptual framework for SME finance, Berger and Udell (2006) refer to the role of the government policy, financial institution structure, the lending infrastructure and the lending technologies (Berger and Udell, 2006). In particular, emphasis is placed on the lending infrastructure. Indicative of

this, Berger and Udell (2006) allude to the role of the information, legal, judicial, bankruptcy, social, tax and regulatory environments in the availability of SME finance. However, a simultaneous evaluation of all environments in the availability of SME finance is currently absent i.e. no empirical evaluation of the lending infrastructure underpinning Berger and Udell's (2006) model. This is to the author's best knowledge and this represents a gap in the literature. Acknowledging the prevalence of financial concerns for SMEs finance availability in particular the availability of bank credit, there is a need to consider all potential factors which may impact on this availability. This is predominately motivated by concerns that part of the recent crisis stemmed from inefficiencies in market discipline, regulation and supervision (Global Financial Development Report, 2013). *Ipsa facto*, this has called for a shift in focus to readdress the 'basics' again (Global Financial Development Report, 2013). Illustrous of this, the Global Financial Development Report (2013) emphasise the importance for 'a coherent institutional and legal framework that establishes market discipline, complemented by strong, timely and anticipatory supervisory action' (Global Financial Development Report 2013, pp. 8).

#### **1.4 Research Objective and Research Questions**

This study is set in a European context given the importance of SMEs as outlined earlier and the importance of bank finance for firms especially SMEs where a challenging environment is evident in light of the recent financial crisis. The research objective is to evaluate a comprehensive set of country characteristics on the availability of SME bank credit and on the SME capital structure. This study aims to provide a deeper understanding of SME bank credit availability where the focus shifts solely from the structure of banking institutions to include the environments (country characteristics) in which SMEs and indeed banking

institutions operate in. In addition, this study aims to investigate the SME capital structure by moving the focus from the owner, firm and industry characteristics to include the environments (country characteristics). This study builds on the existing studies in both the availability of SME bank credit and SME capital structure. The country characteristics evaluated include the information, legal, judicial, bankruptcy, social, tax and regulatory, derived from a US conceptual framework by Berger and Udell (2006). The conceptual framework of Berger and Udell (2006) was developed in the space of external finance availability for SMEs where they define the above environments collectively as the lending infrastructure. This study however defines these environments as country characteristics, perceived as the closest term in extant literature to the lending infrastructure. Doing so provides a moderator between the availability of SME bank credit and the capital structure of SMEs.

This study focuses on bank credit and firm leverage given its importance as a fundamental source of external finance for SMEs (Popov and Udell, 2012; Holton, Lawless and McCann, 2011, Beck *et al.* 2008). Particularising this, SMEs are heavily dependent on bank loans with few other alternatives to choose from (European Commission, 2013).

Against this backdrop, the study has two research questions which are

1. Do country characteristics influence the likelihood of bank credit availability for SMEs?
2. Do country characteristics determine SME firm leverage?

In a more complete conceptual framework for SME finance, Berger and Udell (2006) highlight the causal chain from government policy to a country's financial institution structure and lending infrastructure which influences the lending

technologies and ultimately the availability of external finance. This study however focuses only on what Berger and Udell (2006) dub the lending infrastructure given the study's motivation is to address the research gaps integral to country characteristics.

### **1.5 Research Methodology**

Appreciating the importance of philosophy, emphasis is placed on three intertwining questions, the ontological question, the epistemological question and the methodological question (Guba and Lincoln, 1994), an explanation of which is provided in chapter five. After much consideration, a positivist approach is adopted where reality is perceived to exist out there and the researcher is to be independent of the research subject. More specifically, the positivist approach is shaped by a longitudinal design which commands a quantitative orientation for this study.

Two datasets are employed to address the research questions of this study, namely, the EC/ECB Survey on Access to Finance of SMEs (ECB, 2012) and the Bureau Van Dijk Amadeus database. To address the first research question, linear probability models are employed given the dichotomous nature of the dependent variable where logit and probit models are conducted. To address the second research question, the random effects regression model is employed.

### **1.6 Contribution of the Study**

Appreciating the contextual setting, the motivation, the research objective and research questions of this study, the following presents the contribution which is fourfold:

- I. This study is the first in a European context to empirically evaluate country characteristics in the availability of SME bank credit and the SME capital

structure. Pettit and Singer (1985, pp. 54) posit ‘firms of all sizes select their financial structure in view of the cost, nature and availability of financial alternatives’, highlighting the interconnectedness of the capital structure and the availability of financial sources. Appreciating the interrelatedness of the two, it is not the intention of the study to empirically evaluate this. Indeed, the focus is on country characteristics, to provide a more holistic evaluation of their impact on two fundamental areas of SME finance. The focus on country characteristics is justified earlier in the formation of the research questions. *Ipsa facto*, country characteristics can be perceived as the common denominator of the study.

- II. This study provides the opportunity to extend the theoretical basis of the US conceptual framework developed by Berger and Udell (2006). Initially, this model was developed in the space of SME external finance availability (Berger and Udell, 2006). *Ipsa facto*, the conceptual framework underpinning this study incorporates the US model of Berger and Udell (2006) but is extended to include the capital structure. More specifically, only the information, legal, judicial, bankruptcy, social, tax and regulatory are evaluated in an environment outside of the US i.e. European context.
- III. A methodological contribution is provided where direct measures of a comprehensive set of country characteristics provide greater validity and reliability surrounding the analysis.
- IV. There is a practical contribution, given the economic importance of SMEs and even more pertinent against the backdrop of the recent financial and economic crisis, the focus on country characteristics facilitates a deeper understanding of SME bank credit availability and the SME capital structure.

## **1.7 Structure of the thesis**

Presenting the contextual setting, the motivation, the research objective and research questions coupled with the contribution of the study, the remainder of this chapter now provides the structure of the thesis. Chapter two presents the theoretical underpinnings of this study with particular attention placed on the capital structure theories occupying the capital structure determination model. Moreover, given the dominance of the legal environment in extant literature, emphasis is placed on the legal origin theory. Considering the availability of external finance in particular the availability of bank credit, attention is placed on the small bank advantage hypothesis and on a more complete conceptual framework for SME finance by Berger and Udell (2006).

Chapter three presents a review of the literature. More specifically, extant studies of the SME capital structure are evaluated, alluding to firm, owner, industry and country characteristics as fundamental determinants. In the context of country characteristics, an evaluation of the capital structure for large firms and SMEs is conducted, reinforcing the importance of such characteristics. Referring to the availability of external finance namely bank credit, an evaluation of the empirical findings of the more complete conceptual framework for SME finance by Berger and Udell (2006) is presented including the small bank advantage hypothesis.

Chapter four provides the hypotheses of the study, derived from capital structure theories and the availability of external finance, more specifically bank credit. Chapter five presents the methodology of the study, facilitating the union of the philosophical orientation with the research questions. More specifically, the research design, conceptual framework, data collection, sampling frame and method of

analysis are defined coupled with a description of the data. Emphasis is also placed on the reliability, replication and validity of this study.

Chapter six presents the descriptive statistics and empirical results relating to the research questions. Chapter seven presents the discussion of the empirical results, comparing the findings to the hypotheses and conceptual framework of this study along with the extant literature. Finally, chapter eight is the concluding chapter in which it presents a summary of the empirical findings, shaping the contribution of this study. The policy implications are then presented. Moreover, the limitations of the study are outlined whilst providing recommendations for future research.

## **1.8 Conclusion**

This chapter has presented the contextual setting of the study which illustrates the importance of small and medium sized enterprises. More specifically, emphasis was placed on the financing of such firms given the idiosyncratic nature of SME finance and concerns surrounding the availability of financial sources. Indicative of this, the motivation for the study was provided, funnelling the formation of the research questions. Emphasis was then placed on the contribution of this study. Chapter two now presents the theoretical framework underpinning this study.

## **Chapter Two: Theoretical Framework**

*'It is the theory which decides what can be observed'*

*Albert Einstein*

## 2.1 Introduction

The previous chapter outlined the background to this study, highlighting the study's focus on the availability of external finance in particular SME bank credit and SME capital structure with attention placed on country characteristics. Indeed both the availability of SME bank credit and the SME capital structure lie at the thrust of this study where country characteristics are perceived as the common denominator. As a corollary of this, this chapter aims to explore the theoretical footings underpinning both the availability of external finance and the SME capital structure. This chapter begins with the capital structure theories given their dominance in the literature.

Reflecting the modern theory of capital structure, the seminal contribution of Modigliani and Miller (1958) has intensified much of the theoretical discourse surrounding the financial paradigm of a firm's financing choice (Bradley, Jarrell and Kim, 1984). Indeed lessening the assumptions underpinning the theorem of Modigliani and Miller (1958) approximates 'the theory to the firm reality'....leading to the categorisation of the 'capital structure theory under different stances'...contingent on the chosen economic aspect and firm characteristic' in question (Sogorb-Mira 2005, pp.448). Weaving the fabric of modern corporate finance, the perfect market theorem of Modigliani and Miller (1958) has introduced many theoretical extensions, leading to alternative capital structure propositions including that of the agency theory (Jensen and Meckling, 1976), static trade-off theory (DeAngelo and Masulis, 1980; Bradley *et al.* 1984) and the information asymmetry theories i.e. pecking order hypothesis (Myers, 1984; Myers and Majluf, 1984) and signalling theory (Ross, 1977). Mac an Bhaird and Lucey (2009) also refer to these theories. Furthermore, the financial growth life cycle constitutes an additional theorem of SME finance (Mac an Bhaird, 2010).

Rooted in the empirical investigations of small and medium sized enterprise financing, the capital structure theories adopt a ‘firm characteristic’ and / or an ‘owner characteristic’ orientation (Mac and Bhaird, 2010). Indeed the empirics underpinning the capital structure proposition evaluate the relationship between firm leverage and several firm characteristics namely firm age, firm size, firm profitability and firm tangibility (Mac an Bhaird, 2010). Despite the plethora of capital structure theorems, Mac an Bhaird and Lucey (2009) stipulate capital structure theories are classified into three broad types namely, trade-off theory, agency theory and information asymmetry theory (pecking order theory). Kayo and Kimura (2011) also allude to these three main theoretical considerations in the firm determinants of leverage. Given these theories are the most prevalent in extant research, they form the theoretical footing of this study’s second research question.

Representing a delicacy of movement, interest in the landscape of the external environment has gathered momentum in which the role of country specific characteristics in the capital structure determination is considered. Rajan and Zingales (1995, pp.1458) posit

‘only through a better understanding of the actual determinants of capital structure decisions can we think of designing tests to uncover the possible impact of the institutional environment...a better understanding of the influence of institutions can provide us enough inter-country variation so as to enable us to identify the fundamental determinants of capital structure’.

Despite the growing interest within SME finance, large firms dominate much of this domain. Against this backdrop, emphasis is placed on the legal origin theory (La Porta *et al.* 1997: 1998).

In a related field to the capital structure, the chapter turns to the availability of external finance considering key theories which influence access to external finance. In particular, Beck *et al.* (2008) emphasise how a country's legal and financial environment impinges on a firm's access to external financing sources alluding to the work of La Porta, Lopez-de-Silanes, Shleifer and Vishny, (1997:1998). Key scholars in the field of law and finance, La Porta, Lopez-de-Silanes, Shleifer and Vishny, (1997:1998) highlight the legal origin theory. Moreover, the recent conceptual model of Berger and Udell (2006) further extends the theoretical foundations of external finance availability, highlighting the role of the information, legal, judicial, bankruptcy, social, tax and regulatory environments. As outlined in chapter one, whilst Berger and Udell (2006) define these environments collectively as the lending infrastructure, this study defines these environments as country characteristics. The small bank advantage hypothesis commands a potent presence in finance availability and serves as a catalyst in the construction of Berger and Udell's framework (2006).

## **2.2 Capital Structure Theories**

Alluding to the proposition of Modigliani and Miller (1958), theoretical extensions have centred on searching for the 'optimal capital structure' (Myers 1989, pp. 80). Depicting the trade-off theory as the balancing of tax benefits of debt against the costs including bankruptcy and financial distress, (to determine the optimal leverage ratio) (DeAngelo and Masulis, 1980), scholars have extended this proposition to the SME arena (Heyman *et al.* 2008; López-Gracia and Sogorb-Mira, 2008). Informed by the threads of agency theory, Jensen and Meckling (1976) refer to 'the agency relationship as a contract under which one or more persons (the principal (s)) engage another person (the agent) to perform some service on their behalf which involves

delegating some decision making authority to the agent' (Jensen and Meckling 1976, pp. 308). Whilst the agency conflict tends to occur in the separation of ownership between shareholder and manager but given this separation remains absent for small and medium sized enterprises, the agency problem still proves relevant as 'the primary conflict in a small business generally is between insiders and outside contributors of capital, not between owners and managers, or between owners and creditors' (Hand, Lloyd and Rogow 1982, pp. 27; Mac an Bhaird and Lucey, 2009). Indeed, Hand *et al.* (1982, pp. 26) posits the 'optimal capital structure is not determined by minimization of agency costs, as it would be if capital markets were perfect, but it is affected by the relative sophistication of potential suppliers of funds'.

Lending credence to alternative asymmetric theories, Myers (1984) and Myers and Majluf (1984) introduce the pecking order theory of financing where the assumption; inside management holds more information surrounding the true value of a firm than outside investors underpins the thrust of the proposition (Mac an Bhaird, 2010). *De facto*, the presence of informational asymmetries lends credence to a hierarchy in financing with a preference for internal funds, debt and then equity, reflecting agency, informational asymmetry and signalling considerations (Hall *et al.* 2004). Within the SME sphere, the preference for internal finance remains contingent on demand and supply side factors. In particular, while the need by SMEs to retain independence and control constitutes the demand side composition, the presence of informational asymmetries reinforces supply side constraints (Hogan and Hutson, 2005). Moreover, within the SME empirical arena, conventional wisdom emphasises the relevance of the pecking order proposition within the parameters of supply and

demand side factors (Chittenden *et al.* 1996; Hall *et al.* 2004; Sogorb-Mira, 2005 and Mac an Bhaird and Lucey, 2009). This is noted by Mac and Bhaird (2010).

Alluding to the capital structure theories, the question, ‘How do firms choose their capital structures?’ (Myers 1984, pp. 575) still proves arduous to address given extant theorems clarify only certain facets of the finance complexity (Margaritis and Psillaki, 2010). More specifically, Myers (2001 pp. 81) purports ‘there is no universal theory of the debt-equity choice, and no reason to expect one. There are several useful conditional theories however’.

### **2.3 Legal Origin Theory (Availability of External Finance)**

Through the prism of comparative law, an “*école de vérité*” which provides better solutions to scholars of critical capacity (Zweigert and Kötz 1998, pp. 15), the intrinsic typicality of this paradigm facilitates diffraction and thus comparison of legal systems in the world (Zweigert and Kötz, 1998). Classifying national legal systems with much similarity into families of law, Zweigert and Kötz (1998, pp. 68) allude to the style of a legal family, lending credence to

‘(1) its historical background and development, (2) its predominant and characteristic mode of thought in legal matters, (3) especially distinctive institutions, (4) the kind of legal sources it acknowledges and the way it handles them, and (5) its ideology’ (Zweigert and Kötz, 1998).

Defining a legal family, La Porta, Lopez-De-Silanes, Shleifer and Vishny, henceforth ‘LLSV’ (1998) allude to criteria put forth by Glendon, Gordon and Osakwe (1994) in which theories and hierarchies of sources of law, working methodology of jurists and characteristics of legal concepts constitute some of the key criteria.

Adopting this approach, many scholars highlight two legal traditions of the world i.e. the common law and civil law dichotomy (LLSV, 1997; 1998 and La Porta, Lopez-De-Silanes and Shleifer, 2008), originating from the law of England and the Roman law respectively. Illustrating the idiosyncratic nature of legal traditions, LLSV (1998) allude to the transplantation of such traditions to much of the world through conquest or colonisation where ‘laws in different countries are typically not written from scratch, but rather transplanted – voluntarily or otherwise – from a few legal families or traditions’ (LLVS 1998, pp. 1115). Elements of transplantation include ‘legal codes, legal principles and ideology’ (LLVS 1998, pp. 1115). Although no two legal systems are identical given the presence of economic, social and political forces, much of the transplanted elements remain, facilitating the classification of legal systems into legal traditions (La Porta, Lopez-De-Silanes and Shleifer, 2008). Such a movement in legal paradigms across countries lends credence to the legal transplant typology of Watson (1974) as noted by LLSV (1998).

Originating from the law of England, the common law legal tradition is shaped by appellate judges who solve legal disputes, such that judicial decisions rather than scholarly contributions set the precedence (LLSV, 1998; La Porta, Lopez-De-Silanes and Shleifer, 2008). Crystallising the specificities of common law history, less rigid requirements underpin the legal formalism of this tradition (Zweigert and Kötz 1998). Moreover, judges bestowed with interpretation powers coupled with the creation of law through courts as situations change defines the jurisprudence of common law (Zweigert and Kötz 1998). Eschewing logical principles of codified law, common law adheres to facts, illustrative of Holmes’ dictum, ‘The life of the law has not been logic: it has been experience’ (Zweigert and Kötz 1998, pp. 181) (Beck and Levine, 2003).

Perceived as the oldest and widely distributed legal tradition in the world (Merryman, 1985) (See Figure 1.1), the civil law tradition has evolved from the revolution and legal science where ‘legislative supremacy; a rigorous separation of the judicial from the legislative and administrative powers; a narrowly defined and uncreative judicial role; the denial of stare decisis.....and a constant preoccupation with certainty’ defines the essence of the tradition (Merryman 1985, pp. 151). Extending its parameters to many subtraditions i.e. French, German and Scandinavian (LLSV, 1997: 1998; and La Porta, Lopez-De-Silanes and Shleifer, 2008), Merryman (1985, pp. 2) finds that the grouping of legal systems under ‘the rubric of civil law....indicates that they have something in common, something that distinguishes them from....“common law”’

**Figure 1.1: The Distribution of Legal Origin**



Source: La Porta, Lopez-De-Silanes and Shleifer, (2008).

The French civil code, inspired by the spirit of the French revolutionary generation and the reign of Napoleon Bonaparte in 1799 (Zweigert and Kötz, 1998), commands

a clear coherent manner in which judges are paralysed from making law by choosing between laws. In particular, judges are inhibited to make law from their own interpretation of ambiguous laws (Beck and Levine, 2003). Spreading his civil code into Belgium, Netherlands and Italy (La Porta, Lopez-De-Silanes and Shleifer, 2008), Napoleon referred to his role in the code civil creation, declaring ‘It is not in winning 40 battles that my real glory lies, for all those victories will be eclipsed by Waterloo. But my Code civil will not be forgotten, it will live forever’ (Zweigert and Kötz 1998, pp. 84).

Illustrative of the unification of courts in Germany, the reign of Otto Von Bismarck, through which private law was codified and unified, led to the adoption of the German civil code in 1900 (Beck and Levine, 2003). In particular, the fusion of both scholars and practitioners facilitated Germany in developing a ‘dynamic common fund of legal principles’ providing the foundation for codification (Beck and Levine 2003, pp.8). Merryman (1985, pp.31) purports the code is ‘not intended to abolish prior law and substitute a new legal system.....the idea was to codify those principles of German law that would emerge from careful historical study of the German legal system’ (Beck and Levine, 2003)

The final sub-tradition, the Nordic Legal family achieves much harmony where homogeneity in the historical development, cultural ties and economic power of the Scandinavian countries facilitates co-operation in the legal capacity of this tradition, extending such co-operation to economic, social and cultural policy (Zweigert and Kötz, 1998). Emanating from the Germanic legal rule, the influx of Roman law into Scandinavian countries was minimal, confined to areas where rules in ‘contract law, law of credit and securities, partnership and bankruptcy law’ (Zweigert and Kötz 1998, pp. 284) were inferior. Although this legal system facilitated legal

development of Europe, it still harbours idiosyncratic features, deterministic of the Nordic group (Zweigert and Kötz, 1998).

Classifying legal origins as ‘highly persistent systems of social control of economic life’, begetting ‘significant consequences for the legal and regulatory framework of the society’ (La Porta, Lopez-De-Silanes and Shleifer 2008, pp. 326), La Porta, Lopez-De-Silanes and Shleifer (2008, pp. 286) refers to common law as ‘a strategy of social control’ seeking to ‘support private market outcomes’ with civil law seeking to achieve ‘state-desired allocations’. In particular, fundamental differences between common and civil law constitute the legal origin theory, derived by LLSV. Perceived as an ‘interpretation of the evidence’, this theory ‘traces different strategies of common and civil law to different ideas about law and its purpose’ (La Porta, Lopez-De-Silanes and Shleifer 2008, pp. 286).

Indicative of the variation of legal investor protection with legal traditions or origins (La Porta, Lopez-De-Silanes and Shleifer, 2008), LLSV (1998) assert common law countries afford the strongest protection to both shareholders and creditors with opposite results materialising for French civil law countries. Disentangling the relationship between the quality of legal protection, quality of legal enforcement, legal origin and external finance, LLSV (1997) purport French civil law countries harbour a less developed capital market than common law countries. (La Porta, Lopez-De-Silanes and Shleifer, 2008). Illustrative of how legal origins shape finance, scholars consider two interrelated mechanisms; the political channel and the adaptability channel in which the political channel centres on the power of the state with the adaptability channel emphasising the law making process (Beck *et al.* 2003, Beck and Levine, 2003). Particularising this, the political channel illustrates how ‘the civil law tradition promotes the development of institutions that advance state power

with adverse implications on financial development’ whilst the adaptability channel reveals how ‘many French civil law countries will have more rigid legal systems and therefore support financial development less effectively than German civil law countries, common law countries’ (Beck *et al.* 2003, pp. 655).

Perceiving the seminal contributions of LLSV (1997:1998) as the genesis of defining the legal underpinnings surrounding corporate finance, the legal specificities can be traced further back in the finance literature with scholars such as Jensen and Meckling (1976) opining this ‘view of the firm points up the important role which the legal system and the law play in social organizations, especially, the organizations of economic activity’ (LLSV 2000a, pp. 5-6). In particular, LLSV (2000) purport the marrying of law and finance stem from the evolution of corporate finance theory.

Whilst the consequences of legal origins have been considered across legal, economic and social spheres, La Porta, Lopez-De-Silanes and Shleifer (2008) allude to four propositions i.e.

- Measurable differences in legal rules and regulations are evident across countries.
- Much of the differences in legal rules and regulations are accounted for by legal origins.
- The historical differences in the styles of legal traditions, ‘the policy-implementing focus of civil law versus the market-supporting focus of common law’ illustrates why legal rules diverge.
- Differences in legal rules impinge economic and social frameworks.

Extending the parameters of the theory, La Porta, Lopez-De-Silanes and Shleifer (2008) opine consideration of evolving legal systems, particularly in the presence of crises, reforms and new forms of regulation is a prerequisite. Furthermore, a deeper appreciation for the dynamic typicality of legal traditions may address whether differences between common and civil law will prevail albeit arguments are now emerging for convergence of the two (La Porta, Lopez-De-Silanes and Shleifer, 2008).

#### **2.4 Small Bank Advantage Hypothesis (Availability of External Finance)**

Conventional wisdom purports within the paradigm of SME financing, two categories of lending technologies constitute the bank SME loan market i.e. transaction lending and relationship lending <sup>2</sup> (Berger and Udell, 2006; Udell, 2008). Introducing a continuum along which lending technologies can be classified, financial scholars define relationship lending as the acquisition of soft qualitative information ‘through multiple interactions with the borrower, often through the provision of multiple financial services’ (Boot 2000, pp. 4). Udell (2008) notes this. In this capacity, the close proximity between the bank and the borrower mitigates problems of asymmetric information, the crux of the financial intermediation process, such that relationship banking introduces a Pareto exchange value of information (Boot, 2000).

In the context of SME finance, personalised relations with small and medium sized enterprises address issues of informational opacity inherent to the sector, reinforcing the validity of relationship lending (De la Torre, Peria and Schmukler, 2010).

<sup>2</sup> In evaluating relationship lending, Udell (2008) alludes to the Cole, Goldberg and White (2004); Scott (2004) and Stein (2002).

At the opposite end of the spectrum, transaction lending technologies are perceived to employ hard quantitative data, applicable to informationally transparent borrowers where each transaction remains independent to each other (Berger *et al.* 2001).

Nesting within the SME financing paradigm is the perception that the capacity to provide relationship lending differs across banking institutions, lending credence to the small bank advantage hypothesis (Berger, Klapper and Udell, 2001). More specifically, given the idiosyncratic nature of relationship lending, conventional wisdom asserts larger banks and foreign banking institutions encounter obstacles that inhibit their engagement (Berger *et al.* 2001; De la Torre *et al.* 2010). Stemming from the informational intensive nature of small firm borrowing, Williamson (1967) type organisational diseconomies materialise for larger banks as the increased vertical and horizontal complexities of these institutions limit their ability to screen and monitor soft qualitative data (Stein, 2002). Berger *et al.* (2001) notes this.

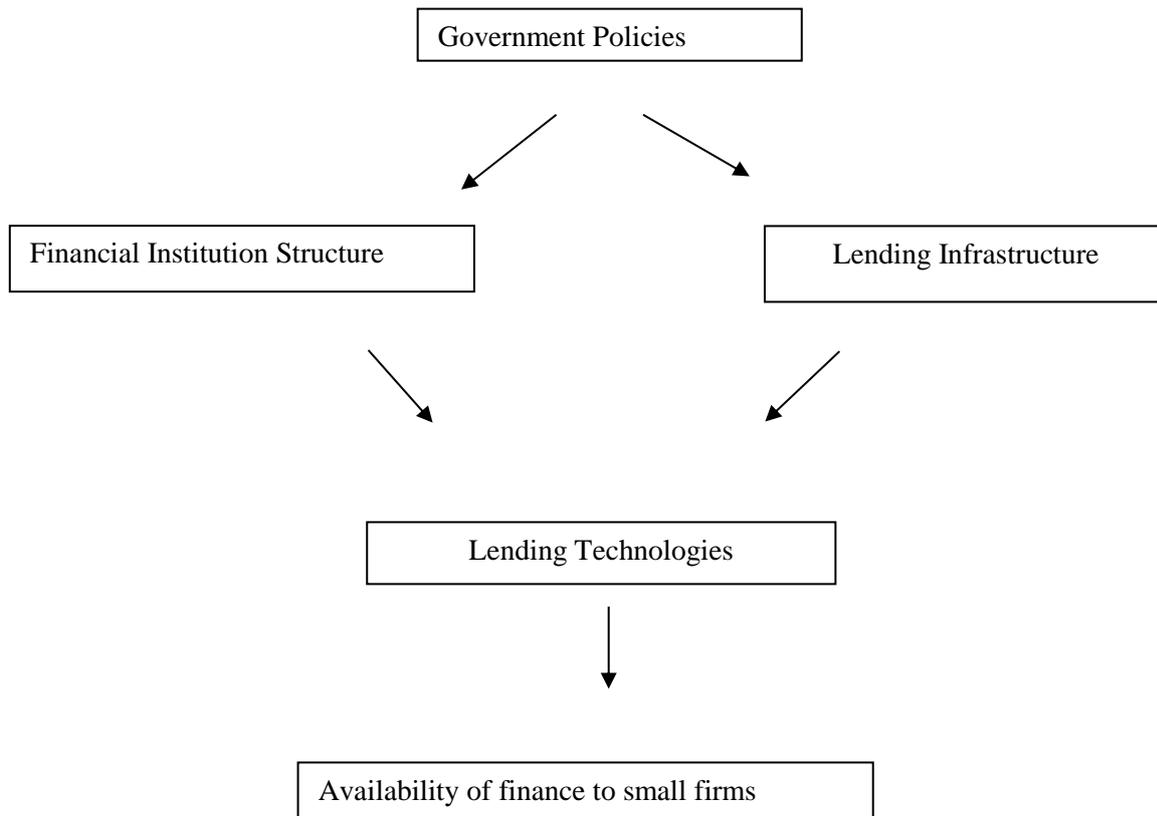
By contrast, smaller banking institutions experience a more robust comparative advantage in SME lending where the informational distance is perceived minimal between both participants (Hauswald and Marquez, 2000). Berger *et al.* (2001) notes this. Smaller banking institutions acquire more local business market knowledge, executing more personalised banking conveniences to fulfil the idiosyncratic needs of the small firm (Berger and Udell, 1996). The conjectured disadvantage of larger banks in originating loans to small firms can thus be perceived as the small bank advantage hypothesis (Jayaratne and Wolken, 1999; Berger *et al.* 2001).

## **2.5 ‘A More Complete Conceptual Model for SME Finance’ (Berger and Udell, 2006) (Availability of External Finance)**

Berger and Udell (2006) posit the current conceptual model by which SME literature abides by, illustrates the mechanism by which markets and institutions facilitate the financing of small and medium sized enterprises. However, Berger and Udell (2006) perceive the model to be fundamentally flawed, omitting core elements of the financial system (Berger and Udell, 2006). In particular, this model characterises lending technologies into two groups; transaction based lending and relationship based lending (Berger and Udell, 2006). This underpins much of the small bank advantage hypothesis. Given the classification, Berger and Udell (2006) argue this represents an oversimplification, a premise which underlines much of extant empirical research (Berger and Udell, 2006). Moreover, Berger and Udell (2006, p.2946) purport transaction based lending should not be perceived as a ‘single homogenous lending technology’ given that transaction based lending techniques can also be employed when extending credit to informational opaque borrowers. Thus, Berger and Udell (2006) execute a conceptual model (See Figure 1.2), lending credence to the government policies of a nation, the financial institution structure and the lending infrastructure (Berger and Udell, 2006).

Stemming from their study, Berger and Udell (2006) identify a causal chain between a country’s government policies, its financial institution structure, the lending infrastructure and thus its lending technologies.

**Figure 1.2: ‘A More Complete Conceptual Model for SME Finance’**



Source: Berger and Udell, (2006).

Government policies influence the intensity of large versus small institutions, foreign versus domestically owned institutions, state owned versus privately owned institutions and market competition, moulding the market structure of these institutions and determining the competitive nature of the industry (Berger and Udell, 2006).<sup>3</sup> Evaluating market structure, emphasis is placed on the market power hypothesis and the information hypothesis. The market power hypothesis stipulates less competitive banking markets are negatively related to credit availability (Carbó-Valverde, Rodríguez-Fernández and Udell, 2009).

<sup>3</sup> Whilst the focus of this study is on country characteristics, namely the environments derived from Berger and Udell’s conceptual framework, emphasis is placed on the financial institution structure, in particular large versus small institutions, foreign versus domestically owned institutions and market competition.

The information hypothesis posits less competitive banking markets are positively related to credit availability (Petersen and Rajan, 1995).

Additionally, these policies influence a nation's legal, judicial and bankruptcy framework coupled with the social, information, tax and regulatory environment of a country i.e. the lending infrastructure. Subsequently, such financial structures play a pivotal role in the feasibility and profitability of the employment of a diverse range of lending technologies (Berger and Udell, 2006).

With reference to the bottom half of the chain, the array of lending techniques influences the availability of finance for firms, each technique differing in their fusion of an informational source, underwriting policies, loan structure and monitoring mechanisms (Berger and Udell, 2006). A firm's choice hinges therefore on the suitability and adaptability of each technique coupled with the availability of the firm sources of information (Berger and Udell, 2006). Thus, identification of the lending technologies materialises as a fundamental prerequisite within SME finance (Berger and Udell, 2006).

## **2.6 Conclusion**

This chapter has presented the theoretical framework underpinning this study. Under the capital structure determination model, key capital structure theories were explored in particular, the agency theory, the pecking order theory and the trade-off theory. Appreciating the movement in capital structure theory which considers the external environment, the chapter focused on the legal origin theory. Indeed, in the availability of external finance, the legal origin theory commands a potent presence. Furthermore, emphasis is placed on the small bank advantage hypothesis and the

conceptual framework by Berger and Udell (2006) in the availability of SME finance.

Chapter three now presents a review of the literature relevant to this study.

## **Chapter Three: Literature Review**

*'If I have seen further, it is by standing on the shoulders of giants'*

*Isaac Newton<sup>a</sup>*

### **3.1 Introduction**

The preceding chapter explored the theoretical footings underpinning both the SME capital structure determination and the availability of external finance in particular bank credit. Emphasis was placed on the capital structure theories of the agency theory, the pecking order theory and the trade-off theory. Attention was also placed on the legal origin theory. Given the dominance of capital structure within SME finance, this chapter commences with an empirical review of the determinants of the SME capital structure proposition, emphasising the role of firm, owner and industry characteristics. Representing a recent movement in the literature in which the empirical lens now fixates its focus on country characteristics as additional determinants of the capital structure, warrants a review of key studies in this space. *Ipsa facto*, the next section of this chapter provides this review. This reinforces the importance of the legal origin theory.

The chapter then evaluates the empirical work surrounding the availability of external finance in particular bank credit availability. Emphasis is placed on the conceptual framework by Berger and Udell (2006) where its architectural form is derived from extant theoretical and empirical studies. This includes the small bank advantage hypothesis. The focus of this study is on country characteristics, namely the environments derived from the conceptual framework by Berger and Udell (2006). As outlined in chapter one, whilst Berger and Udell (2006) define these environments collectively as the lending infrastructure, this study defines them as country characteristics. Finally, the chapter concludes with a summary of key points from the review of the literature. Indicative of this, current gaps in the research are identified.

### **3.2 Determinants of SME Capital Structure Proposition**

Pettit and Singer (1985, pp. 54) purport ‘firms of all sizes select their financial structure in view of the cost, nature and availability of financial alternatives’ where Thornhill, Gellatly and Riding (2004) opine empirical research needs to consider how such financial alternatives can be conditioned by endogenous and exogenous factors. Upon inspecting the capital structure determination of small and medium sized enterprises, it appears that much of the empirical evidence alludes to capital structure theories (Hamilton and Fox, 1998; Michaelas *et al.* 1999; Cassar and Holmes, 2003; Sogorb-Mira, 2005; Heyman *et al.* 2008; López-Gracia and Sogorb-Mira, 2008 and Mac an Bhaird and Lucey, 2009). Alluding to the above studies, Mac an Bhaird (2010) posit such studies adopt a ‘firm characteristic’ and / or an ‘owner characteristic’ orientation, peppered across diverse industries and institutional contexts (Mac and Bhaird, 2010). Studies investigating the role of industry factors include Degryse *et al.* (2012) and Hall *et al.* (2000). In particular, the literature devotes much of its attention to technology based firms (Hogan and Hutson, 2005, Giudici and Paleari, 2000) where their peculiarities elevate much interest (Mac an Bhaird, 2010).

#### **3.2.1 Firm and Owner Characteristics**

Upon examination of the capital structure of small and medium sized enterprises, the extant literature lends credence to firm specific characteristics including firm size, firm age, asset structure, growth, profitability, non-debt tax shields, the effective tax rate, operating risk and owner specific characteristics such as personal factors, goals, motivations and preferences of the owner (Mac an Bhaird, 2010). Hamilton and Fox (1998) illustrate the preference of owners for financing sources particularly those which do not impact on owner independence.

Investigating the firm characteristic determinants of the capital structure, emphasis is placed on some key studies. Considering the relationship between firm size (total assets) and the total debt ratio of UK SMEs, Michaelas *et al.* (1999, pp. 122) find a positive relationship, alluding to the 'scale effects in the gearing ratios'. Michaelas *et al.* (1999) find costs of debt namely, bankruptcy costs, agency costs and informational asymmetry costs are higher for smaller firms (Michaelas *et al.* 1999). However, when categorising total debt into short and long term debt ratios, opposite results materialise. Michaelas *et al.* (1999) assert the effect of firm size is thus inherent to the maturity structure of debt coupled with the total level of debt held. Similarly, in the Australian study of Cassar and Holmes (2003), long term leverage and firm size are positively related. Limited support is presented though for short term leverage, highlighting the importance of the duration of financing (Cassar and Holmes, 2003). In the Spanish study of Sogorb-Mira (2005), firm size has a positive relationship to firm leverage, providing further support of the trade-off theory. In a later Spanish study, López- Gracia and Sogorb-Mira (2008) also find a positive relationship between firm size and leverage. Contrary to much of the literature which lends itself to the positive relationship between firm size and debt, Heyman *et al.* (2008) find a negative relationship. Particularising this, Pettit and Singer (1985) suggest there may be a negative relationship between leverage and firm size given the negative relationship between size and the agency costs associated with equity may be stronger than the negative relationship between size and the agency costs of debt (Heyman *et al.* 2008).

Alluding to long term debt and firm age, the empirical results of Mac an Bhaird and Lucey (2009) illustrate a negative relationship. Experiencing the greatest informational asymmetries at the start up stage, a firm's access to debt remains

limited albeit with time, as the firm develops its trading history, its capacity to borrow increases (Mac an Bhaird and Lucey, 2009). As the firm continues to grow and acquire more assets, collateralised debt becomes more available, facilitating maturity matching (Mac an Bhaird and Lucey, 2009). At later stages of firm development, firms utilise more of their retained earnings, rendering the role of debt redundant (Mac an Bhaird and Lucey, 2009). Both Michaelas *et al.* (1999) and López-Gracia and Sogorb-Mira (2008) find similar results, stipulating older SMEs will depend more on internal funding i.e. retained profits than debt in comparison to younger firms, concurring with the pecking order hypothesis.

Crystallising the importance of collateral in accessing and securing debt finance including personal assets to erode asymmetric problems, Mac an Bhaird and Lucey (2009) find a positive relationship between collateral secured on assets and long/short term debt, reinforcing the agency theory. This concurs with the earlier studies of Michaelas *et al.* (1999), Cassar and Holmes (2003), Sogorb-Mira (2005) and Heyman *et al.* (2008) albeit discrepancies occur when short term debt is considered. Particularising this, although the results of Michaelas *et al.* (1999) suggest asset structure and short term debt are positively correlated, Cassar and Holmes (2003) and Sogorb-Mira (2005) find a negative rapport, highlighting the maturity matching principle. Characterising SMEs with high R & D expenditure, these firms utilise more external equity, illustrating a greater probability in relinquishing control in the pursuit of growth (Mac and Bhaird and Lucey, 2009). This result is further reinforced by the earlier study of Hogan and Hutson (2005).

Lending credence to growth, Michaelas *et al.* (1999) find a positive relationship between growth and gearing ratios. Whilst the agency theory assumes a negative relationship given growth opportunities can increase agency costs, Michaelas *et al.*

(1999) stipulate such agency costs can be minimised if short term debt as opposed to long term debt is employed. Michaelas *et al.* (1999) also posit the positive relationship between growth and gearing ratios supports the pecking order theory. Cassar and Holmes (2003) find a significant positive relationship between growth and total leverage and short term leverage. López-Gracia and Sogorb-Mira (2008) and Heyman *et al.* (2008) find a negative relationship between leverage and growth concurring with the agency theory. In relation to profitability, much of the extant studies (Michaelas *et al.* 1999; Cassar and Holmes, 2003; Sogorb-Mira, 2005, Heyman *et al.* 2008 and López-Gracia and Sogorb-Mira, 2008) find a negative relationship to leverage, supporting the pecking order theory. Sogorb-Mira (2005) and López-Gracia and Sogorb-Mira (2008) find non-debt tax shields are negatively related to leverage. Although hypothesised the effective tax rate would be positively related to leverage, Sogorb-Mira (2005) found it was negatively related. Limited attention is placed on operating risk and leverage. Michaelas *et al.* (1999) find a positive relationship between gearing and operating risk.

Whilst the empirical results allude to the role of firm and owner specific characteristics, Mac an Bhaird and Lucey (2009) lend credence to the minimisation of informational asymmetries to facilitate access to external finance. Moreover, the availability of collateralised assets coupled with the financing preferences of investors impinges on the debt and equity markets (Mac an Bhaird and Lucey, 2009).

### **3.2.2 Industry Characteristics**

Whilst firm and owner characteristics occupy much of extant literature, focus is extended to include industry characteristics. Evaluating the industry effects of the capital structure for UK SMEs, Hall *et al.* (2000) find short term debt effects of profitability differ across industries albeit growth remains constant. In the empirical

work of Degryse *et al.* (2012) in which capital structure determinants of SME Dutch firms are evaluated, most firm characteristics support the pecking order theory. Moreover, Degryse *et al.* (2012) find inter and intra industry differences are fundamental to the capital structure model. In particular, inter industry differences concur with the trade-off theory, illustrating industries have different target capital structures (Degryse *et al.* 2012). Evaluating firm characteristics across the industries, much support is provided for the pecking order theory in all industries except leisure and catering (Degryse *et al.* 2012). Here, more profitable firms have more debt, concurring with the trade-off theory (Degryse *et al.* 2012).

Studies also evaluate the financing of SMEs in chosen industries, in particular technology based small firms (TBSFs) (Giudici and Paleari, 2000; Hogan and Huston, 2005) where the specificities of these firms can be very definite. Mac an Bhaird (2010) also makes note of these studies. Perceived as imperative conduits in the translation of knowledge, fundamental to the ‘development and diffusion of innovation’, (Hogan and Hutson 2005, pp. 370), their capital structure determination commands significant attention given the severity of capital market imperfections (Hogan and Hutson, 2005). In particular, the lack of tangible assets in the early stages of the life cycle coupled with the role of scientific knowledge and intellectual property further reinforces the issue (Giudici and Paleari, 2000). Inspecting the financing patterns, studies support the contention TBSFs employ less debt finance than equity (Brierley, 2001).

Within the Irish context, Hogan and Hutson (2005) investigate the capital structure of new technology based small firms (NTBFs), probing into the motives, financial goals and preferred sources of finance. Lending credence to the pecking order hypothesis, the financial hierarchy of finance, Hogan and Hutson (2005) opine the

preference of internal financing can stem from both supply side and demand side factors where the existence of informational asymmetries coupled with the need to maintain control and independence remains fundamental to small and medium sized enterprises. Thus, the pecking order proposition underpins much of the empirical work of Hogan and Hutson (2005), forming a platform from which the capital structure of 117 Irish indigenous companies was analysed (Hogan and Hutson, 2005).

Illustrating the dominance of internal sources of financing at the start up stages, Hogan and Hutson (2005) illustrate how external finances are more important for firms aged 2-10 years with retained profits proving fundamental for the more mature firms. The use of internal finance concurs with the pecking order hypothesis albeit the preference of external equity over debt represents an apparent contradiction (Hogan and Hutson, 2005). In particular, the preference for internal finance stems firstly from supply side constraints as the effects of adverse selection and moral hazard become more pronounced due to information asymmetries (Hogan and Hutson, 2005). Moreover, the importance of internal financing can also be attributed to demand side factors where an owner's preference for retaining independence and control represents a stylised characteristic of small firms (Hogan and Hutson, 2005).

Contrary to the hypothesis, Hogan and Hutson (2005) purport the preference for external equity over debt materialises for new technology based small firms (NTBFs) as the intangibility and opacity of such firms raises the acuity of information asymmetries with banking institutions which in turn would increase the price of debt and thus reducing the quantity available. Furthermore, although SMEs prefer to retain independence, the idiosyncratic nature of NTBFs implies such firms have a greater probability to cede control in the pursuit of innovation and financial

goals (Hogan and Hutson, 2005). Berggren *et al.* (2000) opine SME owners adopt a more favourable attitude towards external finance in view of technological development, size, financial strength and growth. Hogan and Hutson (2005) also refer to this study.

Instigating one of the initial studies into Irish technology based small firms, the empirical evidence of Hogan and Hutson (2005) illustrates how the dominance of internal financing, the preference for external equity and the dearth of debt utilised can be attributed to the financial constraints of the debt market coupled with the goals and motivations of SME decision makers. Evaluating the provision of finance for Italian technology based small firms (TBSFs); Giudici and Paleari (2000) consider not only the availability of finance but the 'attitudinal component' where even if sources are available, the conservative attitude of TBSFs may form constraints. Contrary to the results of Hogan and Hutson (2005) which favoured external equity over debt, Giudici and Paleari (2000) found Italian TBSFs occupied a greater preference for debt. Giudici and Paleari (2000) posit if external shareholders failed to add value to the firm, these firms were unwilling to cede control to external shareholders. Instead these firms had a greater preference for debt (Giudici and Paleari, 2000). Such contradictory results were attributed to the diverse goals, motivations and attitudes of firms (Giudici and Paleari, 2000). Although the dominance of external equity appears to contradict the proposition, Hogan and Hutson (2005) posit their results concur with the spirit of the pecking order theory, stipulating firms favour financing sources with minimal information asymmetry (Hogan and Hutson, 2005).

Empirical contributions to date support the relevance of the agency theory, the pecking order theory and the trade-off theory within SME finance (Mac an Bhaird,

2010) through the firm, owner and industry characteristic orientations. Introducing a further unit of analysis, the role of country characteristics in the capital structure choice of SMEs represents a further movement in the research. Given country characteristics were firstly evaluated in the capital structure of large, listed firms, this occupies the focus of the next section after which the attention turns to country characteristics in the capital structure of SMEs.

### **3.2.3 Country Characteristics**

#### **3.2.3.1 Country Characteristics in the Capital Structure of Large Firms**

Grappling with the many tenets of research surrounding the capital structure determination, institutional differences occupy a space of ‘otherness’, composing a musical of further dimensional realities in which country specificities including the legal environment are perceived fundamental in the financing behaviour of firms. Scholars posit a firm’s financing behaviour is shaped not only by firm characteristics but concomitantly by the typicality of their institutional environments (Fan *et al.* 2012). Considering the capital structure determination of large firms, whilst early crusaders evaluated traditional capital structure theories (similar to SMEs) within the US context, highlighting the role of firm factors, a growing body of literature now conducts cross country comparisons of a firm’s capital structure choice (Rajan and Zingales, 1995; La Porta *et al.* 1997:1998; Demirgüç-Kunt and Maksimovic, 1998, 1999; Booth *et al.* 2001; Claessens *et al.* 2001; Bancel and Mittoo, 2004; Deesomsak *et al.* 2004; Fan *et al.* 2012; De Jong *et al.* 2008; Antoniou *et al.* 2008; López-Iturriaga and Rodríguez-Sanz, 2008; Alves and Ferreira, 2011; Kayo and Kimura, 2011). Facilitating this tenet of research, Rajan and Zingales (1995, pp. 1421) assert ‘Without testing the robustness of....findings outside the environment in which they

were uncovered, it is hard to determine whether these empirical regularities are merely spurious correlations, let alone whether they support one theory or another’.

Serving as a catalyst to the seminal contribution of La Porta, Lopez-De-Silanes, Shleifer and Vishny (LLSV) in which the legal underpinnings of corporate finance are further defined; Shleifer and Vishny (1997) provide a reference to legal protection as an effective corporate governance mechanism. Stemming from the contractual view of the firm (Jensen and Meckling, 1976) in which the agency problem crystallises the separation of ownership and control, Shleifer and Vishny (1997) opine corporate governance serves to ensure the suppliers of finance to a firm receive a return on their investment with legal protection materialising as a fundamental approach. More specifically, differences in corporate governance systems can be attributed to differences in legal protection across countries (Shleifer and Vishny, 1997). Against this backdrop, the work of LLSV (1997:1998) lends credence to the rule of law, the quality of legal investor protection, the quality of enforcement, the financial systems and the corporate ownership nexus.

Crystallising differences in law across countries, much pertaining to the legal origin, LLSV (1998) assert across many dimensions of legal protection, common law countries afford the strongest protection to both shareholders and creditors with opposite results materialising for French civil law countries. Furthermore, the quality of law enforcement remains robust for common law and Scandinavian and German civil law countries with French civil law nations encountering inferior levels (LLSV, 1998). Illustrative of the variation of law and the quality of legal enforcement across countries, LLSV (1998) find as an adaptive response to poor legal protection, high ownership concentration materialises, reinforcing the proposition that legal systems

are important to corporate governance and when limitations are evident, firms need to adapt (LLSV, 1998).

Intertwining an earlier study to further weave the thread of research, LLSV (1997) dissect the relationship between the quality of legal protection, quality of legal enforcement, legal origin and external finance, purporting the dimensions of capital markets remain contingent on the legal environment. Indicative of this, French civil law countries harbour a less developed capital market than common law countries, rendering the legal system as a fundamental determinant in the availability of external finance (LLSV, 1997). Alluding to the positive nexus between financial development and economic growth (Levine, 1999; Rajan and Zingales, 1998), the parallelism between legal origins and financial development crystallises the significance of a country's legal capacity, extending its parameters to economic development (Roe, 2006).

Facilitating an osmosis movement throughout the literature, the legal origins proposition occupies several strands of research including investor protection and financial development; government regulation and ownership of economic interests and the idiosyncratic nature of judiciary systems and thus their effects on property rights and contract enforcement (La Porta, Lopez-De-Silanes and Shleifer, 2008). Epitomizing further tenets of research within the field of law and finance, scholars consider law and external financing sources and firm growth (Demirgüç – Kunt and Maksimovic, 1998); corporate valuations (LLSV, 2002); ownership structures (La Porta, Lopez-De-Silanes, Shleifer, 1999); dividend policies (LLSV, 2000b) and procedural formalism (Djankov, Lopez-De-Silanes, Shleifer, 2003). Whilst the paradigm of the legal origins theory has ignited a vortex of interest, financial scholarship alludes to much criticism of the theorisation with scholars questioning

the theoretical logic and empirical foundations of the proposition (Rajan and Zingales, 2003; Roe, 2006; Cioffi, 2009 and Armour *et al.* 2009).

Serving as a catalyst for later research that conduct cross country comparisons of capital structure determination, the seminal contribution of Rajan and Zingales (1995) suggests although factors that influence firm leverage in the US are similar in other G7 countries, the theoretical foundations of these observations remain ambiguous. Further studies must hinge on reinforcing the relationship between theoretical models and their empirical specifications coupled with acquiring a deeper appreciation for institutional differences (Rajan and Zingales, 1995). Laden with concerns surrounding the pernicious nature of agency costs in which its presence stymies the financing behaviour of firms, financial theory suggests such concerns can be mitigated by appropriate financial contracts, depending on the availability of information and the enforcement of legal rights (Demirgüç – Kunt and Maksimovic, 1998: 1999). An effective legal system is a prerequisite to minimise the opportunistic behaviour of corporate insiders with an effective financial system facilitating investors with access to firm information (Demirgüç – Kunt and Maksimovic, 1998).

Inspecting the debt maturity levels of firms both in developed and developing countries, Demirgüç – Kunt and Maksimovic (1999) attribute much of the diversity to differences in financial institutions, legal systems, government subsidies coupled with firm characteristics and economic factors. In particular, evidence surrounding the efficiency of the legal system as opposed to legal origin proves highly important (Demirgüç – Kunt and Maksimovic, 1999). Demirgüç – Kunt and Maksimovic (1998) illustrate how firms in countries with an active stock market and a robust legal system are able to acquire external finance and thus grow faster.

Evaluating the capital structure of large public firms from developing countries, Booth *et al.* (2001) find variables important in the capital structure of firms in the United States and Europe are also important for firms in developing countries despite differences in the institutional environments. Considering several different threads of literature including the relationship between financing behaviour and firm performance and governance; cross country comparisons of financial structures and finally, the evolution of financial crises, Claessens *et al.* (2001) weave all strands together to evaluate whether financing patterns and risk taking behaviour imitate legal, regulatory and financial milieus across 46 countries. Claessens *et al.* (2001) find the legal origin of a country, the shareholder and creditor rights protection of a country coupled with its financial system influence the extent of corporate risk taking. Particularising this, in common law countries and market based financial systems, firms appeared to be less risky (Claessens *et al.* 2001). Furthermore, higher investor protection seemed to reduce financial risk (Claessens *et al.* 2001). En masse, a firm's financing patterns are mirrored in the institutional environment of a country (Claessens *et al.* 2001).

Facilitating a comparison of US and European managerial views surrounding the determinants of capital structure from 720 large, public firms, Bancel and Mittoo (2004) cite much similarity in factors that determine a firm's financing policy with financial flexibility and credit ratings perceived as the most important factors in the context of the debt policy. Cross country variations of the rankings of the most important factors are said to be attributed to country characteristics (Bancel and Mittoo, 2004). Particularising this, factors relating to debt are influenced more by the quality of the legal system i.e. English, French, German and Scandinavian than common stock factors (Bancel and Mittoo, 2004). This concurs with LLSV

(1997:1998), illustrative of how the legal environment can impinge on the availability of external sources of finance. Moreover, these empirical results support the theoretical foundations of the agency theory proposition which alludes to the role of debt contracts and bankruptcy law (Bancel and Mittoo, 2004). Considering an additional dimension, further variations in the ranking of factors can be attributed to firms operating internationally when foreign debt and equity are employed (Bancel and Mittoo, 2004). Stemming from their results, Bancel and Mittoo (2004, pp. 131) purport the capital structure of a firm is the ‘result of a complex interaction of several institutional features as well as firm characteristics in the home country’ (Bancel and Mittoo, 2004).

Representing a further delicacy of movement, Deesomsak *et al.* (2004) consider the capital structure determination of 1,527 large, public firms stemming from the Asia Pacific region where the diverse institutional and legal environments of these countries extend and intensify the parameters of empirical reasoning. Employing a time period from 1993-2001, the Asian financial crisis of 1997 is further captured (Deesomsak *et al.* 2004). Their empirical results allude to the role of firm specific characteristics with the differences in the extent of the relationships between these factors and leverage attributed to country characteristics (Deesomsak *et al.* 2004). Following the inclusion of a number of country specific variables into the regression namely, creditor rights, ownership concentration, stock market activity and interest rates, the results further reinforced their role (Deesomsak *et al.* 2004). Deesomsak *et al.* (2004, pp.404) purport ‘the capital structure decision is not only the product of the firm’s own characteristics but also the result of the corporate governance, legal framework and institutional environment of the countries’.

On parallel to previous studies, De Jong *et al.* (2008) facilitate a more integrated exploration of the capital structure for large public firms from 42 countries. Considering not only the direct impact of country specific factors on capital structure, De Jong *et al.* (2008) evaluate the indirect effect, i.e. whether country factors influence the importance of firm factors on leverage, a lacuna which has occupied extant research. Illustrating the significance of the GDP growth rate, bond market development and credit right protection in the capital structure determination, the empirical results of De Jong *et al.* (2008) reinforce the direct role of country specificities.

Hypothesising ‘bond market structure mitigates the effect of bankruptcy costs (tangibility, risk and size) on leverage; capital formation mitigates the effect of bankruptcy costs (tangibility, risk and size) on leverage; bond market structure mitigates the effect of agency costs (growth opportunities and tangibility) on leverage; stock market structure mitigates the effect of agency costs (growth opportunities and tangibility) on leverage; capital formation strengthens the effect of pecking order financing (profitability and liquidity) on leverage’ (De Jong *et al.* 2008, pp. 1960), De Jong *et al.* (2008) provide evidence to support some of the hypotheses, crystallising the indirect role of country factors. In particular, in countries with robust legal environments and stable economic indicators, firms employ more debt with the impact of firm factors on leverage further reinforced (De Jong *et al.* 2008). On a similar vein, evaluating the capital structure of large public firms from 10 countries, López-Iturruga and Rodríguez-Sanz (2008) stipulate the differential impact of the determinants of the capital structure is conditioned by legal and institutional frameworks. Furthermore, Kayo and Kimura (2011) also evaluate

the direct and indirect effects of firm industry and country characteristics in 40 countries and find all characteristics were fundamental in the capital structure.

Evaluating the capital structure of firms from market based and bank based economies; Antoniou *et al.* (2008) find firm characteristics and market factors of the capital structure are reliant on the legal and economic factors of a country. Alves and Ferreira (2011) highlight the importance of shareholder rights as a fundamental determinant of the capital structure for large public firms in 31 countries worldwide. Extending the literature further through the employment of a larger number of countries and more institutional variables, more recently Fan *et al.* (2012) find in their sample of large firms from 39 developed and developing countries, the legal and tax system, corruption and the preferences of capital suppliers accounted for much of the variation in firm leverage.

Whilst the role of firm factors has occupied much of the empirical arena, scholars have now introduced a new dimensional analysis in which country characteristics are considered in the financing behaviour of firms. Evaluating such specificities, the extant literature illustrates how the parameters of the research remain infinite where each study differs according to time periods, geographical regions and explanatory factors employed. Illustrative of this infinity, considering both the direct and indirect effect of country factors maintains the rigidity of the research. This suggests in the capital structure determination, firm factors and country factors are not mutually exclusive events. Lending credence to the role of country characteristics, this movement in research has provoked a curiosity within the financing of SMEs and hence the subject of the next section of this chapter.

### **3.2.3.2 Country Characteristics in the Capital Structure of SMEs**

Escorting one of the initial studies of country factors in the capital structure determination of small and medium sized enterprises, Hall *et al.* (2004) stipulate a perusal of international differences in the capital structure determination for SMEs has remained absent from research where data restrictions surrounding SMEs particularises this fundamental concern. Representing a significant gap, Hall *et al.* (2004) opine with SMEs occupying no stock market listings, such firms will be exposed to greater inter country variability in comparison to those larger firms.

Evaluating whether any discrepancies in the capital structure for a sample of 4,000 European SMEs stem from country characteristics or from differences in firm factors between countries, Hall *et al.* (2004) derive key hypotheses, indicative to traditional capital structure theories. Illustrative of this, Hall *et al.* (2004) hypothesise relationships between firm factors and long and short term debt, suggesting if country factors exert no influence on the capital structure, all hypotheses would be upheld with the strength of each relationship across countries remaining homogenous. Finding variation in both long term and short term debt across countries, Hall *et al.* (2004) conclude the hypotheses failed to fully explain the capital structure of SMEs given differences in the effects of the determinants of capital structure between countries. Such divergence may stem from economic, social and cultural differences including disclosure requirements, banking relationships and taxation, warranting an investigation of additional country specific variables (Hall *et al.*, 2004).

Serving as a parallelism to Hall *et al.* (2004), Daskalakis and Psillaki (2008) address whether the capital structure determination of French and Greek SMEs are driven by similar factors and if discrepancies are evident, do these differences stem from firm

specific or country specific orientations? Furthermore, consideration is placed on the size and structure of financial markets to justify any potential differences in cross country capital structures (Daskalakis and Psillaki, 2008). Adopting a similar approach to Hall *et al.* (2004), the relationships between the dependent variable and the explanatory variables are assumed to be the same across countries if country specific factors exert no influence on the capital structure (Daskalakis and Psillaki, 2008). Initial results allude to similarities in the determinants of the capital structure, denoted by similar signs of the coefficients (Daskalakis and Psillaki, 2008). Daskalakis and Psillaki (2008) attribute this to the homogeneity of the legal institutional environment occupied in France and Greece. Additional statistical analysis employing a fixed effects model find the intensity of the capital structure relationship does differ across countries, accrediting such differences to firm specific characteristics (Daskalakis and Psillaki, 2008). As a corollary of this, Daskalakis and Psillaki (2008) assert future research must embark on a paradigm shift from country factors back to firm factors.

Stitching the fabric of cross country comparisons further, Psillaki and Daskalakis (2009, pp.320) intertwine a later paper with their earlier research, considering the paradigm, ‘country versus firm specific differences in capital structure choices of SMEs’. Disentangling some of the elasticated knots surrounding the capital structure determination, Psillaki and Daskalakis (2009) employ a larger sample of countries of institutional similarity with more conditioning variables. Considering this stratum of investigation, the employment of more countries with similar institutional specificities facilitates an evaluation of whether the SMEs’ specificity paradigm remains valid (Psillaki and Daskalakis, 2009). Concurring with Daskalakis and Psillaki (2008), Psillaki and Daskalakis (2009) find similarity in the signs of the

coefficients stemming from the similarity in the country's institutional, financial and legal environments albeit Psillaki and Daskalakis (2009) caution structure differences may materialise due to differences in the magnitude of the coefficients. Conducting additional analysis, Psillaki and Daskalakis (2009) find statistical disparities in the structure of the relationship between the dependent and explanatory variables, concluding firm rather than country factors account for such differences in the capital structure determination. This suggests firm heterogeneity is fundamental in the SME capital structure choice (Psillaki and Daskalakis, 2009)

Considering the financing patterns of small and large firms around the world, Beck *et al.* (2008) evaluate the relationship between the financial and legal environment of a country and the external financing employed. Furthermore the relationship between the financing behaviour of a firm and firm size is investigated across various degrees of financial and institutional development (Beck *et al.* 2008). Divorcing their study from extant research, Beck *et al.* (2008) consider a broader spectrum of financing sources, beyond the traditional focus of external debt and equity, employing data from the World Business Environment Survey as a means of facilitation.

Dissecting the financing behaviour of three thousand firms spanning 48 countries, Beck *et al.* (2008) assert controlling for country specific and firm specific variables, smaller firms employ significantly less external financing where the relationship between firm size and bank finance is monotonic in nature. Inspecting the influence of a country's institutional development on the financing behaviour of firms, Beck *et al.* (2008) posit smaller firms gain significantly more from the presence of robust property rights, increasing their access to external finance. In the absence of a strong legal and financial system where access to bank finance is curtailed, informal sources of financing are employed such as leasing, negating the underdevelopment

of a nation (Beck *et al.* 2008). Contrary to their perceptions, their empirical results suggest such informal sources are limited, thereby failing to close the financing gap (Beck *et al.* 2008). Thus, institutional reforms strengthening legal and financial systems are a prerequisite in minimising SME financial constraints (Beck *et al.* 2008). Beck *et al.* (2008) opine the supply of external finance to SMEs remains contingent on the infrastructural architecture of a country including a robust legal and information environment. Whilst Beck *et al.* (2008) evaluate the financing patterns of firms, alluding to the capital structure model; emphasis is also placed on external finance availability. More specifically, Beck *et al.* (2008, pp. 485) posit ‘the most effective way of improving small firms’ access to external finance appears to be through institutional reforms addressing weaknesses in legal and financial systems’

In the empirical work of Jõeveer (2013b), the sources of leverage variation are considered and a comparative analysis on the capital structure determinants of large, small, listed and unlisted firms is conducted. More specifically, employing firm level data from ten European Western countries, Jõeveer (2013b) posits in the analysis of variance, country effects rather than industry effects explain more of the variation in leverage for unlisted firms, contrary to listed enterprises. Moreover, the regression results reveal statistical significance of several country factors including GDP growth, shareholder right protection index and the corruption perception index (Jõeveer, 2013b). In a further study, Jõeveer (2013a) evaluates firm, country institutional and macroeconomic factors in the capital structure of listed and unlisted firms in nine Eastern European countries. Considering both a broad and narrow definition of leverage, Jõeveer (2013a) find country specific factors explained most of the variation in narrow leverage whilst firm specific factors explained most of the

variation in broad leverage for unlisted firms. Indeed, Jõeveer (2013a, pp.307) posits for smaller unlisted firms, country factors were ‘the most significant explanatory factors for both leverage measures’.

In summary, occupying the unknown space of cross country comparisons within SME finance, empirical research has begun to facilitate a more integrated exploration of the determinants of the capital structure choice, creating much intellectual fervour surrounding the role of country characteristics. Representing a novel tenet of SME research, motivation largely stems from the plethora of cross country comparisons of larger firms with the preponderance of SME studies conducted within a single country context (Daskalakis and Psillaki, 2008 and Psillaki and Daskalakis, 2009). Whilst Hall *et al.* (2004) attributed much of the variation in leverage to firm characteristics; they further allude to the role of country factors, raising much ambiguity surrounding the extent of this role. Pursuing this avenue of research further, the results of Daskalakis and Psillaki (2008) and Psillaki and Daskalakis (2009) suggest in the context of firm specific versus country specific characteristics, firm factors prevail. Although their results very much favour firm characteristics, the similarity of the signs of the coefficients correspond to similar legal and financial environments of the countries, thus by default, supporting the role of country factors.

Despite the cross country comparisons of the SME capital structure determination, this avenue of research remains in its infancy stage. Indeed, focus is placed on some country characteristics in particular the legal environment. Whilst extant research has crystallised some of the institutional anonymity, the extent of country characteristics within the capital structure determination of SMEs warrants further consideration. Lending credence to the conceptual framework of Berger and Udell (2006) in which

the information, legal, judicial, bankruptcy, social, tax and regulatory environments are perceived to influence the availability of external finance, not all of these country level measures have been evaluated in the SME capital structure determination. Given the interrelatedness of external finance availability and the capital structure, such country measures may indeed impact on the capital structure for SMEs. Hence, this represents a key research gap in the literature.

### **3.3 Empirical Evidence of Berger and Udell's Conceptual Model (2006) <sup>4</sup>**

#### **(Availability of External Finance)**

Given the centrality of the SME capital structure determination model, emphasis is placed on a related field, the availability of external finance in which the conceptual model of Berger and Udell (2006) alludes to the role of government policy, financial institution structure, the lending infrastructure and the lending technologies in the accessibility of finance. Each of these is presented in the following sub sections.

#### **3.3.1 Government Policy**

Conceptualising the dynamics of SME finance, empirical literature alludes to the role of government policy where policy prescriptions seek to address the financial needs of small and medium sized enterprises (Tucker and Lean, 2003; Mac an Bhaird and Lucey, 2009). Evaluating how government considerations can facilitate a reduction in the financing gap of small firms, Tucker and Lean (2003) assert a two pronged orientation is required, lending credence to both economic policy and social policy objectives (Tucker and Lean, 2003).

<sup>4</sup> Included in this literature review are some of the extant studies Berger and Udell (2006) employ to frame their conceptual model.

In particular, to address the development of equity finance, Tucker and Lean (2003) propose initiatives including an advanced support mechanism for informal venture capital networks, an increase in the availability of government funding to improve informal investments and legislation and deregulation centred on promoting venture capital activities (Tucker and Lean, 2003).

Igniting further policy considerations, the empirical results of Mac an Bhaird and Lucey (2009) suggest given Irish current tax incentives favour the extraction of profits from SMEs rather than reinvestment, emphasis should be placed on policy initiatives to encourage the employment of retained profits. Furthermore, recent changes to the regulatory environment introduced under the Basel II Revised International Capital Framework heightens personal distress for SMEs as more stringent capital requirements become evident. Therefore, future policies need to consider these changes (Mac an Bhaird and Lucey, 2009).

In the theoretical contribution of Berger and Udell (2006), the conceptual framework alludes to the role of government policy within the financial institution structure and the lending infrastructure, influencing both the market of financial institutions and the key environments of a country. Thus, this conceptual model further reinforces the imperativeness of government considerations within the arena of SME financing (Berger and Udell, 2006).

### **3.3.2 Financial Institution Structure**

Constituting one of the key pillars in the financial system architecture, banking institutions are perceived as a fundamental source of external credit for small and medium sized enterprises (Berger and Udell, 1998) where imperfect substitutability between bank loans and other alternative sources magnifies their significance within

the SME sector (Bougheas *et al.* 2006). Performing the classical functions of financial intermediaries, banks engaging in the activities of screening, contracting and monitoring assess business quality, reducing the enigma surrounding the informational opacity of small and medium sized firms (Berger and Udell, 1998). Perceived as efficient ‘delegated monitors’ (Bhattacharya and Thakor 1993 cited by Goldberg and White 1998, pp. 3) (Berger and Udell, 1998), some banking institutions experience an informational induced competitive advantage, negating the asymmetric problems of adverse selection and moral hazard, illustrating the importance of the bank-borrower relationship within SME finance (Berger and Udell, 1998). Given the plethora of research that considers the financial institution structure within SME finance, Berger and Udell (2006) purport studies fail to extend beyond the classification of transaction and relationship lending technologies.

### **3.3.2.1 Large versus Small Institutions**

Serving as a parallelism to the theoretical assumptions surrounding the role of large and small institutions within SME finance, an increasing body of literature prevails. Particularising this, given structural changes across the financial landscape have become even more salient with financial and technological innovation stimulating much financial modernisation (Di Patti and Gobbi, 2001), this has acted as a catalyst for much of the research. On a similar vein, the fabric of banking regulation, a stalwart of the banking sector has unravelled, in particular deregulation of restrictions on geographical expansion including the passage of the Riegle-Neal Interstate Banking and Branching Efficiency Act (IBBEA) of 1994<sup>5</sup>

<sup>5</sup> With reference to the IBBEA, Texas became the first state to reject interstate banking and branching where proponents voiced their concerns surrounding the effects of consolidation on small firm lending (Strahan and Weston, 1998) (cited by Jayarante and Wolken, 1999).

which has led to an increasingly consolidated banking market in the US with the emergence of further complex, financial conglomerates (Strahan and Weston, 1998 and Berger *et al.* 1995). Concurrently, structural changes in the multifaceted industry of European banking have become more evident, emanating from the effects of globalisation, deregulation and integration of the European markets (Goddard *et al.* 2007).

Moreover, the integration of financial markets has led to a lack of distinction between the activities of lending, asset management and investment banking (Focarelli *et al.* 2002). Di Patti and Gobbi (2001) note this. Such structural changes are perceived to influence the flow of credit to small firms through three mechanisms; altering the size distribution of banks coupled with their geographical reach, disruptions to established banking relationships, rendering the loss of soft information and changes to the market's competitiveness where the empirical investigation of all three hinges on the information structure of the market (Di Patti and Gobbi, 2001). Within the empirical arena, a plethora of studies (Berger *et al.* 1995; Keeton, 1995; Berger and Udell, 1996; Peek and Rosengren, 1995; Strahan and Weston, 1996, 1998; Berger *et al.* 1998 and Jayaratne and Wolken, 1999) investigate the relationship between size and complexity of banks and small business lending with inconclusive results materialising. Di Patti and Gobbi (2001) note this.

Employing a sample (1993-1994) of New England banks, Peek and Rosengren (1995) analyse the relationship between banking consolidation and the availability of small firm credit. In particular, Peek and Rosengren (1995) lend credence to the benefits of larger financial institutions, asserting with consolidation, a small firm's exposure to the vagaries of a banking market can be mitigated with greater diversification, ameliorating capital shocks. Conversely, potential costs can

materialise, as illustrated in the empirical results of Peek and Rosengren (1995) who assert when banking acquisitions within New England occurred, a decline in both the magnitude and amount of small firm loans after the majority of acquisitions was evident (Peek and Rosengren, 1995). Cautioning the significance of the results given the short time period employed, the empirical evidence injected much ambiguity surrounding the impact of consolidation on small firm lending (Peek and Rosengren, 1995).

Quantifying the developments of the US commercial banking market, Berger *et al.* (1995) estimated a contraction in bank lending to small firms. Moreover, Keeton (1995) purported banks owned by out of state multibank holding companies, smaller banks of instate multibank holding companies coupled with banks with a high degree of branching had a lower propensity to lend to small firms. Strahan and Weston, (1998) notes this.

As alluded to above, much of the earlier studies lend credence to the potential adverse effects of consolidation on small firm lending albeit placing emphasis on the static relationship. Extending this avenue of research, later studies inspect the dynamic nature of mergers and acquisitions (Di Patti and Gobbi, 2001), advocating the imperativeness of the dynamic disposition (Berger *et al.* 1998). Departing from existing literature, Berger *et al.* (1998) employ a more structural model to consider the overall effect of consolidation on small firm lending i.e. static and dynamic effects coupled with the impact of mergers and acquisitions on the lending propensities of other market participants. Disentangling the static and dynamic effects, Berger *et al.* (1998) investigate four effects of consolidation: static effect, restructuring effect, direct effect and the external effect. The static effect implies a change in the lending behaviour, emanating from the fusion of the banks' balance

sheets into a larger financial conglomerate. The impact of restructuring consists of a difference in lending following restructuring of an institution's size, characteristics or competitive stance with the direct effect consisting of a change in lending between a newly restructured institution and the financial institution that fails to engage in consolidation. Employing a very comprehensive list of over 6,000 US mergers and acquisitions spanning the period, late 1970s to early 1990s, the robust data set facilitates in examining the dynamic impact in its entirety (Berger *et al.* 1998). Stemming from their empirical evidence, the static effect impinges negatively on small firm lending, concurring with previous studies albeit when integrating the dynamic effects, the negative static impact is minimised. In the context of bank mergers, the external reaction of other banking institutions offsets the negative static effect. Furthermore, with reference to acquisitions, the static impact is curtailed by both the direct and the external effects. With regard to absolute and relative bank size, the merger of smaller banks leads to an increase in small firm lending with larger bank mergers resulting in a decline. Opposite results materialise for acquisitions (Berger *et al.* 1998).

Interpretation of the empirical findings of Berger *et al.* (1998) highlights the dynamic nature of mergers and acquisitions, suggesting while consolidated institutions may experience a comparative disadvantage in relationship based small firm financing, emphasis must be placed on the reactions of other lenders where their increased supply of credit to fund positive net present value projects counteracts the negative impact (Berger *et al.* 1998). In a similar vein, Strahan and Weston (1998) stipulate that a change in lending propensities by one set of institutions may elicit a change in lending by other participants, reinforcing the importance of the dynamic disposition of consolidation.

A further tenet of research inspects whether a sizeable presence of small banks is a prerequisite to ensure the availability of finance to small and medium sized enterprises (Berger and Udell, 2006). In particular, Jayaratne and Wolken (1999) assert if the small bank advantage hypothesis holds, then small firms in an area with few small banks should have less bank credit. Emanating from their empirical results, Jayaratne and Wolken (1999) assert the likelihood of a small firm having bank finance does not fall in the long run when fewer small banks exist albeit short run disruptions materialise (Jayaratne and Wolken, 1999).

In light of the plethora of empirical work executed with much of the studies differing by econometric techniques, time periods and size of institutions, a paucity of empirical research has been conducted outside of US markets, suggesting future studies need to focus on the non US segment to expand the domain of inquiry (Di Patti and Gobbi, 2001). Extending research, Focarelli *et al.* (2002) inspect the motives for mergers and acquisitions amongst Italian banks spanning the period 1985-1996, stipulating the Italian banking system is analogous to other European countries, constituting a significant share of the financial markets in Europe. Concurring with extant US literature, a reduction in small firm lending is evident following mergers and acquisitions (Focarelli *et al.* 2002). Di Patti and Gobbi (2001) note this.

Deepening the non US market analysis further, Di Patti and Gobbi (2001) investigate the impact of consolidation and the entry into credit markets on the availability of finance for small firms, inspecting both the volume and quality of credit. Distinguishing their study, Di Patti and Gobbi (2001) employ an Italian dataset (1990-1998) to provide information on the stock of loans and bad loans by size of borrower in each local market, facilitating an inspection of the impact on the quality

of credit, the absence of which in extant literature represents a potential caveat. Furthermore, the construction by the Central Credit Register, Bank of Italy ensures the dataset benefits from a high level of information sharing.

Utilising a model to assess consolidation and entry effects on the volume and quality of credit at the local market level, Di Patti and Gobbi (2001) purport bank mergers in particular lead to a temporary reduction in credit coupled with an increase in bad loans, implying greater efficiency in lending policies and a reduction in credit to negative present value borrowers. On the whole, the empirical findings of Di Patti and Gobbi (2001) fail to support the proposition that changes in bank size permanently curtail lending to small firms. In the context of entry, lending to all firms regardless of size is adversely impinged with no impact on bad loans, contrary to the model of competition. More specifically, Di Patti and Gobbi (2001) lend credence to the flight to quality hypothesis in which with entry, competition increases both in the loan and deposit markets, rendering banks with higher deposit rates, thus reducing the level of lending to low quality borrowers (Di Patti and Gobbi, 2001). Furthermore, concentration of banks and branch density exert a positive effect on small firm lending, highlighting the importance of financial market structure (Di Patti and Gobbi, 2001).

Emanating from extant literature, empirical results remain inconclusive and sporadic. While initial studies synthesise larger banking institutions devote less of their assets to small firm finance, supporting the small bank advantage hypothesis, later strands explore additional avenues of research including the dynamic disposition of consolidation coupled with the role of diversification with results refuting the proposition.

### 3.3.2.2 Foreign versus Domestically Owned Institutions

Perusing a further dimension of financial institution structure, foreign owned financial institutions are perceived to have a comparative advantage in transaction lending with a comparative disadvantage materialising for relationship lending technologies (Berger and Udell, 2006). Inspecting the role of banks within relationship lending, conventional wisdom advocates with bank consolidation, larger institutions may be more oriented towards transaction technologies given the informational distance can render the monitoring of soft qualitative data an arduous task. Furthermore, these issues can be further pronounced when international consolidation establishes a distant lender, stemming from a different banking environment (Berger *et al.* 2001). In particular, different language, supervisory and regulatory mechanisms and culture impinges on the ability of foreign banks to engage in relationship lending (Berger *et al.* 2001). In light of the plethora of studies assessing the role of large versus small banks in small firm lending, a dearth of research prevails surrounding the effect of cross border consolidation in small firm lending albeit some studies inspect the strategic focus (DeYoung and Nolle, 1996 and Peek *et al.* 1999). Berger *et al.* (2001) makes note of this.

Investigating the effects of bank size, bank distress and foreign bank ownership in small firm lending, Berger *et al.* (2001) employ data from the Central Bank of Argentina's Central de Deudores, analysing 61,295 firms at the end of the period 1998. Consistent with the large bank barriers hypothesis and the foreign owned bank barriers hypothesis, the empirical results suggest large banks and foreign banks supply less credit to informationally opaque small firms albeit Berger *et al.* (2001) caution the overall supply of credit to these firms may not decline due to external

effects. Thus, emphasis needs to be placed on the lending propensities of other participants in the market (Berger *et al.* 2001).

### **3.3.2.3 State Owned versus Privately Owned Institutions**

Berger and Udell (2006) posit state owned banking institutions have a comparative advantage in transactions lending whilst a comparative disadvantage in relationship lending given the size of these institutions. Evaluating the effect of bank competition on access to credit by a firm from 74 developing and developed countries, Beck, Demirgüç-Kunt and Maksimovic (2004) find more concentrated banking markets present higher financial obstacles for firms. In particular, public bank ownership, high government involvement in the banking system coupled with restrictions on the activities of banks intensifies the effect of bank concentration on the availability of credit (Beck *et al.* 2004).

### **3.3.2.4 Market Competition**

Lending credence to the market power hypothesis (Carbó-Valverde *et al.* 2009) and the information hypothesis (Petersen and Rajan, 1995) as outlined in the theory chapter of this study, Berger and Udell (2006) posit different theoretical models can provide different empirical predictions about one type of lending i.e. relationship lending.

Several studies evaluate bank market competition and credit availability albeit the empirical evidence is mixed (Berger and Udell, 2006). Evaluating SME credit availability and bank market competition in Spain, Carbó-Valverde *et al.* (2009) find the Lerner Index supports the market power hypothesis but the Herfindahl-Hirschmann Index (HHI) supports the information hypothesis. The work of Carbó-Valverde *et al.* (2009) illustrates how conflicting results can be attributable to the

measurement of market power. Ryan *et al.* (2014) also concurs with Carbó-Valverde *et al.* (2009) surrounding the Lerner Index.

In summary, extending beyond the current classification of transaction and relationship lending where no one single hard technology can represent the spectrum of transaction techniques, the different comparative advantages of large banks in hard technologies suggests large banks can lend to small firms given the appropriateness of some of these lending technologies (Berger and Udell, 2006). De La Torre *et al.* (2010) purport banking institutions are now engaging in new technologies, business models and risk management systems, providing an extensive array of products and services to small and medium sized enterprises where large and foreign institutions are exploiting their economies of scale and scope in the sector (De La Torre *et al.* 2010).

### **3.3.3 Lending Infrastructure**

Constituting a further pillar of their new paradigm, Berger and Udell (2006) refer to the lending infrastructure such that the information environment, legal, judicial and bankruptcy environment, social environment and tax and regulatory environment forms much of the mosaic assemblage. Similar to the financial institutional structure, the lending infrastructure also impinges on the composition of lending technologies in terms of their feasibility and profitability (Berger and Udell, 2006). Serving as a parallelism to the body of research inspecting the role of country characteristics in the capital structure determination of SMEs, the evaluation of the lending infrastructure denoted by these four components constitutes a more complete framework, providing a more integrated visualisation of country factors. Extending the nonlinear forms of such characteristics, Berger and Udell (2006) only refer to their role in the availability of finance.

### **3.3.3.1 The Information Environment <sup>6</sup>**

‘The sphere of modern financial economics encompasses finance, micro investment theory and much of the economics of uncertainty’ where the ‘acquisition of information and its dissemination to other economic units are, as we all know, central activities in all areas of finance and especially so in capital markets’ (Merton 1987, pp.1). Within the capital market framework, conflicting incentives and asymmetric information are evident amongst market actors, impeding the efficient allocation of resources, the crux of the market’s functionality. Thus, to attenuate adverse selection and moral hazard and mitigate the presence of informational opacity, emphasis is placed on the role of financial and informational intermediaries in the capital market economy (Healy and Palepu, 2001). More specifically, the exchange of credit data has now materialised as a key institutional mechanism where the economics of information sharing encourages a more robust due diligence process, thwarting the existence of informational asymmetries (Kallberg and Udell, 2003).

Perceived as a fundamental aspect of the information environment, information sharing extruded through public credit registers and private credit bureaus provide formal organisational mechanisms, facilitating the disclosure of payment performance data within credit markets (Berger and Udell, 2006).

<sup>6</sup> Pagano and Jappelli (1993); Padilla and Pagano (1997); Padilla and Pagano (2000); Jappelli and Pagano (2002) and Klapper (2006) cited in Berger and Udell, 2006.

Instigating one of the initial theoretical investigations into the role of shared information, Pagano and Jappelli (1993) execute a theoretical framework; identifying factors which facilitate the exchange of information given disclosure can be prevalent in some countries while embryonic in others.

Moreover, although extant research stipulates information sharing strengthens the degree of competitiveness, intensifies the magnitude of lending and advances the efficiency of credit allocation, Pagano and Jappelli (1993) probe into whether information shared can facilitate the expansion of credit markets, employing a model where disclosure occurs endogenously (Pagano and Jappelli, 1993).

Spanning 14 OECD countries, Pagano and Jappelli (1993) analyse their theoretical predictions, cumulating data surrounding the degree of geographical mobility, size of consumer credit markets and the intensity of information shared. Stemming from both international and historical evidence, they purport the probability of establishing a credit bureau is greatest when there is a high movement of consumers, given the positive correlation found between geographical mobility and the magnitude of information shared. More specifically in the US, Britain and Japan with a relatively high degree of consumer movement, the exchange of information becomes a salient feature in contrast to Belgium, Italy and Spain which fosters lower mobility and minimal disclosure.

Furthermore, the size of the credit markets further exerts a positive influence on shared information albeit this correlation dissolves when geographical mobility is controlled for. Although extant research perceives an increase in lending activity with the disclosure of information, Pagano and Jappelli (1993) assert this will only occur if in the absence of shared data; adverse selection prices safe borrowers out of

the market. In particular, Pagano and Jappelli (1993) lend credence to a two way causation between information sharing and the credit markets, stipulating an increase in the credit market size can encourage the exchange of information, which concomitantly intensifies the credit lending activity further (Pagano and Jappelli, 1993).

Extending this avenue of research, Padilla and Pagano (1997) inspect the effect of information sharing amongst bank lenders, asserting while disclosure can dissipate informational asymmetries inherent to the credit markets, the exchange of information can translate into more stringent banking competition, thwarting the existence of informational rents. In the context of their two period model, Padilla and Pagano (1997) evaluate imperfect competitive banks coupled with heterogeneous entrepreneurs where each loan performance hinges on both the intrinsic quality of the borrower and the level of effort exerted.

Padilla and Pagano (1997) purport in the first period, the absence of disclosure facilitates the ability of lenders to extract informational rents albeit the very existence of their monopoly power can impinge on a borrower's incentive to perform, given the probability of incurring higher interest rates. Consequently, the efforts of a borrower begin to dwindle. To rectify this incentive dilemma, lenders agree to disperse information about their customers at the end of the first period with intensifying competition expected to minimise the opportunistic behaviour of the lender. In anticipation of such an outcome, borrowers advance their efforts, resulting in higher profits for the lender in the first period given their informational advantage. Conversely though, as a corollary of shared information, increased competition besets the market, reducing second period profits. As alluded to above, a lender's ex ante decision to participate in the disclosure of information hinges on which effect

has a greater probability of dominating. Moreover, Padilla and Pagano (1997) consider this trade off in the context that non-disclosure of data will result in no lending within the markets (Padilla and Pagano, 1997).

Stemming from the empirical results of Padilla and Pagano (1997), the trade-off in exchanging information appears less stringent than initially perceived with banks abstaining from disclosure in given circumstances. Moreover, credit markets continue to function in the absence of shared information. When banking institutions choose to engage in the exchange of information however, Padilla and Pagano (1997) find both interest rates and default rates lessen with an increase in the volume of lending. Thus, the theoretical results suggest disclosure facilitates a Pareto effect, improving the welfare of borrowers' coupled with the profit of banks. Advancing this strand of research further, Padilla and Pagano (1997) highlight the effect of disclosing certain information, stipulating data surrounding the past defaults of insolvent borrowers' as opposed to their quality can impinge more so on entrepreneurial incentives, representing a future avenue of theoretical exploration (Padilla and Pagano, 1997).

Against this backdrop, Padilla and Pagano (2000) assert the exchange of information plays a fundamental role in the underlying mechanism of credit markets, minimising problems of adverse selection and homogenising data which concomitantly increases competitive forces to reduce the information monopoly power of banks. This results in augmenting the incentive of borrowers'. Furthermore, shared information exerts a disciplinary effect, increasing a borrower's incentive to perform. In particular, extant research posits when information surrounding defaults is disclosed to the market, borrowers raise their efforts, to impede the probability of poor performance. Concomitantly, the disclosure of defaults can serve as a catalyst in advancing the

efforts of borrowers' to meet their loan obligations, dubbed as the 'disciplinary effect'. Executing a two period model, the results of Padilla and Pagano (2000) illustrate the disclosure of defaults can strengthen the incentive of borrowers' given that the release of this type of information can serve as a signal of bad quality to other extant lenders and consequently result in the exposure of higher interest rates. Thus, borrowers' exert a greater effort, reducing both default and interest rates (Padilla and Pagano, 2000).

Conversely though, the exchange of fuller information surrounding the intrinsic quality of a borrower can weaken the stigma of the defaults per se where problems of adverse selection coupled with the disciplinary effect are eradicated. In particular, borrowers' exert the same level of effort as if no information was shared; stipulating with the release of all information, lenders will not perceive a default as a signal of bad quality given that all data now determines the creditworthiness of a borrower. Consequently, default and interest rates remain unchanged (Padilla and Pagano, 2000). Illustrating the mechanics of the disciplinary effect, Padilla and Pagano (2000) show the intensity of this phenomenon is contingent on both the type and accuracy of information disclosed (Padilla and Pagano, 2000).

On the contrary to the empirical results of Padilla and Pagano (1997) which support a strengthening of incentives with the disclosure of a borrower's intrinsic quality, the discrepancy in the results of Padilla and Pagano (2000) which illustrate no change to incentives following disclosure, stems from the assumptions underlying the banking competition. In the earlier theoretical work of Padilla and Pagano (1997), the creation of a hold up problem facilitates the extraction of informational rents by lenders in contrast to the later empirical study where due to perfect ex-ante competition, informational rents are absent. Consequently, the release of information

surrounding the intrinsic quality of a borrower fails to minimise the interest burden further (Padilla and Pagano, 2000).

Much of the theoretical investigations lend credence to the threefold effect of information sharing where in the empirical work of Pagano and Jappelli (1993), Padilla and Pagano (1997) and Padilla and Pagano (2000), the disclosure of information reduces the level of default rates albeit the effect is more explicit when information surrounding defaults is exchanged only. Additionally, the effect on lending remains more ambiguous. Extending the theoretical analysis further, Jappelli and Pagano (2002) inspect the role of formal information exchanges, analysing the effect of both public and private information sharing arrangements on the credit market (Jappelli and Pagano, 2002).

Utilising an international database of 40 countries spanning the period 1994-1995, Jappelli and Pagano (2002) investigate the correlation between private credit bureaus / public credit registers, the level of defaults rates and the magnitude of lending activity. Stemming from their theoretical analysis, Jappelli and Pagano (2002) assert the breadth of the credit markets is positively correlated with the disclosure of information, illustrating total bank lending to the private sector as measured by GNP is larger in nations where information sharing is evident, irrespective of the type of information exchanged. Controlling for other economic and institutional variables including proxies for the rule of law and the protection of creditor rights where a possible relationship between these variables and banking lending may generate spurious results, the correlation between information sharing and bank lending still remains robust, reinforcing its validity. Evaluating the relationship between information sharing and defaults rates, a negative correlation materialises, concurring with extant theory. Despite this theoretical result however, evidence

remains weak, questioning the quality of the proxy employed for defaults (Jappelli and Pagano, 2002).

Probing into the dynamics of both private and public information sharing arrangements, no discrepancies occur surrounding the impact of each mechanism on the lending activity and level of default rates, suggesting these arrangements can be perceived as substitutes to each other. More specifically, when private credit bureaus are present in the market, public credit registers are less likely to materialise. Conversely though, when private credit bureaus are absent and/or weak creditor rights prevail, governments introduce forced information sharing arrangements (credit registers) Jappelli and Pagano, 2002).

Stemming from the theoretical contribution of Berger and Udell (2006), the conceptual framework places emphasis on the identification of lending technologies, where the heterogeneous nature of lending infrastructures coupled with diffuse national financial structures impinge significantly on the variation of lending technologies employed. In the context of the information environment, the disclosure of information can be perceived as a prerequisite for some lending technologies, in particular small business credit scoring and factoring (Berger and Udell, 2006).

Perceived as a comprehensive financial tool, factoring involves selling at discount, creditworthy accounts receivable, an underlying asset of a firm and receiving cash instantaneously from the factor. More specifically, to provide working capital financing, a factor may offer a seller 70% of the value of an account receivable and provide the remaining 30% to the seller (deducting interest and servicing fees) once the buyer makes full payment. Conducted on a 'without recourse' basis, the factor purchases the accounts receivable coupled with the credit risk of the buyer to make

payment (Klapper, 2006). Embodying three financial services; a credit component, a financial component and a collections component, the mechanics of factoring facilitate the availability of finance for informational opaque firms, highlighting its applicability for small and medium sized enterprises. In particular, as the underwriting is not contingent on the riskiness of the seller but more so on the accounts receivable, issues of opacity are addressed (Klapper, 2006). Moreover, this type of transaction technology lends credence to the quality of the obligor as opposed to the borrower (Berger and Udell, 2006).

Probing into the determinants of factoring, Klapper (2006) inspect the proposition that this lending technology is contingent on fundamental macroeconomic variables including a robust credit information environment. Additionally, an environment of weak legal enforcement is also perceived to foster factoring given this type of supplier financing involves the complete purchase of a receivable as opposed to the collateralisation of a loan, transferring ownership to the factor. Concomitantly though, a poor legal environment can also impede this source of finance, impinging on the ability of a factor to receive full payment. Klapper (2006) further hypothesise greater probability of factoring in countries with a high level of economic development, denoted by GDP per capita (Klapper, 2006).

Employing a ten year dataset, Klapper (2006) investigates the level of factoring turnover on 48 countries spanning the period 1993-2003. Stemming from her empirical results, Klapper (2006) purports factoring is significantly more evident in countries with strong economic development, consistent with the initial hypothesis. Moreover, in countries with a high disclosure of information, factoring remains imperative. This concurs with extant studies which posit countries that foster the disclosure of information experience higher levels of private credit to GDP and a

lowering of financial obstacles (Klapper, 2006). In particular, Love and Mylenko as noted by Klapper (2006) advocate with the presence of private credit bureaus, the perceptions of financial constraints are minimised with a larger portion of bank financing occupying the financial structure of firms. Furthermore, the empirical results of Klapper (2006) illustrate in countries with poor enforcement contracts, factoring occurs albeit the evidence is weak. This suggests factoring can be perceived as a substitute for lending in countries where enforcing collateral, writing debt contracts and collecting in the event of a default proves to be an arduous task (Klapper, 2006).

In the context of the information environment, extant research lends credence to information sharing mechanisms where through the economics of information disclosure, problems of adverse selection and moral hazard are mitigated (Kallberg and Udell, 2003). Under the pure adverse selection model devised by Pagano and Jappelli (1993), both interest and default rates decrease coupled with an enhancement of the borrowers' pool. Moreover, the disclosure of information can further curtail the effects of moral hazard, reinforcing a borrower's incentive either through a decrease of informational rents or through the disciplinary effect (Jappelli and Pagano, 2002). Although previous studies illustrate a positive correlation between credit availability and credit information sharing mechanisms, a strong information environment favours the presence of certain lending technologies, applicable to small and medium sized enterprises. In particular, given the idiosyncratic nature of SMEs, emphasis should be placed on establishing a robust information environment where such lending sources can facilitate the availability of SME financing (Berger and Udell, 2006).

### **3.3.3.2 Legal, Judicial and Bankruptcy Environment**

Defining the legal environment as the composition of commercial laws relating to property rights with the judicial and bankruptcy environment gauging the enforceability of laws when commercial debacles arise, Berger and Udell (2006, pp. 2957) stipulate all constitutes the ‘rule of law’ (Berger and Udell, 2006). Serving as a parallelism to the tenet of research in which the legal system is a significant determinant in the availability of external finance (LLSV, 1997, 1998; Bancel and Mittoo, 2004 and Beck *et al.* 2008), Berger and Udell (2006) extend the parameters of this environment, considering its role in influencing the ability of banking institutions to minimise informational asymmetries, its role in the determination of collateral efficiency coupled with the role of judicial and bankruptcy efficiency in credit availability.

Although discussed earlier in the role of country characteristics in SME capital structure, the empirical work of Beck *et al.* (2008) is also relevant for the availability of SME bank credit. Evaluating the financing patterns of small, medium and large firms in 48 countries worldwide, Beck *et al.* (2008) find with strong protection of property rights, small firms can avail of formal sources of external finance.

Berger and Udell (2006) allude to the role of commercial laws in the context of how banking institutions deploy various contracting elements to mitigate information asymmetric problems of adverse selection and moral hazard. Elevating this tenet of research, Qian and Strahan (2007) evaluate a sample of bank loans to large borrowers in 43 countries excluding the US where emphasis is placed on how the legal infrastructure and institutions impinge on financial contracts i.e. bank loans. Employing a multivariate framework to evaluate ownership and contracting terms, Qian and Strahan (2007) purport in countries with strong creditor protection, banks

loans are illustrative of longer maturity, lower interest rates coupled with high concentration of ownership such that the presence of robust creditor rights leads to an increase in the availability of loans with more favourable terms.

The empirical findings of Qian and Strahan (2007) suggest with the presence of strong creditor protection, lenders can reduce a borrower's risk given their right to acquire assets in the event of a default. In particular, Berger and Udell (2006) stipulate the efficacy of collateral remains contingent on the development of a country's commercial laws in defining the determination of collateral priority, the perfection of a collateral lien and notification, lending credence to the role of the legal environment in security interests. A high efficacy of collateral is perceived as a prerequisite in both asset based lending and fixed asset lending (Berger and Udell, 2006). Further differentiating between domestic and foreign banks, the empirical results of Qian and Strahan (2007) suggest foreign banking institutions require strong creditor protection to facilitate lending.

Extending the empirical work of Qian and Strahan (2007), Bae and Goyal (2009) investigate whether disparities in the legal protection influence the composition of loan contracting, considering not only the role of creditors' rights but concomitantly the role of legal enforceability. Evaluating loan contracts to borrowers from 48 countries spanning the period 1994-2003, Bae and Goyal (2009) found with strong enforceability of contracts, reduced loan spreads, longer loan maturity and increased loan sizes materialised. Conversely, in the absence of enforceability, contracts appeared smaller, highly concentrated syndicates, quantifying the importance of monitoring and recontracting issues (Bae and Goyal, 2009). Inspecting the banking behaviour of 20 transition countries, Haselmann and Wachtel (2010) stipulate the legal environment not only impinges on the credit market development but further

influences which customers banks will lend to with a more robust legal system facilitating lending to borrowers characterised by high information opacity. Moreover, while the legal environment proves fundamental, Haselmann and Wachtel (2010) further assert the perception of bankers surrounding the quality of the environment also remains imperative.

Alluding to the judicial and bankruptcy environment, Berger and Udell (2006) assert the extent of credit availability further remains contingent on the efficacy of such environments with the work of Jappelli *et al.* (2005) and Zazzaro (2005) occupying part of this empirical arena. Quantifying judicial efficiency as the ‘fraction of inside or outside collateral that lenders can expect to recover from an insolvent borrower at the end of a trial’ (Jappelli *et al.* 2005, pp. 224), Jappelli *et al.* (2005) evaluate the effect of judicial enforcement of debt contracts on interest rates, lending and default rates. Presenting a theoretical model coupled with empirical evidence from the Italian credit market, Jappelli *et al.* (2005) find in their model, greater judicial efficiency reduced credit constraints and increased the volume of lending. Concurring with the model, the empirical evidence finds judicial efficiency was positively correlated with the volume of lending and negatively correlated with proxies for credit constraints. They purport with advancements in the efficacy of judicial systems, the magnitude of lending increases with credit constraints appearing minimal (Jappelli *et al.* 2005).

Extending the literature to household debt, Fabbri and Padula (2004) disentangle the quality of legal enforcement from the content of law to evaluate its role in household finance, placing particular emphasis on credit constraints. Their results suggested the fragility of weak functioning legal systems can render many Italian households credit constrained with a greater probability of loan denial materialising in the absence of

robust legal enforcement. In the empirical work of Zazzaro (2005), discrepancies were found in how laws surrounding accounting standards and enforcement of contracts impinged on the credit market. In particular, advancements in accounting standards resulted in more efficient credit allocation with bank screening appearing more cost effective. Moreover, improvements in enforcement of contracts reduced problems of agency costs, extending the availability of external finance albeit it further weakened the incentive of banks to screen and monitor borrowers effectively, resulting in poor social welfare and credit allocation. Thus, Zazzaro (2005) purport the legal protection of banks can be perceived as a substitute for screening where efficient credit allocation may fail to materialise (Zazzaro, 2005). Evaluating measures of judicial and bankruptcy efficiency, Djankov, La Porta, Lopez-De-Silanes and Shleifer (2003) and Djankov, Hart, McLiesh and Shleifer (2008) have spent considerable time on this.

In summary, considering the legal, judicial and bankruptcy environments, Berger and Udell's (2006) recent conceptual framework weaves together the threads of previous research where empirical evidence reinforces the role of these milieus in the financing behaviour of firms, the composition of loan contracting and efficacy of collateral. While a strong lending infrastructure facilitates the employment of asset based lending and fixed asset based lending, conversely, a weak environment can encourage the use of other lending technologies such as factoring (Berger and Udell, 2006). As previously mentioned, Klapper (2006) found with poor quality of legal enforcement, factoring materialised as a fundamental source of finance. Alluding to the theoretical framework of Berger and Udell (2006), in which government policy, financial institution structure and the lending infrastructure influence the availability of SME finance, further emphasis needs to be placed on the interconnectedness

between the financial institution structure and the lending infrastructure as the environments may exert a differential impact on institutional structures (Berger and Udell, 2006).

### **3.3.3.3 Social Environment**

Disentangling the individual threads of the social environment, Berger and Udell (2006) refer to its role in the availability of financing for small and medium sized enterprises. In particular, social capital which defines much of the social environment remains fundamental in maintaining the efficiency of financial contracts (Berger and Udell, 2006). Perceived as a multidisciplinary term, occupying a presence in the fields of sociology, economics, management, political science and psychology (Akdere, 2005), seminal scholars include Bourdieu (1983), Coleman (1988) and Burt (1992) as noted by Partanen *et al.* (2008). At one end of the spectrum, social capital is defined as ‘a set of horizontal associations’ with people (Putman, 1993; Grootaert 1998, pp. 2) where at the opposite side, the term can be perceived as ‘a variety of different entities with two elements in common, they all consist of some aspect of social structures, and they facilitate certain actions of actors – whether persons or corporate actors – within the structure’ (Coleman 1988, pp. S98). Furthermore, social capital ‘makes possible the achievement of certain ends that in its absence would not be possible’ (Coleman 1988, pp. S98) as noted by Danchev (2006).

Denoting finance as ‘an exchange of a sum of money today for a promise to return more money in the future’ (Guiso *et al.* 2004, pp. 527), this exchange not only relies on legal enforcement but can be further facilitated by the extent of trust between participants. Evaluating the relationship between social capital and the degree of financial development within Italy, Guiso *et al.* (2004) find a positive statistical

correlation between trust and the various metrics of financial growth controlling for law enforcement and the level of GNP per capita. Given that social capital is a fundamental factor of a level of trust, concomitantly social capital can be a significant determinant of financial development (Guiso *et al.* 2004) (Berger and Udell, 2006). La Porta, Lopez-De-Silanes, Shleifer and Vishny (1997b) evaluate the impact of trust on the performance of large firms, stipulating trust promotes cooperation.

Referring to social capital as ‘the application or exercise of social norms of reciprocity, trust and exchange for political or economic purposes’ (Cooke 2007, pp. 80), the interactive and embedded nature of the term proves highly relevant for the SME sector (Spence, 2003). Particularising this, small and medium sized enterprises fail to exist in a ‘hermetic world’ with its own governing rules but develop from the interconnectedness with their economic and social milieus (Spence *et al.* 2003, pp. 19). Serving as a parallelism to the small bank advantage hypothesis, the role of social capital remains inherent to relationship lending. Employing a social embeddedness stance, Uzzi (1999) evaluates how the bank borrower relationships and networks impinge on the acquisition and cost of capital for firms, perceiving economic deals intertwined in social relations to influence the allocation and valuation of resources. Particularising this, Uzzi (1999, pp.502) finds firms characterised by ‘embedded relations and high network complementarily’ experience lower costs of financing and are perceived more credit eligible. Evaluating relationship lending for SMEs, considering cost and availability of debt, Hernández-Cánovas and Martínez-Solano (2010) opine a relationship between a firm and a bank (housebanking) based on trust facilitates greater access to financing and lower costs of debt for SMEs. In the empirical work of Carey and Flynn (2005) in which they

consider if bank finance is the Achilles' heel of Irish SMEs, stipulate social capital development is fundamental in using alternative sources of financing.

Against this backdrop, the specificities of the social environment play a fundamental role in the financing of firms where Berger and Udell's conceptual model particularises its role in the availability of financing for small and medium sized enterprises (Berger and Udell, 2006).

#### **3.3.3.4 Tax and Regulation Environments**

Introducing the tax and regulatory environments, Berger and Udell (2006) refer to their role in SME financing with particular emphasis on how the tax and regulatory infrastructure can impinge on credit availability. In particular, Berger and Udell (2006) allude to stamp taxes and value added taxes and their negative effects on factoring. Representing a significant change to the regulatory environment, recent developments under the Basel II Revised International Capital Framework have further raised concerns surrounding SME finance (Berger and Udell, 2006; Mac an Bhaird and Lucey, 2009).

In their Irish study, Mac an Bhaird and Lucey (2009) opine a positive relationship materialised between the employment of an SME owners' own capital, capital from family and friends and the use of personal assets to secure bank finance. With the presence of more stringent capital requirements evident under the regulatory environment, such proposals may extend their use of personal assets in the securitisation of bank debt, heightening the personal distress for SMEs.

Moreover, evaluating whether bank finance remains the Achilles' heel of the Irish SME sector, Carey and Flynn (2005, pp. 725) stipulate while financial regulation is a prerequisite, 'unbalanced regulation may lead to a structural disadvantage for some

sectors of the economy'. Illustrative of the impact of the Basel II, the empirical results of Carey and Flynn (2005) heighten concerns surrounding the reshaping of the Irish banking architecture where the possibility of bank consolidation could reduce competition for Irish SMEs (Carey and Flynn, 2005). Moreover, given the dominant role of bank financing, Irish SMEs had little or no knowledge surrounding the Basel II, uninformed of its impact on the cost of capital, thus heightening concerns of a skills gap (Carey and Flynn, 2005).

Extending the literature, Scellato and Ughetto (2010) investigate the adoption of the Basel II on the availability and cost of credit to Italian SMEs, characterised by high research and development activity and purported the introduction of new regulatory capital requirements impinged adversely on the lending conditions for younger and smaller SMEs. Grappling with the impact on SME financing following the introduction of the Basel III, concerns surrounding credit availability remain.

Dissecting the specificities of the regulatory environment further, Berger and Udell (2006) refer to its role in shaping the financial institution structure, suggesting the entry of different financial institutions, the level of market competition and corporate governance mechanisms are all subject to a country's regulatory infrastructure. Given the structure of the banking sector shapes the bank-firm relationship subject to these regulatory conditions, Utrero-González (2007) considers this in the context of SME financing since their dependency on financial institutions proves highly relevant. Furthermore, the unravelling of regulations such as the Riegle-Neal Interstate Banking and Efficiency Act 1994 led to an increased consolidation in the US banking sector with similar developments emerging in EU under the Single Market Programme (Berger and Udell, 2006). This characteristic of the regulatory environment is very much aligned with the body of research which considers the

structural changes of financial institutions (large versus small) on SME financing. Whilst the conceptual model of Berger and Udell (2006) serves to address the role of government policy, financial institution structure and lending infrastructure, all three nodes fail to occur in a vacuum, suggesting the interconnectedness between all is just as imperative as their individual role. Barth, Caprio and Levine (2001: 2004) have spent much time on the data of capital regulation.

As alluded to above, the tax and regulatory environments play a significant role in the availability of finance, impinging on the structure of financial institutions and the extent to which banks can extend finance through the presence of capital requirements. In particular, the impact of recent regulatory changes has heightened concerns surrounding the SME finance with much empirical research further reinforcing these issues. Moreover, although Berger and Udell (2006) consider the role of the tax and regulatory environment in the availability of finance, Carey and Flynn (2005) highlight the limited knowledge of SME owners surrounding regulatory developments, implying these environments prove fundamental in demand side considerations.

### **3.3.4 Lending Technologies**

Lending credence to the crux of Berger and Udell's conceptual model, studies have now begun to stitch the theoretical assumptions of this framework into the fabric of their research, extending beyond the classification of transaction and relationship techniques to consider all lending technologies. While conventional wisdom highlights the role of relationship lending within SME finance, addressing the opaque peculiarity of these firms, De La Torre *et al.* (2010) illustrate a knowledge gap between academic/policy spheres and the practices of banking institutions. Employing bank surveys stemming from 48 banks in developed and developing

countries, the empirical results of De La Torre *et al.* (2010) reinforce the role of a diverse range of transaction lending techniques including factoring, asset based lending and leasing, concurring with Berger and Udell (2006). More specifically, with the presence of credit bureaus, the collection of hard information facilitates the bank's assessment of the credit worthiness of SMEs where credit scoring can be utilised at lower costs (De La Torre *et al.* 2010).

Contrary to the conventional paradigm which highlights the role of small banks, De la Torre (2010) opine in light of intensifying competition within banking markets, banks including large and foreign institutions now perceive SMEs as a strategic sector. In a similar vein, Berger and Black (2011) found while larger banks had differing comparative advantages in hard information technologies, this failed to monotonically increase in firm size with such banks experiencing a comparative advantage in lending to small and large firms. Particularising this, banks employ hard information techniques such as fixed asset collateral to provide finance to small firms. Further contributing to the extant literature, De La Torre *et al.* (2010) purport banking institutions are now engaging in new technologies, business models and risk management systems, providing an extensive array of products and services to small and medium sized enterprises. Moreover, large banks and foreign institutions are now exploiting their economies of scale and scope (De La Torre *et al.* 2010).

In summary, much empirical evidence centres on the availability of SME finance which falls under a more complete conceptual framework for SME finance by Berger and Udell (2006). Further studies (Holton, Lawless and McCann, 2012: 2013) also evaluate SME bank credit availability albeit these studies do not fall under the Berger and Udell (2006) model. Here focus is placed on the role of firm characteristics and macroeconomic conditions in a European context. Berger and

Udell (2006) refer to the role of the government policy, financial institution structure, the lending infrastructure and the lending technologies in the accessibility of finance. In particular, emphasis is placed on the lending infrastructure. Indicative of this, Berger and Udell (2006) allude to the role of the information, legal, judicial, bankruptcy, social, tax and regulatory environments in the availability of SME finance. However, a simultaneous evaluation of all environments in the availability of SME finance is currently absent i.e. no empirical evaluation of the lending infrastructure in Berger and Udell's (2006) model. This is to the author's best knowledge. This represents a gap in the literature.

### **3.4 Conclusion**

Inspecting the capital structure determination of small and medium sized enterprises, research evaluates the role of firm, owner and industry characteristics (Hamilton and Fox, 1998; Michaelas *et al.* 1999; Hall *et al.* 2000; Giudici and Paleari, 2000; Cassar and Holmes, 2003; Hogan and Hutson, 2005; Sogorb-Mira, 2005; Heyman *et al.* 2008; López-Gracia and Sogorb-Mira, 2008; Mac an Bhaird and Lucey, 2009; Degryse *et al.* 2012). Literature centres on capital structure theories including the agency theory, the pecking order proposition and the trade-off theory. Indeed, whilst empirical results support their validity, other factors must also be considered (Mac an Bhaird and Lucey, 2009). Shyam-Sunder and Myers (1999, pp.242) posit the 'pecking order is an excellent first order descriptor of corporate financing behavior' however, it does not disclose the whole story, advocating 'financing decisions reflect many motives, forces and constraints' (Shyam-Sunder and Myers 1999, pp.221).

Envisaging a change in paradigm, the role of country specific characteristics within SME finance has now progressed to the forefront of research (Hall *et al.* 2004; Daskalakis and Psillaki, 2008; Beck *et al.* 2008; Psillaki and Daskalakis, 2009;

Jõeveer, 2013a; 2013b). Indeed, the empirical work of Beck *et al.* (2008) occupies two fields, i.e. the capital structure and the availability of finance, highlighting the relatedness of the two. Despite the cross country comparisons of the SME capital structure determination, this avenue of research still remains in its infancy stage. Indeed, focus has been placed on some country characteristics in particular the legal environment. Lending credence to the conceptual framework of Berger and Udell (2006) in which the information, legal, judicial, bankruptcy, social, tax and regulatory environments are perceived to influence the availability of SME finance, not all of these country level measures have been evaluated in the SME capital structure determination. Given the interrelatedness of external finance availability and the capital structure, such country measures may indeed impact on the capital structure for SMEs. Hence, this represents a key research gap in the literature.

In a related field to the capital structure model i.e. the availability of external finance, much empirical evidence prevails where under the more complete conceptual framework for SME finance, Berger and Udell (2006) refer to the role of the government policy, financial institution structure, the lending infrastructure and the lending technologies in the accessibility of SME finance. In particular, emphasis is placed on the lending infrastructure. Indicative of this, Berger and Udell (2006) allude to the role of the information, legal, judicial, bankruptcy, social, tax and regulatory environments in the availability of SME finance. However, a simultaneous evaluation of all environments in the availability of SME finance is currently absent i.e. no empirical evaluation of the lending infrastructure in Berger and Udell's (2006) model. This is to the author's best knowledge and represents a gap in the literature. Acknowledging the prevalence of financial concerns for SMEs

finance availability in particular the availability of bank credit, there is a need to consider all potential factors which may impact on this availability.

The seminal study of Berger and Udell (2006) provides a complete concise framework, where their emphasis on the lending infrastructure is highly relevant for extending the empirical focus on country characteristics. Whilst acknowledging their conceptual framework centres on the importance of identifying the different lending technologies, this goes beyond the scope of this study. The next chapter now presents the hypotheses of this study.

## Chapter Four: Hypotheses

*'No great discovery was ever made without a bold guess'*

*Isaac Newton<sup>b</sup>*

## 4.1 Introduction

The preceding chapter provided a review of the key studies under both the capital structure determination of SMEs and the availability of external finance in particular SME bank credit availability. Appreciating the specificities of the empirical contributions and indeed the theoretical contributions of chapter two, emphasis is placed again on the study's research questions.

1. Do country characteristics influence the likelihood of bank credit availability for SMEs?
2. Do country characteristics determine SME firm leverage?

Given the idiosyncratic nature of these questions informed by the theoretical and empirical footing of this study, the hypotheses are derived. This chapter now presents the hypotheses of the study.

In forming inferences about a population, hypothesis testing can be applied (Diamantopoulos and Schlegelmilch, 1997). More specifically, this approach is commonly employed in both the fields of SME credit availability and SME capital structure. Particularising this, Berger *et al.* (2001) and Di Patti and Gobbi (2001) centre their empirics on the small bank advantage hypothesis underpinning SME bank credit availability. Moreover, evaluating country characteristics and the SME capital structure, extant studies namely, Hall *et al.* (2004), Daskalakis and Psillaki (2008) and Psillaki and Daskalakis (2009) execute hypothesis testing derived from capital structure theories. Furthermore, hypothesis testing strengthens the construct validity of this study, as discussed in section 5.10.3.1 of the methodology chapter.

The derivation of the hypotheses stems from both Berger and Udell's (2006) more complete conceptual framework for SME finance and the capital structure determination theorem which alludes to the capital structure theories. Informing the rationale for research question 1, Berger and Udell's (2006, pp. 2946) conceptual framework refers to the 'lending infrastructure' i.e. the information, legal, judicial, bankruptcy, social, tax and regulatory environments which defines the 'rules and conditions that affect the ability of these [financial] institutions to lend'. Not all environments however impact on bank credit availability per se. In particular, Berger and Udell (2006) allude to the tax environment in factoring only. *Ipsa facto*, only environments perceived relevant in the availability of bank credit are included in the first research question, namely the information, legal, judicial, bankruptcy, social and regulatory environments. The composition of hypotheses under the first research question is similar to that of Westhead (2008). Shaping the rationale for research question 2, emphasis is placed on capital structure theories where the information, legal, judicial, bankruptcy, social, tax and regulatory environments are evaluated. The composition of hypotheses under the second research question is similar to that of Hall *et al.* (2004) and Psillaki and Daskalakis (2009).

## **4.2 Hypotheses under Research Question 1**

### **4.2.1 Information Environment under a More Complete Conceptual Framework for SME Finance**

The exchange of credit data has now materialised as a key institutional mechanism where the economics of information sharing encourages a more robust due diligence process, thwarting the existence of asymmetric information (Kallberg and Udell, 2003). Private credit bureaus and public credit registries are perceived as one such median which facilitate the exchange of information between lenders. Jappelli and

Pagano (2002) posit such mechanisms can advance the bank's knowledge of loan applicants to strengthen the efficient allocation of resources. Berger and Udell (2006) highlight the relationship between information exchange mechanisms and credit availability. In particular, Love and Mylenko (2003) posit information sharing mechanisms reduce information asymmetries, increasing lending activities and thus lessening financial constraints. En masse, this suggests the following hypothesis:

*H1: Greater credit information sharing is more likely to increase bank credit availability for SMEs.*

#### **4.2.2 Legal environment under a More Complete Conceptual Framework for SME Finance**

Defining the commercial laws which indicate the property rights in a commercial transaction, the legal environment influences the availability of SME credit (Berger and Udell, 2006). Beck *et al.* (2008) posit with higher levels of property rights protection, small firms avail of more external finance such that improvements in the legal and financial systems increase access to external financing. Property rights protection 'measures a key input into the efficient operation of financial contracts' (Beck *et al.* 2008, pp. 471). *Ipsa facto*, this suggests the following hypothesis:

*H2: Greater levels of private property protection are more likely to increase bank credit availability for SMEs.*

#### **4.2.3 Judicial/Bankruptcy Environment under a More Complete Conceptual Framework for SME Finance**

Closely related to the legal environment in which the commercial laws relating to property rights are defined, the judicial and bankruptcy environments inform the enforcement of these laws (Berger and Udell, 2006). Berger and Udell (2006)

highlight the importance of judicial efficiency in the availability of credit. In the absence of inefficient judicial enforcement, the opportunistic behaviour of borrowers' increases, where the inability of the creditor to recover loans easily and cheaply results in lenders reducing the availability of credit (Jappelli *et al.* 2005). Collectively, this suggests the following two hypotheses:

*H3: Greater efficiency of enforcement under the judicial environment is more likely to increase the availability of SME bank credit.*

*H4: Greater efficiency of enforcement under the bankruptcy environment is more likely to increase the availability of SME bank credit.*

#### **4.2.4 Social Environment under a More Complete Conceptual Framework for SME Finance**

Lending credence to the social environment, Berger and Udell (2006) highlight the importance of social capital and trust in financial contract. Defining financial contracts as 'the ultimate trust-intensive contracts' (Guiso *et al.* (2004, pp. 527), such that 'financing is nothing but an exchange of a sum of money today for a promise to return more money in the future' (Guiso *et al.* 2004, pp. 527), the exchange of money is contingent on 'not only the legal enforceability of contracts, but also on the extent to which the financier trusts the financee' (Guiso *et al.* 2004, pp. 527). Appreciating the importance of social capital and trust underpinning the financial contract (Guiso *et al.* 2004), this suggests the following hypotheses:

*H5: Greater values of social capital are more likely to increase the availability of SME bank credit.*

*H6: Greater levels of trustworthiness are more likely to increase the availability of SME bank credit.*

#### **4.2.5 Regulation Environment under a More Complete Conceptual Framework for SME Finance**

Alluding to capital regulation, banking supervision and the structure of financial institutions, Berger and Udell (2006) define these three tenets as the regulatory environment of their conceptual framework. Particularising this, minimum bank capital requirements, strong bank supervisory practices and greater market discipline underpinning the Basel Capital Accord is a prerequisite for the functionality and stability of the banking sector (Barth *et al.* 2004). Illustrative of the regulatory environment, Berger and Udell (2006) lend credence to their earlier empirical work (Berger and Udell, 1994) where stringent banking supervision and amendments to capital regulations in the US facilitated in reducing the supply of credit to businesses, dubbed the ‘credit crunch’ of the 1990s. Considering the relationship between risk-based capital requirements and bank lending in a theoretical model, Thakor (1996) found an increase in risk based capital requirements strengthened the borrower’s probability of becoming credit denied. Given an increase in such capital requirements raises the bank’s loan funding costs, competition in the market place renders the ability of banks to pass on such costs to borrowers as redundant (Thakor, 1996). As a corollary of this, the bank profits are reduced with an increase in minimum capital requirements leading to a reduction in bank lending (Thakor, 1996). *Ipso facto*, this suggests the following hypothesis:

*H7: Greater capital regulatory requirements are more likely to decrease the availability of SME bank credit.*

### **4.3 Hypotheses under Research Question 2**

#### **4.3.1 Information environment under the Pecking Order Theory**

Unravelling the specificities and complexities of the pecking order theory, traces of its inception stem back to the scholarly work of Donaldson (1961) asserting ‘management strongly favoured internal generation as a source of new funds even to the exclusion of external sources except for occasional unavoidable ‘bulges’ in the need for funds’ (Donaldson 1961, pp. 67). Strengthening the theoretical footing of the proposition, Myers (1984) and Myers and Majluf (1984) extend the model to reinforce the role of asymmetric information such that inside management can be privileged with more information than outside investors. As a corollary of this, the presence of information asymmetries generates information costs which vary the financing costs of external sources. *De facto*, a hierarchical order of financing materialises such that internal sources are preferred over external funds (Cassar and Holmes 2003; López-Gracia and Sogorb-Mira, 2008; Mac an Bhaird and Lucey, 2009). Recognition of asymmetric information and financial distress costs constitute the thrust of the modified pecking order theory. Particularly acute for small and medium sized enterprises, the presence of asymmetric information intensifies for such firms (Pettit and Singer, 1985; Hand *et al.* 1982; Binks and Ennew, 1996; Berger and Udell, 1998) where the privacy of contracts, the limited disclosure of audited accounts and the minimal presence in public markets renders information opacity a defining characteristic of small firm finance (Berger and Udell, 1998).

As discussed in the rationale under research question 1, the sharing of credit information reduces information asymmetries (Kallberg and Udell, 2003) where private credit bureaus and public credit registries facilitate this exchange (Jappelli and Pagano, 2002). An increase in the sharing of credit information reduces

information asymmetries which in turn reduces the costs of external financing. *De facto*, this suggests the following hypothesis:

*H8: Greater credit information sharing will be positively related to SME firm leverage.*

#### **4.3.2 Information environment under the Agency Theory**

A further way to minimise information asymmetry lies in the sharing of credit information in particular the sharing of information surrounding defaults only (Padilla and Pagano, 2000). This exerts a disciplinary effect where the borrower is more determined to meet their loan obligations (Padilla and Pagano, 2000). The sharing of default information can serve as a signal of bad quality to other lenders when seeking finance in the future (Padilla and Pagano, 2000). As a corollary of this, conflicts of interest between the borrower and lender are minimal. *De facto*, this reinforces hypothesis 8.

#### **4.3.3 Legal environment under the Agency Theory**

Under the agency theory, Jensen and Meckling (1976) alludes to ‘the agency relationship as a contract under which one or more persons (the principal (s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent’ (Jensen and Meckling 1976, pp. 308). Crystallising a classic example of market imperfections i.e. agency problems inherent with the ownership structure of firms, Barnea *et al.* (1981) highlight conflicts of interest that can materialise between the agent and principal underpinned by the assumption that each actor satisfies their own self-interest, behaves rationally and has the capacity to make unbiased expectations about future

wealth (Barnea *et al.* 1981). Highlighting key sources of agency problems, Barnea *et al.* (1981) allude to the role of informational asymmetry where such imperfections prevent the management (agent) from disclosing the nature of the firm to external financiers (principals) without some cost. Given imperfect information is inherent to small and medium sized enterprises, Pettit and Singer (1985) posit smaller firms incur greater costs of minimising such agency problems. Whilst the agency conflict tends to occur in the separation of ownership between shareholder and manager, this separation fails to materialise for small and medium sized enterprises (Hand *et al.* 1982; Mac an Bhaird and Lucey, 2009). However, the agency problem still proves relevant for SMEs as the primary conflict occurs between the inside and outside providers of capital (Hand *et al.* 1982; Mac an Bhaird and Lucey, 2009).

Minimisation of conflicts of interest and information asymmetries remains contingent on the effectiveness of legal systems (Demirgüç- Kunt and Maksimovic, 1998). An effective legal system is a prerequisite for long term financing to minimise the opportunistic behaviour of corporate insiders such that the utilisation of debt covenants and the significance of fiduciary responsibilities remains integral to their purpose (Demirgüç- Kunt and Maksimovic, 1998). Demirgüç- Kunt and Maksimovic (1998) depict an effective legal system in terms of its ability to mediate disputes and enforce contracts. In particular, Demirgüç- Kunt and Maksimovic (1998, pp. 2113) allude to ‘the efficiency of the state in enforcing property rights’. Acknowledging this as well as reflecting on the rationale of the legal environment under research question 1, the study concentrates on private property protection. *Ipsa facto*, this suggests the following hypothesis:

*H9: Greater levels of private property protection will be positively related to SME firm leverage.*

#### **4.3.4 Judicial/Bankruptcy environment under the Agency Theory**

Intertwined with the legal environment which specifies the commercial laws relating to property rights, the judicial and bankruptcy environments define how well such laws are enforced (Berger and Udell, 2006). Under the realm of agency problems, La Porta *et al.* (2000) allude to the law in terms of its content and quality of enforcement. Evaluating debt enforcement around the world, Djankov *et al.* (2008) found it was 'time consuming, costly, and inefficient' (Djankov *et al.* 2008, pp. 1107). En masse, this suggests the following hypotheses:

*H10: Greater efficiency of enforcement under the judicial environment will be positively related to SME firm leverage.*

*H11: Greater efficiency of enforcement under the bankruptcy environment will be positively related to SME firm leverage.*

#### **4.3.5 Bankruptcy environment under the Trade off Theory**

Serving as a parallelism to the perfect market theorem of Modigliani and Miller, conventional wisdom in the mid-1970s defined the balancing of debt tax advantages against bankruptcy costs as optimising the capital structure of a firm (Bradley *et al.* 1984). Particularising this, Kraus and Litzenberger (1973, pp. 918) assert 'the market value of a levered firm is shown to equal the unlevered market value, plus the corporate tax rate times the market value of the firm's debt, less the complement of the corporate tax rate times the present value of bankruptcy costs'. On a further strand, Miller (1977) alluded to the size of bankruptcy costs which appeared disproportionately small relative to tax savings such that 'the supposed trade-off between tax gains and bankruptcy costs looks suspiciously like the recipe for the

fabled horse and rabbit stew – one horse and one rabbit’ (Miller 1977, pp. 264). As a corollary of this, Bradley *et al.* (1984) lend credence to the study of DeAngelo and Masulis (1980) which highlighted fundamental ‘leverage-related costs’, including bankruptcy costs, loss of non-debt tax shields and agency costs. Illustrative of this, Bradley *et al.* (1984) purported the trade-off between the tax advantage of debt and the many leverage related costs define the optimality of the capital structure. Conventional wisdom purports high bankruptcy costs have an adverse effect on leverage demanded by a firm (De Jong *et al.* 2008). High bankruptcy costs imply less efficiency in the enforcement of the bankruptcy environment. *De facto*, this reinforces hypothesis 11.

#### **4.3.6 Social environment under the Agency Theory**

Binks and Ennew (1996) define the provision of debt to small firms by financial institutions as a fundamental agency problem where under conditions of asymmetric information generates concerns of adverse selection and moral hazard. To minimise the effects of asymmetric information and thus agency problems, the provision of collateral is often utilised (Mac an Bhaird and Lucey, 2009). Stiglitz and Weiss (1981, pp.393-394) purport ‘in a world with perfect and costless information, the bank would stipulate precisely all the actions which the borrower could undertake’. Conversely though, as this fails to materialise, the bank constructs loan contract terms so to align their interests with those of the borrower (Stiglitz and Weiss, 1981). Illustrative of this, the amount of collateral in the form of assets are used to minimise agency costs (Stiglitz and Weiss, 1981). A further mechanism to reduce information asymmetry lies in a ‘close working relationship between the lender and the borrower’ (Binks and Ennew 1996, pp. 18). Binks and Ennew (1996) purport a close

relationship facilitates the bank with a better understanding of the borrower, so that resources can be allocated more efficiently to address their needs. A better understanding of the borrower can reduce issues of adverse selection. Several indicators are employed in the literature, indicative of the strength of the bank – borrower relationship i.e. concentration and duration (Hernández-Cánovas and Martínez-Solano, 2010). Here strength and closeness are perceived synonymous to each other. A less traditional measure of the bank – borrower relationship is trust (Hernández-Cánovas and Martínez-Solano, 2010). Collectively, this suggests the following hypotheses:

*H12: Greater values of social capital will be positively related to SME firm leverage.*

*H13: Greater levels of trustworthiness will be positively related to SME firm leverage.*

#### **4.3.7 Tax environment under the Trade off Theory**

Aligned with the thrust of the static trade-off theory, emphasis is placed on debt tax advantages where scholars allude to the tax deductibility of interest payments (Sogorb-Mira, 2005; López-Gracia and Sogorb-Mira, 2008). Haugen and Senbet (1972, pp. 5) posit ‘in the absence of other debt related costs or tax induced differential returns, the relatively favourable treatment of interest expenditures leads to a preference for debt financing by firms’. Graham (2003) refers to the key trade-off implications, consistent with Modigliani and Miller’s proposition (1963) such that firms are incentivised to finance with debt with higher corporate tax rates. Extant literature lends credence to the positive relationship between the effective tax rate and debt where the effective rate is defined as taxes paid divided by earnings

after interest and before taxes (Sogorb-Mira, 2005; López-Gracia and Sogorb-Mira, 2008). Constructing a database on the effective corporate income tax rates spanning 85 countries, Djankov, Ganser, McLiesh, Ramalho and Shleifer (2010) found countries with effective tax rates were positively correlated with a firm's debt level, denoted by the debt to equity ratio. *Ipsa facto*, this suggests the following hypothesis:

*H14: Greater tax rates will be positively related to SME firm leverage.*

#### **4.3.8 Regulatory environment under the Agency Theory**

Adhering to the regulatory environment, Berger and Udell (2006) allude to capital regulation, banking supervision and the structure of financial institutions. Mac an Bhaird and Lucey (2009) posit following the occurrence of more stringent capital requirements for banks, SMEs may have to provide more personal assets to secure bank credit. Whilst collateral reduces agency costs, thus increasing firm leverage, the use of more personal assets may generate personal loss and distress for the SME owner. *Ipsa facto*, this suggests the following hypothesis:

*H15: Greater capital regulatory requirements will be negatively related to SME firm leverage.*

In summary, Table 4.1 presents all the hypotheses underpinning this study.

**Table 4.1: Summary of Hypotheses**

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**Hypotheses under Research Question 1**

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*H1: Greater credit information sharing is more likely to increase bank credit availability for SMEs.*

*H2: Greater levels of private property protection are more likely to increase bank credit availability for SMEs.*

*H3: Greater efficiency of enforcement under the judicial environment is more likely to increase the availability of SME bank credit.*

*H4: Greater efficiency of enforcement under the bankruptcy environment is more likely to increase the availability of SME bank credit.*

*H5: Greater values of social capital are more likely to increase the availability of SME bank credit.*

*H6: Greater levels of trustworthiness are more likely to increase the availability of SME bank credit.*

*H7: Greater capital regulatory requirements are more likely to decrease the availability of SME bank credit.*

**Hypotheses under Research Question 2**

*H8: Greater credit information sharing will be positively related firm leverage.*

*H9: Greater levels of private property rights will be positively related firm leverage.*

*H10: Greater efficiency of enforcement under the judicial environment will be positively related firm leverage.*

*H11: Greater efficiency of enforcement under the bankruptcy environment will be positively related to firm leverage.*

*H12: Greater values of social capital will be positively related to firm leverage.*

*H13: Greater levels of trustworthiness will be positively related to firm leverage.*

*H14: Greater tax rates will be positively related to firm leverage.*

*H15: Greater capital regulatory requirements will be negatively related to firm leverage.*

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**4.4 Conclusion**

Perceiving deductive theory as the most conventional form ‘of the nature of the relationship between theory and research’ (Bryman and Bell 2003, pp. 9), Bryman

and Bell (2003) adhere to the formation of hypotheses which lie at the very crux of this relationship. The theoretical and empirical considerations facilitate the deduction of hypotheses, upon which are translated into operational items (Bryman and Bell, 2003). This study applies deductive theory to construct hypotheses derived from two fundamental areas of SME finance i.e. the availability of bank credit and the capital structure. This has been outlined in this chapter. Indeed to evaluate country characteristics, the theoretical and empirical considerations lead to the formation of 15 hypotheses. The next chapter now focuses on the methodology of this study.

## Chapter Five: Methodology

*'If politics is the art of the possible, research is surely the art of the soluble.*

*Both are immensely practical-minded affairs.'*

Sir Peter Medawar (1964)

## 5.1 Introduction

Having outlined the hypotheses of this study in the previous chapter, this chapter now presents the specificities of the study's research methodology. Indeed, the research process provides a connection between the what, why and how of research such that its shape and form is sculptured by methodological decisions (Dunne, Pryor and Yates, 2005). Firstly, this chapter lends credence to the philosophical orientation of the study whose composition is informed by the philosophy of business and management research, the philosophy of financial theory and capital structure. Secondly, the chapter presents a review of methodologies adopted by extant literature in the capital structure space and the availability of credit space. Thirdly, the research design of the study is presented, providing the structure in which the research method is conducted and the analysis of the data is performed (Bryman and Bell, 2003). Fourthly, emphasis is then placed on the conceptual framework of the study providing a visual representation of where this study positions itself amongst extant literature. Fifthly, the data collection is then specified followed by the selection of the sampling frame. Finally, statistical methods are presented as the main methods of analysis where issues of validity and reliability are addressed. *Ipsa facto*, these threads are woven together to define the 'how' of the study, ensuring the research remains soluble.

## 5.2 Philosophical Orientation of the Study

*“Human beings have an innate desire to know”*

Aristotle (Metaphysics 980a21)

Giving shape to the contours of research, a voyage into the unknown defines its very being. A systematic inquiry, the particularity of research represents a movement of discovery (Kothari, 2004), in its pursuit of the soluble. Adopting a close proximity, philosophy commands the intellectual integrity of research, ensuring the trinity, ‘process, person and project’ (Harrington, 2010) remains integral to its purpose. Whilst philosophy centres on knowing what kinds of things exist and what is the justification for knowing them, research concerns itself with their ‘knowable properties’ (Williams 1996, pp. 135) such that the ‘philosophical assumptions are the explicit, or implicit, starting point for research’ (Williams 1996, pp. 135). Hughes (1990 cited by Remenyi *et al.* 1998, pp. 23) asserts

*‘Every research tool or procedure is inextricably embedded in commitments to particular visions of the world and to knowing that world. To use an attitude scale, to take the role of a participant observer, to select a random sample ...to be involved in conceptions of the world which allow these instruments to be used for the purposes conceived. No technique or method of investigation is self-validating’.*

Philosophy keeps ‘meaning open in a scientific field’, battling the engagement, observation and discussion of the world which can be taken for granted (Tsoukas and Chia (2011, pp. 15). This facilitates the human being in their quest to know.

Crystallising the philosophical orientation of research, Guba and Lincoln (1994) allude to three key albeit intertwining questions:

1. *Ontological Question*: ‘What is the form and nature of reality and, therefore, what is there that can be known about it?’ (Guba and Lincoln 1994, pp.108). Alluding to the concept of existence, ontology centres on ‘what does it mean to be?’ reiterating Aristotle’s quote from *Metaphysics* ‘being qua being or being as being’ (Jacquette 2002, pp.1). Ontology facilitates the researcher in bringing out the ‘constitutive element of the phenomena they explore’ (Tsoukas and Chia 2011, pp. 7), giving weight to Aristotle’s interpretation of ‘carving up reality at the joints’ (Tsoukas and Chia 2011, pp. 9). Illustrative of this, Guba and Lincoln (1994, pp. 108) posit if the world is assumed ‘real’ then ‘how things really are’ and ‘how things really work’ can be known.

2. *Epistemological Question*: ‘What is the nature of the relationship between the knower or would be knower and what can be known?’ (Guba and Lincoln 1994, pp. 108). Tsoukas and Chia (2011) posit epistemology considers ‘how we know what we claim to know’ (Tsoukas and Chia 2011, pp. 9), providing a ‘theory of the nature and grounds of knowledge’ (Remenyi *et al.* 1998, pp.282). Derived from two Greek words; *episteme* meaning ‘knowledge or science’ and *logos* meaning ‘knowledge, information, theory or account’, epistemology concerns itself with ‘knowledge about knowledge’ (Johnson and Buberley 2003, pp. 2). Appreciating the interconnectedness between ontology and epistemology, if reality is assumed to be real, *Ipsa facto*, the relationship between the knower and what can be known must bear an objective detachment so as to evaluate ‘how things really are’ and ‘how things really work’ (Guba and Lincoln 1994, pp. 108).

3. *Methodological Question*: Completing this trinity, the methodology considers how the knower will find out what he or she believes can be known? (Guba and Lincoln

1994, pp. 108). Bounded by the ontological and epistemological considerations, the chosen methodology must complement these considerations.

Contextualising the philosophical considerations of research where emphasis is placed on ontology, epistemology and methodology, philosophy facilitates the establishment of the research design, identifying its appropriateness where its creation may step outside the boundaries of the researcher's past experience (Easterby-Smith, Thorpe and Lowe, 2002). Holden and Lynch (2004) posit in selecting the research methodology, this extends beyond the practicalities of the study, necessitating 'a philosophical solution to the question, 'why research?'. Research issues are perceived to be shaped by 'moral and ontological considerations about the social world' (Williams 1996 pp.136) where research methods embody 'epistemological assumptions about the operationalization of the research question and the best means for obtaining the knowledge required' (Williams 1996 pp.136). The research process 'interacts with the world in which it takes place' (Williams 1996 pp.136). More specifically, Saunders, Lewis, and Thornhill (2008, pp. 108) concur with Johnson and Clark (2006), asserting it is not whether 'research should be philosophically informed, but it is how well we are able to reflect upon our philosophical choices and defend them in relation to the alternatives we could have adopted'.

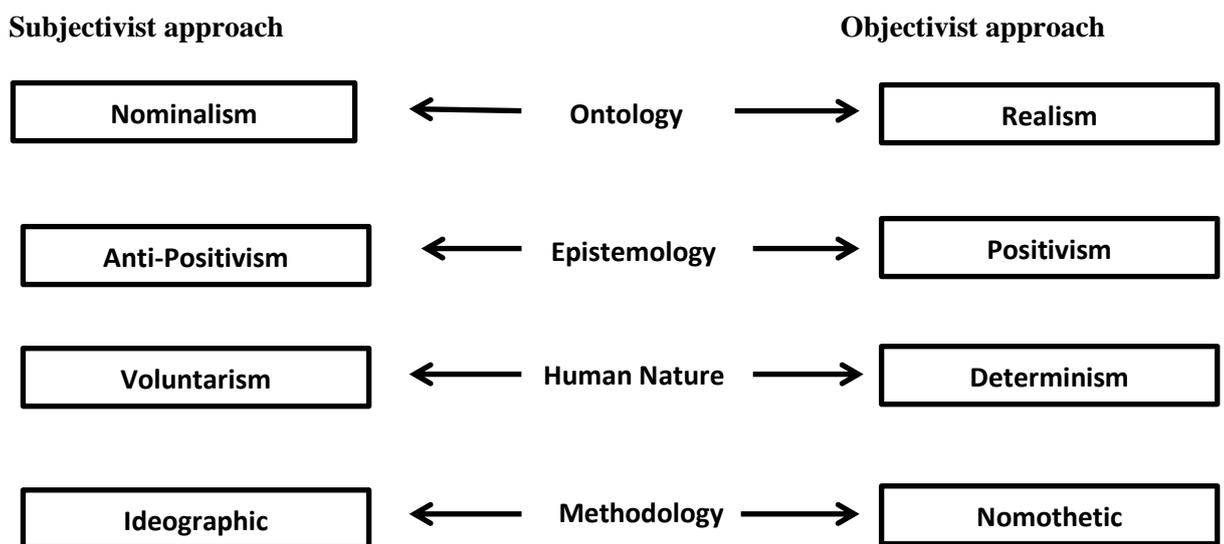
### **5.2.1 Philosophy of Business and Management Research**

Presenting the dialogue of developments in business and management research, Johnson and Clark (2006) lend credence to the reflexivity engagement underpinning the philosophical debates of the field. Perceiving reflexivity as having an 'unsettling' tone, (Pollner cited by Cunliffe 2004, pp. 407), Johnson and Clark (2006) allude to the preunderstandings of the researcher and its impact on the objects of research.

Occupying the main methodological debates in business and management research, Johnson and Clark (2006) crystallise the concept of paradigms as per Burrell and Morgan (1979), the relevance of positivism and the importation of postmodernism and critical theory.

Scholars, Burrell and Morgan (1979, pp.1) assert ‘all theories of organisation are based upon a philosophy of science and a theory of society’. Lending credence to their framework, Burrell and Morgan (1979) specify the nature of two fundamental dimensions of analysis and the paradigms which lie within their perimeters. Firstly, the ontological, epistemological, human nature and methodological considerations define the key assumptions underpinning the nature of social science in which Burrell and Morgan (1979) develop two polarised views on each assumption i.e. subjective-objective approach (Figure 5.1). Secondly, Burrell and Morgan (1979) allude to the nature of society, lending credence to regulation and radical change.

**Figure 5.1: Subjectivist/Objectivist Approach to Social Science**



Source: Burrell and Morgan (1979, pp. 3)

### **5.2.1.1 Ontological Debate**

Lending credence to the nature of the phenomena under perusal, Burrell and Morgan (1979) allude to the nominalism versus realism perspective. Whilst nominalism assumes the social world, external to individual reasoning, is not real, using names and concepts for nothing more than structuring reality, realism assumes the social world is real, embodying ‘hard, tangible and immutable structures’ (Burrell and Morgan 1979 pp. 4). Realism perceives individuals as ‘being born into and living within a social world which has a reality of its own. It is not something the individual creates – it exists out there’ (Burrell and Morgan 1979 pp. 4). Crystallising the continuum as per Burrell and Morgan (1979), Remenyi *et al.* (1998, pp. 103) posit nominalism is where the phenomena under investigation are ‘the product of consciousness’ and realism is where the phenomena ‘exists independently’. Bryman and Bell (2003) posit the central concern of social ontology is whether social entities are objective, having an external reality to social actors or whether they are social constructions stemming from these social actors.

### **5.2.1.2 Epistemological Debate**

Reflecting on the grounds of knowledge, the anti-positivism versus the positivism dichotomy defines the epistemological debate (Burrell and Morgan, 1979). Under anti-positivism, the social world can only ‘be understood from the point of view of the individuals who are directly involved in the activities which are to be studied’...rejecting ‘the standpoint of the observer’ (Burrell and Morgan 1979, pp.5). Understanding only comes from ‘occupying the frame of reference of the participant in action’ (Burrell and Morgan 1979, pp. 5). At the opposite end of the spectrum, positivism assumes the ‘researcher is independent of and neither affects nor is affected by the subject of the research’ such that ‘there are independent causes that

lead to the observed effects' (Remenyi *et al.* 1998, pp. 33). Easterby-Smith *et al.* (2002, pp. 28) posit 'knowledge is only of significance if it is based on observations of this external reality'. More specifically, Easterby-Smith *et al.* (2002) lend credence to implications of the positivist viewpoint including independence, hypothesis and deduction, generalisation and cross sectional analysis. Whilst epistemology addresses the question of 'what is (or should be) regarded as acceptable knowledge' (Bryman and Bell 2003, pp. 13), Bryman and Bell (2003, pp. 13) raise a fundamental issue of whether the social world can and should be studied by the 'same principles, procedures and ethos' underpinning the natural sciences. Framing epistemological considerations in a positivism-interpretivism dialect, Bryman and Bell (2003, pp. 14) assert positivism supports the use of natural science methods in social reality, alluding to principles of phenomenalism, deductivism, inductivism and objectivity. Conversely, interpretivism perceives the social world to be different from natural sciences, positing the differences between the social world and the natural sciences renders 'a different logic of research procedure' for the social reality (Bryman and Bell 2003, pp. 15).

### **5.2.1.3 Human Nature Debate**

Considering the relationship between human beings and the environment, the human nature debate alludes to voluntarism versus determinism (Burrell and Morgan, 1979). Particularising this, whilst voluntarism perceives human beings as independent, determinism perceives human beings to be determined 'by the situation or environment' (Burrell and Morgan 1979, pp. 6).

### **5.2.1.4 Methodological Debate**

Reflecting on the ways in which attempts are made 'to investigate and obtain knowledge about the social world (Burrell and Morgan 1979, pp. 2), the

methodological debate specifies two orientations i.e. ideographic versus nomothetic theory. Ideographic centres on ‘getting close to one’s subject’....such that the analysis of subjectivity requests ‘getting inside situations’ (Burrell and Morgan 1979, pp. 6). More specifically, ideographic highlights the ‘importance of letting one’s subject unfold its nature and characteristics during the process of investigation (Burrell and Morgan 1979, pp. 6). Nomothetic centres on the construction of scientific tests, basing the research on systematic technique. Emphasising the process of hypothesis testing, nomothetic methodology alludes to the approach adopted by natural sciences (Burrell and Morgan 1979, pp. 6).

#### **5.2.1.5 The Nature of Society**

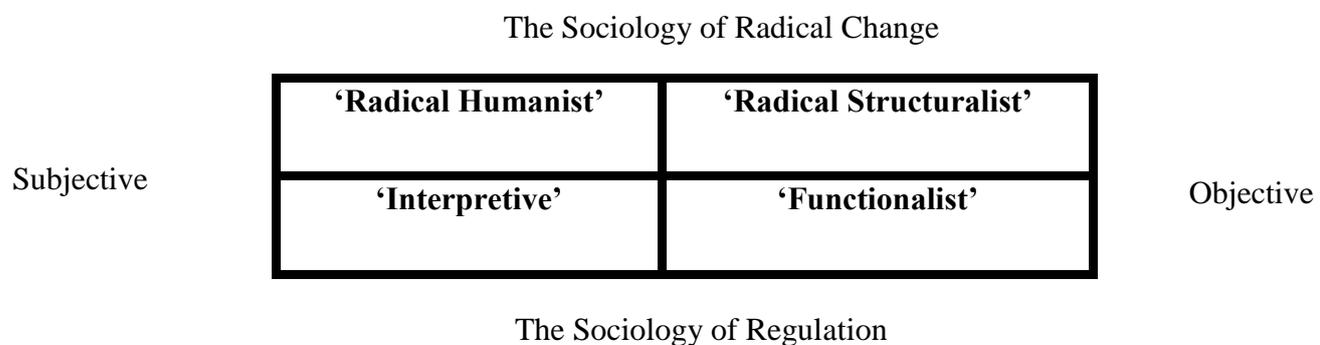
Stemming from the order-conflict debate, Burrell and Morgan (1979, pp. 17) introduce the ‘sociology of regulation’ and the ‘sociology of radical change’, alluding to the assumptions of the nature of society in a regulation-radical change orientation. Particularising this, whilst ‘sociology of regulation’ centres on the unity and cohesiveness of society such that the fundamental question focuses on the need to understand ‘why society is maintained as an entity’ (Burrell and Morgan 1979, pp. 17), ‘sociology of radical change’ addresses the ‘radical change, deep seated structural conflict’ defining society.

#### **5.2.1.6 Four Paradigms Model**

Stemming from the assumptions of the nature of social science and the nature of society, Burrell and Morgan (1979) develop a two dimensional, four paradigm typology (See Figure 5.2), introducing the specificity of the subjective-objective orientation and the sociology of regulation and radical change to develop four paradigms i.e. ‘radical humanist’, ‘radical structuralist’, ‘interpretive’ and ‘functionalist’ (Burrell and Morgan 1979, pp. 22). Embedded in the sociology of

regulation from an objectivist standpoint, the functionalist paradigm perceives society to have a ‘real, concrete existence and a systematic character’ (Hassard 1995, pp. 89) centred on order and regulation (Hassard, 1995). Central to the study of organisations, the functionalist paradigm defines an organisation as ‘objective and value free’ (Hassard 1995, pp. 89). The interpretive perspective adopts a social reality of order and regulation but is the ‘product of intersubjective experience’ where the social world is perceived from a ‘participant in action’ stance (Hassard 1995, pp. 89). The radical humanist paradigm adopts a subjective orientation where society is linked to ‘pathology of consciousness’ (Hassard 1995, pp. 89) where actors become a prisoner of the world they create (Hassard, 1995). Finally, the radical structuralist views society as having an external existence, independent from how it is socially constructed (Hassard, 1995).

**Figure 5.2: Four Paradigms Model of Social Theory**



Source: Burrell and Morgan (1979, pp. 22)

Appreciating the contribution of Burrell and Morgan (1979), debates surrounding the extent of ‘paradigm incommensurability’ (Clegg, Hardy and Nord, 1996) have arisen in business and management research. Whilst Burrell and Morgan (1979, pp.25) perceive the four paradigms to be contradictory in their pure form, underpinned by

‘opposing meta-theoretical assumptions’, Burrell (1996) alludes to the arguments of others over the extent of mutual exclusivity, where they suggest an element of translation between the quadrants is a prerequisite. The perception of Burrell and Morgan (1979) assumes the social world is divided where sociologists are bounded by their chosen paradigm (Collins, 1998). This creates a lack of consensus surrounding the ‘very building blocks of knowledge’ (Collins 1998, pp.180). Contrary to this, Gioia and Pitre (1990) assert while the paradigms are distinct, their boundaries are poorly defined, alluding to the proposition of ‘transition zones’ (Gioia and Pitre 1990, pp. 592) where these boundaries occupy a certain degree of commensurability.

#### **5.2.1.7 Positivism**

Perceived as the dominant methodological orthodoxy to occupy business and management research, positivism origins can be traced back to the 16<sup>th</sup> and 17<sup>th</sup> century of European thought which witnessed significant ‘changes in ways of thinking’ (Hughes and Sharrock, 1997). Whilst positivism was pioneered through the work of Auguste Comte (1798-1857) (Remenyi *et al.* 1998), the tenets of this philosophical orientation can be found in the early work of Francis Bacon (1561-1626). Whilst Bacon sought for the ‘authority of experience, experiment, induction and painstaking observation as the way toward a reliable basis for scientific ideas’ (Hughes and Sharrock 1997, pp. 25), Descartes (1596-1650), a fellow scholar alluded to mathematics as the basis underpinning scientific knowledge. Differentiating Descartes’ preference for deduction and Bacon’s emphasis on induction, it was the latter which found its way into positivist philosophy (Hughes and Sharrock, 1997).

Coining the phrase ‘positivist philosophy’, Auguste Comte perceived society to obey the same logic of inquiry as do the natural sciences, asserting ‘a unity of method between the natural and the social sciences was timely and fateful’ (Hughes and Sharrock 1997, pp. 27). Comte argued ‘the development of all sciences followed a historical sequence from mathematics, through astronomy, the physical and the biological sciences, to reach their apogee in the rise of the social sciences’ (Hughes and Sharrock 1997, pp.27). Crystallising the specificities of positivist philosophy, this orientation perceives the researcher as an ‘objective analyst and interpreter of a tangible social reality’ (Remenyi *et al.* 1998, pp. 33). Positivists assert the objectivity of science remains contingent on an ‘observation language’ in which the researcher gives the minimal account of their direct experience of the world. Indeed, the ‘observation language’ has both ontological and epistemological importance; ‘ontologically because it reports phenomena which have been observed and epistemologically because it is these observed phenomena which present the objects of explanation’ (Hughes and Sharrock 1997, pp.43).

Underpinning the positivist philosophy is the assumption that reality embodies all that is ‘available to the senses’ (Hughes and Sharrock 1997, pp.28) where natural and social sciences adopt similar logical and methodological principles albeit differ in their research techniques since the subject matters warrant diverse ‘investigative practices’ (Hughes and Sharrock 1997, pp. 28). This stems more from a ‘matter of pragmatic adaptation of a general procedure, not one of logical or principled difference’ (Hughes and Sharrock 1997, pp. 28). Positivism alludes to the empirical and logical form of knowledge. Giving weight to the empirical, positivism asserts all ideas stem from ‘our sensory experience of the world (Hughes and Sharrock 1997, pp. 29), contingent on the proposition that the ‘external world acts on our senses’

(Hughes and Sharrock 1997, pp. 29). Hughes and Sharrock (1997, pp.13) assert the language of social science observation has to embody ‘objectively defined observables....generalisable and quantifiable’. Illustrative of this, a fundamental move in social research led to the inclusion of quasi mathematical terms, coined the ‘language of variables’ (Hughes and Sharrock 1997, pp. 13). Inter alia, this facilitates the evaluation of social phenomena in a neutral model (Hughes and Sharrock 1997, pp. 13). Stemming from a long tradition in mathematics, the concept of a variable in contrast to a constant is its variation in value within a range of values (Hughes and Sharrock 1997, pp. 14). This development marked the pivot point around which social research could revolve (Hughes and Sharrock, 1997).

Although applicable to natural sciences, difficulties have materialised in the application of scientific methods to social sciences. Whilst the material world is seen to be independent of the observer, the human phenomena are seen to be relative to the observer, questioning the extent to which the human phenomena possess the ‘permanence, durability and independence of human volition and perception’ (Hughes and Sharrock 1997, pp. 30). One strand of thought stems from the assertion that ‘human action is not random but conforms to predictable patterns’ (Hughes and Sharrock 1997, pp. 30). Illustrative of this, Adam Smith’s ‘Invisible Hand’ theory reflects how the individual’s pursuit of their self-interest produces beneficial ‘large-scale social regularities’ (Hughes and Sharrock 1997, pp. 30). *Ipsa facto*, appreciating the uniqueness and independence of individuals, human phenomena illustrate how social actors display ‘large-scale regularities’ (Hughes and Sharrock 1997, pp. 30). The appropriateness of the natural science model applied to the social science occupies a long standing debate (Bryman and Bell, 2003).

### 5.2.2 Philosophy of Financial Theory

Reflecting the idiosyncratic nature of financial theory such that the value of future payments, the transactions of payments and the methods used to determine the expected value and /or risk of payments remain at the crux of the theory, much focus is centred on the financial contract i.e. where one actor receives money today in return for granting claims to another actor that promises a return in the future. The financial contract is thus subject to a time differential underpinned by risk, rights to information and the opportunity to influence decisions. Debt and equity are perceived as the two most important financial contracts (Spremann, 2010).

Stemming from the days of ‘The Merchant of Venice’, highlighting the financial thought in the Renaissance, financial theory has been exposed to many influences including the 1950’s ‘old finance’, neoclassical finance, modern portfolio theory and option price theory (Spremann, 2010). More specifically, many theories and policies underpinning financial theory including the efficient market theory, portfolio theory, capital asset pricing theory, option pricing theory, agency theory and arbitrage pricing theory adopt the functionalist paradigm (Ardalan, 2008). Common threads are identified in these policies, woven together to stitch the fabric of financial theory.

Illustrious of this, Bettner *et al.* (1994, pp. 3) assert

‘the cause and effect mechanism underlies all nature and human activity (ontology) where it is known through the set of nomological connections between initial conditions and final outcomes (epistemology). Human beings interact with each other and society in accordance with this mechanism and information is acquired through observations and measurement unaffected by individual perceptual differences (methodology)’ (Ardalan, 2008).

Although making reference to the subjective end of the continuum as per Burrell and Morgan (1979), Bettner *et al.* (1994, pp.4) assert ‘capital market researchers look at

debt...as if it were a proton' where all protons are identical with laws governing their behaviour. Inter alia, 'debt is debt, and there must be invariant laws that govern it' (Bettner *et al.* 1994, pp. 4).

Whilst theories of finance are based on the functionalist paradigm, Ardalan (2008) refers to the application of the remaining paradigms as per Burrell and Morgan model. Illustrative of this, the interpretive paradigm perceives financial theorists to belong to a small community which sees corporations and financial markets existing in a concrete world and theorise about concepts which have little relevance to those outside of the community (Ardalan, 2008). Rejecting the proposition that the subject of study is a 'hard, concrete and tangible phenomenon which exists 'out there'', interpretive researchers perceive the social world to be 'no more than the subjective construction of individual human beings who create and sustain a social world of intersubjectivity shared meaning' (Ardalan 2008, pp. 19). *Ipsa facto*, universal rules of finance remain absent. The radical humanist paradigm provides a critique of financial theorists, identifying factors which can influence 'human consciousness in the form of seemingly objective social forces' (Ardalan 2008, pp. 19) including the cognition of rationality. This paradigm assumes that reality is socially constructed. The radical structuralist paradigm perceives 'truth as the whole' where social order is seen as 'a totality rather than as a collection of small truths about various parts and aspects of society (Ardalan 2008, pp. 20). Contingent on four premises: 1) totality suggests businesses and financial markets are only understood in the 'wider social formation in which they exist' (Ardalan 2008, pp. 20), 2) structure suggests businesses and financial markets 'are structural elements of a wider structure....from which they derive their existence and true significance' (Ardalan 2008, pp. 21), 3) contradiction suggests that it is in the businesses that the 'contradictions between the

relations and the means of production, capital, and labour' (Ardalan 2008, pp. 21) are thought to work out and 4) crisis suggests that businesses and financial markets 'monitor and reflect the movement of totality from one crisis to another' (Ardalan 2008, pp. 21). Both the radical humanist paradigm and the radical structuralist paradigm remain absent from financial theory.

### **5.2.3 Philosophy and Capital Structure**

Identifying the sources of finance used by a firm, the capital structure is perceived a fundamental determinant of a firm's risk and cost of capital (Baker and Martin, 2011). Pettit and Singer (1985, pp. 54) posit 'firms of all sizes select their financial structure in view of the cost, nature and availability of financial alternatives'. Tracing its origins back to the seminal contribution of Modigliani and Miller (1958), they found the choice between debt and equity has no effect on firm value, the cost of capital or the availability of capital, assuming a perfect and frictionless capital market (Myers, 2001). Later theoretical propositions of the capital structure allude to agency costs, information asymmetries and tax considerations (Myers, 2001). This lends credence to the agency theory (Jensen and Meckling, 1976), pecking order theory (Myers, 1984; Myers and Majluf, 1984) and the static trade-off theory (DeAngelo and Masulis, 1980; Bradley *et al.* 1984).

Differentiating between empirical and theoretical research, Remenyi *et al.* (1998) highlight the significance of empirical techniques in academic research such that the use of empiricism is underpinned by a 'philosophical assumption that evidence, as opposed to thought or discourse is required to be able to make a satisfactory claim to have added to the body of knowledge' (Remenyi *et al.* 1998, pp. 31). Whilst the empiricist observes the phenomena, the theorist studies the phenomena through the writings of others, having no involvement in the observation (Remenyi *et al.* 1998).

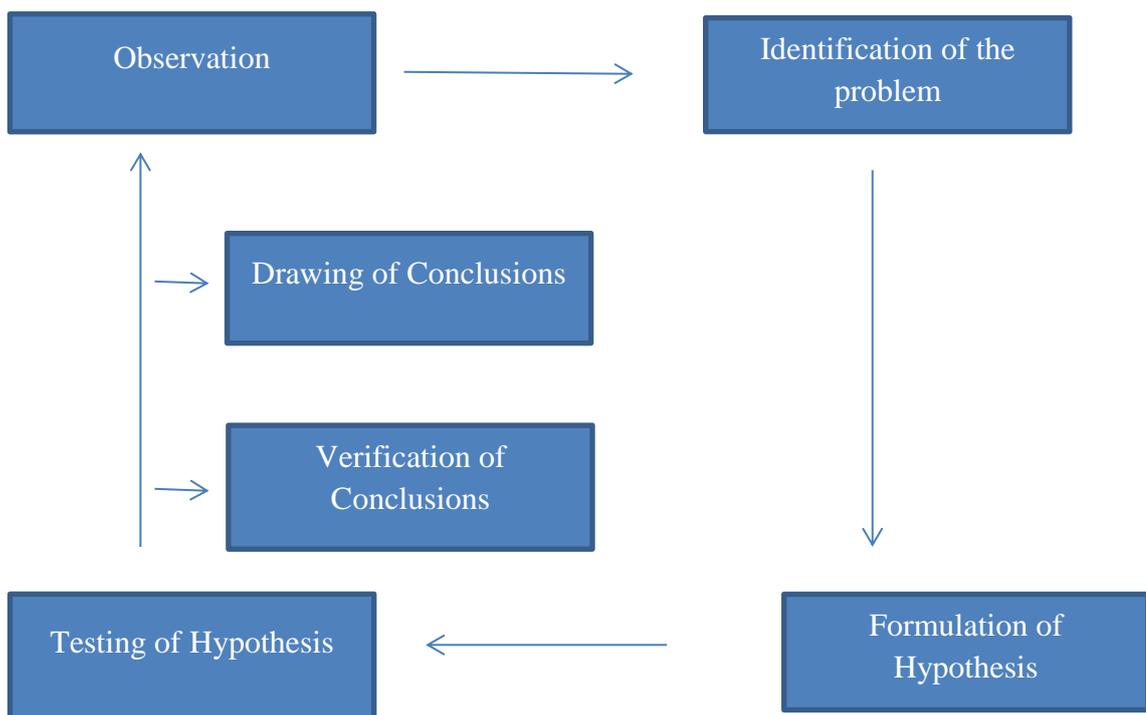
Although appearing mutually exclusive, Remenyi *et al.* (1998) allude to the interconnectedness of empirical and theoretical research where the empirics can adopt a theoretical perspective and theoretical interpretations can stem from empirical findings. Highlighting the specificities of the capital structure, ‘no universal theory of the debt-equity choice’ exists albeit ‘several useful conditional theories’ are evident (Myers 2001, pp. 81). Occupying this space, both theoretical and empirical developments have materialised with much empirical evidence of the theoretical propositions<sup>7</sup>.

Illustrious of the interrelatedness of theory and data, Rajan and Zingales’ (1995) motivation for conducting cross country comparison of the firm’s capital structure stemmed from the minimal empirical relevance of different theories, suggesting ‘without testing the robustness of these findings outside of the environment in which they were uncovered, it is hard to determine whether these empirical regularities are merely spurious correlations, let alone whether they support one theory or another’ (Rajan and Zingales 1995, pp. 1421). Crystallising the paradox of data and theory i.e. ‘which comes first, data or theory’; Remenyi *et al.* (1998) posit ‘a dialectical relationship’ exists ‘between these two aspects of research that reinforce each other’ (Remenyi *et al.* 1998, pp. 32).

<sup>7</sup> Harris and Raviv (1991) present a review of the theoretical and empirical developments.

Jensen and Meckling (1976, pp. 310) define an organisation as ‘legal fictions which serve as a nexus for a set of contracting relationships among individuals’ such that the ‘firm is not an individual’. Inter alia, DeAngelo and Masulis (1980, pp. 4) posit the trade-off model ‘yields a number of testable hypotheses regarding the cross-sectional and time series properties of firms’ capital structures’. The idiosyncratic nature of capital structure commands the key steps of the scientific method including observation, problem identification, hypothesis formulation, hypothesis testing, conclusions and verification of conclusions, adopting a cyclic orientation (see Figure 5.3) (Gregorio, 2000). *Ipsa facto*, research surrounding the capital structure incorporates the language of observation and the language of variables.

**Figure 5.3: Steps underpinning the scientific method**



Source: Gregorio (2000)

Capital market research is based on the functionalist paradigm (Ardalan, 2008; Bettner, McGoun and Robinson, 1994) with the belief ‘that knowledge about finance

is quantifiable and stable' where 'society has certain immutable rules that researchers can discover' (Bettner *et al.* 1994, pp. 5). Following the discovery of these rules, 'researchers can then specify how future behaviors will unfold, because they are predictable from the rules' (Bettner *et al.* 1994, pp. 5).

Considering the capital structure, the functionalist approach believes 'firms have an intrinsic value equal to the discounted value of their future cash flows' where the objective of research is to 'determine how the mix of financial claims issued by the firm affects (if at all) its intrinsic value' (Bettner *et al.* 1994, pp. 5). Under the radical structuralist approach, research surrounding capital structure involves the discovery of 'rules which govern how this value appropriated from labor is distributed among the capitalists and what effect that distribution has upon relative power of the classes' (Bettner *et al.* 1994, pp. 6). Interpretive research sees capital structure as trying to 'determine what effects a firm sought to have on investors when it chose which claims to issue and what those effects turned out to be' (Bettner *et al.* 1994, pp. 6). *Ipsa facto*, debt is perceived as 'a claim whose sign value will always be quite different, depending upon who issued the debt, when and under what circumstances' (Bettner *et al.* 1994, pp. 6). Under the radical humanist paradigm, the capital structure is a 'reflection of a power struggle involving the firm issuing the claims, the investment bank managing the issuance of the claims, and the community of investors' (Bettner *et al.* 1994, pp. 7).

Asserting there is 'no best social science' research paradigm, Bettner *et al.* (1994, pp. 7) posit all quadrants contribute to the capital structure knowledge where the right paradigm remains contingent on beliefs and interests of the researcher. Whilst highlighting the prevalence of quantitative research in capital markets, Bettner *et al.* (1994) argue qualitative research could occupy future research avenues albeit caution

such a ‘departure from tradition’ would ‘require a great deal of academic retooling’ (Bettner *et al.* 1994, pp. 11). Moreover, McGoun (1992) posits no external environment exists in financial economics where it becomes impossible to ‘determine the truth of a scientific statement’ and ‘to state more or better truths’ (McGoun 1992, pp. 175). Consequently, McGoun (1992) requests a change in the research of financial economics, requiring ‘a much-reduced role for statistical methods’ (McGoun 1992, pp.175)

Extant research surrounding the capital structure extends to both public firms and small and medium sized enterprises, evaluating firm, owner, industry and country characteristics as possible determinants. Studies analysing the relationship between firm characteristics and the capital structure of small and medium sized enterprises formulate hypotheses, derived from the capital structure theories and employ statistical methods such as multivariate regression models on panel data as a means of evaluation (Mac an Bhaird and Lucey, 2009). Similarly, evaluating country specific factors, studies also formulate hypotheses and employ statistical methods including cross sectional models (Hall *et al.* 2004) and balanced panel models (Daskalakis and Psillaki, 2008; Psillaki and Daskalakis, 2009). Secondary data sources are commonly employed to facilitate capital structure research, Bureau Van Dijk’s Amadeus databases, Dun and Bradstreet and the World Business Environment Survey to name but a few. Considering the quantitative methodological orientation of cross country SME studies, their methods are mirrored in the theoretical and empirical contributions of studies which evaluate country characteristics in the financing of large and public firms, employing both primary (Bancel and Mittoo, 2004) and secondary data. A key country characteristic which commands much attention is the legal framework of a country, following the pioneering work of

scholars, La Porta, Lopez, Shleifer and Vishny (1997:1998). More specifically, their classification of a legal system i.e. the common and civil law dichotomy is commonly included in the analysis of capital structure determinants (Fan *et al.* 2012).

#### **5.2.4 Philosophical Orientation Adopted by this Study**

Appreciating the philosophical tenets of business and management research, more specifically the philosophical consideration of financial theory and in particular capital structure, this study commands a positivist approach where the author perceives reality to exist out there and on the grounds of knowledge, the researcher is to be independent of the subject of research. The typicality of the research questions i.e. do country characteristics influence the likelihood of credit availability for SMEs and do country characteristics determine SME firm leverage warrants a cross country analysis, surrendering itself to a quantitative approach. This highlights the ‘dictatorship of the research questions’ (Tashakkori and Teddlie, 1998) as the starting point of the research design.

#### **5.3 Methodologies Used in Previous Studies**

Defining the methodology of extant literature underpinning the availability of SME bank credit, logistic regression models dominate this space. Particularising this, one facet of this research i.e. the impact of structural changes to the banking industry on SME credit availability illustrates the use of logit models by several studies in the field including Cole (1998), Jayaratne and Wolken (1999), Berger *et al.* (2001) and Craig and Hardee (2007). More specifically, the dependent variable commands a binary value to denote access or denial of SME credit (Jayaratne and Wolken, 1999; Berger *et al.* 2001; Craig and Hardee, 2007). In the empirical work of Berger *et al.* (2001), dependent variables take a value of 1 if a small firm borrows from at least

one large bank, one foreign bank or one distressed bank, representing access to credit. As a corollary of this, the large-bank barriers hypothesis, foreign-owned-bank barriers hypothesis and distressed-bank barriers hypothesis are evaluated. Surrounding the measurement of credit availability, concerns have been expressed where Hernández-Cánovas and Martínez-Solano (2010, pp.468) posit ‘the debt ratio of a firm is a bad approximation because it is simultaneously determined by the supply of and the demand for financing’. In the empirics of their work, Hernández-Cánovas and Martínez-Solano (2010) employ a measure of credit renewal, obtained from a Likert scale survey question.

Commanding the capital structure determination of small and medium sized enterprises in which firm, owner, industry and country characteristics are evaluated, a plethora of regression tests are employed including the fixed effects model (Sogorb-Mira, 2005; Heyman *et al.* 2008, Degryse *et al.* 2012); the Period SUR (Seemingly Unrelated Regression) pooled EGLS (Estimated Generalised Least Squares) (Daskalakis and Psillaki, 2008; Psillaki and Daskalakis, 2009), Tobit regressions (Beck *et al.* 2008) and ordinary least squares/linear regression (Hall *et al.* 2004; Jõeveer, 2013a:2013b). The inclusion of such techniques is predominately informed by the typicality of the research questions and the idiosyncrasy of the data sources available.

#### **5.4 Research Design**

Integral to the purpose of the study, the research design provides the anatomy which informs the execution of the research method which in turn facilitates the analysis of the data, subject to the premise of validity, reliability and replication (Bryman and Bell, 2003). Underpinning the embryonic stage of the research design, the research questions provoke a reflective dialogue between the ‘what’, ‘why’ and ‘how’ of the

study, thus shaping its composition and form. The research questions of the study include

1. Do country characteristics influence the likelihood of bank credit availability for SMEs?
2. Do country characteristics determine SME firm leverage?

Appreciating the philosophical orientation of the study and reflecting the typicality of the research questions, a longitudinal design is adopted. Diamantopoulos and Schlegelmilch (1997) distinguish between cross sectional and longitudinal data, stipulating whilst the former refers to a one point in time, the latter refers to several time periods. Longitudinal research is ‘research in which (a) data are collected for each item or variable for two or more distinct time periods; (b) the subjects or cases analysed are the same or at least comparable from one period to the next; and (c) the analysis involves some comparison of data between or among periods’ (Menard 2002, pp. 2). Appreciating the dynamic complexities defining research contexts and phenomena, approaches to research must command a more dynamism orientation to reflect this reality (Hassett and Paavilainen-Mäntymäki, 2013). Thus, longitudinal research provides the mechanism for ‘establishing temporal order, measuring change, and making stronger causal interpretations (Menard 2002, pp.1). En masse, the typology of this design presents more ‘holistic, dynamic and multifaceted information about topics in business economics’ (Hassett and Paavilainen-Mäntymäki 2013, pp.2).

## **5.5 Conceptual Framework**

Illustrious of the research questions, Figure 5.4 presents the conceptual framework underpinning this study. Crystallising the visual parameters, the conceptual framework positions the capital structure and the availability of external finance in

an asymmetrical balance such that this visual equilibrium ensures the research remains integral to its purpose. Occupying the left side of this anatomy, the capital structure theories including the pecking order hypothesis, agency theory and trade-off theory allude to firm, owner, industry and country characteristics as key determinants of SME bank credit. Commanding the right side domain, transaction and relationship lending technologies which reinforces the small bank advantage hypothesis highlights the structure of financial institutions as key determinants in the availability of SME bank credit.

Defining the core peripheral contribution of this study, the black and green shaped rectangle presents the country characteristics to be evaluated as per Berger and Udell's (2006) conceptual model. Denoted as the 'lending infrastructure' by Berger and Udell (2006), the country factors include the information, legal, judicial, bankruptcy, social, tax and regulatory environments. Nested amongst the extant literature underpinning the capital structure and the availability of SME bank credit and framed by the theoretical models of information asymmetries, legal origin theory and social capital, the evaluation of the country characteristics as per Berger and Udell's (2006) conceptual model commands a direct effect analysis in this duality approach. As specified in Berger and Udell's (2006) conceptual framework, the information, legal, judicial, bankruptcy, social, tax and regulatory environments constitute the study's key country characteristics. Emphasis is thus placed on all environments where applicable, for completeness purposes. *Ipsa facto*, this facilitates a more comprehensive analysis of country characteristics in the study.

In summary, to address the first research question of whether country characteristics increase the likelihood of SME bank credit availability, this study evaluates if

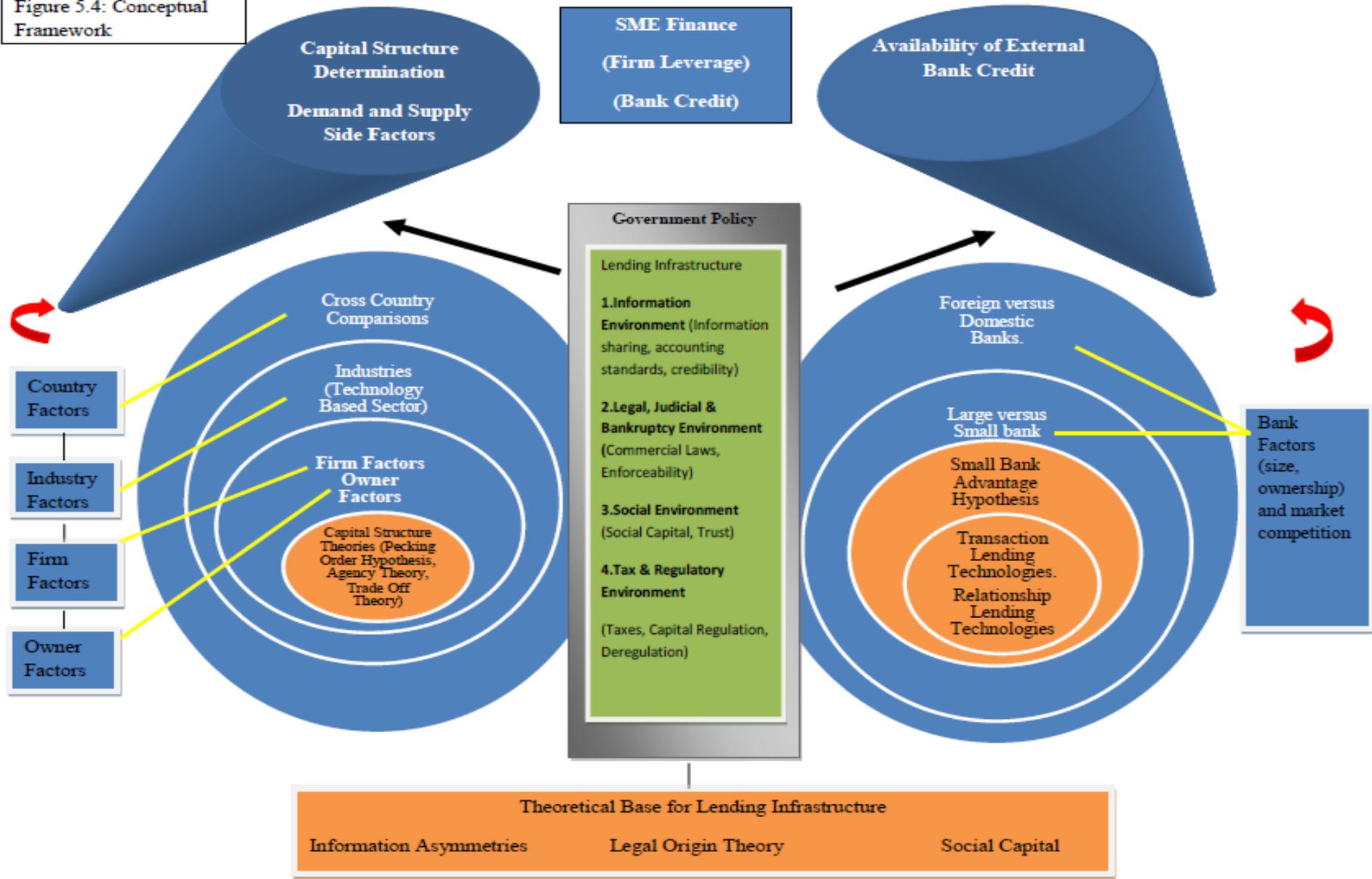
Prob (SME bank credit availability) = f (Information, Legal, Judicial, Bankruptcy, Social and Regulatory).

To address the second research question of whether country characteristics determine SME firm leverage, this study evaluates if

SME Firm Leverage = f (Information, Legal, Judicial, Bankruptcy, Social, Tax and Regulatory).

This operationalises the conceptual framework of this study (overleaf).

Figure 5.4: Conceptual Framework



## 5.6 Data Collection

SME bank credit availability is sourced from the EC/ECB Survey on the Access to Finance of SMEs (ECB, 2012) whilst SME firm leverage is sourced from the Bureau Van Dijk Amadeus database. Adler and Clark (2011, pp. 369) define units of observation as ‘units from which information is collected’. Evaluating the availability of SME bank credit, extant studies employ secondary data sources including the National Survey of Small Business Finance (NSSBF), the Survey of Small Business Finances (SSBF) and databases maintained by central credit registries. The NSSBF, facilitated by the Board of Governors of the Federal Reserve System and the US Small Business Administration provides current and past financial data of small firms in the US (Jayaratne and Wolken, 1999). The SSBF conducted by the Federal Reserve provides individual firm level data of small firms in the US (Craig and Hardee, 2007). Central credit registry databases provide financial data of small firms, disclosing the identities of their banks (Berger *et al.* 2001). Much of the extant literature surrounding availability of SME bank credit commands a US focus.

Evaluating the capital structure of small and medium sized enterprises, extant studies employ self-administrated questionnaires (Hogan and Hutson, 2005; Mac an Bhaird and Lucey, 2009) and secondary data sources (Cassar and Holmes, 2003; Sogorb-Mira, 2005; Heyman *et al.* 2008; López-Gracia; Sogorb-Mira, 2008 and Degryse *et al.* 2012) to evaluate whether firm, owner and industry characteristics are determinants of SME firm leverage. More specifically, these studies position their analysis in a single country context. The secondary sources used include firm financial data from the Business Longitudinal Survey by the Australian Bureau of Statistics (Cassar and Holmes, 2003), firm financial data on the SABI database provided by Bureau Van Dijk (Sogorb-Mira, 2005; López-Gracia and Sogorb-Mira, 2008), firm financial data from Belfirst DVD database provided by Bureau Van Dijk (Heyman *et al.* 2008) and firm financial data from Rabobank (Degryse *et al.* 2012). Studies evaluating

country characteristics also employ secondary data sources (Hall *et al.* 2004; Daskalakis and Psillaki, 2008; Beck *et al.* 2008; Psillaki and Daskalakis, 2009; Jõeveer, 2013a, 2013b) which include firm financial data provided by Dun and Bradstreet (Hall *et al.* 2004), firm financial data on the Amadeus databases, provided by Bureau Van Dijk (Daskalakis and Psillaki, 2008; Psillaki and Daskalakis, 2009; Jõeveer, 2013a:2013b) and firm financial data from World Business Environment Survey (Beck *et al.* 2008). Such studies conduct a cross country analysis encompassing several countries.

Appreciating the specificity of the study's research questions in which the research design moulds the methodology, the data collection shapes the contours of the research design, thickening the boundary lines of this work. Acknowledging the data collection adopted by extant literature and reflecting on the study's research questions and design, secondary data sources are employed. Indeed the study's focus on country characteristics commands a cross country analysis warranting several countries. Secondary data sources are thus perceived most appropriate, serving as an equilibrium balance between time and cost considerations to provide timely and comparable data.

### **5.7 Selection of the Sample Frame**

Babbie (2013, pp. 216) defines a sampling frame as 'the list or quasi list of elements from which a probability sample is selected'. In choosing the sampling frame, the sample elements must be representative of the population elements (Diamantopoulos and Schlegelmilch, 1997). As outlined in the introduction chapter of the study, small and medium sized enterprises have a potent presence in the financial and economic geography of Europe in terms of innovation, flexibility, value creation and employment (European Commission, 2010). As a corollary of this, the study's decision to focus on European SMEs is justified. Moreover, this decision is further compounded by the growing presence of SMEs on the academic and political agenda in Europe where the impact of changing financial and

economic conditions in recent years have been particularly hard felt by these firms. Comparing the Real GDP growth in countries from 2007-2011 (See Table 5.1), the effects of the financial and economic crisis have been very pronounced in the Euro area in comparison to the United States.

**Table 5.1: Real GDP Growth, 2007-2011 (%)**

Real GDP Growth, 2007-2011 (%)					
	2007	2008	2009	2010	2011
<b>Denmark</b>	1.6	-0.8	-5.7	1.6	1.1
<b>Finland</b>	5.3	0.3	-8.5	3.3	2.7
<b>France</b>	2.2	-0.2	-3.1	1.6	1.7
<b>Hungary</b>	0.1	0.9	-6.8	1.3	1.6
<b>Ireland</b>	5.4	-2.1	-5.5	-0.8	1.4
<b>Italy</b>	1.5	-1.2	-5.5	1.8	0.6
<b>Korea</b>	5.1	2.3	0.3	6.3	3.6
<b>Netherlands</b>	3.9	1.8	-3.7	1.6	1.1
<b>New Zealand</b>	3.4	-0.6	-0.2	0.9	0.5
<b>Norway</b>	2.7	0	-1.7	0.7	1.4
<b>Portugal</b>	2.4	0	-2.9	1.4	-1.7
<b>Russia</b>	8.5	5.2	-7.8	4.3	4.3
<b>Serbia</b>	5.4	3.8	-3.5	1	1.8
<b>Slovak Republic</b>	10.5	5.8	-4.9	4.4	3.2
<b>Slovenia</b>	7	3.4	-7.8	1.2	0.6
<b>Spain</b>	3.5	0.9	-3.7	-0.3	0.4
<b>Sweden</b>	3.4	-0.8	-5	6.3	3.9
<b>Switzerland</b>	3.8	2.2	-1.9	3	1.9
<b>Thailand</b>	5	2.5	-2.3	7.8	0.1
<b>Turkey</b>	4.7	0.7	-4.8	9.2	8.5
<b>United Kingdom</b>	3.6	-1	-4	1.8	0.9
<b>United States</b>	1.9	-0.3	-3.1	2.4	1.8
<b>Euro Area</b>	3	0.3	-4.3	1.9	1.5
<b>OECD Area</b>	2.8	0.2	-3.6	3	1.8

Source: OECD (2012), World Development Indicators

In selecting the sampling frame, the EC/ECB Survey on the Access to Finance of SMEs (ECB, 2012) is used to address the first research question whilst the Bureau Van Dijk Amadeus database is used to address the second research question. In response to a lack of

‘comparable, timely, and frequent data for SMEs in the European Union’ (ECB, 2012) coupled with the economic and financial conditions unfolding, as a collaborative effort, the European Central Bank and European Commission (Directorate General Enterprise and Industry) initiated the survey on the access to finance of European SMEs (ECB, 2012). Conducted every six months, the first wave commenced June – July of 2009 (ECB, 2012). Contact was made via telephone. The top level executive (general manager, financial director or chief accountant) participated (SAFE User Guide, 2014).

Each wave evaluates ‘the latest developments of the financing conditions of firms in the euro area’ (ECB, 2012). Given European SMEs are the focal point of this study, the EC/ECB Survey on the Access to Finance of SMEs (ECB, 2012) is the most appropriate source to satisfy the requirement for a representative sample at the euro area level. Moreover, adhering to the first research question in which emphasis is placed on the availability of SME bank credit, the EC/ECB Survey on the Access to Finance of SMEs (ECB, 2012) proves most relevant given their focus on credit availability. Furthermore, the use of this survey by other extant studies including Mac and Bhaird, Sanchez Vidal and Lucey (2014) and Holton *et al.* (2013:2012) further compounds its relevance. These studies employ the EC/ECB Survey on the Access to Finance of SMEs (ECB, 2012) in the context of borrower discouragement (Mac and Bhaird *et al.* 2014) and credit demand and supply conditions for SMEs (Holton *et al.* 2013: 2012).

Three waves of the EC/ECB Survey on the Access to Finance of SMEs (ECB, 2012) are employed to address the first research question. These three waves are selected on the basis of comparability. Eleven European countries are considered over the time frame 2010 - 2011 (See Table 5.2). This time frame is selected on the basis of data comparability issues and the relevance of this time period given the heightened concerns surrounding credit availability.

**Table 5.2: Countries and Time Frame of Research Question 1**

Countries Included	<b>Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal and Spain.</b>
Time Frame	2010-2011

These eleven countries are chosen for two reasons. Firstly, they are presented in all waves of the survey including the three selected waves unlike other countries (Estonia, Cyprus, Luxembourg, Malta, Slovenia and Slovakia) which feature on an ad hoc basis. Secondly, these countries are representative of the Euro area. The ECB (2012) stipulates these eleven European countries constitute a balance between the representativity of the euro area and the costs involved in conducting such the survey. This provides 20,360 firm observations when all sources of finance are considered. Concentrating on (the availability of) bank loans only (new or renewal excluding bank overdrafts and credit lines), the final sample is 4,909 unpanel firm observations (see Table 5.3).

**Table 5.3: Sample Selection from the EC/ECB Survey on the Access to Finance of SMEs (2010-2011)**

	No. of Firm Observations	
Sample of Firm Observations		20360
<b><i>Ineligibles</i></b>		
<i>Firm Observations from Type of Financing Excluding Bank Loans</i>		
Bank Overdraft, Credit Line or Credit Cards Overdraft, Trade Credit, Other External Financing	15451	
Total Ineligibles		(15451)
<b>Final Sample (Bank Loan, New or Renewal)</b>		4909
<b>Composition of Final Sample</b>		
Austria	240	
Belgium	292	
Finland	154	
France	892	
Germany	604	
Greece	371	
Ireland	156	
Italy	897	
Netherlands	128	
Portugal	253	
Spain	922	
Total		<b>4909</b>

The Bureau Van Dijk Amadeus database provides ‘comparable financial information for public and private companies across Europe’ (Bureau Van Dijk, 2014). Given the study’s focus on firm leverage in the second research question, the financial data presented on total debt in Amadeus is deemed appropriate. Moreover, the use of Amadeus in several studies namely Daskalakis and Psillaki, (2008), Psillaki and Daskalakis, (2009), Jõeveer, (2013a, 2013b), is testimonial of its merit. Both the EC/ECB Survey on the Access to Finance of SMEs (ECB, 2012) and the Bureau Van Dijk Amadeus database commands a cross country orientation at a European level. This satisfies the study’s focus on European SMEs.

Acknowledging the European Commission's (2011) definition of a small and medium sized enterprise, the following criteria are applied when selecting the sampling frame from the Bureau Van Dijk Amadeus database:

1. The number of employees: Min is 1 and Max is 250.
2. Annual Turnover (Operating Revenue): Min €1 and Max is €50,000,000.
3. Balance Sheet Total: Min is €1 and Max is €43,000,000.
4. Legal Form: Private.
5. Ownership: BVD Independence Indicator – Level of Independence is A,A,A.  
Amadeus defines independent as 'no participation in other enterprises and no enterprise has a participation in yours or your minority partnerships'.
6. Exclusion of Subsidiaries.

Six European countries across the time frame 2005 to 2011 are considered (see Table 5.4). This time frame is perceived appropriate, serving as a continuum in the research surrounding country characteristics and the SME capital structure. More specifically, Hall *et al.* (2004) concentrate on the year 1995. Daskalakis and Psillaki (2008) and Psillaki and Daskalakis (2009) centre on the years 1997 to 2002. Beck *et al.* (2008) refer to 1995-1999 whilst Jõeveer (2013b) and Jõeveer (2013a) focus on the years 2000 and 1995 – 2002 respectively. The starting year for this study, 2005 serves as a balance between continuing on the research in this arena whilst providing sufficient data observations. For comparison purposes, only the eleven countries included in the analysis of the first research question are selected for the second research question. However, due to data accessibility issues, SMEs from Spain are omitted from the analysis of research question 2. This yields a sample of 36,092 panel firm observations. Furthermore, owing to ineligibility issues including omitted industries and poorly represented countries (Germany, Greece, Ireland and the Netherlands), six countries

constitute the final sample of 34,468 firm observations (Table 5.5). Ineligibility issues are discussed in section 5.10.3.3 ‘External Validity’ of this chapter.

**Table 5.4: Countries and Time Frame of Research Question 2**

<b>Countries Included</b>	<b>Austria, Belgium, Finland, France, Italy, and Portugal.</b>
<b>Time Frame</b>	2005 – 2011.

**Table 5.5: Sample Selection from the Bureau Van Dijk Amadeus Database (2005-2011)**

	<b>No. of Firm Observations</b>	
Austria		287
Belgium		1659
Finland		686
France		3437
Germany		301
Greece		119
Ireland		56
Italy		20468
Netherlands		63
Portugal		9016
<b>Total</b>		<b>36092</b>
<b><i>Ineligibles</i></b>		
<i>Omitted Industries</i>		
Financial, Insurance, Agriculture, Household Employers	1085	
<i>Poorly Represented Countries</i>		
Germany	301	
Greece	119	
Ireland	56	
Netherlands	63	
Total Ineligibles		(1624)
<b>Final Sample</b>		<b>34468</b>
<b>Composition of Final Sample</b>		
Austria - 287	France - 3346	
Belgium - 1568	Italy - 20055	
Finland - 658	Portugal - 8554	

## 5.8 Method of Analysis

Remaining integral to the ‘process, person and project’ (Harrington, 2010), two components of analysis occupy this study i.e. the availability of SME bank credit and SME capital structure. Shaping a positivist approach through a longitudinal design, the exigencies of the investigation commands a quantitative orientation to achieve ‘measurement, generalization and control of variables’ (Hammersley 2008, pp. 43). The ‘quantification in the collection and analysis of data’ (Bryman and Bell 2003, pp. 25) strengthens the reliability and validity of measurement informed by the availability of SME bank credit and SME firm leverage underpinning the research questions. Whilst the study adopts a deductive stance such that the theoretical assumptions deduce the hypotheses to be empirically evaluated (Bryman and Bell, 2003), this study perceives a dual partite dialogue between research and theory such that the paradox of data and theory obeys a concentric design adopting a continuous orientation with no predetermined direction of flow.

Econometrics constitutes the principal method of analysis to address the research questions, defined as the ‘study of quantitative tools for analysing economic data...based on probability and statistical theory’ in a ‘mathematical field’ (Koop, 2005, pp. 1). In the scholarly contributions of Frisch and Tinbergen, their ambition was to ‘lend economic theory mathematical stringency...in a form that permits empirical quantification and...statistical testing of hypotheses’ (Bjerkholt and Dupont-Kieffer 2009, pp. xiii). Appreciating the arbitrary nature in defining econometrics, Tintner (1953) defines econometrics as the trilogy of economics, mathematics and statistics. This study applies forms of regression analysis to quantify the relationship between known values of one or more variables (independent) on an unknown value of a variable (dependent) (Koop, 2005).

The two datasets employed to address the research questions of this study i.e. the EC/ECB Survey on Access to Finance of SMEs (ECB, 2012) and the Bureau Van Dijk Amadeus

database command a panel orientation which constitutes both time series and cross sectional data (Koop, 2005). Appreciating its dyadic composition, panel data provides ‘a large number of data points, increasing the degrees of freedom and reducing the collinearity among explanatory variables’ (Hsiao 2003, pp.3). The idiosyncrasy of panel data has dominated much of the SME capital structure literature, evaluating firm, owner and industry factors as key determinants (Michaelas *et al.* 1999; Sogorb-Mira, 2005 and Heyman *et al.* 2008).

To address the first research question, the dichotomous nature of the dependent variable, SME bank credit denial, an inverse proxy for credit availability renders ordinary least squares regression inappropriate. As a corollary of this, models including linear probability models, logit and probit models are considered. Overcoming the assumptions of ordinary least squares regression estimation, logistic regression estimates the probability of an event occurring e.g. predicting business failure or not (Ruspini 2003, pp.116). *Ipsa facto*, not assuming a linear relationship between the dependent and independent variables, the model fits ‘a special s shaped curve’ where the logistic coefficient discloses the ‘change in the natural logarithm of the odds’ following a ‘one unit change in the independent variable’ (Ruspini 2003, pp.116).

An alternative to logistic regression, the probit model is also appropriate to address ‘categorical dependent variables’ (Ruspini 2003, pp.117). Whilst logistic regression concerns itself with the ‘natural log of the odds ratio’, the probit model concerns itself with ‘the inverse of the standard normal cumulative distribution function’ (Ruspini 2003, pp.117). In choosing between logit or probit, little differentiates the two in terms of ‘model specification and parameter selection’ (Feinstein and Thomas 2002, pp.419). Based on a normal distribution, the probit has a marginally elongated S shape in contrast to logit albeit the difference is minimal (Feinstein and Thomas 2002, pp.419). However, the coefficients of the probit model are ‘systematically smaller’ where the ‘divergence is due to the different shape of the normal and logistic distributions (Feinstein and Thomas 2002, pp.419). Similar to the

models adopted by previous studies on SME credit availability, this study utilises the logistic regression model to evaluate if country characteristics increase the availability of SME bank credit. Given the close substitution between logit and probit (Feinstein and Thomas 2002, pp.419), a probit model is employed to facilitate robustness testing. To measure credit availability, an inverse proxy is employed i.e. credit denial. The logistic regression equation is estimated as follows:

$$V_{i,t} = \beta_1 + \beta_2 x_{2\ i\ t} + \beta_3 x_{3\ i\ t} + \varepsilon$$

where  $V_{i,t}$  is the dependent variable indicating whether firm  $i$  is credit denied or not for the  $i$ th case in the  $t$ th period,  $\beta_2$  and  $\beta_3$  represent the various independent variables including bank structure, macroeconomic factors and country characteristics.  $\varepsilon$  is the residual. The logistic regression identifies the relative importance of a predictor (Zakour and Gillespie, 2013), to determine, if a significant association is present between country characteristics and the availability of SME bank credit. Logistic regression provides the opportunity to conduct multivariate analysis with data inconsistent with the assumptions of linearity, providing a mechanism to interpret relationships through the analysis of the relationship between a set of conditions (country characteristics) and the likelihood of having access to credit (Sweet and Grace-Martin, 2014). More specifically, logistic regression evaluates whether country factors increase the probability of an SME having access to credit.

To evaluate if country characteristics determine SME firm leverage in the second research question, the following classes of panel estimators are conducted, the fixed effects model and the random effects model. The fixed effects model is estimated as

$$\gamma_{i\ t} = \alpha + \beta x_{i\ t} + \mu_i + v_{i\ t} \quad (\text{Fixed Effects})$$

where  $\gamma_{it}$  is the dependent variable (SME firm leverage),  $\alpha$  is the intercept,  $\beta$  is a  $k \times 1$  vector of parameters to be estimated on the independent variables,  $x_{it}$  is a  $k \times 1$  vector of observations on the independent variables,  $\mu_i$  is the individual specific effect of the disturbance term and  $v_{it}$  is the remainder disturbance' (Brooks 2008, pp.488-490). The random effects model is estimated as

$$\gamma_{it} = \alpha + \beta x_{it} + \epsilon_i + v_{it} \quad (\text{Random Effects})$$

where  $\epsilon_i$  is a 'random variable that varies cross sectionally but is constant over time' (Brooks 2008, pp. 498).  $\epsilon_i$  is 'independent of the individual observation error term ( $v_{it}$ ) has a constant variance  $\sigma^2_{\epsilon}$  and is independent of the explanatory variables,  $x_{it}$  (Brooks 2008, pp. 498).

In summary, the purpose of the regression analysis is to evaluate if the likelihood of SME credit availability and firm leverage can be determined by country characteristics. This study perceives the logistic and probit regression models and the fixed effects / random effects models to be the most appropriate regression techniques to use. As a form of statistical testing, multicollinearity commands a key focus. To execute these models, Stata statistical software is employed. This statistical software proves statistically powerful, providing extensive data management capabilities, performing a plethora of statistical analysis whilst remaining user friendly (UCLA, 2014). Moreover, its compatibility with Microsoft Excel further reinforces its relative ease of use.

## 5.9 Description of Data

### 5.9.1 Description of Data for Research Question 1

A cross country analysis is conducted spanning 11 European countries over the time frame 2010- 2011. The justification of the sample selection has been presented earlier in section 5.7 of this chapter.

#### 5.9.1.1 Derivation of the Dependent Variable

Whilst the focus of the first research question is on the availability of SME bank credit, an inverse proxy for credit availability is employed in the study i.e. credit denial. The dependent variable relates to question 7(b), part a of the EC/ECB *Survey on the Access to Finance of SMEs* (ECB, 2012) in which firms are asked

*Q7B. If you applied and tried to negotiate for this type of financing over the past 6 months, did you: receive all the financing you requested; receive only part of the financing you requested; refuse to proceed because of unacceptable costs or terms and conditions; or have you not received anything at all? [PROMPT IF NEEDED: Other external financing includes loans from other lenders, equity or debt issuance, leasing, factoring, etc., but excludes overdrafts, credit lines, bank loans and trade credit]*

- Applied and got everything ..... 1
- Applied and got most of it [BETWEEN 75% AND 99%] ..... 5
- Applied but only got a limited part of it [BETWEEN 1% AND 74%].....6
- Applied but refused because cost too high ..... 3
- Applied but was rejected ..... 4
- [DK] ..... 9
- d) Bank overdraft, credit line or credit cards overdraft ..... 1 3 4 5 6 9
- a) **Bank loan (new or renewal; excluding overdraft and credit lines)** ..... **1 3 4 5 6 9**
- b) Trade credit ..... 1 3 4 5 6 9
- c) Other external financing..... 1 3 4 5 6 9'

The type of financing which is of interest is bank loan (new or renewal, excluding overdrafts and credit lines). The rationale for this lies in the maturity and duration of bank loans which are perceived to have longer maturity and duration with greater contractual obligations and screening procedures attached in contrast to bank overdrafts. Hence country characteristics may be more relevant for bank loans, justifying the choice. In the context of firm leverage,

Cassar and Holmes (2003, pp.131) posit ‘long term leverage is more fixed and arguably more deliberate, with greater contractual obligations and screening processes required’. Firms which answered ‘applied and got everything’ or ‘applied and got most of it [between 75% and 99%]’ are defined as credit extended whereas firms which answered ‘applied and only got a limited part of it [between 1% and 74%]’ or ‘applied but refused because cost too high’ or ‘applied but was rejected’ are credit denied. This concurs with Holton *et al.* (2013) in which they adopt a similar approach. Whilst this question was asked in all of waves of *the EC/ECB Survey on the Access to Finance of SMEs* (ECB, 2012) i.e. (1) First half 2009, (2) Second Half 2009, (3) Mar-Aug 2010 (4) Sept 2010-Feb 2011 and (5) April-Sep 2011, the first two waves (first half 2009 and second half 2009) define ‘other external financing’ differently. For comparison purposes, only the above mentioned waves (3, 4 and 5) are considered (ECB, 2012). Evaluating all three waves together facilitates a more aggregated approach, providing a more comprehensive analysis of the likelihood of credit availability whilst not sacrificing any degrees of freedom.

**Table 5.6: Waves used for the dependent variable, Credit Denial.**

Waves	Time Period
3	Mar (2010) – August (2010)
4	September (2010) – February (2011)
5	April (2011) – September (2011)

Source: ECB, 2012.

### 5.9.1.2 Derivation of the Independent Variables for Research Question 1

In the sample, several independent variables are included. Definitions and sources are provided in Appendix (1). All independent variables are lagged one year (t-1). Alves and Ferreira (2011) employ independent variables lagged one year to avoid issues of reverse causality whilst Rajan and Zingales (1995) lag their explanatory variables one period to minimise endogeneity concerns. This section of the chapter represents the independent

variables relating to the first research question. Firstly, bank structure variables are presented given their dominance in the extant literature. Appreciating this, the study conducts several equations of which bank structure variables are evaluated first in SME bank credit availability followed by the country characteristics. This is outlined in chapter six of this study. For simplicity, this section outlines bank structure variables first followed by the country characteristics and several control variables including macroeconomic conditions, supply conditions and firm size and industry.

### **Bank Structure**

Representing the structure of banks in each European country, four variables are employed, namely bank size, bank ownership, the bank concentration ratio and the Lerner Index. Bank size and bank ownership are derived from the European Central Bank's *Consolidated Banking Data* (ECB, 2013b). Grouping banks into size ranges of large, medium and small, the European Central Bank defines a large domestic bank as a bank with total assets greater than 0.5 per cent of the total consolidated assets of EU banks, medium sized banks as a bank with total assets of between 0.5 per cent and 0.005 per cent of the total consolidated assets and small banks with total assets of less than 0.005 per cent of total consolidated assets (ECB, 2013b). The European Central Bank defines a bank as foreign if its subsidiaries and branches are controlled by a parent who is foreign from the reporting country's perspective (ECB, 2013b). As per the small bank advantage hypothesis, this study expects an increase in the size of banks is less likely to increase SME bank credit availability. Furthermore, an increase in the size of foreign banks is less likely to increase SME bank credit availability.

To contextualise competitive conditions in the banking market both bank concentration ratio and the Lerner index are employed. Jayaratne and Wolken (1999) allude to the standard argument of how less competitive markets incur higher credit supply constraints. Petersen and Rajan (1995) posit in concentrated credit markets, credit constrained firms including

small businesses are more likely to receive finance from creditors as it is less arduous for these creditors to internalise the benefits of facilitating such firms. Studies in the field of SME credit availability (Jayaratne and Wolken, 1999 and Craig and Hardee, 2007) include a measure of competition, mainly the Herfindahl-Hirschmann Index (HHI). The ‘structure conduct performance paradigm’, a framework used to evaluate competitive conditions in industries and developed by key writers in the area of industrial organisation, namely Edward Mason (1949) and Joe Bain (1959) as noted by Lipczynski and Wilson (2004), provides for two bank concentration measures i.e. the concentration ratio and the HHI (Global Financial Development Report, 2014). Due to data availability issues, only the bank concentration ratio is included in this study, i.e. the ‘assets of the three largest commercial banks as a share of total commercial banking assets’ (Global Financial Development Report, 2014).

However, the Global Financial Development Report (2014) posits the predictive capacity of concentration measures is weakened by market contestability such that the competitive behaviour of banks is impinged by the threat of market entry or exit. *Ipsa facto*, recent research considers bank pricing behaviour measures or market power measures, taken from the literature dubbed ‘new empirical industrial organization’ (Global Financial Development Report, 2014). Lipczynski, Wilson and Goddard (2005) allude to the ‘new empirical industrial organization’ in response to weaknesses of the ‘structure conduct performance paradigm’. One such measure of the ‘new empirical industrial organization’ is the Lerner index, defined as ‘the difference between output prices and marginal costs (relative to prices) (Global Financial Development Report, 2014). Higher values of the Lerner index imply less bank competition (Global Financial Development Report, 2014). For comparison purposes, the Lerner index is also included, sourced from the Global Financial Development Report (2014) by the World Bank. Both Carbó-Valverde *et al.* (2009) and Ryan *et al.* (2014) also employ the Lerner Index. Berger and Udell (2006) allude to the measurement of market

power where Carbó-Valverde *et al.* (2009) finds the Lerner Index supports the market power hypothesis but the Herfindahl-Hirschmann Index (HHI) supports the information hypothesis. Ryan *et al.* (2014) also concurs with Carbó-Valverde *et al.* (2009) surrounding the Lerner Index. Appreciating the ambiguity between bank competition and bank credit availability, this study is unable to depict the direction of the relationship between bank competition and SME bank credit availability.

## **Country Characteristics**

### **Information Environment:<sup>8</sup>**

Constituting the information environment, Berger and Udell (2006) allude to the accounting infrastructure and the sharing of information. Lending credence to the specificities of accounting infrastructure, Berger and Udell (2006) dissect this rubric into accounting standards and credible accounting firms. Employing this concept, Rajan and Zingales (1998) use accounting standards as a proxy for financial development, stipulating they ‘reflect the potential for obtaining finance rather than the actual finance raised’ (Rajan and Zingales 1998, pp. 571). Furthermore LLSV (1998) employ the quality of accounting standards as a proxy for legal enforcement, asserting ‘basic accounting standards are needed to render company disclosure interpretable’ (LLSV 1998, pp.1140). Derivation of this term stems from the Center for International Financial Analysis and Research which creates an index for different countries, ranking companies’ 1990 annual reports for the inclusion or omission of 90 items (LLSV, 1998; Rajan and Zingales, 1998).

<sup>8</sup> This study constructs another measure of shared credit information i.e. the average number of credit reports issued by private credit bureaus and public credit registries in Europe through questionnaires. Due to the relatively small sample size of this measure, it is not used as the main proxy for the information environment but as part of the study’s robustness testing.

Despite the potent reference of this instrument, the date of the survey has heightened concerns surrounding endogeneity albeit such concerns are perceived minimal and can be reconcilable (Rajan and Zingales, 1998).

Moreover, with the adoption of international accounting standards across the European Union, to facilitate the harmonisation of financial information (Europa, 2013), the employment of an accounting standard measure for each European country appears inappropriate and thus redundant from this study. Avoiding any ecstatic knots in the empirics, in this study emphasis is placed on the sharing of credit information, to represent the information environment, denoted by the credit depth of information index.

The credit depth of information index created by the World Bank measures the ‘scope, accessibility, and quality of credit information’ (World Bank, 2012a). Ranging from 0 – 6, the index allocates a score of one for each feature if the following features of a public credit registry or a private credit bureau are present:

- a) Disclosure of both positive (white) and negative (black) information.
- b) Disclosure of credit information for both firms and individuals.
- c) Disclosure of credit information for retail and utility firms and financial institutions.
- d) Disclosure of more than two years of information.
- e) Disclosure of credit information on loans below one per cent of income per capita.
- f) Legal rights for borrowers to access their credit information (Doing Business, 2012a).

Higher values on this scale imply greater sharing of credit information (World Bank, 2012a). Klapper (2006) also employs this measure.

### **Legal Environment:**

Appreciating the specificities of the legal, judicial and bankruptcy environments, Berger and Udell (2006, pp.297) allude to the legal environment which ‘consists of the commercial laws that specify the property rights associated with a commercial transaction’ whilst the judicial and bankruptcy environments define the enforceability of these laws amidst commercial and bankruptcy debacles (Berger and Udell, 2006). En masse, these elements represent the rule of

law in the availability of bank credit (Berger and Udell, 2006). Constituting the legal environment, private property protection is employed which quantify ‘the ability of individuals to accumulate private property, secured by clear laws that are fully enforced by the state’ (Heritage Foundation, 2013). Such a measure reveals ‘the degree to which a country’s laws protect private property rights and the degree to which its government enforces those laws’, making reference to government expropriation, judicial independence, judicial corruption and contract enforcement (Heritage Foundation, 2013). This measure was employed by Beck *et al.* (2008) whose study occupies both the SME capital structure and availability of bank credit space.

The measure is designed as follows. Each country is graded according to the following criteria:

- a) **100**—Private property is guaranteed by the government. The court system enforces contracts efficiently and quickly. The justice system punishes those who unlawfully confiscate private property. There is no corruption or expropriation.
- b) **90**—Private property is guaranteed by the government. The court system enforces contracts efficiently. The justice system punishes those who unlawfully confiscate private property. Corruption is nearly nonexistent, and expropriation is highly unlikely.
- c) **80**—Private property is guaranteed by the government. The court system enforces contracts efficiently but with some delays. Corruption is minimal, and expropriation is highly unlikely.
- d) **70**—Private property is guaranteed by the government. The court system is subject to delays and is lax in enforcing contracts. Corruption is possible but rare, and expropriation is unlikely.
- e) **60**—Enforcement of property rights is lax and subject to delays. Corruption is possible but rare, and the judiciary may be influenced by other branches of government. Expropriation is unlikely.
- f) **50**—The court system is inefficient and subject to delays. Corruption may be present, and the judiciary may be influenced by other branches of government. Expropriation is possible but rare.
- g) **40**—The court system is highly inefficient, and delays are so long that they deter the use of the court system. Corruption is present, and the judiciary is influenced by other branches of government. Expropriation is possible.
- h) **30**—Property ownership is weakly protected. The court system is highly inefficient. Corruption is extensive, and the judiciary is strongly influenced by other branches of government. Expropriation is possible.

- i) **20**—Private property is weakly protected. The court system is so inefficient and corrupt that outside settlement and arbitration is the norm. Property rights are difficult to enforce. Judicial corruption is extensive. Expropriation is common.
- j) **10**—Private property is rarely protected, and almost all property belongs to the state. The country is in such chaos (for example, because of ongoing war) that protection of property is almost impossible to enforce. The judiciary is so corrupt that property is not protected effectively. Expropriation is common.
- k) **0**—Private property is outlawed, and all property belongs to the state. People do not have the right to sue others and do not have access to the courts. Corruption is endemic.” (Heritage Foundation, 2013).

### **Judicial Environment:**

Measuring the efficiency of the judicial system in resolving disputes, the cost, time and procedural complexity of enforcing a contract are considered (Doing Business, 2012b). Jappelli *et al.* (2005) employ two indicators of judicial inefficiency i.e. the time of ordinary civil trails and enforcement cost. Arguably, whilst the cost, time and procedural complexity capture a different dimension of judicial efficiency, each indicator is derived from the same commercial sale dispute in the local courts of each country (Doing Business, 2012b). *Ipso facto*, all three dimensions of efficiency serve as a close substitute to each other. Such indicators represent the judicial environment in which Berger and Udell (2006) stipulate can serve as a barometer for the enforceability of law.

The cost required to enforce a contract includes

- a) Attorney Fees (Average)
- b) Court Costs and Expert Fees
- c) Enforcement Fees (Doing Business, 2012c)

These costs are measured as a percentage of the claim and represent two hundred per cent of income per capita. The time required to enforce a contract includes

- a) The time period to file and serve the case
- b) The time period for trial and obtaining judgement
- c) The time period to enforce the judgement (Doing Business, 2012c)

Measured in calendar days, this indicator records the time from the filing of a lawsuit to payment (Doing Business, 2012c). Procedures required to enforce a contract include any engagement between the parties involved in a commercial dispute. This comprises of

- a) Procedures to file and serve the case
- b) Procedures for trial and judgement
- c) Procedures to enforce the judgement (Doing Business, 2012c)

All three indicators record a measure for effective commercial dispute resolution. The lower the costs, time and the complex nature of procedures, the more effective the commercial dispute resolution will be (Doing Business, 2012b). These measures are based on the work of Djankov, La Porta, Lopez-De-Silanes and Shleifer (2003).

### **Bankruptcy Environment:**

Constituting the bankruptcy environment, the time, cost and result of the insolvency case is considered (Doing Business, 2012d). Similar to the judicial efficiency in which three measures are considered, the time, cost and result of the insolvency case capture different dimensions of bankruptcy efficiency. Derived from the same insolvency proceedings involving domestic firms (Doing Business, 2012d), all three dimensions serve as a close substitute to each other. The time required to resolve a debt, measured in years records the time period from the company's default to payment of all or some of the debt. The cost required to resolve a debt, as a percentage of the value of debtor's estate includes

- a) Court Fees
- b) Insolvency Administrator Fees
- c) Lawyers' Fees
- d) Assessors' and Auctioneers' Fees
- e) Other (Doing Business, 2012d)

Finally, the recovery rate, recorded as the cents on the dollar recovered by creditors includes the resulting outcome i.e. whether the business remains a going concern or the assets are sold gradually. This measure deducts the cost of proceedings, a cent for every one percentage point of the value of the debtor estate. Furthermore, the value lost as a result of capital

entangled in the insolvency case is also deducted (Doing Business, 2012d). These measures are based on the work of Djankov, Hart, McLiesh and Shleifer (2008).

### **Social Environment:<sup>9</sup>**

Given the multifaceted typicality of social capital, much ambiguity is raised, rendering the definition an arduous task (Guiso, Sapienza and Zingales, 2011). Stemming from the critique of present definitions, Guiso *et al.* (2011, pp. 419) posit ‘for social capital to continue to be useful in the economic discourse, we need to abandon this ambiguity’, differentiating ‘social capital from standard human capital’, outlining ‘the mechanisms through which social capital can be accumulated and depreciated’. Thus, Guiso *et al.* (2011, pp. 419) define social capital as ‘those persistent and shared beliefs and values that help a group overcome the free rider problem in the pursuit of socially valuable activities’ (Guiso *et al.* 2011).

Illustrious of the multidimensionality inherent to the social environment, this study departs from outcome based measures to capture social capital for fear of contamination by other factors. Such measures include level of economic cooperation (Guiso *et al.* 2011). Whilst previous research employs variables such as electoral participation and blood donation, where a non-existent relationship between the input and output measures is evident (Guiso *et al.* 2004), the lack of data availability for the eleven European countries renders these variables redundant.

To ensure geographical coverage, direct measures of values/beliefs are extracted from the European Social Survey (ESS, 2012) conducted on an annual basis. The specificity of certain questions in the survey presents value judgements on activities which can yield private benefit at the expense of high social cost (Guiso *et al.* 2011).

<sup>9</sup> Owing to data availability issues, measures of values/beliefs and trustworthiness are not available for all eleven countries in the sample. Measures are unavailable for Austria and Italy.

One advantage of the ESS is its ability to capture the intensity of the belief/value, employing a scale format to answer the questions (Guiso *et al.* 2011). Further reducing the anonymity, the structure of these questions provides greater accuracy. Guiso *et al.* (2011) refers to the use of these measures.

Consideration is placed on the following question ‘please tell me how wrong it is to’:

	Not Wrong at all	A bit Wrong	Wrong	Seriously Wrong	Don't Know
Make an exaggerated or false insurance claim?					
Buy something you thought might be stolen?					
Commit a traffic offence like speeding or crossing a red light?					

Source: (European Social Survey, 2012).

Alluding to the formation of *Rotating Credit Associations* in which US loans and saving activities were first introduced (Putman, 1993), cooperative behaviour remained integral to their efficiency such that there is the belief each participant will continue to contribute even after receiving the fund (Putman, 1993). Aligned with the definition of Guiso *et al.* (2011), strong beliefs/values will facilitate cooperative behaviour. These three measures of social value are perceived to be close substitutes to each other.

A further component of the social environment alludes to trust. Guiso *et al.* (2011, pp.440) purports ‘fairness’ and ‘trustworthiness’ are integral for economic transactions such that the belief that others are unfair or cannot be trusted will minimise their involvement in any such activities. Perceiving trust as having a probabilistic content, a measure of probability thus remains highly quantitative (Guiso *et al.* 2011). Differentiating between personalised trust and generalised trust in which personalised trust relates to individuals that are known,

generalised trust is associated with the generic individual from the broader community and thus is perceived as a more accurate measure of trust (Guiso *et al.* 2011, pp.440). Providing a measure for generalised trust, the following question is employed from the European Social Survey:

*‘Generally speaking, would you say that most people can be trusted, or that you can’t be too careful in dealing with people? Please tell me on a score of 0 to 10, where 0 means you can’t be too careful and 10 means that most people can be trusted.’*

Source: (European Social Survey, 2012)

La Porta *et al.* (1997b) employs a similar measure, taken from the World Values Survey.

### **Regulatory Environment:**

Appreciating the specificities of the regulatory environment, Berger and Udell (2006) allude to its impact on SME credit availability, highlighting how stringent bank supervision and changes in capital regulations can impinge adversely on credit supply. Defining the regulatory environment, the capital regulatory index is employed which is the sum of the overall capital stringency and the initial capital stringency (Bank Regulation and Supervisory Survey, 2013). This index is based on the work of Barth *et al.* (2001: 2004). The overall capital stringency indicates ‘whether the capital requirement reflects certain risk elements and deducts certain market value losses from capital before minimum capital adequacy is determined’ (Bank Regulation and Supervisory Survey, 2013). The initial capital stringency indicates ‘whether certain funds may be used to initially capitalize a bank and whether they are official’ (Bank Regulation and Supervisory Survey, 2013). On a scale from 0 – 10, higher values of the capital regulatory index implies more stringent capital regulation (Bank Regulation and Supervisory Survey, 2013).

## **Controls: Macroeconomic Conditions**

Contextualising the macroeconomic environment of each European country, many macroeconomic variables are considered for completeness purposes. To represent economic growth, both the GDP annual growth rate and GDP per capita are included. The GDP growth rate is the annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2005 U.S. dollars' (World Bank, 2013a). Beck *et al.* (2008) and Jõeveer (2013a:2013b) also employ the GDP annual growth rate. The GDP per capita is 'gross domestic product divided by midyear population' (World Bank, 2013b). Beck *et al.* (2008) also employs GDP per capita. To further represent the real economy, domestic demand is included, defined as the 'growth of domestic demand component of GDP (at current prices)' (Eurostat, 2014). This is extracted from Eurostat. Holton *et al.* (2013) employ domestic demand in their analysis of SME financing conditions in Europe and found domestic demand and bank rejection had a statistically significant negative relationship, implying in a weakened real economy, credit conditions tightened.

This study expects an increase in the GDP annual growth rate, GDP per capita and domestic demand is more likely to increase SME bank credit availability.

To proxy for the stability of the value of the currency, inflation is employed, defined as the log difference of the Consumer Price Index (ECB, 2013c). Demirgüç-Kunt and Maksimovic (1998, pp. 2112) assert the inflation rate indicates whether the 'local currency provides a stable measure of value to be used in long term contracting'. Relating to agency costs as depicted in agency theory, the ability of financial contracts to control for such costs remains contingent not only on the firm but the institutional environment in which the contracting occurs (Demirgüç-Kunt and Maksimovic, 1999). Fan *et al.* (2012) posit high inflation instils uncertainty about future inflation, deterring lenders away from long term debt. *De facto*, higher inflation not only increases contracting costs but raises uncertainty, thus resulting in a

lower availability of credit. Beck *et al.* (2008), Jõeveer (2013a:2013b) and Fan *et al.* (2012) employ inflation.

This study expects an increase in inflation is less likely to increase SME bank credit availability.

Finally, acknowledging the recent economic and financial crisis, many European countries were classified as having a systemic banking crisis. This resulted in significant interventions and support measures by their governments and central banks. This was particularly acute across Europe where supports ranged from government guarantees to capital injections to liquidity support measures. Appreciating this, two measures are employed, a systemic crisis measure and a government and central bank support measure. These measures are only applicable from 2007 onwards. The government and central bank support is from 2007-2010 whilst the systemic banking crisis is from 2007-2011. Particularising this, Laeven and Valencia (2012) define a banking crisis as systemic if significant signals of financial distress are evident in a banking system, depicted by significant bank runs, bank liquidation and losses classify whether countries experienced a systemic banking crisis.

This study expects higher government and central bank support and the classification of having a systemic banking crisis is less likely to increase the availability of SME bank credit.

### **Controls: Supply of Credit**

To control for the supply of credit conditions, three variables are employed, namely domestic savings as a percentage of GDP, the 10 year benchmark government bond yield and deposits per GDP. The level of domestic savings serves as a proxy for the supply of funds available to financial intermediaries (Fan *et al.* 2012, Jõeveer, 2013b). Fan *et al.* (2012) posits employing proxies such as the domestic savings which are not subject to the capital structure preferences of firms. This departs from extant literature where concerns have been raised that variables

used to represent the lending of financial intermediaries simply mirror the financing preferences of firms and investors. The gross domestic savings as a percentage of GDP is employed, sourced from the World Bank. Both Fan *et al.* (2012) and Jõeveer (2013b) employ domestic savings in their studies.

This study expects an increase in domestic savings as a percentage of GDP is more likely to increase SME bank credit availability.

Furthermore, sovereign bonds can impinge on the supply of credit by banks (Holton *et al.* 2012, 2013). Particularising this, Holton *et al.* (2013) alludes to Gonzalez-Paramo (2011) which identifies three channels 1) *the price channel* where the yield on sovereign bonds provides a benchmark for interest rates on loans imposed by banks and thus acts as a floor for the costs of private sector funding 2) *the liquidity channel* where sovereign bonds provide a fundamental source of collateral such that any disruptions to the sovereign debt market will impinge on the interbank market, reducing its liquidity. As a corollary of this, money market rates increase, impacting on the capacity of banks to supply credit. Finally, 3) *balance sheet channel* where a fall in the price of sovereign bonds will reduce the value of assets held by the bank and thus their capital base. Hence, the 10 year benchmark government bond yield is employed, sourced from Thomson One. Holton *et al.* (2012: 2013) employ the 10 year government bond yield.

This study expects an increase in the 10 year government bond yield is less likely to increase SME bank credit availability.

Finally, deposits per GDP are included, defined as ‘the total value of demand, time and saving deposits at domestic deposit money banks as a share of GDP’ (Global Financial Development Database, 2013). This is obtained from the World Bank. Fan *et al.* (2012)

employs such a measure to proxy for the supply of bank funds. This study expects an increase in deposits per GDP is more likely to increase SME bank credit availability.

### **Controls: Firm Size and Industry**

To control for firm size, the number of employees is employed. This is similar to Holton *et al.* (2012). Furthermore, the industry classification of each firm is also included. Both are extracted from the EC/ECB Survey on Access to Finance of SMEs (ECB, 2012). This study expects an increase in firm size is more likely to increase SME bank credit availability. Table 5.7 presents the variables used in the first research question including their measurement, expected relationship with the dependent variable (credit denial) and theoretical setting. Table 5.7 also notes the use of these variables by extant studies.

**Table 5.7: Variables Used in Research Question 1**

Variables	Representation	Measurement	Previous Studies	Expected Relationship between Dependent and Independent Variables	Theory
<b>Dependent Variable:</b>					
SME Bank Credit Denial (Inverse Proxy for SME Bank Credit Availability)	Inverse proxy for availability of SME bank credit.	Binary Variable. SMEs which answered ‘applied and got everything’ or ‘applied and got most of it [between 75% and 99%]’ are defined as credit extended whereas SMEs which answered ‘applied and only got a limited part of it [between 1% and 74%]’ or ‘applied but refused because cost too high’ or ‘applied but was rejected’ are credit denied. Credit extended is measured as 0 and credit denied is measured as 1.	Holton, Lawless and McCann (2013).		A More Complete Conceptual Framework on SME Finance (Berger and Udell, 2006).
<b>Independent Variables: Banking Structure Proxies</b>					
Bank Size	Size of the Bank	€bn	Berger <i>et al.</i> (2001).	(+)	A More Complete Conceptual Framework on SME Finance (Berger and Udell, 2006).
Bank Ownership	Ownership of the Bank	€bn	Berger <i>et al.</i> (2001).	Domestic (-) Foreign (+)	A More Complete Conceptual Framework on SME Finance (Berger and Udell, 2006).
Bank Concentration Ratio	Bank Competition	% Measurement		(-/+)	‘Structure Conduct Performance Paradigm’ Edward Mason (1949) and Joe Bain (1959) (cited by Lipczynski and Wilson, 2004).
Lerner Index	Bank Competition	Ratio Measurement	Ryan <i>et al.</i> (2014) Carbó-Valverde <i>et al.</i> (2009) Berger <i>et al.</i> (2008)	(-/+)	‘New Empirical Industrial Organization’ (cited by Lipczynski, Wilson and Goddard, 2005).

<b>Independent Variables: Country Characteristics</b>					
Credit Depth of Information Index	Information Environment	Scale Measurement, ranging from 0 to 6. Higher values on this scale imply greater availability of credit information. Assumption that greater availability increases the sharing of credit information.	Klapper (2006).	(-)	A More Complete Conceptual Framework on SME Finance (Berger and Udell, 2006).
Private Property Protection	Legal Environment	Scale Measurement, ranging from 0 to 100. Higher values on this scale imply stronger protection for private property.	Beck <i>et al.</i> (2008).	(-)	A More Complete Conceptual Framework on SME Finance (Berger and Udell, 2006).
Cost to Enforce a Contract	Judicial Environment	% Measurement. Costs are measured as a percentage of the claim.	Based on the methodology used by Djankov <i>et al.</i> (2003).	(+)	A More Complete Conceptual Framework on SME Finance (Berger and Udell, 2006).
Time to Enforce a Contract	Judicial Environment	Time Measurement. The time is measured in calendar days.	Based on the methodology used by Djankov <i>et al.</i> (2003).	(+)	A More Complete Conceptual Framework on SME Finance (Berger and Udell, 2006).
Procedures to Enforce a Contract	Judicial Environment	Number Measurement. The number of procedures to enforce a contract.	Based on the methodology used by Djankov <i>et al.</i> (2003).	(+)	A More Complete Conceptual Framework on SME Finance (Berger and Udell, 2006).
Time to Resolve a Debt	Bankruptcy Environment	Time Measurement. The time is measured in years.	Based on the methodology used by Djankov <i>et al.</i> (2008).	(+)	A More Complete Conceptual Framework on SME Finance (Berger and Udell, 2006).
Cost to Resolve a Debt	Bankruptcy Environment	% Measurement. Costs are measured as a percentage of the value of debtor's estate.	Based on the methodology used by Djankov <i>et al.</i> (2008).	(+)	A More Complete Conceptual Framework on SME Finance (Berger and Udell, 2006).
Recovery Rate	Bankruptcy Environment	Value Measurement. Recovery Rate is measured in cents on the dollar.	Based on the methodology used by Djankov <i>et al.</i> (2008).	(-)	A More Complete Conceptual Framework on SME Finance (Berger and Udell,

					2006).
Social Capital: <sup>10</sup> 3 Direct Measures of Values/Beliefs. Values (Insurance) Values (Stolen) Values (Traffic)	Social Environment	A 5 point Likert Scale. Not Wrong at all. A Bit Wrong. Wrong. Seriously Wrong. Don't Know.	Guiso, Sapienza and Zingales (2011).	(-)	A More Complete Conceptual Framework on SME Finance (Berger and Udell, 2006).
Trust <sup>10</sup>	Social Environment	Scale Measurement, ranging from 0 to 10 where 0 means you 'can't be too careful and 10 means that most people can be trusted.	La Porta, Lopez De Silanes, Shleifer and Vishny, (1997b)	(-)	A More Complete Conceptual Framework on SME Finance (Berger and Udell, 2006).
Capital Regulatory Index <sup>10</sup>	Regulatory Environment	Scale Measurement, ranging from 0 to 10 with higher values implying greater stringency in capital regulation.	Barth <i>et al.</i> (2001, 2004)	(+)	A More Complete Conceptual Framework on SME Finance (Berger and Udell, 2006).
<b>Controls: Macroeconomic Variables</b>					
GDP Annual Growth Rate	Economic Growth.	% Measurement	Beck <i>et al.</i> (2008); Jõeveer (2013a, 2013b).	(-)	NA
GDP per Capita	Economic Growth.	Current US \$	Beck <i>et al.</i> (2008).	(-)	NA
Domestic Demand	Economic Growth.	% Measurement	Holton <i>et al.</i> (2013).	(-)	NA
Inflation	Proxy for the stability of the value of the currency.	Log Difference	Beck <i>et al.</i> (2008); Jõeveer (2013a; 2013b), Fan <i>et al.</i> (2012).	(+)	NA
Government and Central Bank Support	Effects of the financial and economic crisis.	Scale Measurement, ranging from 4-8. This measure is defined as the number of support measures (scale of 4-8 across Europe) taken by government and central banks during the banking crisis, 2007-10, including deposit insurance and bank guarantees, capital injections, asset purchases, liquidity support measures, reduction of policy rates to the purchase of private securities.	Laeven and Valencia (2012).	(+)	NA
Systemic Banking Crisis	Effects of the financial and economic crisis.	Classification of a systemic banking crisis where 1 means a country is classified as having a systemic banking crisis and 0 means a country is classified	Laeven and Valencia (2012).	(+)	NA

		as not having a systemic banking crisis.			
<b>Controls: Supply of Credit Conditions</b>					
Gross Domestic Savings	Proxy for the bank credit supply.	% GDP	Jõeveer (2013b) and Fan <i>et al.</i> (2012).	(-)	NA
10 Year Government Bond Yield	Proxy for the bank credit supply.	% Measurement	Holton <i>et al.</i> (2012, 2013).	(+)	NA
Deposits per GDP	Proxy for the bank credit supply.	% GDP	Fan <i>et al.</i> (2012).	(-)	NA
<b>Controls: Firm Variables</b>					
No. of Employees	Firm Size.	Number Measurement	Holton <i>et al.</i> (2012)	(-)	NA
Firm Industry	Firm Industry.	Industry Classification			NA

<sup>10</sup> Social values, trust and the capital regulation index have non-consecutive years of data. Data is only available for the following years: Social Values (2010), Trust (2004, 2006, 2008 and 2010) and Capital Regulation Index (2006, 2010).

## **5.9.2 Description of Data for Research Question 2**

A cross country analysis is conducted spanning six European countries over the time frame 2005 to 2011. The justification of the sample selection has been presented earlier in section 5.7.

### **5.9.2.1 Derivation of Dependent Variable**

The dependent variable used is the total debt ratio which is defined as the ratio of total debt to total assets. Cassar and Holmes (2003) also employ the same variable. Total debt consists of both short term debt and long term debt, extracted from the Bureau Van Dijk Amadeus database. Short term debt includes short term financial debts e.g. to credit institutions and part of long term financial debt payable within the year. Long term debt includes long term financial debts e.g. to credit institutions (loans, credits and bonds). As a robustness test, the determination of country characteristics on long term debt and short term debt is evaluated separately. The first research question focuses on bank loans where the longer maturity and duration of such loans particularises the relevance of country characteristics. The second research question focuses on total debt which includes both long term and short term debt. Whilst country characteristics are perceived to be more relevant for long term debt given the greater contractual obligations and screening involved (Cassar and Holmes, 2003), attention is placed on short term debt also. This is motivated by the study's curiosity to evaluate the extent of country characteristics on short term debt, if any. Total debt ratio is the main measure of the dependent variable, similar to Jõeveer (2013a: 2013b).

### **5.9.2.2 Derivation of Independent Variables**

In this sample, several independent variables are included. Definitions and sources are provided in Appendix (1). All independent variables are lagged one year (t-1), similar to Alves and Ferreira (2011) and Rajan and Zingales (1995) as noted under research question 1.

This section of the chapter represents the independent variables relating to the second research question. Firstly, firm characteristics are presented given their dominance in the extant literature. Appreciating this, the study conducts several equations of which firm characteristics are evaluated first in SME firm leverage followed by the country characteristics. This is outlined in chapter six of this study. For simplicity, this section outlines firm characteristics first followed by the country characteristics and several control variable including macroeconomic conditions and supply conditions.

### **Firm Characteristics**

Five firm characteristics are included, namely firm age, firm size, firm asset tangibility, firm profitability and the effective tax rate, extracted from the Bureau Van Dijk Amadeus dataset. Firm age is measured in years and is obtained by subtracting the firm's birth year from the year of the dataset. Firm age is employed by many studies including Michaelas *et al.* (1999) and Hall *et al.* (2004). This study expects a negative relationship between firm age and SME firm leverage. Firm size is defined as the natural log of the firm's total assets. Firm size is employed by many studies including Heyman *et al.* (2008) and López-Gracia and Sogorb-Mira (2008). Tangibility is defined as the ratio of tangible assets to total assets. Tangibility is employed by many studies including Daskalakis and Psillaki (2008), Psillaki and Daskalakis (2009) and Jõeveer (2013a: 2013b). Profitability is defined as the ratio of earnings before interest and taxes to total assets. Profitability is employed by many studies including López-Gracia and Sogorb-Mira (2008), Daskalakis and Psillaki (2008), Psillaki and Daskalakis (2009), Heyman *et al.* (2008) and Jõeveer (2013a: 2013b). Finally, the effective tax rate is defined as the ratio of total tax to earnings before tax. The effective tax rate is employed by studies including López-Gracia and Sogorb-Mira (2008). However, whilst previous studies consider the effective tax rate as a firm characteristic, this study employs the effective tax rate as a proxy for the tax environment.

## Country Characteristics

As per the first research question, the same country characteristics are used in addressing the second research question, details of which are presented in the earlier section 5.9.1.2. Referring to the information environment, the credit depth of information index is employed. This depicts the sharing of credit information. Extending the pecking order theory, Myers (1984) and Myers and Majluf (1984) consider asymmetric information and its impact on the financing costs of external finance. An increase in the sharing of credit information reduces information asymmetries and thus costs of external credit. Furthermore, under the agency theory, an increase in the sharing of credit information minimises conflicts of interest between the borrower and the lender. *De facto*, the sharing of credit information is perceived to impinge positively on firm leverage.

Considering the legal environment, private property protection is used. Demirgüç- Kunt and Maksimovic (1998) posit an effective legal system reduces both conflicts of interest coupled with information asymmetries through its capacity to mediate disputes and enforce contracts. *Ipsa facto*, stronger private property protection impinges positively on firm leverage. Beck *et al.* (2008) also employ this measure. Evaluating both the judicial and bankruptcy environment, in particular the quality of enforcement, the time, cost and procedure complexity of contract enforcement coupled with time, cost and recovery rates in resolving insolvency are included. Similar to the legal environment in which the agency theory proves most relevant, La Porta *et al.* (2000) refer to the content of law and the quality of enforcement under this paradigm. As a corollary of this, greater efficiency in judicial and bankruptcy enforcement is perceived to impinge positively on firm leverage. The measures used here are based on Djankov *et al.* (2003) and Djankov *et al.* (2008).

Alluding to the bankruptcy environment under the trade off theory in which Bradley *et al.* (1984) lends credence to the study of DeAngelo and Masulis (1980) highlighting several

‘leverage-related costs’, Bradley *et al.* (1984) defines the optimal capital structure as the trade-off between the tax advantage of debt and these leverage costs. Conventional wisdom stipulates high bankruptcy costs negatively affect firm leverage (De Jong *et al.* 2008). *Ipsa facto*, greater efficiency in terms of lower bankruptcy costs is perceived to positively impact on firm leverage.

Referring to the social environment, direct measures of values/beliefs are extracted from the European Social Survey (ESS, 2012). Guiso *et al.* (2011) refer to such measures. Furthermore, a measure for generalised trust is also employed from the European Social Survey (ESS, 2012). La Porta *et al.* (1997b) employ a similar measure from the World Values Survey. Under agency theory, whilst collateral is employed to minimise agency costs, emphasis is also placed on the closeness of the ‘working relationship between the lender and borrower’ (Binks and Ennew 1996, pp.18). A less traditional measure of the bank – borrower relationship is trust (Hernández-Cánovas and Martínez-Solano, 2010). Given the interrelatedness between social capital and trust, higher values of social capital and trustworthiness under the social environment are perceived to impinge positively on firm leverage. Finally, to measure the regulatory environment, the capital regulatory index is employed, derived from the Bank Regulation and Supervisory Survey (2013). This index is based on the work of Barth *et al.* (2001, 2004). A more stringent capital regulatory environment as denoted by the capital regulatory index is perceived to impinge adversely on firm leverage, requiring the use of more personal assets to obtain bank credit. Mac an Bhaird and Lucey (2009) note this following the emergence of more stringent capital requirements for banks in recent years.

## **Controls: Macroeconomic Conditions**

As per the first research question, the same macroeconomic variables are employed to address the second research question, presented earlier in section 5.9.1.2. Whilst macroeconomic variables are perceived to impact the availability of bank credit, macroeconomic variables may also impact firm leverage. To represent economic growth, the GDP annual growth rate, GDP per capita and domestic demand are included. Jõeveer (2013a) notes higher GDP growth serves as a proxy for growth opportunities and hypothesises a positive relationship to firm leverage. Beck *et al.* (2008) and Jõeveer (2013a: 2013b) also employ the GDP annual growth rate. Beck *et al.* (2008) also employs GDP per capita and Holton *et al.* (2013) also employs domestic demand.

This study expects an increase in the GDP annual growth rate, GDP per capita and domestic demand will be positively related to SME firm leverage.

To proxy for the stability of the value of the currency, inflation is employed, defined as the log difference of the Consumer Price Index (ECB, 2013c). Fan *et al.* (2012) stipulates high inflation provides uncertainty whilst Demirgüç-Kunt and Maksimovic (1998) posit high inflation can generate higher contracting costs. Beck *et al.* (2008), Jõeveer (2013a: 2013b) and Fan *et al.* (2012) employ inflation.

This study expects an increase in inflation will be negatively related to SME firm leverage.

Appreciating the effects of the recent financial and economic crisis, two measures are employed, a classification measure of a systemic banking crisis and a government and central bank support measure. This is derived from the work of Laeven and Valencia (2012).

This study expects higher government and central bank support and the classification of having a systemic banking crisis will be negatively related to SME firm leverage.

### **Controls: Supply of Credit**

Finally, to control for the supply of credit conditions, domestic savings per GDP, the 10 Year Government Bond Yield and deposits per GDP are included. Both Fan *et al.* (2012) and Jõeveer (2013b) employ domestic savings in their studies. This study expects an increase in domestic savings as a percentage of GDP will be positively related to SME firm leverage. Holton *et al.* (2012: 2013) employ the 10 year government bond yield. This study expects an increase in the 10 year government bond yield will be negatively related to SME firm leverage. Fan *et al.* (2012) also employs deposits per GDP. This study expects an increase in deposits per GDP will be positively related to SME firm leverage.

Table 5.8 presents the variables used in research question 2 including their measurement, expected relationship with the dependent variable, the total debt ratio and theoretical setting. Table 5.8 also notes the use of these variables by extant studies.

**Table 5.8: Variables used in Research Question 2**

Variables	Representation	Measurement	Previous Studies	Expected Relationship between Dependent and Independent Variables	Theory
<b>Dependent Variable:</b>					
Total Debt Ratio	SME Firm Leverage	% Measurement	Cassar and Holmes (2003); Hall <i>et al.</i> (2004).		Capital Structure Theory.
<b>Independent Variables: Firm Factors</b>					
Firm Age	Firm Age	Years	Michaelas <i>et al.</i> 1999; Hall <i>et al.</i> , 2004.	(-)	Capital Structure Theory.
Firm Size	Firm Size	% Measurement	Heyman <i>et al.</i> 2008; López-Gracia and Sogorb-Mira, 2008.	(+)	Capital Structure Theory.
Tangibility	Tangibility	% Measurement	Daskalakis and Psillaki, 2008; Psillaki and Daskalakis, 2009; Jöeveer, 2012.	(+)	Capital Structure Theory.
Profitability	Profitability	% Measurement	López-Gracia and Sogorb-Mira, 2008; Daskalakis and Psillaki, 2008; Heyman <i>et al.</i> 2008; Psillaki and Daskalakis, 2009.	(-)	Capital Structure Theory.
<b>Effective Tax Rate</b>	Effective Tax Rate	% Measurement	López-Gracia and Sogorb-Mira, 2008.	(+)	Capital Structure Theory.
<b>Independent Variables: Country Characteristics</b>					
Credit Depth of Information Index	Information Environment	Scale Measurement, ranging from 0 to 6. Higher values on this scale imply greater availability of credit information. We assume greater availability increases the sharing of credit information.	Klapper (2006).	(+)	Capital Structure Theory.
Private Property Protection	Legal Environment	Scale Measurement, ranging from 0 to 100. Higher values on this scale imply stronger protection for private property.	Beck <i>et al.</i> (2008).	(+)	Capital Structure Theory.
Cost to Enforce a Contract	Judicial Environment	% Measurement. Costs are measured as a percentage of the claim.	Based on the methodology used by Djankov <i>et al.</i> (2003).	(-)	Capital Structure Theory.
Time to Enforce a Contract	Judicial Environment	Time Measurement. The time is measured in calendar days.	Based on the methodology used by Djankov <i>et al.</i> (2003).	(-)	Capital Structure Theory.
Procedures to Enforce a Contract	Judicial Environment	Number Measurement. The number of procedures to enforce a contract.	Based on the methodology used by Djankov <i>et al.</i> (2003).	(-)	Capital Structure Theory.

Time to Resolve a Debt	Bankruptcy Environment	Time Measurement. The time is measured in years.	Based on the methodology used by Djankov <i>et al.</i> (2008).	(-)	Capital Structure Theory.
Cost to Resolve a Debt	Bankruptcy Environment	% Measurement. Costs are measured as a percentage of the value of debtor's estate.	Based on the methodology used by Djankov <i>et al.</i> (2008).	(-)	Capital Structure Theory.
Recovery Rate	Bankruptcy Environment	Value Measurement. Recovery Rate is measured in cents on the dollar.	Based on the methodology used by Djankov <i>et al.</i> (2008).	(+)	Capital Structure Theory.
Social Capital: <sup>11</sup> 3 Direct Measures of Values/Beliefs. Values (Insurance) Values (Stolen) Values (Traffic)	Social Environment	A 5 point Likert Scale. Not Wrong at all. A Bit Wrong. Wrong. Seriously Wrong. Don't Know.	Guiso, Sapienza and Zingales (2011).	(+)	Capital Structure Theory.
Trust <sup>11</sup>	Social Environment	Scale Measurement, ranging from 0 to 10 where 0 means you 'can't be too careful and 10 means that most people can be trusted.	La Porta, Lopez De Silanes, Shleifer and Vishny, (1997b)	(+)	Capital Structure Theory.
Capital Regulatory Index <sup>11</sup>	Regulatory Environment	Scale Measurement, ranging from 0 to 10. Higher values imply greater stringency.	Barth <i>et al.</i> (2001, 2004).	(-)	Capital Structure Theory.
<b>Controls: Macroeconomic Factors</b>					
GDP Annual Growth Rate	Economic Growth	% Measurement	Beck <i>et al.</i> (2008); Jõeveer (2013a; 2013b).	(+)	NA
GDP per Capita	Economic Growth	Current US \$	Beck <i>et al.</i> (2008).	(+)	NA
Domestic Demand	Economic Growth.	% Measurement	Holton <i>et al.</i> (2013).	(+)	NA
Inflation	Proxy for the stability of the value of the currency.	Log Difference	Beck <i>et al.</i> (2008); Jõeveer (2013a; 2013b) and Fan et a (2012).	(-)	NA
Government and Central Bank Support	Effects of the financial and economic crisis.	Scale Measurement, ranging from 4-8. This measure is defined as the number of support measures (scale of 4-8 across Europe) taken by government and central banks during the banking crisis, 2007-10, including deposit insurance and bank guarantees, capital injections, asset purchases, liquidity support measures, reduction of policy rates to the purchase of private securities.	Laeven and Valencia (2012).	(-)	NA

Systemic Banking Crisis	Effects of the financial and economic crisis.	Classification of a systemic banking crisis where 1 means a country is classified as having a systemic banking crisis and 0 means a country is classified as not having a systemic banking crisis.	Laeven and Valencia (2012).	(-)	NA
<b>Controls: Supply of Credit Conditions</b>					
Gross Domestic Savings	Proxy for the bank credit supply.	% GDP	Jõeveer (2013b) and Fan <i>et al.</i> (2012).	(+)	NA
10 Year Government Bond Yield	Proxy for the bank credit supply.	% Measurement	Holton <i>et al.</i> (2012, 2013).	(-)	NA
Deposits per GDP	Proxy for the bank credit supply.	% GDP	Fan <i>et al.</i> (2012).	(+)	NA

<sup>11</sup> Social values, trust and the capital regulation index have non-consecutive years of data. Data is only available for the following years: Social Values (2010), Trust (2004, 2006, 2008 and 2010) and Capital Regulation Index (2006, 2010).

## **5.10 Reliability, Replication and Validity of Research**

Both Bryman and Bell (2003) and Bryman and Cramer (2009) refer to the imperative criteria in which to gauge the quality of business research i.e. the criteria of reliability, replication and validity.

### **5.10.1 Reliability**

Reliability concerns itself with the ‘consistency of measures’ (Bryman and Bell 2003, pp. 74) which can take two forms, external and internal reliability (Bryman and Cramer, 2009). External reliability implies the variable does not vary greatly over time, i.e. it is stable. Internal reliability relates to ‘multiple-indicator variables’ such that if a variable is internally reliable, it is therefore perceived coherent (Bryman and Cramer 2009, pp. 23). Particularising this, if a respondent’s answers to each question are summed together to form an aggregated score, all indicators must relate to the same thing so as to ensure coherence (Bryman and Bell, 2003). Considering a further facet of reliability, Bryman and Bell (2003) lend credence to inter-observer consistency in which the recording of observations and the categorising of data by more than one observer may be subject to a degree of inconsistency.

To test for external reliability, the *test-retest reliability* is conducted in which a measure is obtained at two time periods where a high correlation is expected between these observations (Bryman and Bell, 2003). High correlation implies stable and reliable variables (Bryman and Bell, 2003). The results of the *test-retest reliability* are presented in Tables 5.9 and 5.10 for research question 1 and 2 respectively. The study adopts 2009 as the first time period and 2010 as the second time period unless owing to data availability issues; different time frames are thus employed.

In Table 5.9, the majority of the independent variables are highly reliable <sup>12</sup>. However, three variables appear less reliable, namely the capital regulatory index, inflation and the annual growth rate. One possible explanation for this result stems from the financial and economic crisis of 2008 (Laeven and Valencia, 2012) in which the aftershocks were witnessed in the instability of macroeconomic conditions i.e. annual growth rates and inflation rates in later years. The recent financial and economic crisis also resulted in changes to the capital regulatory environment. Most recently, the Basel Committee on Bank Supervision (BCBS) has introduced Base III which features ‘a redefined and higher capital requirement, a liquidity requirement....and still greater complexity’ (Caprio 2013, pp. 12). Adopting a longitudinal design addresses this issue of instability, facilitating an evaluation of how change in the independent variables per country and across countries can impact on the availability of SME bank credit.

<sup>12</sup> The variable, social values/beliefs are omitted from this analysis due to only having observations in one time period i.e. 2010. Moreover, firm characteristics derived from the EC/ECB Survey on Access to Finance of SMEs (ECB, 2012) are also omitted as different SMEs participate in the waves of the survey i.e. the survey has an unbalanced set of firms.

**Table 5.9: Test-Retest Reliability for Research Question 1**

<b>Independent Variables</b>	<b>Time Period (1)</b>	<b>Time Period (2)</b>	<b>Correlation</b>
<b>Banking Structure Characteristics</b>			
Bank Size: Large Bank	2009	2010	0.9956
Bank Size: Medium Bank	2009	2010	0.9848
Bank Size: Small Bank	2009	2010	0.9993
Bank Ownership: Domestic Bank	2009	2010	0.9994
Bank Ownership: Foreign Bank	2009	2010	0.8370
Bank Concentration	2009	2010	0.9416
Bank Lerner Index	2009	2010	0.8318
<b>Supply Characteristics</b>			
Government 10 Year Bond Yield	2009	2010	0.8810
Domestic Savings	2009	2010	0.9909
Deposits per GDP	2009	2010	0.9912
<b>Macroeconomic Characteristics</b>			
Inflation	2009	2010	0.3065
GDP per Cap	2009	2010	0.9929
Annual Growth Rate	2009	2010	-0.3370
Domestic Demand	2009	2010	0.7422
Government and Central Bank Support	2009	2010	1.0000
Systematic Crisis	2009	2010	1.0000
<b>Country Characteristics</b>			
Credit Depth of Information Index	2009	2010	1.0000
Private Property Rights	2009	2010	0.9723
Cost to Enforce a Contract	2009	2010	1.0000
Time to Enforce a Contract	2009	2010	0.9978
Procedures to Enforce a Contract	2009	2010	0.9991
Time to Recover a Debt	2009	2010	1.0000
Cost to Recover a Debt	2009	2010	0.9791
Recovery Rate	2009	2010	0.9970
Capital Regulatory Index	2006	2010	-0.0842
Social Trust	2006	2010	0.7450

The majority of the independent variables are shown to be highly reliable as illustrated in Table 5.10 <sup>13</sup>. However, several variables are low correlations, namely firm profitability, effective tax rate, inflation, domestic demand, capital regulatory index and trust values.

<sup>13</sup> The variable, social values/beliefs are omitted from this analysis due to only having observations in one time period i.e. 2010.

As per research question 1, the instability of the macroeconomic variables i.e. inflation and domestic demand stems from the financial and economic crisis of 2008 (Laeven and Valencia, 2012) in which its effects were felt in many European economies. Not surprising, whilst firm age, firm size and tangibility remain stable, firm profitability and the effective tax rate are less stable owing to the presence of the recent crisis. Finally, both the capital regulatory index and the trust values have low correlations. A similar result is present for the capital regulatory index under research question 1, attributable to the introduction of Basel III which commands a higher capital requirement (Caprio, 2013). In relation to the trust values, whilst the same values are employed in research question 1 and 2, the difference in the correlation under the *test-retest reliability* is attributed to the smaller sample of countries used in research question 2.

**Table 5.10: Test-Retest Reliability for Research Question 2**

<b>Independent Variables</b>	<b>Time Period (1)</b>	<b>Time Period (2)</b>	<b>Correlation</b>
<b>Firm Characteristics</b>			
Firm Age	2009	2010	1.0000
Firm Size	2009	2010	0.9960
Tangibility	2009	2010	0.9538
Profitability	2009	2010	0.5403
Effective Tax Rate	2009	2010	0.0314
<b>Supply Characteristics</b>			
Government 10 Year Bond Yield	2009	2010	0.7754
Domestic Savings	2009	2010	0.9991
Deposits per GDP	2009	2010	0.9804
<b>Macroeconomic Characteristics</b>			
Inflation	2009	2010	-0.5639
GDP per Cap	2009	2010	0.9997
Annual Growth Rate	2009	2010	-0.7467
Domestic Demand	2009	2010	-0.4169
Government and Central Bank Support	2009	2010	1.0000
Systematic Crisis	2009	2010	1.0000
<b>Country Characteristics</b>			
Credit Depth of Information Index	2009	2010	1.0000
Private Property Rights	2009	2010	0.9583
Cost to Enforce a Contract	2009	2010	1.0000
Time to Enforce a Contract	2009	2010	1.0000
Procedures to Enforce a Contract	2009	2010	1.0000
Time to Recover a Debt	2009	2010	1.0000
Cost to Recover a Debt	2009	2010	1.0000
Recovery Rate	2009	2010	0.9989
Capital Regulatory Index	2006	2010	-0.2813
Social Trust	2006	2010	0.1050

Issues surrounding internal reliability are non-applicable to this study given the idiosyncrasy of the variables employed. Moreover, given the study requires minimal ‘subjective judgement... in the recording of observations or the translation of data into categories’ (Bryman and Bell 2003, pp.77), concerns surrounding inter-observer consistency are irrelevant.

### **5.10.2 Replication**

Closely related to reliability, replication involves researchers replicating the research of others. *Ipsa facto*, for replication to occur, the research must be replicable where the availability of detailed procedures underpinning a piece of work must be made available (Bryman and Bell, 2003). As a corollary of this, derivation of the variables coupled with their definitions is presented in the data chapter. Moreover, the steps taken in the statistical models are also outlined.

### **5.10.3 Validity**

The final criterion in business research, validity gauges ‘the integrity of the conclusions’ (Bryman and Bell 2003, pp. 33) that stem from a piece of research. Differentiating between the tenets of validity, emphasis is placed on measurement validity, internal validity, external validity and ecological validity (Bryman and Bell, 2003).

#### **5.10.3.1 Measurement Validity**

Measurement validity centres around the measurement of a concept such that does the measure actually measure the concept in question (Bryman and Bell, 2003). Crystallising various facets of measurement validity, this provides a reflection surrounding the validity of a measure of a concept (Bryman and Bell, 2003). Particularising this, measurement validity is subcategorised by face validity, construct validity, convergent validity, concurrent validity and predictive validity (Bryman and Bell, 2003). This study focuses on the first three

categories of measurement validity as they are perceived more relevant. Availing of the opinion of experts in the research field helps to establish the face validity of a measure i.e. ‘whether on the face of it the measure seems to reflect the concept concerned’ (Bryman and Bell 2003, pp. 77). To strengthen the face validity of this study, the variables employed are similar to the variables employed in the work of key scholars albeit in different research contexts e.g. Klapper (2006) employs the credit depth of information index to represent the importance of shared credit information for small and medium enterprise factoring. Construct validity considers theoretical deduction of hypotheses relevant to the concept (Bryman and Bell, 2003). *Ipsa facto*, formulation of hypotheses deduced from a theoretical stance informs the study’s employment of relevant measures. Finally, convergent validity of a measure concerns itself with its comparison to other measures of the same concept (Bryman and Bell, 2003). Tests of convergent validity are conducted as part of the robustness testing.

### **5.10.3.2 Internal Validity**

Stemming from the issue of causality, internal validity considers whether a causal relationship is evident between two or more variables (Bryman and Bell, 2003). *Ipsa facto*, rigorous quantitative research remains contingent on the confidence in the causal inferences made by a researcher (Bryman and Bell, 2003). Unlike cross sectional design studies where internal validity is poor such that ‘associations rather than findings from which causal inferences can be unambiguously made’ (Bryman and Bell 2003, pp. 49), longitudinal design studies have a greater capacity to reduce some of the ambiguity surrounding the direction of causal influence. To test for causality, the Granger causality test is performed through the equations under research question 1 and 2 of the results chapter. The results illustrate that many of the explanatory variables Granger cause the dependent variables. *Ipsa facto*, the Granger causality tests evaluates whether ‘a variable X Granger causes Y’ (Koop 2005, pp. 187) such that past values of X may explain Y (Koop, 2005). Koop (2005) cautions the extent

of causality that can be tested, hence the term Granger causality as opposed to causality. This implies ‘if past values of X have explanatory power for current values of Y, it at least suggests that X might be causing Y’ (Koop 2005, pp. 187).

Posing as threats to internal validity, Srivastava (2011) lends credence to

- History: The occurrence of an event beyond the control of the study.
- Maturation: The maturity of the subjects.
- Testing Effects: The subject’s familiarity of the study and its intended purpose.
- Selection: Selection bias.
- Mortality: Changes in the participation of the sample study.

One key threat to internal validity is sample attrition (mortality) such that over the time frame of a study, the sample changes due to the subject’s circumstance e.g. a business closes down or an employee finds new employment (Bryman and Bell, 2003). Acknowledging the significance in minimising sample attrition, whilst the sample of firms extracted from the Bureau Van Dijk Amadeus database commands a balanced panel data such that the same firms are used throughout, an unbalanced panel dataset from the EC/ECB Survey on the Access to Finance of SMEs (ECB, 2012) is employed. Despite efforts made to obtain a balanced panel, this would have meant a severe reduction in the number of firm observations. As a corollary of this, the sample for the first research question is kept unbalanced.

### **5.10.3.3 External Validity**

Bryman and Bell (2003) lend credence to the generalisation of research beyond its contextual form such that the sample employed is representative. Moreover, issues surrounding generalisation are heightened with the adoption of cross sectional and longitudinal designs (Bryman and Bell, 2003). To ensure the representativity of a sample, probability sampling must be conducted where through the process of random selection; essentially selection bias is eliminated (Bryman and Bell, 2003). The two datasets of this study include the EC/ECB

Survey on the Access to Finance of SMEs (ECB, 2012) and the Bureau Van Dijk Amadeus database.

Considering the EC/ECB Survey on the Access to Finance of SMEs (ECB, 2012), the sample of firms were randomly selected from the Dun and Bradstreet database and then ‘stratified by firm size class, economic activity and country’ (SAFE User Guide 2014, pp.4). The EC/ECB Survey on the Access to Finance of SMEs (ECB, 2012) purposely modifies the number of firms in each strata of the sample activity and size class. The employment of appropriate weights provides correct results (SAFE User Guide 2014, pp.4). Stratification by firm size class ensures a proportional representation of micro (1 to 9 employees), small (10 to 49 employees), medium-sized firms (50 to 249 employees) and large firms (250 or more employees) (SAFE User Guide 2014, pp.4).

The selection of sample sizes for each economic activity aims to achieve representation of the four largest activities i.e. industry, construction, trade and services where their statistical stratification considers the following economic activities as per the European NACE-Nomenclature: ‘Enterprises from “mining and quarrying” (C), “manufacturing” (D) and “electricity, gas and water supply” (E) were combined into “industry”. “Construction” is simply “construction” (F). “Trade” includes “wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods” (G). “Services” include enterprises in “hotels and restaurants” (H), “transport, storage and communication” (I), “real estate, renting and business activities” (K), “education” (M), “health and social work” (N) and “other community, social and personal service activities” (O)’ (SAFE Guide 2014, pp.5). Agriculture, forestry, fishing (NACE A and B), financial intermediation (J), public administration (L), activities of households (P), extra-territorial organisations and bodies (Q) and holding companies’ were excluded from the sample (SAFE User Guide 2014, pp.5). Also private non-profit institutions were omitted (Safe User Guide 2014, pp.5).

The sample sizes in each country constitute a balancing between the cost of the survey and the representation of the euro area level (Safe User Guide 2014, pp.5). Of the eleven countries, the four largest euro area countries i.e. Germany, Spain, France and Italy are represented in the sample (Safe User Guide 2014, pp. 5) whilst there are some concerns for the remaining seven i.e. Austria, Belgium, Finland, Greece, Ireland, Netherlands and Portugal (Safe User Guide, 2014). From the fourth wave onwards, a larger sample of firms (500 firms) from these countries is selected to strengthen their representativity (SAFE User Guide 2014, pp.5). Occasionally, the EC/ECB Survey on the Access to Finance of SMEs (ECB, 2012) includes Estonia, Cyprus, Luxembourg, Malta, Slovenia and Slovakia in some of the waves. However, due to their ad hoc presence, the later countries are omitted from this study.

To reconcile the distorted proportions inherent to firm size and economic activity, the EC/ECB Survey on the Access to Finance of SMEs (ECB, 2012) employs post stratification or calibration weights (SAFE User Guide 2014, pp.6). Given the economic weight of firms changes with firm size, the survey uses weights ‘that restore the proportions of the economic weight of each size class, economic activity and country’ (SAFE User Guide 2014, pp.6). Here the number of employees serves as a proxy for economic weight (SAFE User Guide 2014, pp.6). As a corollary of this, the study weights all cases by the weight variable, *wgtCommon* (Safe User Guide, 2014).

Lending credence to the Bureau Van Dijk Amadeus database, only firms which meet the European Commission’s definition of a small and medium sized enterprise are selected. Particularising this, firms with a maximum of 249 employees, operating revenue (turnover) of less than or equal to €50 million and total assets (balance sheet total) of less than or equal to €43 million are chosen. Furthermore, these firms are private, independent (have a Bureau van Dijk Independence Indicator of AAA) and have no subsidiaries. Both Psillaki and Daskalakis (2009) and Daskalakis and Psillaki (2008) also select firms which meet the European

Commission's criteria of an SME. Corresponding to the first research question in which the EC/ECB Survey on the Access to Finance of SMEs (ECB, 2012) focuses on 11 European countries, six out of the eleven countries are considered in the second research question due to data accessibility issues and poor representation of some of the countries. Moreover, whilst the study adopts the time horizon of 2010-2011 in addressing research question 1, informed largely by data comparability issues and the relevance of this time period, the study adopts the time frame of 2005 - 2011 in addressing research question 2. This time frame is perceived appropriate, serving as a balance between continuing on the research in country characteristics and SME capital structure whilst providing sufficient data observations.

To ensure the external validity of the firm sample from the Bureau Van Dijk Amadeus database, the sample coverage is compared to the Small Business Act Fact File of the European Commission and the Structural Business Statistics of the Eurostat. The study evaluates the representativeness of the sample across number of SMEs per country and industry. Jõeveer (2013b) adopts a similar approach albeit compares her sample to data from 'Enterprises in Europe' by the European Commission and Eurostat. Considering the representativity of SMEs across countries, Germany, Ireland, Greece and the Netherlands are very poorly represented for research question 2. As a corollary of this, the study omits these countries for the second research question. Evaluating the representation of SMEs across industries, a number of industries including manufacturing, information and communication, mining and quarrying are over sampled in a number of countries whilst a number of industries such as professional, scientific and technical activities and electricity, gas, steam and air conditioning supply are under sampled.

#### 5.10.3.4 Ecological Validity

The typology of this validity concerns itself with the applicability of research to the real world such that the research findings are relevant to everyday life (Bryman and Bell, 2003). Bryman and Bell (2003, pp. 34) posit ‘if research findings are ecologically invalid, they are in a sense artefacts of the social scientist’s arsenal of data collection and analytic tools’. Strengthening the ecological validity of this study’s findings, many of the variables employed reflect the contextual setting of real world actualities, indicative to country, macroeconomic, bank structure and firm financial parameters. More specifically, the country characteristics include measures to represent the realities of the information, legal, judicial, bankruptcy, social and regulatory environments of each country in the sample. The measure for the information environment quantifies the sharing of credit information at a country level where consideration is placed on whether positive and negative credit information is shared, whether credit information for individuals and firms is available and whether borrowers have the legal capacity to access such information (World Bank, 2012a). Similarly, measures capturing the macroeconomic conditions and bank structure reveal the typicality of the macroeconomic environment and the structure of banking markets underpinning each country where each element is recorded at a national level. Derivation of firm factors from the Bureau Van Dijk Amadeus database further strengthens the ecological merit of the study where its validity is heightened in the reality of the firms’ financial data employed.

Lending credence to the utilisation of the questionnaire, Bryman and Bell (2003, pp. 35) posit ‘the unnaturalness....of having to answer a questionnaire may mean that the findings have limited ecological validity’. *Ipsa facto*, the study’s employment of questionnaire measures to capture the availability of SME credit and the social environment raises some concern. Such concerns are however reconciled through the typology of the questionnaires which require real world experience to answer the questions. Particularising this, quantifying the

availability of SME credit, SMEs were asked if they applied and negotiated for this type of finance over the last six months, did they receive it (ECB, 2012). Framing the question to a time period instils a certain precision, requiring SMEs to reflect on their real world experiences. A similar reconciliation is adopted for the questionnaire which captures the measure representing the social environment.

### **5.11 Conclusion**

Kothari (2004) perceives the methodology of research as ‘tools of...trade’. In knowing how research is executed facilitates a ‘disciplined thinking or a ‘bent of mind’ to observe the field objectively’ (Kothari 2004, pp.10). In this chapter, emphasis is placed on the philosophical orientation of the study, methodologies used in previous studies coupled with the research design, conceptual framework, data collection, selection of the sampling frame, method of analysis and description of data underpinning this work. Further emphasis is placed on reliability, replication and validity. Rigorous and potent research is the recognition of its counterpoint in reliability, replication and validity. As a corollary of this, the union of reliability, replication and validity is a sine qua non of true research.

In presenting the methodology of this study, some limitations are highlighted. Despite the merit of quantitative research, limitations are evident. In evaluating the second research question, the lack of data accessibility for Spanish SMEs warrants the attention of future research. Moreover, firm growth is not controlled for in this study. Furthermore, the sectoral coverage of the Bureau Van Dijk Amadeus database illustrates over/under sampling of several industries. This is also evident in extant studies including Jõeveer (2013b). Gómez-Salvador, Messina and Vallanti (2004, pp.474-475) find a ‘small bias towards employment in manufacturing’ but stipulate the ‘sectoral coverage is rather homogenous across countries and stable over time’ (Jõeveer, 2013b). Finally, given the low reliability of some of the variables employed presents a further limitation. The next chapter now presents the findings.

# **Chapter Six (Part A): Findings for Research**

## **Question 1**

*'To find is the thing.'*

*Pablo Picasso*

## **6.1 Introduction**

The preceding chapter presented the ‘how’ of the study i.e. the methodology. Part A of this chapter presents the descriptive statistics coupled with the empirical results relating to the first research question which seeks to address if country characteristics influence the likelihood of SME bank credit availability. Part B of this chapter presents the descriptive statistics coupled with the empirical results relating to the second research question which seeks to address whether country characteristics determine SME firm leverage.

## **6.2 Descriptive Statistics**

The following section presents the descriptive statistics for the full sample, per wave of the EC/ECB Survey of Access to Finance of SMEs (ECB, 2012) and per country. Descriptives across industries per country are also presented.

For the full sample, the credit denial mean is 0.223 which remains consistent across each of the three waves (See Table 6.01). Credit denial on average is deemed higher for SMEs in Ireland, Greece, Netherlands, Portugal and Spain, in contrast to SMEs from Austria, Belgium, Finland, France, Germany and Italy whose credit denial on average is lower. Whilst credit denial is evident across the sample, the mode reveals more often than not, credit is extended.

Across the assets of large, medium and small banks, there appears to be significant variation. In the full sample, medium sized banks have a stronger presence in comparison to all other bank sizes with several countries, namely Austria, Finland, Greece, Ireland and Portugal having no large sized banks (i.e. assets in excess of 0.5 per cent of the total consolidated assets of EU banks (ECB, 2013b)). Ireland reportedly has no small banks over this time frame. Across the three waves, noticeably there is a fall in the assets of large, medium and small banks. In comparing the assets of domestic banks and foreign banks, foreign banks are considerably smaller, approximately a tenth of the size of domestic banks. Germany has the

largest domestic banks whilst Ireland has the largest foreign banks. Similarly to large, medium and small banks, the assets of domestic and foreign banks are shown to fall across the three waves. Both measures of bank concentration indicate a highly concentrated banking market across the sample of countries with the bank concentration ratio increasing across the three waves. Conversely though, the Lerner Index falls across these waves implying there is less concentration albeit the fall is minimal.

Across the country characteristics, the credit depth of information index reveals the sharing of credit information is relatively high (mean 4.89) across the sample albeit there is a very slight decrease across the three waves. Both Austria and Germany are depicted to have the highest levels of credit information disclosure. Private property protection remains high in the sample with an increase in the protection of property rights across the three waves. Finland has the highest level of private property protection whilst Greece and Italy have the lowest. Referring to the efficiency of judicial enforcement, there is significant variation across the number of procedures to enforce a contract, the time to enforce a contract and the cost to enforce a contract. The three waves reveal a fall in the number of procedures, time and cost, implying greater judicial efficiency. Whilst Spain has the highest number of procedures to enforce a contract, Ireland has the lowest. Italy has the longest time and the highest costs to enforce a contact whilst Finland has the shortest time and Portugal has the lowest costs to enforce a contact.

Significant variation is also evident in the efficiency of bankruptcy enforcement, as depicted by the time to resolve a debt, the cost to resolve a debt and the recovery rate. The three waves reveal a fall in the cost to resolve a debt and a rise in the recovery rate, implying greater bankruptcy efficiency. Whilst the time to resolve a debt fell from wave three to wave four, it rose again in wave five. Both Greece and Portugal have the longest time to resolve a debt whilst Ireland has the shortest time. Austria has the highest costs to resolve a debt with

several countries, namely, Belgium, Finland and the Netherlands having the lowest costs. The recovery rate is the highest for Finland but the lowest for Greece.

Across the measures of social values and trust, there is some variation in the sample. Both Greece and Portugal have the highest social values in terms of how wrong it is to make an exaggerated or false insurance claim, to buy something stolen and commit a traffic offence. Finland has the highest levels of trustworthiness whilst Greece has the lowest levels. Finally, there is significant variation in the capital regulatory index across the sample. Belgium, France, Germany, Ireland, the Netherlands and Spain have the most stringent capital regulation whilst Austria and Portugal have the least stringent capital regulation.

Reflecting economic conditions, GDP per capita, the annual growth rate and domestic demand illustrate signs of a recovery following the aftermath of the recent financial and economic crisis. Indeed, between wave four (Sep 2010- Feb 2011) to wave five (April 2011- Sep 2011), the annual growth rate rises from -4.205 per cent to 1.044 per cent whilst domestic demand rises from -4.614 per cent to 1.464 per cent. The log difference of inflation reveals much instability with a maximum value of 0.771 and a minimum value of -0.398. Across the three waves, there is a considerable rise in inflation with Greece reporting the highest value and Belgium the lowest. Although the effects of the financial and economic crisis were hard felt by the sample of European countries, the effects were particularly pronounced in Greece, Ireland and Spain. Capturing the effects of this crisis, the government and central bank support measure reveals high levels of support afforded to all countries in the sample with support increasing across the three waves. The systemic banking crisis classification indicates several countries are classified as having a systemic bank crisis namely, Austria, Belgium, Germany, Greece, Ireland, the Netherlands and Spain. France, Italy and Portugal are classified as not having a systemic banking crisis. Across the supply of credit conditions, there appears to a fall in the supply of credit. Evaluating each wave of the

EC/ECB Survey on Access to Finance of SMEs (ECB, 2012), the 10 year government bond yield increases whilst domestic savings per GDP and deposits per GDP decrease. From wave four (Sep 2010- Feb 2011) to wave five (April 2011- Sep 2011), there is an increase in deposits per GDP. Greece has the highest 10 year government bond yield and the lowest domestic savings per GDP, implying a low supply of credit. Finland has the lowest deposits per GDP. In contrast, credit supply conditions in terms of the 10 year government bond yield, domestic savings and deposits per GDP are more favourable in Germany, Ireland and Spain. Indicative of this, Germany has the lowest 10 year government bond yield; Ireland has the highest domestic savings per GDP whilst Spain has the highest deposits per GDP.

**Table 6.01: Summary Statistics: Full Sample**

	Mean	Median	Standard Deviation	Max	Min	Mode	N
<b>Dependent Variable: Credit Denial</b>	0.223	0.000	0.416	1.000	0.000	0.000	4909
<b>Large Bank (€bn)</b>	2479.646	2073.300	2154.436	5914.500	0.000	0.000	4909
<b>Medium Bank (€bn)</b>	777.951	656.300	609.257	2315.050	74.700	1291.000	4909
<b>Small Bank (€bn)</b>	96.131	12.100	206.017	720.030	0.000	44.000	4909
<b>Domestic Bank (€bn)</b>	3353.741	2535.620	2500.482	7639.700	117.800	3408.000	4909
<b>Foreign Bank (€bn)</b>	325.007	236.300	197.809	821.800	98.330	333.000	4909
<b>Concentration %</b>	69.400	66.960	11.158	94.790	48.590	74.000	4909
<b>Lerner Index %</b>	0.209	0.200	0.040	0.330	0.030	0.000	4909
<b>Credit Index (scale)</b>	4.899	5.000	0.659	6.000	4.000	5.000	4909
<b>Private Property (scale)</b>	71.964	70.000	14.187	95.000	50.000	70.000	4909
<b>ProEnforce (number)</b>	33.212	33.000	5.718	41.000	21.000	37.000	4909
<b>TimeEnforce (days)</b>	631.031	515.000	312.781	1210.000	375.000	515.000	4909
<b>CostEnforce %</b>	19.227	17.400	5.719	29.900	13.000	14.000	4909
<b>TimeResolve (years)</b>	1.535	1.500	0.413	2.000	0.400	2.000	4909
<b>CostResolve %</b>	11.997	9.000	5.811	22.000	4.000	9.000	4909
<b>RecoveryRat (\$)</b>	64.677	67.600	14.987	89.400	43.200	68.000	4909
<b>Values Insurance (scale)</b>	3.284	3.346	0.219	3.686	3.034	3.000	1325
<b>Values Stolen (scale)</b>	3.338	3.392	0.160	3.565	3.117	3.000	1325
<b>Values Traffic (scale)</b>	3.022	2.909	0.218	3.434	2.727	3.000	1325
<b>Trust (scale)</b>	4.885	4.866	0.643	6.547	4.098	4.000	1325
<b>Regulatory (scale)</b>	7.071	8.000	1.331	8.000	4.000	8.000	1685
<b>GDP per Cap \$</b>	36584.79	39186.02	6691.76	50559.74	21381.90	31679.00	4909
<b>Annual Growth %</b>	-2.411	-3.147	2.992	4.012	-8.539	-4.000	4909
<b>Domestic Demand %</b>	-2.496	-3.000	4.166	4.000	-17.000	-4.000	4909
<b>Inflation (log)</b>	0.172	0.079	0.251	0.771	-0.398	0.000	4909
<b>Gov and CB Support (scale)</b>	6.771	7.000	0.581	8.000	6.000	7.000	4909
<b>Systematic Crisis (binary)</b>	0.571	1.000	0.495	1.000	0.000	1.000	4755
<b>10 Year Gov Bond Yield %</b>	4.064	3.970	1.100	9.090	2.740	4.000	4909
<b>Domestic Savings %</b>	19.300	19.810	4.869	31.080	7.110	22.000	4909
<b>Deposits per GDP %</b>	105.718	103.270	29.288	157.690	61.950	155.000	4909

Dependent variable is credit denial. All other variables are independent variables i.e. bank structure, country characteristics, macroeconomic conditions and credit supply conditions. Dependent variable is from 2010 and 2011 (t). Independent variables are from 2009 and 2010 (t-1).

**Table 6.02: Summary Statistics per Wave**

	Wave 3 (Mar 2010 – Aug 2010)	Wave 4 (Sept 2010 – Feb 2011)	Wave 5 (April 2011- Sept 2011)	Total	Wave 3 (Mar 2010 – Aug 2010)	Wave 4 (Sept 2010 – Feb 2011)	Wave 5 (April 2011- Sept 2011)	Total	
<b>Dependent Variable:</b>									
<b>Credit Denial</b>					<b>Credit Index (scale)</b>				
Mean	0.223	0.209	0.239	0.223	Mean	4.955	4.896	4.858	4.899
Median	0.000	0.000	0.000	0.000	Median	5.000	5.000	5.000	5.000
St. dev.	0.417	0.407	0.427	0.416	St. dev.	0.659	0.660	0.655	0.659
Max	1.000	1.000	1.000	1.000	Max	6.000	6.000	6.000	6.000
Min	0.000	0.000	0.000	0.000	Min	4.000	4.000	4.000	4.000
Mode	0.000	0.000	0.000	0.000	Mode	5.000	5.000	5.000	5.000
<b>Large Bank (€bn)</b>					<b>Private Property (scale)</b>				
Mean	2928.941	2269.238	2348.986	2479.646	Mean	70.088	71.012	74.531	71.964
Median	2073.300	1746.800	1768.680	2073.300	Median	70.000	70.000	80.000	70.000
St. dev.	2071.170	2158.418	2164.069	2154.436	St. dev.	14.240	15.209	12.514	14.187
Max	5849.100	5849.100	5914.500	5914.500	Max	95.000	95.000	90.000	95.000
Min	0.000	0.000	0.000	0.000	Min	50.000	50.000	55.000	50.000
Mode	2073.000	0.000	0.000	0.000	Mode	70.000	70.000	90.000	70.000
<b>Medium Bank(€bn)</b>					<b>Pro Enforce (No.)</b>				
Mean	893.675	731.045	736.244	777.951	Mean	34.023	32.969	32.823	33.212
Median	656.300	656.300	447.510	656.300	Median	34.000	33.000	33.000	33.000
St. dev.	616.391	577.379	625.594	609.257	St. dev.	5.493	5.864	5.671	5.7180
Max	1976.100	1976.100	2315.050	2315.05	Max	41.000	41.000	40.000	41.000
Min	74.700	74.700	82.570	74.700	Min	21.000	21.000	21.000	21.000
Mode	1291.000	656.30	253.85	1291.000	Mode	41.000	37.000	29.000	37.000
<b>Small Bank (€bn)</b>					<b>Time Enforce (days)</b>				
Mean	117.517	86.392	89.608	96.131	Mean	629.855	635.737	626.780	631.031
Median	12.100	12.100	9.030	12.100	Median	515.000	515.000	515.000	515.000
St. dev.	218.016	187.470	214.309	206.017	St. dev.	319.969	310.988	308.974	312.781
Max	607.100	607.100	720.030	720.03	Max	1210.000	1210.000	1210.000	1210.000
Min	0.000	0.000	0.000	0.000	Min	375.000	375.000	375.000	375.0005
Mode	44.000	12.100	4.390	44.000	Mode	515.000	515.000	515.000	15.000
<b>Domestic Bank (€bn)</b>					<b>Cost Enforce %</b>				
Mean	3940.156	3086.691	3174.837	3353.741	Mean	19.402	19.267	19.041	19.227
Median	3408.000	2415.200	2535.620	2535.62	Median	17.4000	17.400	17.400	17.400
St. dev.	2395.425	2506.467	2500.679	2500.482	St. dev.	5.787	5.776	5.598	5.719
Max	7639.700	7639.700	7517.460	7639.700	Max	29.900	29.900	29.900	29.900
Min	117.800	117.800	126.310	117.800	Min	13.000	13.000	13.000	13.000
Mode	3408.000	2415.200	6172.73	340800	Mode	17.000	14.400	14.400	14.000
<b>Foreign Bank (€bn)</b>					<b>Time Resolve (years)</b>				
Mean	347.765	339.857	290.201	325.007	Mean	1.578	1.514	1.523	1.535
Median	236.300	236.300	274.190	236.300	Median	1.500	1.500	1.500	1.500
St. dev.	215.133	221.140	143.932	197.809	St. dev.	0.343	0.433	0.438	0.413
Max	821.800	821.800	731.950	821.800	Max	2.000	2.000	2.000	2.000
Min	103.900	103.900	98.330	98.330	Min	0.400	0.400	0.400	0.400
Mode	333.000	236.300	212.24	333.000	Mode	2.000	1.800	1.900	2.000
<b>Concentration %</b>					<b>Cost Resolve %</b>				
Mean	68.020	69.222	70.712	69.400	Mean	12.965	12.070	11.133	11.997
Median	74.070	70.520	66.960	66.960	Median	9.000	9.000	9.000	9.000
St. dev.	10.740	12.582	9.560	11.158	St. dev.	5.681	5.986	5.589	5.811
Max	93.710	93.710	94.790	94.790	Max	22.000	22.000	22.000	22.000
Min	48.590	48.590	57.700	48.590	Min	4.000	4.000	4.000	4.000
Mode	74.000	54.420	63.800	74.000	Mode	9.000	9.000	9.000	9.000
<b>Lerner Index %</b>					<b>Recovery Rate \$</b>				
Mean	0.208	0.208	0.211	0.209	Mean	63.182	64.903	65.635	64.677
Median	0.200	0.200	0.220	0.200	Median	67.600	67.600	70.500	67.600
St. dev.	0.035	0.048	0.032	0.040	St. dev.	13.635	15.052	15.851	14.987
Max	0.330	0.330	0.270	0.330	Max	87.300	87.300	89.400	89.400
Min	0.030	0.030	0.090	0.030	Min	44.200	44.200	43.200	43.200
Mode	0.000	0.200	0.220	0.000	Mode	67.600	56.600	45.200	68.000

	Wave 3 (Mar 2010 – Aug 2010)	Wave 4 (Sept 2010 – Feb 2011)	Wave 5 (April 2011- Sept 2011)	Total		Wave 3 (Mar 2010 – Aug 2010)	Wave 4 (Sept 2010 – Feb 2011)	Wave 5 (April 2011- Sept 2011)	Total
<b>Values</b>					<b>Inflation (log)</b>				
<b>Insurance</b> (scale)*					Mean	0.034	0.050	0.419	0.172
Mean	NA	NA	3.284	3.284	Median	0.041	0.041	0.362	0.079
Median	NA	NA	3.346	3.346	St. dev.	0.150	0.207	0.158	0.251
St. dev.	NA	NA	0.219	0.219	Max	0.462	0.462	0.771	0.771
Max	NA	NA	3.686	3.686	Min	-0.398	-0.398	0.000	-0.398
Min	NA	NA	3.034	3.034	Mode	-0.046	-0.046	0.362	0.000
Mode	NA	NA	3.034	3.000	<b>Gov and CB</b>				
<b>Values (scale)</b>					<b>Support (scale)</b>				
<b>Stolen*</b>					Mean	6.753	6.770	6.786	6.771
Mean	NA	NA	3.338	3.338	Median	7.000	7.000	7.000	7.000
Median	NA	NA	3.392	3.392	St. dev.	0.524	0.608	0.596	0.581
St. dev.	NA	NA	0.160	0.16	Max	8.000	8.000	8.000	8.000
Max	NA	NA	3.565	3.565	Min	6.000	6.000	6.000	6.000
Min	NA	NA	3.117	3.117	Mode	7.000	7.000	7.000	7.000
Mode	NA	NA	3.117	3.000	<b>Systematic</b>				
<b>Values</b>					<b>Crisis (binary)</b>				
<b>Traffic (scale)*</b>					Mean	0.547	0.583	0.576	0.571
Mean	NA	NA	3.022	3.022	Median	1.000	1.000	1.000	1.000
Median	NA	NA	2.909	2.909	St. dev.	0.498	0.493	0.494	0.495
St. dev.	NA	NA	0.218	0.218	Max	1.000	1.000	1.000	1.000
Max	NA	NA	3.434	3.434	Min	0.000	0.000	0.000	0.000
Min	NA	NA	2.727	2.727	Mode	1.000	1.000	1.000	1.000
Mode	NA	NA	2.856	3.000	<b>10 Year Gov</b>				
<b>Trust</b>					<b>Bond Yield</b>				
<b>(scale)*</b>					%				
Mean	NA	NA	4.885	4.885	Mean	3.918	4.030	4.218	4.064
Median	NA	NA	4.866	4.866	Median	3.970	3.970	4.040	3.970
St. dev.	NA	NA	0.643	0.643	St. dev.	0.473	0.538	1.727	1.100
Max	NA	NA	6.547	6.547	Max	5.230	5.230	9.090	9.090
Min	NA	NA	4.098	4.098	Min	3.220	3.220	2.740	2.740
Mode	NA	NA	4.387	4.000	Mode	4.000	4.310	3.120	4.000
<b>Regulatory</b>					<b>Domestic</b>				
<b>(scale)</b>					<b>Savings %</b>				
Mean	NA	NA	7.071	7.071	Mean	19.454	19.302	19.173	19.3
Median	NA	NA	8.000	8.000	Median	20.190	20.190	19.810	19.81
St. dev.	NA	NA	1.331	1.331	St. dev.	4.013	5.219	5.095	4.869
Max	NA	NA	8.000	8.000	Max	31.080	31.080	30.470	31.08
Min	NA	NA	4.000	4.000	Min	7.110	7.110	8.260	7.110
Mode	NA	NA	8.000	8.000	Mode	22.000	18.320	17.030	22.000
<b>GDP per Cap</b>					<b>Deposits per</b>				
<b>%</b>					<b>GDP %</b>				
Mean	36566.96	37271.67	35840.16	36584.79	Mean	107.382	103.850	106.436	105.718
Median	35073.16	40270.16	39186.02	39186.02	Median	103.270	102.120	103.300	103.270
St. dev.	5731.36	6942.06	7044.691	6691.76	St. dev.	31.595	28.344	28.261	29.288
Max	50559.74	50559.74	46492.06	50559.74	Max	155.030	155.030	157.690	157.690
Min	22019.26	22019.26	21381.90	21381.90	Min	61.990	61.990	61.950	61.950
Mode	31678.96	35073.16	39186.02	31679.00	Mode	155.030	75.670	79.680	155.000
<b>Annual</b>					<b>Domestic</b>				
<b>Growth %</b>					<b>Demand %</b>				
Mean	-4.232	-4.205	1.044	-2.411	Mean	-4.501	-4.614	1.464	-2.496
Median	-3.832	-3.832	1.725	-3.147	Median	-4.000	-4.000	3.000	-3.000
St. dev.	1.081	1.306	2.252	2.992	St. dev.	2.630	3.132	3.202	4.166
Max	-2.801	-2.801	4.012	4.012	Max	-1.000	-1.000	4.000	4.000
Min	-8.539	-8.539	-4.943	-8.539	Min	-17.000	-17.000	-8.000	-17.00
Mode	-3.832	-5.494	1.725	-4.000	Mode	-4.000	-4.000	3.000	-4.000
<b>Number of</b>	1362	1862	1685	4909	<b>Number of</b>	1362	1862	1685	4909
<b>obs.</b>					<b>obs.</b>				

Dependent variable is credit denial. All other variables are independent variables i.e. bank structure, country characteristics, macroeconomic conditions and credit supply conditions. Wave three: Dependent Variable is taken from 2010. Independent variables are taken from 2009. Wave four: Dependent Variable is taken from 2010-2011. Independent variables are taken from 2009. Wave five: Dependent Variable is taken from 2011. Independent variables are taken from 2010. \*Social values, trust and regulation are only available for 2010 i.e. only wave five.

**Table 6.03: Summary Statistics per Country**

	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
<b>Dependent Variable: Credit Denial</b>											
Mean	0.070	0.137	0.052	0.159	0.142	0.377	0.462	0.213	0.352	0.304	0.302
Median	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
St. dev.	0.257	0.344	0.223	0.366	0.350	0.485	0.500	0.410	0.479	0.461	0.459
Max	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mode	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<b>Large Bank (€bn)</b>											
Mean	0.000	510.328	0.000	5872.269	4893.012	0.000	0.000	1753.459	2079.994	0.000	2159.468
Median	0.000	513.700	0.000	5849.100	5056.500	0.000	0.000	1746.800	2148.600	0.000	2073.300
St. dev.	0.000	4.313	0.000	31.298	259.313	0.000	0.000	10.073	88.918	0.000	126.638
Max	0.000	513.700	0.000	5914.500	5056.500	0.000	0.000	1768.680	2148.600	0.000	2345.380
Min	0.000	504.830	0.000	5849.100	4482.390	0.000	0.000	1746.800	1965.650	0.000	2073.300
Mode	0.000	513.700	0.000	5849.100	5056.500	0.000	0.000	1746.800	2148.600	0.000	2073.300
<b>Medium Bank (€bn)</b>											
Mean	742.726	77.692	106.408	250.460	2072.622	388.704	485.984	687.225	385.076	400.401	1235.689
Median	746.5	74.7	102.600	248.600	1976.100	385.300	517.300	656.300	378.900	395.700	1290.900
St. dev.	5.015	3.827	4.131	2.512	153.096	4.138	34.823	46.780	8.005	6.075	81.141
Max	746.5	82.570	110.860	253.850	2315.050	393.720	517.300	757.910	395.370	408.220	1290.900
Min	736.09	74.700	102.600	248.600	1976.100	385.300	447.510	656.300	378.900	395.700	1116.570
Mode	746.500	74.700	102.600	248.600	1976.100	385.300	517.300	656.300	378.900	395.700	1290.900
<b>Small Bank (€bn)</b>											
Mean	121.035	1.991	15.320	3.944	639.259	0.944	0.000	11.166	2.474	5.730	41.385
Median	121.3	1.9	15.200	3.700	607.100	0.900	0.000	12.100	2.200	5.700	43.700
St. dev.	0.352	0.117	0.130	0.330	51.008	0.054	0.000	1.413	0.355	0.039	3.402
Max	121.3	2.140	15.460	4.390	720.030	1.010	0.000	12.100	2.930	5.780	43.700
Min	120.57	1.900	15.200	3.700	607.100	0.900	0.000	9.030	2.200	5.700	36.390
Mode	121.300	1.900	15.200	3.700	607.100	0.900	0.000	12.100	2.200	5.700	43.700
<b>Domestic Bank (€bn)</b>											
Mean	863.765	590.015	121.723	6126.669	7604.890	389.649	485.984	2451.850	2467.540	406.131	3436.614
Median	867.8	590.3	117.800	6101.400	7639.700	386.200	517.300	2415.200	2529.700	401.400	3408.000
St. dev.	5.362	0.365	4.256	34.135	55.213	4.192	34.823	55.440	80.564	6.114	42.053
Max	867.8	590.300	126.310	6172.730	7639.700	394.730	517.300	2535.620	2529.700	414.000	3498.350
Min	856.67	589.550	117.800	6101.400	7517.460	386.200	447.510	2415.200	2363.940	401.400	3408.000
Mode	867.800	590.300	117.800	6101.400	7639.700	386.200	517.300	2415.200	2529.700	401.400	3408.000
<b>Foreign Bank (€bn)</b>											
Mean	272.857	585.239	298.016	213.893	659.528	101.648	781.483	234.133	202.813	112.583	325.334
Median	272.1	600	264.300	214.800	771.100	103.900	821.800	236.300	118.400	109.500	332.700
St. dev.	1.007	18.881	36.573	1.225	176.967	2.737	44.832	3.278	109.404	3.984	10.826
Max	274.19	600.000	337.430	214.800	771.100	103.900	821.800	236.300	343.500	117.710	332.700
Min	272.1	561.170	264.300	212.240	379.300	98.330	731.950	229.180	118.400	109.500	309.440
Mode	272.100	600.000	264.300	214.800	771.100	103.900	821.800	236.300	118.400	109.500	332.700
<b>Concentration %</b>											
Mean	51.892	87.169	94.208	62.909	76.315	65.371	68.923	56.563	84.616	85.204	73.677
Median	48.590	88.29	93.710	62.420	75.880	64.930	70.520	54.420	89.090	85.080	74.070
St. dev.	4.389	1.434	0.540	0.660	0.688	0.536	1.776	3.241	5.798	0.160	0.577
Max	57.700	88.290	94.790	63.800	77.400	66.020	70.520	61.460	89.090	85.410	74.070
Min	48.590	85.340	93.710	62.420	75.880	64.930	66.960	54.420	77.160	85.080	72.830
Mode	48.590	88.290	93.710	62.420	75.880	64.930	70.520	54.420	89.090	85.080	74.070
<b>Lerner Index %</b>											
Mean	0.211	0.221	0.058	0.207	0.191	0.228	0.303	0.200	0.160	0.250	0.224
Median	0.200	0.21	0.030	0.200	0.180	0.240	0.330	0.200	0.130	0.250	0.240
St. dev.	0.014	0.015	0.030	0.010	0.018	0.015	0.030	0.000	0.039	0.000	0.023
Max	0.230	0.240	0.090	0.220	0.220	0.240	0.330	0.200	0.210	0.250	0.240
Min	0.200	0.210	0.030	0.200	0.180	0.210	0.270	0.200	0.130	0.250	0.190
Mode	0.200	0.210	0.030	0.200	0.180	0.240	0.330	0.200	0.130	0.250	0.240

	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
<b>Credit Index (scale)</b>											
Mean	6.000	4.000	4.000	4.000	6.000	5.000	5.000	5.000	5.000	5.000	5.000
Median	6.000	4.000	4.000	4.000	6.000	5.000	5.000	5.000	5.000	5.000	5.000
St. dev.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Max	6.000	4.000	4.000	4.000	6.000	5.000	5.000	5.000	5.000	5.000	5.000
Min	6.000	4.000	4.000	4.000	6.000	5.000	5.000	5.000	5.000	5.000	5.000
Mode	6.000	4.000	4.000	4.000	6.000	5.000	5.000	5.000	5.000	5.000	5.000
<b>Private Property (scale)</b>											
Mean	90.000	80.000	92.695	73.543	90.000	54.043	90.000	51.522	90.000	70.000	70.000
Median	90.000	80.000	95.000	70.000	90.000	50.000	90.000	50.000	90.000	70.000	70.000
St. dev.	0.000	0.000	2.501	4.786	0.000	4.914	0.000	2.302	0.000	0.000	0.000
Max	90.000	80.000	95.000	80.000	90.000	60.000	90.000	55.000	90.000	70.000	70.000
Min	90.000	80.000	90.000	70.000	90.000	50.000	90.000	50.000	90.000	70.000	70.000
Mode	90.000	80.000	95.000	70.000	90.000	50.000	90.000	50.000	90.000	70.000	70.000
<b>ProEnforce (No.)</b>											
Mean	25.000	26.000	33.000	29.000	30.000	39.000	21.000	37.000	26.000	34.000	40.683
Median	25.000	26.000	33.000	29.000	30.000	39.000	21.000	37.000	26.000	34.000	41.000
St. dev.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.465
Max	25.000	26.000	33.000	29.000	30.000	39.000	21.000	37.000	26.000	34.000	41.000
Min	25.000	26.000	33.000	29.000	30.000	39.000	21.000	37.000	26.000	34.000	40.000
Mode	25.000	26.000	33.000	29.000	30.000	39.000	21.000	37.000	26.000	34.000	41.000
<b>TimeEnforce (days)</b>											
Mean	397.000	505.000	375.000	390.000	394.000	988.302	515.000	1210.000	514.000	547.000	515.000
Median	397.000	505.000	375.000	390.000	394.000	960.000	515.000	1210.000	514.000	547.000	515.000
St. dev.	0.000	0.000	0.000	0.000	0.000	34.399	0.000	0.000	0.000	0.000	0.000
Max	397.000	505.000	375.000	390.000	394.000	1030.000	515.000	1210.000	514.000	547.000	515.000
Min	397.000	505.000	375.000	390.000	394.000	960.000	515.000	1210.000	514.000	547.000	515.000
Mode	397.000	505.000	375.000	390.000	394.000	960.000	515.000	1210.000	514.000	547.000	515.000
<b>CostEnforce %</b>											
Mean	18.000	17.700	13.300	17.400	14.400	14.400	26.900	29.900	24.400	13.000	17.200
Median	18.000	17.700	13.300	17.400	14.400	14.400	26.900	29.900	24.400	13.000	17.200
St. dev.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Max	18.000	17.700	13.300	17.400	14.400	14.400	26.900	29.900	24.400	13.000	17.200
Min	18.000	17.700	13.300	17.400	14.400	14.400	26.900	29.900	24.400	13.000	17.200
Mode	18.000	17.700	13.300	17.400	14.400	14.400	26.900	29.900	24.400	13.000	17.200
<b>TimeResolve (years)</b>											
Mean	1.100	0.900	0.900	1.900	1.200	2.000	0.400	1.800	1.100	2.000	1.500
Median	1.100	0.900	0.900	1.900	1.200	2.000	0.400	1.800	1.100	2.000	1.500
St. dev.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Max	1.100	0.900	0.900	1.900	1.200	2.000	0.400	1.800	1.100	2.000	1.500
Min	1.100	0.900	0.900	1.900	1.200	2.000	0.400	1.800	1.100	2.000	1.500
Mode	1.100	0.900	0.900	1.900	1.200	2.000	0.400	1.800	1.100	2.000	1.500
<b>CostResolve %</b>											
Mean	18.000	4.000	4.000	9.000	8.000	9.000	9.000	22.000	4.000	9.000	13.733
Median	18.000	4.000	4.000	9.000	8.000	9.000	9.000	22.000	4.000	9.000	15.000
St. dev.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.862
Max	18.000	4.000	4.000	9.000	8.000	9.000	9.000	22.000	4.000	9.000	15.000
Min	18.000	4.000	4.000	9.000	8.000	9.000	9.000	22.000	4.000	9.000	11.000
Mode	18.000	4.000	4.000	9.000	8.000	9.000	9.000	22.000	4.000	9.000	15.000
<b>RecoveryRat (scale)</b>											
Mean	72.080	86.794	88.268	44.877	80.599	43.796	86.959	57.026	82.400	70.602	68.518
Median	71.500	86.300	87.300	44.700	80.200	44.200	86.600	56.600	82.700	69.400	67.600
St. dev.	0.771	0.632	1.050	0.239	0.632	0.491	0.399	0.645	0.389	1.553	1.350
Max	73.100	87.600	89.400	45.200	81.600	44.200	87.400	58.000	82.700	72.600	70.500
Min	71.500	86.300	87.300	44.700	80.200	43.200	86.600	56.600	81.900	69.400	67.600
Mode	71.500	86.300	87.300	44.700	80.200	44.200	86.600	56.600	82.700	69.400	67.600
<b>Values Insurance (scale)*</b>											
Mean	NA	3.175	3.346	3.034	3.072	3.686	3.462	NA	3.464	3.504	3.358
Median	NA	3.175	3.346	3.034	3.072	3.686	3.462	NA	3.464	3.504	3.358
St. dev.	NA	0.000	0.000	0.000	0.000	0.000	0.000	NA	0.000	0.000	0.000
Max	NA	3.175	3.346	3.034	3.072	3.686	3.462	NA	3.464	3.504	3.358
Min	NA	3.175	3.346	3.034	3.072	3.686	3.462	NA	3.464	3.504	3.358
Mode	NA	3.175	3.346	3.034	3.072	3.686	3.462	NA	3.464	3.504	3.358

	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
<b>Values</b>											
<b>Stolen (scale)*</b>											
Mean	NA	3.167	3.483	3.117	3.358	3.557	3.392	NA	3.325	3.565	3.400
Median	NA	3.167	3.483	3.117	3.358	3.557	3.392	NA	3.325	3.565	3.400
St. dev.	NA	0.000	0.000	0.000	0.000	0.000	0.000	NA	0.000	0.000	0.000
Max	NA	3.167	3.483	3.117	3.358	3.557	3.392	NA	3.325	3.565	3.400
Min	NA	3.167	3.483	3.117	3.358	3.557	3.392	NA	3.325	3.565	3.400
Mode	NA	3.167	3.483	3.117	3.358	3.557	3.392	NA	3.325	3.565	3.400
<b>Values</b>											
<b>Traffic (scale)*</b>											
Mean	NA	2.956	2.880	2.856	2.849	3.434	2.909	NA	2.727	3.422	3.098
Median	NA	2.956	2.880	2.856	2.849	3.434	2.909	NA	2.727	3.422	3.098
St. dev.	NA	0.000	0.000	0.000	0.000	0.000	0.000	NA	0.000	0.000	0.000
Max	NA	2.956	2.880	2.856	2.849	3.434	2.909	NA	2.727	3.422	3.098
Min	NA	2.956	2.880	2.856	2.849	3.434	2.909	NA	2.727	3.422	3.098
Mode	NA	2.956	2.880	2.856	2.849	3.434	2.909	NA	2.727	3.422	3.098
<b>Trust (scale)</b>											
Mean	NA	5.045	6.547	4.387	4.866	4.098	5.387	NA	6.157	4.229	5.258
Median	NA	5.045	6.547	4.387	4.866	4.098	5.387	NA	6.157	4.229	5.258
St. dev.	NA	0.000	0.000	0.000	0.000	0.000	0.000	NA	0.000	0.000	0.000
Max	NA	5.045	6.547	4.387	4.866	4.098	5.387	NA	6.157	4.229	5.258
Min	NA	5.045	6.547	4.387	4.866	4.098	5.387	NA	6.157	4.229	5.258
Mode	NA	5.045	6.547	4.387	4.866	4.098	5.387	NA	6.157	4.229	5.258
<b>Regulatory (scale)</b>											
Mean	4.000	8.000	6.000	8.000	8.000	7.000	8.000	6.000	8.000	4.000	8.000
Median	4.000	8.000	6.000	8.000	8.000	7.000	8.000	6.000	8.000	4.000	8.000
St. dev.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Max	4.000	8.000	6.000	8.000	8.000	7.000	8.000	6.000	8.000	4.000	8.000
Min	4.000	8.000	6.000	8.000	8.000	7.000	8.000	6.000	8.000	4.000	8.000
Mode	4.000	8.000	6.000	8.000	8.000	7.000	8.000	6.000	8.000	4.000	8.000
<b>GDP per Cap %</b>											
Mean	45455.70	43501.98	44380.63	40026.69	40234.38	27400.13	48734.50	34673.68	47534.34	21779.94	31103.83
Median	45872.22	43834.1	44837.71	40487.89	40270.16	28451.92	50559.74	35073.16	48173.91	22019.26	31678.96
St. dev.	553.514	424.832	495.808	623.019	56.756	1278.391	2029.632	604.289	828.918	309.251	845.243
Max	45872.22	43834.10	44837.71	40487.89	40270.16	28451.92	50559.74	35073.16	48173.91	22019.26	31678.96
Min	44723.20	42960.42	43846.30	39186.02	40144.51	25850.50	46492.06	33760.59	46468.40	21381.90	29862.96
Mode	45872.22	43834.10	44837.71	40487.89	40270.162	28451.92	50559.74	35073.16	48173.91	22019.26	31678.96
<b>Annual Growth %</b>											
Mean	-1.795	-0.853	-3.051	-1.421	-2.538	-3.866	-3.352	-3.298	-1.719	-1.089	-2.682
Median	-3.822	-2.801	-8.539	-3.147	-5.145	-3.136	-5.456	-5.494	-3.668	-2.908	-3.832
St. dev.	2.693	2.491	5.952	2.331	4.136	0.888	2.340	3.323	2.525	2.351	1.690
Max	1.769	2.323	3.363	1.725	4.012	-3.136	-0.766	1.723	1.528	1.936	-0.201
Min	-3.822	-2.801	-8.539	-3.147	-5.145	-4.943	-5.456	-5.494	-3.668	-2.908	-3.832
Mode	-3.822	-2.801	-8.539	-3.147	-5.145	-3.136	-5.456	-5.494	-3.668	-2.908	-3.832
<b>Domestic Demand %</b>											
Mean	0.450	-0.959	-1.390	-0.874	-0.291	-4.404	-12.962	-1.870	-1.500	-1.372	-5.466
Median	-1.000	-4.000	-6.000	-3.000	-2.000	-4.000	-17.000	-4.000	-3.000	-4.000	-8.000
St. dev.	1.927	3.890	5.001	2.871	2.710	0.491	4.491	3.223	1.944	3.396	3.724
Max	3.000	4.000	4.000	3.000	4.000	-4.000	-8.000	3.000	1.000	3.000	0.000
Min	-1.000	-4.000	-6.000	-3.000	-2.000	-5.000	-17.000	-4.000	-3.000	-4.000	-8.000
Mode	-1.000	-4.000	-6.000	-3.000	-2.000	-4.000	-17.000	-4.000	-3.000	-4.000	-8.000
<b>Inflation (log)</b>											
Mean	0.182	-0.031	0.382	0.148	0.053	0.587	0.000	0.165	0.016	0.399	0.129
Median	0.079	-0.398	0.301	0.041	-0.046	0.462	0.000	0.079	-0.155	0.380	-0.046
St. dev.	0.136	0.470	0.088	0.144	0.157	0.152	0.000	0.130	0.222	0.247	0.256
Max	0.362	0.568	0.477	0.342	0.301	0.771	0.000	0.362	0.301	0.431	0.505
Min	0.079	-0.398	0.301	0.041	-0.046	0.462	0.000	0.079	-0.155	0.380	-0.046
Mode	0.079	-0.398	0.301	0.041	-0.046	0.462	0.000	0.079	-0.155	0.380	-0.046

	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
<b>Gov and CB Support (scale)</b>											
Mean	8.000	7.000	7.000	7.000	7.000	6.000	8.000	6.000	7.000	6.000	7.000
Median	8.000	7.000	7.000	7.000	7.000	6.000	8.000	6.000	7.000	6.000	7.000
St. dev.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Max	8.000	7.000	7.000	7.000	7.000	6.000	8.000	6.000	7.000	6.000	7.000
Min	8.000	7.000	7.000	7.000	7.000	6.000	8.000	6.000	7.000	6.000	7.000
Mode	8.000	7.000	7.000	7.000	7.000	6.000	8.000	6.000	7.000	6.000	7.000
<b>Systematic Crisis (binary)*</b>											
Mean	1.000	1.000	NA	0.000	1.000	1.000	1.000	0.000	1.000	0.000	1.000
Median	1.000	1.000	NA	0.000	1.000	1.000	1.000	0.000	1.000	0.000	1.000
St. dev.	0.000	0.000	NA	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Max	1.000	1.000	NA	0.000	1.000	1.000	1.000	0.000	1.000	0.000	1.000
Min	1.000	1.000	NA	0.000	1.000	1.000	1.000	0.000	1.000	0.000	1.000
Mode	1.000	1.000	NA	0.000	1.000	1.000	1.000	0.000	1.000	0.000	1.000
<b>10 Year Gov Bond Yield %</b>											
Mean	3.683	3.641	3.403	3.462	3.083	6.755	5.571	4.228	3.428	4.657	4.059
Median	3.94	3.82	3.740	3.650	3.220	5.170	5.230	4.310	3.690	4.210	3.970
St. dev.	0.342	0.229	0.365	0.254	0.217	1.926	0.379	0.124	0.340	0.577	0.130
Max	3.94	3.820	3.740	3.650	3.220	9.090	5.990	4.310	3.690	5.400	4.250
Min	3.23	3.350	3.010	3.120	2.740	5.170	5.230	4.040	2.990	4.210	3.970
Mode	3.940	3.820	3.740	3.650	3.220	5.170	5.230	4.310	3.690	4.210	3.970
<b>Domestic Savings %</b>											
Mean	25.641	22.652	20.015	17.088	21.856	7.575	30.806	18.253	25.668	12.672	21.659
Median	25.550	22.53	20.190	17.120	21.380	7.110	31.080	18.320	25.390	12.800	22.140
St. dev.	0.120	0.156	0.190	0.043	0.754	0.565	0.304	0.101	0.360	0.165	0.707
Max	25.800	22.850	20.190	17.120	23.050	8.260	31.080	18.320	26.130	12.800	22.140
Min	25.550	22.530	19.810	17.030	21.380	7.110	30.470	18.100	25.390	12.460	20.620
Mode	25.550	22.530	20.190	17.120	21.380	7.110	31.080	18.320	25.390	12.800	22.140
<b>Deposits per GDP %</b>											
Mean	98.252	103.624	61.972	78.066	115.898	102.597	112.803	78.178	133.283	116.158	155.872
Median	99.060	103.27	61.990	77.180	116.670	102.120	111.870	75.670	134.250	113.650	155.030
St. dev.	1.074	0.452	0.020	1.196	1.224	0.580	1.038	3.794	1.254	3.241	1.238
Max	99.060	104.200	61.990	79.680	116.670	103.300	113.950	83.910	134.250	120.330	157.690
Min	96.830	103.270	61.950	77.180	113.960	102.120	111.870	75.670	131.670	113.650	155.030
Mode	99.060	103.270	61.990	77.180	116.670	102.120	111.870	75.670	134.250	113.650	155.030
<b>Number of obs.</b>	240	292	154	892	604	371	156	897	128	253	922

Dependent variable is credit denial. All other variables are independent variables i.e. bank structure, country characteristics, macroeconomic conditions and credit supply conditions. Dependent variable is from 2010 and 2011 (t). Independent variables are from 2009 and 2010 (t-1). \*Social values are not available for Austria and Italy. Systemic banking crisis not available for Finland

## Descriptives across Industries per Country

There appears to be significant variation across the industries of the sample. In Austria, Belgium, Finland, France, Germany, the Netherlands and Spain, ‘Other Services’ is the most dominant industry. ‘Other Services’ include enterprises in “hotels and restaurants” (H), “transport, storage and communication” (I), “real estate, renting and business activities” (K), “education” (M), “health and social work” (N) and “other community, social and personal service activities” (O)’ (Safe User Guide 2014, pp. 5). Noticeably, the wholesale or retail trade are the dominant industries in Greece and Ireland whilst manufacturing is the dominant industry in Italy and Portugal. Manufacturing also includes electricity, gas and water supply as well as mining and quarrying (See Table 6.04).

**Table 6.04: Descriptives across Industries per Country**

	Austria	Belgium	Finland	France	Germany	Greece	Ireland	Italy	Netherlands	Portugal	Spain
<b>Construction</b>	16 (6.7)	33 (11.3)	27 (17.5)	69 (7.7)	49 (8.1)	21 (5.7)	13 (8.3)	71 (7.9)	14 (10.9)	45 (17.8)	128 (13.9)
<b>Manufacturing</b>	58 (24.2)	59 (20.2)	43 (27.9)	197 (22.1)	152 (25.2)	89 (24.0)	31 (19.9)	(408) (45.5)	16 (12.5)	77 (30.4)	201 (21.8)
<b>Wholesale or Retail Trade</b>	57 (23.8)	81 (27.7)	16 (10.4)	258 (28.9)	103 (17.1)	205 (55.3)	66 (42.3)	148 (16.5)	36 (28.1)	47 (18.6)	183 (19.8)
<b>Other Services to businesses or persons</b>	81 (33.8)	103 (35.3)	56 (36.4)	268 (30.0)	211 (34.9)	29 (7.8)	41 (26.3)	173 (19.3)	46 (35.9)	62 (24.5)	299 (32.4)
<b>Missing</b>	28 (11.7)	16 (5.5)	12 (7.8)	100 (11.2)	89 (14.7)	27 (7.3)	5 (3.2)	97 (10.8)	16 (12.5)	22 (8.7)	111 (12.0)
<b>Total</b>	240 (100)	292 (100)	154 (100)	892 (100)	604 (100)	371 (100)	156 (100)	897 (100)	128 (100)	253 (100)	922 (100)

Table 6.04 reports the number of firms by country and sector. Percentages are in parentheses.

## 6.3 Empirical Results

To evaluate country characteristics on the likelihood of bank credit denial, the following logistic regression is estimated:

$$V_{i,t} = \beta_1 + \beta_2 x_{2it} + \beta_3 x_{3it} + \varepsilon$$

where  $V_{i,t}$  is the dependent variable indicating whether firm  $i$  is credit denied or not,  $\beta_2$  and  $\beta_3$  represent the various independent variables including bank structure, country characteristics,

macroeconomic factors and credit supply conditions.  $\varepsilon$  is the residual. Several equations are conducted, adopting a stepwise approach. In equation 1, to evaluate if differences across bank structure (4 proxies) and macroeconomic conditions in SME credit denial are evident, credit denial is regressed on bank size, bank ownership, bank competition and macroeconomic conditions.

$$V_{i,t} = \beta_1 + \beta(\text{Bank Structure})_{i,t} + \beta(\text{Macroeconomic})_{i,t} + \varepsilon \quad (\text{Eq1})$$

In equation 2 industry dummies are included where ‘other services’ industry is the base category. Selection of this base category is determined by the industry group whose mean for credit denial appears closest to the sample mean. In the work of Hernandez and Koëter-Kant (2010), the base category is to ‘be the group whose mean for the dependent variable is closest to the sample mean’ (See Appendix 2 for the group mean and the sample mean of credit denial).

$$V_{i,t} = \beta_1 + \beta(\text{Bank Structure})_{i,t} + \beta(\text{Macroeconomic})_{i,t} + \beta(\text{Industry Dum})_{i,t} + \varepsilon \quad (\text{Eq2})$$

Thirdly, equation 3 adds country dummies for all countries in the sample except Italy which is the base category. Similar to the rationale in selecting the base category for industry outlined above, the base category for country also adopts the approach of Hernandez and Koëter-Kant (2010).

$$V_{i,t} = \beta_1 + \beta(\text{Bank Structure})_{i,t} + \beta(\text{Macroeconomic})_{i,t} + \beta(\text{Industry Dum})_{i,t} + \beta(\text{Country Dum})_{i,t} + \varepsilon \quad (\text{Eq3})$$

Finally, equation 4 omits country dummies whilst the country characteristics of credit depth of information index, private property protection, cost to enforce, cost to resolve, values stolen, trust and the capital regulatory index are included in equations 4(a) – 4(d).

$$V_{i,t} = \beta_1 + \beta(\text{Bank Structure})_{i,t} + \beta(\text{Macroeconomic})_{i,t} + \beta(\text{Industry Dum})_{i,t} + \beta(\text{Country Factors})_{i,t} + \varepsilon \quad (\text{Eq4})$$

These four equations are conducted on an unbalanced dataset where population weights are applied as outlined in the methodology earlier. The formulation of these equations (Eq1 to Eq4) arises from steps taken to address issues of multicollinearity. This is explained in the following paragraphs.

Initially, equations were conducted to include bank structure, macroeconomic conditions, industry dummies, country dummies and country characteristics (See Appendix 3). Following these equations, tests of multicollinearity are conducted, including the variance inflation factor (VIF). According to UCLA (2014), tolerance is ‘an indication of the per cent of variance in the predictor that cannot be accounted for by the other predictors, hence very small values indicate that a predictor is redundant, and values that are less than 0.10 may merit further investigation’ (UCLA, 2014). The variance inflation factor is defined as  $1/\text{tolerance}$  where ‘as a rule of thumb, a variable whose VIF value is greater than 10 may merit further investigation’ (UCLA, 2014)<sup>15</sup>.

<sup>15</sup> Further sources note VIF values greater than 4 warrants investigation albeit VIF values exceeding 10 are indicative of serious multicollinearity (Young, 2014)

Executing a collinearity diagnostics in Stata, multicollinearity is evident in all four equations of Table 6.05. Stata omits the time to resolve a debt, social value measures, trust and the capital regulatory index from this analysis. The presence of multicollinearity is further confirmed by the correlation matrix (Table 6.06) where a correlation equal to or greater than 0.70 is deemed to be strong (Pollner, 2012).

**Table 6.05: Variance Inflation Factors and Tolerance**

	(1)		(2)		(3)		(4)	
	VIF	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF	Tolerance
<b>Bank Structure Variables</b>								
Large Bank	2498.4	0.0004	2492.96	0.0004	5580484.73	0	83753.47	0
Small Bank	247.3	0.004	235.56	0.0042	15715.13	0.0001	14546.41	0.0001
Domestic	3038.3	0.0003	3006.68	0.0003	4811082.17	0	118222.31	0
Foreign	6.26	0.1597	6.41	0.1559	6097.08	0.0002	124.78	0.008
Bank Concentration	25.67	0.0389	25.33	0.0395	9033.72	0.0001	274.83	0.0036
Lerner Index	12.29	0.0814	12.48	0.0801	1410.78	0.0007		
<b>Macroeconomic Variables</b>								
GDP Per Capita	74.9	0.0134	76.23	0.0131	31139.01	0	204.74	0.0049
Annual Growth Rate	24.83	0.0403	24.12	0.0415	14343.78	0.0001	138.91	0.0072
Domestic Demand	40.67	0.0246	40.78	0.0245	11292.67	0.0001	325.56	0.0031
Inflation	6.6	0.1515	6.54	0.1528	153.83	0.0065	19.54	0.0512
Government and Central Bank Support	21.62	0.0463	21.74	0.046	568125.49	0	275.62	0.0036
Systemic Crisis	36.8	0.0272	36.74	0.0272	589638.99	0		
10 Year Government Bond	6.47	0.1545	6.59	0.1518	309.1	0.0032	23.64	0.0423
Domestic Savings	62.69	0.016	65	0.0154	449928.79	0	965.44	0.001
Deposits per GDP	73.86	0.0135	71.9	0.0139	104805.11	0	893.44	0.0011
Firm Size	1.02	0.9808	1.09	0.9184	1.09	0.9177	1.09	0.9153
<b>Industry Dummies</b>								
Construction			1.22	0.8194	1.22	0.8192	1.22	0.8184
Manufacturing			1.51	0.6604	1.52	0.659	1.51	0.6622
Wholesale			1.46	0.6869	1.46	0.6855	1.45	0.6878
<b>Country Dummies</b>								
Belgium					101111.24	0		
Ireland					36584.09	0		
Netherlands					149212.54	0		
Portugal					55964.42	0		
Spain					143936.52	0		
<b>Country Characteristics</b>								
Credit Index							208.27	0.0048
Private Property							95.59	0.0105
Procedures to Enforce							981.73	0.001
Time to Enforce							5278.26	0.0002
Cost to Enforce							3185.94	0.0003
Cost to Resolve a Debt							960.3	0.001
Recovery Rate							3009.26	0.0003

Table 6.06: Correlation Matrix

	LB	MB	SB	DB	FB	Gov Bond	DS	Inflat	GDP	AGR	DD	GovCB	SBC	Depot	Con	LI	Value Ins	Value Stol	Value Traf	TT	CI	PP	Proc	TE	CE	TR	CR	RR	RG	
<b>LB</b>	1.00																													
<b>MB</b>	0.19	1.00																												
<b>SB</b>	0.29	0.89	1.00																											
<b>DB</b>	0.94	0.50	0.57	1.00																										
<b>FB</b>	-0.19	0.14	0.17	-0.11	1.00																									
<b>Gov Bond</b>	-0.69	-0.26	-0.34	-0.70	-0.32	1.00																								
<b>DS</b>	0.10	0.33	0.29	0.19	0.89	-0.60	1.00																							
<b>Inflat</b>	-0.42	-0.18	-0.27	-0.43	-0.52	0.57	-0.70	1.00																						
<b>GDP</b>	0.40	-0.01	0.23	0.36	0.69	-0.60	0.73	-0.66	1.00																					
<b>AGR</b>	0.55	0.34	0.51	0.61	0.33	-0.91	0.53	-0.61	0.53	1.00																				
<b>DD</b>	0.58	0.18	0.34	0.58	-0.08	-0.81	0.10	-0.15	0.22	0.85	1.00																			
<b>GovCB</b>	0.33	0.15	0.12	0.34	0.79	-0.58	0.89	-0.76	0.78	0.42	0.02	1.00																		
<b>SBC</b>	-0.55	0.46	0.29	-0.34	0.47	0.28	0.36	0.27	0.01	-0.31	-0.43	0.13	1.00																	
<b>Depot</b>	-0.43	0.45	0.05	-0.25	0.18	0.07	0.29	0.17	-0.39	-0.15	-0.21	0.07	0.63	1.00																
<b>Con</b>	-0.47	0.24	0.27	-0.32	0.32	-0.20	0.26	0.09	-0.09	0.42	0.39	-0.14	0.32	0.40	1.00															
<b>LI</b>	-0.24	-0.32	-0.02	-0.29	0.42	0.02	0.21	-0.49	0.37	0.26	-0.03	0.17	-0.26	-0.49	0.24	1.00														
<b>Value Ins</b>	-0.86	-0.17	-0.36	-0.82	-0.19	0.88	-0.37	0.50	-0.63	-0.81	-0.77	-0.51	0.44	0.43	0.09	-0.05	1.00													
<b>Value Stol</b>	-0.73	0.28	0.08	-0.55	-0.23	0.73	-0.31	0.39	-0.71	-0.56	-0.57	-0.53	0.48	0.56	0.26	-0.10	0.86	1.00												
<b>Value Traf</b>	-0.69	-0.17	-0.31	-0.67	-0.50	0.84	-0.72	0.71	-0.90	-0.70	-0.47	-0.79	0.15	0.27	0.13	-0.10	0.82	0.80	1.00											
<b>TT</b>	-0.16	0.29	0.08	-0.05	0.68	-0.38	0.83	-0.34	0.40	0.22	-0.05	0.64	0.58	0.65	0.34	-0.16	0.01	-0.02	-0.43	1.00										
<b>CI</b>	-0.25	0.85	0.73	0.07	0.08	0.17	0.17	-0.05	-0.22	0.00	-0.19	-0.10	0.59	0.53	0.32	-0.15	0.32	0.69	0.19	0.26	1.00									
<b>PP</b>	0.45	0.30	0.51	0.51	0.63	-0.72	0.77	-0.85	0.87	0.78	0.40	0.72	-0.07	-0.26	0.13	0.44	-0.66	-0.54	-0.87	0.41	0.09	1.00								
<b>Proc</b>	-0.23	0.23	-0.11	-0.15	-0.58	0.44	-0.54	0.71	-0.86	-0.54	-0.22	-0.56	0.26	0.60	-0.05	-0.77	0.49	0.59	0.68	-0.13	0.29	-0.83	1.00							
<b>TE</b>	-0.67	-0.23	-0.28	-0.67	-0.37	0.95	-0.63	0.74	-0.57	-0.90	-0.70	-0.67	0.38	0.08	-0.13	-0.13	0.85	0.68	0.80	-0.33	0.16	-0.75	0.49	1.00						
<b>CE</b>	-0.07	-0.29	-0.32	-0.17	0.67	-0.14	0.69	-0.59	0.64	-0.01	-0.39	0.76	0.16	0.05	-0.21	0.29	0.00	-0.27	-0.50	0.64	-0.22	0.46	-0.55	-0.23	1.00					
<b>TR</b>	0.28	-0.26	-0.27	0.15	-0.97	0.26	-0.89	0.48	-0.64	-0.29	0.13	-0.72	-0.60	-0.28	-0.40	-0.37	0.07	0.07	0.45	-0.75	-0.26	-0.61	0.52	0.28	-0.64	1.00				
<b>CR</b>	0.16	0.24	-0.09	0.20	-0.39	0.23	-0.26	0.03	-0.56	-0.34	-0.31	-0.05	-0.11	0.37	-0.48	-0.48	0.17	0.32	0.32	-0.17	0.20	-0.44	0.65	0.07	-0.19	0.43	1.00			
<b>RR</b>	-0.39	0.42	0.38	-0.20	0.78	-0.31	0.76	-0.33	0.30	0.44	0.11	0.42	0.57	0.53	0.78	0.29	0.02	0.17	-0.21	0.73	0.46	0.47	-0.28	-0.31	0.30	-0.85	-0.38	1.00		
<b>RG</b>	0.47	0.19	0.16	0.47	0.45	-0.41	0.53	-0.21	0.66	0.12	0.02	0.70	0.32	-0.02	-0.39	-0.36	-0.48	-0.57	-0.70	0.45	-0.13	0.40	-0.21	-0.31	0.45	-0.41	-0.06	0.03	1.00	

\* The heading abbreviations are fully explained in Appendix 4.

As depicted in the correlation matrix in table 6.06, multicollinearity appears to be present in many of the variables including bank structure, country characteristics, macroeconomic and credit supply conditions. In relation to the bank size variable under bank structure, there appears to be a high correlation between medium bank and small bank (0.89) and between large bank and domestic bank (0.94). Foreign banks have a low correlation with large banks (-0.19), medium banks (0.14), small banks (0.17) and domestic banks (-0.11). Given all five variables capture bank size, it was decided to omit the large, medium and small banks and retain those of domestic and foreign banks (See Table 6.07). This still facilitates the analysis of bank structure in SME credit denial, having addressed issues of multicollinearity. Moreover, the log of domestic banks assets and foreign banks assets is now presented to compress their scale.

Table 6.07: Bank Size

<b>Original Measures of Bank Size</b>	<b>Final Measures of Bank Size after Dealing with Multicollinearity</b>
<b>Large Bank (assets) €bn</b>	Domestic Bank (assets) €bn
<b>Medium Bank (assets) €bn</b>	Foreign Bank (assets) €bn
<b>Small Bank (assets) €bn</b>	
<b>Domestic Bank (assets) €bn</b>	
<b>Foreign Bank (assets) €bn</b>	

Many of the country characteristics also appear to be highly correlated with each other as shown in the correlation matrix of table 6.06. In relation to the judicial environment where three measures were identified to illustrate the efficiency of enforcement, high correlation is present. Procedures to enforce a contract are shown to be highly correlated with private property rights (-0.83), GDP per capita (-0.86), Lerner index (-0.77) and inflation (0.71). Time to enforce is also shown to be highly correlated with the 10 year government bond yield (0.95), the annual growth rate (-0.90), value (insurance) (0.85), value (traffic) (0.80), private property protection (-0.75), inflation (0.74) and domestic demand (-0.70). The cost to enforce

a contract is also illustrated to be highly correlated with government and central bank support only (0.76). As a corollary of this, the measure which commands the least high correlations with the other explanatory variables is selected for final analysis. More specifically, considering time to enforce a contract, cost to enforce a contract and procedures to enforce a contract deemed earlier as relatively close substitutes under the judicial environment, it was decided to select the cost to enforce a contract (Table 6.08).

Table 6.08: Judicial Environment

<b>Original Measures of Judicial Environment</b>	<b>Final Measure of Judicial Environment after Dealing with Multicollinearity</b>
<b>Time to Enforce a Contract (days)</b>	Cost to Enforce a Contract %
<b>Cost to Enforce a Contract %</b>	
<b>Procedures to Enforce a Contract (No.)</b>	

Similarly, in relation to the bankruptcy environment where three measures were identified to capture the efficiency of enforcement, high correlation is also shown to be present in two of the three measures. The time to resolve a debt is shown to be highly correlated with foreign banks (-0.97), domestic savings (-0.89), the recovery rate (-0.85), trust (-0.75) and government and central bank support (-0.72). The recovery rate is also illustrated to be highly correlated with foreign banks (0.78), the bank concentration ratio (0.78), domestic savings (0.76) and trust (0.73). As a corollary of this, the measure which commands the least high correlations with the other explanatory variables is selected for final analysis. Considering time to resolve a debt and the recovery, deemed earlier as relatively close substitutes under the bankruptcy environment, it was decided to select the cost to resolve a debt (Table 6.09).

Table 6.09: Bankruptcy Environment

<b>Original Measures of Bankruptcy Environment</b>	<b>Final Measure of Bankruptcy Environment after Dealing with Multicollinearity</b>
<b>Time to Resolve a Debt (years)</b>	Cost to Resolve a Debt %
<b>Cost to Resolve a Debt %</b>	
<b>Recovery Rate (scale)</b>	

In a similar vein, the three measures representing social values are highly correlated as shown in the correlation matrix of table 6.06. The value (insurance) appears highly correlated with the 10 year government bond yield (0.88), large banks (-0.86), domestic banks (-0.82), the annual growth rate (-0.81) and domestic demand (-0.77). The value (stolen) is also shown to be highly correlated with value (insurance) (0.86), large banks (-0.73), the 10 year government bond yield (0.73) and GDP per capita (-0.71). Finally, the value (traffic) appears highly correlated with GDP per capita (-0.90), the 10 year government bond yield (0.84), the value (insurance) (0.82), the value (stolen) (0.80), government and central bank support (-0.79), domestic savings (-0.72), inflation (0.71) and the annual growth rate (-0.70). As a corollary of this, the measure which commands the least high correlations with the other explanatory variables is selected for final analysis. Considering value (insurance), value (stolen) and value (traffic), deemed earlier as relatively close substitutes under the social environment, it was decided to select value (stolen) (Table 6.10).

Table 6.10: Social Environment

<b>Original Measures of Social Environment (Social Values)</b>	<b>Final Measure of Social Environment after Dealing with Multicollinearity (Social Values)</b>
<b>Values (Insurance) (scale)</b>	<b>Values (Stolen) (scale)</b>
<b>Values (Stolen) (scale)</b>	
<b>Values (Traffic) (scale)</b>	

The presence of high correlation found between the remaining country characteristics must also be noted. In particular, the credit depth of information index appears highly correlated with medium banks (0.85) and small banks (0.73). Private property protection appears highly correlated with GDP per capita (0.87), value (traffic) (-0.87), inflation (-0.85), annual growth rate (0.78), domestic savings (0.77), the 10 year government bond yield (-0.72) and government and central bank support (0.72). Trust appears highly correlated with domestic

savings (0.83). The capital regulatory index appears highly correlated with government and central bank support (0.70) and value (traffic) (-0.70).

As a corollary of this, several equations must be conducted to facilitate the analysis of the first research question. Equation 4(a) includes credit depth of information index, private property protection, cost to enforce a contract and cost to resolve a debt. Equation 4(b) includes only value (stolen). Equation 4 (c) includes only trust and equation 4 (d) includes the capital regulatory index.

Unsurprisingly, several macroeconomic variables are highly correlated. Three measures quantify economic activity of a country, namely, GDP per capita, the annual growth rate and domestic demand. The measure with the least number of high correlations is selected for analysis i.e. domestic demand (See Table 6.11).

Table 6.11: Economic Activity

<b>Original Measures of Economic Activity</b>	<b>Final Measure of Economic Activity after Dealing with Multicollinearity</b>
<b>GDP per Capita %</b>	<b>Domestic Demand %</b>
<b>GDP Annual Growth Rate %</b>	
<b>Domestic Demand %</b>	

Three measures quantify the supply of credit, i.e. the 10 year government bond yield, domestic savings and deposits per GDP. The measure with the least number of high correlations is selected for analysis i.e. deposits per GDP (See Table 6.12).

Table 6.12: Supply of Credit

<b>Original Measures of Credit Supply</b>	<b>Final Measure of Credit Supply after Dealing with Multicollinearity</b>
<b>10 Year Government Bond %</b>	<b>Deposits per GDP %</b>
<b>Domestic Savings %</b>	
<b>Deposits per GDP %</b>	

To capture the effects of the financial crisis, two measures are employed, government and central bank support and the classification of a systemic banking crisis. The measure with the least number of high correlations is selected for analysis i.e. the classification of a systemic banking crisis (See Table 6.13).

Table 6.13: Effects of Financial Crisis

<b>Original Measures Financial Crisis Effects</b>	<b>Final Measure of Financial Crisis Effects after Dealing with Multicollinearity</b>
<b>Government and Central Bank Support (scale)</b>	Systemic Banking Crisis (binary)
<b>Systemic Banking Crisis (binary)</b>	

In summary, the following table, 6.14 presents the variables used in the models conducted under research question 1 after dealing with multicollinearity. The statistical package, Stata also influences the construction of equations where some variables are omitted due to collinearity issues.

Table 6.14: Equations of Research Question 1

	(1)	(2)	(3)	(4a)	(4b)	(4c)	(4d)
<b>Bank Structure Variables</b>							
LnDomestic	X	X	X	X	X	X	X
LnForeign	X	X	X	X	X	X	X
Bank Concentration	X	X	X	X	X	X	X
Lerner Index	X	X	X	X	X	X	X
<b>Control Variables</b>							
Domestic Demand	X	X	X	X	X	X	X
Systemic Crisis	X	X	X	X	X	X	X
Deposits per GDP	X	X	X	X	X	X	X
<b>Firm Variables</b>							
Firm Size	X	X	X	X	X	X	X
<b>Industry Dummies</b>							
Construction		X	X	X	X	X	X
Manufacturing		X	X	X	X	X	X
Wholesale		X	X	X	X	X	X
<b>Country Dummies</b>							
Austria			X				
France			X				
Germany			X				
Greece			X				
Ireland			X				
Netherlands			X				
Portugal			X				
Spain			X				
<b>Country Characteristics</b>							
Credit Index				X			
Private Property Protection				X			
Cost to Enforce a Contract				X			
Cost to Resolve a Debt				X			
Values Stolen					X		
Trust						X	
Capital Regulatory Index							X

Evaluating whether differences across bank structure and macroeconomic conditions in SME credit denial are evident; equation 1 of Tables 6.15, 6.16 and 6.17 illustrate some significant results at the 5 per cent level. More specifically, larger SMEs appear less likely to be credit denied. Equation 1 of Table 6.16 which presents the marginal effects, indicates a larger SME is 5.153 per cent less likely to be denied credit. From equation 1 of Table 6.17 which presents the odds ratio, the odds of being credit denied versus not being credit denied is 0.702, hence a large SME is less likely to be denied credit than not.

Interestingly, of the bank structure variables, only domestic banks appear statistically significant. As can be seen in equation 1 of Tables 6.15 which presents the logit coefficients, SMEs are less likely to be denied credit with larger sized domestic banks. Equation 1 of Table 6.16 which presents the marginal effects, illustrates with an increase in the assets of domestic banks; an SME is 3.402 per cent less likely to be credit denied. Moreover, the odds of an SME being credit denied versus not being credit denied is 0.7917 following an increase in the size of a domestic bank.

Evaluating the control variables, domestic demand, systemic crisis and deposits per GDP appear statistically significant. With an increase in domestic demand, SMEs are less likely to be credit denied where equation 1 of Table 6.16 implies an increase in domestic demand results in SMEs being 0.362 per cent less likely to be denied credit. Furthermore the odds of an SME being credit denied versus not being credit denied is 0.975, thus the SME is less likely to be denied credit than not if domestic demand increases. Contrary to expectations, if a country was classified as having a systemic banking crisis, SMEs are 7.317 per cent less likely to be credit denied with the odds of credit denial versus no credit denial equalling 0.6109. This suggests SMEs are less likely to be denied credit than not if a country has a systemic banking crisis.

Referring to deposits per GDP, SMEs are more likely to be credit denied following an increase in deposits per GDP. Quantifying this, the marginal effects under equation 1 of Table 6.16 illustrates an increase in deposits per GDP results in an SME being 0.2132 per cent more likely to be denied credit. In equation 1 of Table 6.17, the odds of an SME being credit denied versus not being credit denied is 1.0147, reinforcing the result that SMEs are more likely to be denied credit than not if deposits per GDP increase.

Table 6.15: Logit Coefficients

	(1)		(2)		(3)	
Constant	2.3941*	(0.8850)	2.8566*	(0.8328)	31.1638	(22.1508)
<b>Bank Structure Variables</b>						
LnDomestic	-0.2336*	(0.0756)	-0.1531*	(0.0697)	-4.4599	(3.0430)
LnForeign	-0.2377	(0.1514)	-0.4890*	(0.1251)	-0.7497	(0.5300)
Bank Concentration	-0.0050	(0.0063)	-0.0006	(0.00567)	-0.0401	(0.0501)
Lerner Index	-3.3718	(2.3070)	-1.6309	(2.0422)	-0.1842	(3.0751)
<b>Control Variables</b>						
Domestic Demand	-0.0249*	(0.0147)	-0.0169	(0.0138)	-0.0318	(0.0293)
Systemic Crisis	-0.4928*	(0.1819)	0.0576	(0.1837)	-8.0326	(5.1465)
Deposits per GDP	0.0146*	(0.0032)	0.0095*	(0.0030)	0.1208	(0.0627)
<b>Firm Variables</b>						
Firm Size	-0.3538*	(0.0514)	-0.4572*	(0.0592)	-0.4526*	(0.0597)
<b>Industry Dummies</b>						
Construction			0.5381*	(0.1498)	0.5356*	(0.1486)
Manufacturing			0.0584	(0.1146)	0.0498	(0.1175)
Wholesale			0.0196	(0.1174)	-0.0047	(0.1197)
<b>Country Dummies</b>						
Austria					-0.1655	(2.4882)
France					4.0772	(2.7539)
Germany					9.8096	(7.7577)
Greece					-2.2404	(2.2424)
Ireland					-1.2001	(1.8562)
Netherlands					3.3293	(4.4950)
Portugal					-11.3761	(6.6181)
Spain					1.4818	(6.1225)
N	4755		4244		4244	
Pseudo R <sup>2</sup>	0.0596		0.0558		0.0669	
Predicted Probability	0.2303		0.2391		0.2387	

\*5 per cent level of significance. Standard error presented in parentheses.

Table 6.16: Marginal Effects

	(1)		(2)		(3)	
<b>Bank Structure Variables</b>						
LnDomestic	-0.0340*	(0.0109)	-0.0266*	(0.0121)	-0.7683	(0.5240)
LnForeign	-0.0346	(0.0218)	-0.0851*	(0.0217)	-0.1291	(0.0913)
Bank Concentration	-0.0007	(0.0009)	-9.7E-05	(0.0010)	-0.0069	(0.0086)
Lerner Index	-0.4911	(0.3388)	-0.2839	(0.3555)	-0.0317	(0.5297)
<b>Control Variables</b>						
Domestic Demand	-0.0036*	(0.0021)	-0.0029	(0.0024)	-0.0055	(0.0050)
Systemic Crisis	-0.0732*	(0.0279)	0.0100	(0.0319)	-0.9442*	(0.1422)
Deposits per GDP	0.0021*	(0.0005)	0.0017*	(0.0005)	0.0208	(0.0108)
<b>Firm Variables</b>						
Firm Size	-0.0515*	(0.0064)	-0.0796*	(0.0107)	-0.0780*	(0.0107)
<b>Industry Dummies</b>						
Construction			0.1039*	(0.0314)	0.1025*	(0.0308)
Manufacturing			0.0103	(0.0203)	0.0087	(0.0205)
Wholesale			0.0034	(0.0206)	-0.0008	(0.0206)
<b>Country Dummies</b>						
Austria					-0.0273	(0.3910)
France					0.7692*	(0.2891)
Germany					0.9582*	(0.0668)
Greece					-0.2034*	(0.0805)
Ireland					-0.1437	(0.1380)
Netherlands					0.6723	(0.4831)
Portugal					-0.2943*	(0.0472)
Spain					0.3060	(1.3919)

\*5 per cent level of significance. Standard error presented in parentheses.

Table 6.17: Odds Ratio

	(1)		(2)		(3)	
Constant						
<b>Bank Structure Variables</b>						
LnDomestic	0.7917*	(0.0599)	0.8581*	(0.0598)	0.0116	(0.0352)
LnForeign	0.7884	(0.1193)	0.6132*	(0.0767)	0.4725	(0.2505)
Bank Concentration	0.9951	(0.0063)	0.9994	(0.0057)	0.9607	(0.0481)
Lerner Index	0.0343	(0.0792)	0.1957	(0.3998)	0.8318	(2.5578)
<b>Control Variables</b>						
Domestic Demand	0.9755*	(0.0143)	0.9832	(0.0136)	0.9687	(0.0284)
Systemic Crisis	0.6109*	(0.1111)	1.0593	(0.1946)	0.0003	(0.0017)
Deposits per GDP	1.0147*	(0.0032)	1.0100*	(0.0031)	1.1284	(0.0708)
<b>Firm Variables</b>						
Firm Size	0.7020*	(0.0361)	0.6331*	(0.0374)	0.6360*	(0.0379)
<b>Industry Dummies</b>						
Construction			1.7128*	(0.2566)	1.7087*	(0.2538)
Manufacturing			1.0602	(0.1214)	1.0511	(0.1235)
Wholesale			1.0198	(0.1198)	0.9953	(0.11912)
<b>Country Dummies</b>						
Austria					0.8475	(2.1087)
France					58.9821	(162.4285)
Germany					18208.58	(141257.3)
Greece					0.1064	(0.2386)
Ireland					0.3012	(0.5590)
Netherlands					27.9110	(125.5003)
Portugal					1.15E-05	(7.59E-05)
Spain					4.4011	(26.9455)

\*5 per cent level of significance. Standard error presented in parentheses.

Equation 2 sees the inclusion of industry dummies. Similar to equation 1, firm size, domestic banks and deposits per GDP appear to be statistically significant. Interestingly, whilst domestic banks were the only bank structure variable deemed to be statistically significant in equation 1, both domestic banks and foreign banks appear to be statistically significant in equation 2. Referring to the logit coefficients in equation 2 of Table 6.15, if foreign banks increase in size, SMEs are less likely to be denied credit. The marginal effects of equation 2 in table 6.16 illustrate with an increase in the assets of foreign banks; an SME is 8.51 per cent less likely to be credit denied. Moreover, the odds of an SME being credit denied versus not being credit denied is 0.613 (Table 6.17), thus the SME is less likely to be denied credit than not if a foreign bank increases in size. Alluding to macroeconomic conditions, deposits per GDP is the only macroeconomic variable to appear statistically significant with results

similar to those of equation 1. Lending credence to the industry dummies, only construction is deemed to be statistically significant, suggesting that SMEs in the construction industry are more likely to be credit denied than SMEs from other services industry, the base category. Particularising this, SMEs in construction are 10.39 per cent more likely to be denied credit than SMEs from other services industry with an odds ratio of 1.712.

Equation 3 features the inclusion of country dummies. The statistical package Stata omits two of these country dummies namely, Belgium and Finland due to issues of collinearity. Noticeably, none of the bank structure variables or the macroeconomic variables are statistically significant. Firm size appears significant with similar results to equation 1 and 2. In particular, larger SMEs are less likely to be credit denied. The marginal effects of equation 3 in table 6.16 indicate a larger SME is 7.8 per cent less likely to be denied credit. From equation 3 of Table 6.17, the odds of being credit denied versus not being credit denied is 0.636, hence a large SME is less likely to be denied credit than not. Similar to equation 2, construction appears to be statistically significant, suggesting that SMEs in construction are more likely to be credit denied than SMEs from other services industry, the base category. Particularising this, SMEs in construction are 10.25 per cent more likely to be denied credit than SMEs from other services industry with an odds ratio of 1.708.

To evaluate country characteristics, equation 4 (a) includes only credit depth of information index, private property protection, cost to enforce a contract and cost to recover a debt, equation 4 (b) includes only value (stolen), equation 4(c) includes only trust and equation 4(d) includes only the capital regulatory index. As illustrated earlier in table 6.15, firm size also appears statistically significant in equation 4(a) with results revealing larger SMEs are less likely to be credit denied. Particularising this, the marginal effects underpinning equation 4(a) of Table 6.19 illustrate a larger SME is 7.72 per cent less likely to be credit denied.

Moreover, the odds of an SME being credit denied versus not being credit denied are 0.64, reaffirming the result. Significant results are also evident for foreign banks where equation 4(a) illustrates with an increase in the size of foreign banks; SMEs are less likely to be credit denied. In equation 4 (a) of Table 6.19, the marginal effects suggest an increase in the assets of foreign banks results in an SME being 8.08 per cent less likely to be credit denied. This concurs with results from equation 2. Of the macroeconomic variables, only deposits per GDP are statistically significant with an SME more likely to be denied credit following an increase in deposits per GDP. Quantifying this, with an increase in deposits per GDP, an SME is 0.2496 per cent more likely to be credit denied. Lending credence to the industry dummies, only construction appears to be statistically significant, indicating that SMEs in construction are more likely to be credit denied than SMEs from other services industry. More specifically, SMEs in construction are 10.37 per cent more likely to be denied credit than SMEs from other services industry with an odds ratio of 1.715.

Considering country characteristics, all prove to be statistically significant in equation 4(a). Evaluating the credit depth of information index, an SME is deemed more likely to be denied credit the higher the extent of credit information sharing. Moreover, in equation 4(a) of Table 6.19, the marginal effects reveal with an increase in the sharing of credit information, an SME is 4.919 per cent more likely to be denied credit with the odds of being credit denied versus not being credit denied equalling 1.3288 in equation 4(a) of Table 6.20. This is contrary to expectations where it was hypothesised an increase in the sharing of credit information reduces credit denial. Referring to private property protection, the logit coefficient underpinning equation 4(a) of Table 6.18 illustrates with an increase in protection, an SME is less likely to be credit denied. In particular, as per equation 4(a) of Table 6.19, an SME is 0.359 per cent less likely to be denied credit following an increase in private protection. This concurs with expectations of the study. The odds of an SME being credit

denied versus not credit denied are 0.979 with greater legal protection. Alluding to the judicial and bankruptcy environments, both the cost to enforce a contract (judicial) and the cost to resolve a debt (bankruptcy) are deemed statistically significant. This suggests denial is more likely when the cost to enforce a contract increases whereas the denial is less likely following an increase in the cost to resolve a debt. Whilst results surrounding cost to enforce a contract concur with the hypothesis, the results for the cost to resolve a contract are unexpected. More specifically, equation 4(a) of Table 6.19 implies an SME is 1.11 per cent more likely to be credit denied following an increase in the cost to enforce a contract where the odds ratio of being credit denied versus not credit denied equalling 1.066. However, an SME is 1.684 per cent less likely to be credit denied following an increase in the cost to resolve a debt. The odds of an SME being credit denied versus not credit denied are 0.907 with higher bankruptcy costs.

Table 6.18: Logit Coefficients

	(4a)		(4b)		(4c)		(4d)	
Constant	0.54440	(1.1247)	-0.4976	(5.8589)	-5.4533	(4.0154)	-1.2789	(1.9336)
<b>Bank Structure Variables</b>								
LnDomestic	-0.0132	(0.0778)	0.9659	(0.6015)	0.2944	(0.2703)	0.3157	(0.2137)
LnForeign	-0.4671*	(0.1427)	-1.5971	(0.8495)	-0.824*	(0.2756)	0.2158	(0.2745)
Bank Concentration	-0.0094	(0.0102)	0.2483	(0.1339)	0.0943*	(0.0443)	0.1068*	(0.0314)
Lerner Index	4.1495	(2.2408)					-22.6532*	(8.5429)
<b>Macroeconomic Variables</b>								
Domestic Demand	-0.0099	(0.0144)	-0.6924*	(0.3130)	-0.3298*	(0.1039)	-0.3986*	(0.0823)
Systemic Crisis	-0.0668	(0.2408)	-0.5398	(0.3422)	-0.4091	(0.3216)	-0.4553	(0.2835)
Deposits per GDP	0.0144*	(0.0039)	-0.0056	(0.0071)	-0.0041	(0.0065)	-0.0170	(0.0089)
<b>Firm Variables</b>								
Firm Size	-0.4459*	(0.0596)	-0.4046*	(0.1133)	-0.4046*	(0.1133)	-0.3460*	(0.1013)
<b>Industry Dummies</b>								
Construction	0.5398*	(0.14980)	0.4564	(0.2850)	0.4564	(0.2850)	0.8312*	(0.2544)
Manufacturing	0.0527	(0.1168)	0.1201	(0.2213)	0.1201	(0.2213)	-0.0435	(0.1961)
Wholesale	0.0143	(0.1186)	-0.1365	(0.2221)	-0.1365	(0.2221)	-0.1844	(0.2082)
<b>Country Characteristics</b>								
Credit Index	0.2843*	(0.1164)						
Private Property Protection	-0.0207*	(0.0064)						
Cost to Enforce a Contract	0.0645*	(0.0138)						
Cost to Resolve a Debt	-0.0973*	(0.0246)						
Values Stolen			-4.3938	(3.6734)				
Trust					0.3654	(0.3055)		
Capital Regulatory Index							-0.3792*	(0.1597)
Observations	4244		1126		1126		1436	
Pseudo R <sup>2</sup>	0.0615		0.0916		0.0916		0.0845	
Predicted Probabilities	0.2373		0.2891		0.2891		0.2697	

\*5 per cent level of significance. Standard error presented in parentheses.

Table 6.19: Marginal Effects

	(4a)		(4b)		(4c)		(4d)	
<b>Bank Structure Variables</b>								
LnDomestic	-0.0023	(0.0135)	0.1703	(0.1060)	0.0519	(0.0482)	0.0565	(0.0388)
LnForeign	-0.0808*	(0.0247)	-0.2816	(0.1490)	-0.1453*	(0.0490)	0.0386	(0.0491)
Bank Concentration	-0.0016	(0.0018)	0.04378	(0.0235)	0.0166*	(0.0079)	0.0191*	(0.0057)
Lerner Index	0.7180	(0.3886)					-4.0500*	(1.5414)
<b>Macroeconomic Variables</b>								
Domestic Demand	-0.0017	(0.0025)	-0.1221*	(0.0549)	-0.0581*	(0.0187)	-0.0713*	(0.0152)
Systemic Crisis	-0.0116	(0.0417)	-0.0994	(0.0654)	-0.0746	(0.0605)	-0.0818	(0.0510)
Deposits per GDP	0.0025*	(0.0007)	-0.0010	(0.0013)	-0.0007	(0.0012)	-0.0030	(0.0016)
<b>Firm Variables</b>								
Firm Size	-0.0772*	(0.0107)	-0.0713*	(0.0206)	-0.0713*	(0.0206)	-0.0619*	(0.0187)
<b>Industry Dummies</b>								
Construction	0.1037*	(0.0312)	0.0882	(0.0593)	0.0882	(0.0593)	0.1717*	(0.0578)
Manufacturing	0.0092	(0.0205)	0.0216	(0.0404)	0.0216	(0.0404)	-0.0077	(0.0346)
Wholesale	0.0025	(0.0206)	-0.0236	(0.0378)	-0.0236	(0.0378)	-0.0320	(0.0354)
<b>Country Characteristics</b>								
Credit Index	0.0492*	(0.0203)						
Private Property Protection	-0.0036*	(0.0011)						
Cost to Enforce a Contract	0.0113*	(0.0024)						
Cost to Resolve a Debt	-0.0168*	(0.0043)						
Value Stolen			-0.7746	(0.6439)				
Trust					0.0644	(0.0536)		
Capital Regulatory Index							-0.0678*	(0.0289)

\*5 per cent level of significance. Standard error presented in parentheses.

Table 6.20: Odds Ratio

	(4a)		(4b)		(4c)		(4d)	
<b>Bank Structure Variables</b>								
LnDomestic	0.9869	(0.0768)	2.6271	(1.5802)	1.3423	(0.3628)	1.3713	(0.2930)
LnForeign	0.6268*	(0.0895)	0.2025	(0.1720)	0.4387*	(0.1209)	1.2409	(0.3406)
Bank Concentration	0.9907	(0.0101)	1.2819	(0.1717)	1.0989*	(0.0487)	1.1128*	(0.0350)
Lerner Index	63.4016	(142.0707)					1.45E-10*	(1.24E-09)
<b>Macroeconomic Variables</b>								
Domestic Demand	0.9901	(0.0143)	0.5004*	(0.1566)	0.7191*	(0.0747)	0.6712*	(0.0552)
Systemic Crisis	0.9354	(0.2252)	0.5828	(0.1994)	0.6642	(0.2136)	0.6343	(0.1798)
Deposits per GDP	1.0145*	(0.0040)	0.9944	(0.0070)	0.9959	(0.0065)	0.9832	(0.0088)
<b>Firm Variables</b>								
Firm Size	0.6402*	(0.0381)	0.6672*	(0.0756)	0.6672*	(0.0756)	0.7075*	(0.07166)
<b>Industry Dummies</b>								
Construction	1.7157*	(0.2570)	1.5783	(0.4499)	1.5783	(0.4499)	2.2960*	(0.5840)
Manufacturing	1.0541	(0.1231)	1.1276	(0.2495)	1.1276	(0.2495)	0.9574	(0.1878)
Wholesale	1.0144	(0.1203)	0.8724	(0.1938)	0.8724	(0.1938)	0.8316	(0.1731)
<b>Country Characteristics</b>								
Credit Index	1.3288*	(0.1548)						
Private Property Protection	0.9795*	(0.0063)						
Cost to Enforce a Contract	1.0667*	(0.0147)						
Cost to Resolve a Debt	0.9073*	(0.0223)						
Value Stolen			0.0124	(0.0454)				
Trust					1.4411	(0.44025)		
Capital Regulatory Index							0.6844*	(0.1093)

\*5 per cent level of significance. Standard error presented in parentheses.

In equation 4 (b) where the only country characteristic included is value (stolen) due to the collinearity issues specified earlier, none of the bank structure variables appear statistically significant. Of the macroeconomic variables, only domestic demand appears statistically significant with similar negative results as found earlier. In addition, larger SMEs are less likely to be credit denied following the statistically significant negative results for firm size. Interestingly, the construction dummy is not significant contrary to previous results, suggesting SMEs from the construction industry are not more or less likely to be credit denied than SMEs from other services industry. *Ipsa facto*, no industry differences exist when value (stolen) are included. The coefficient on value (stolen) also appears insignificant.

In equation 4 (c) where the only country characteristic included is trust, of the bank structure variables, now only foreign banks and bank concentration appear statistically significant.

Concurring with previous findings, if foreign banks increase in size, SMEs are less likely to be denied credit. In equation 4 (c) of table 6.19, the marginal effects illustrate with an increase in the assets of foreign banks, an SME is 14.527 per cent less likely to be credit denied. Moreover, the odds of an SME being credit denied versus not being credit denied is 0.4387. Noticeably, an SME is more likely to be denied credit in more a concentrated banking market. The marginal effects underpinning equation 4 (c) of Table 6.19 illustrates an SME is 1.66 per cent more likely to be credit denied with a more concentrated banking market with the odds of being credit denied versus not being credit denied equalling 1.0989. Similar negative results emerge for firm size and domestic demand as in equation 4 (b). Again, the construction dummy remains insignificant following only the inclusion of the country characteristic, trust. As in equation 4 (b), no industry differences in credit denial exist. Trust also appears insignificant.

Considering the final equation, 4 (d), both measures of bank competition appear statistically significant. As in equation 4 (c), an SME is more likely to be denied credit in a more concentrated banking market. Conversely though, an increase in the Lerner index which implies low bank competition results in less denial of bank credit. Similar negative results emerge for firm size and domestic demand as in equation 4 (b) and 4 (c). Referring to the industry dummies, with the inclusion of the country characteristic, capital regulatory index, construction now appears significant. Similar to equation 4(a), SMEs in construction are more likely to be credit denied than SMEs from other services industry. Particularising this, SMEs in construction are 17.17 per cent more likely to be denied credit than SMEs from other services industry with an odds ratio of 2.29. Finally, the capital regulatory index is significant where an SME is deemed less likely to be credit denied following an increase in the regulatory index. In equation 4 (d) of table E, the marginal effects reveal with an increase in the capital regulatory index, SME are 6.779 per cent less likely to be denied credit.

Contrary to expectations, the odds of an SME being credit denied versus not being credit denied is 0.684 with greater stringency in capital regulation.

In summary, significant results emerge for bank structure, macroeconomic conditions, credit supply conditions, industry dummies and country dummies. In particular, country characteristics appear to influence the likelihood of SME bank credit availability where the information, legal, judicial, bankruptcy and regulatory are deemed important. In chapter seven, several robustness tests are conducted. The next section of this chapter now presents the findings for the second research question of whether country characteristics determine SME firm leverage.

## **Chapter Six (Part B): Findings for Research**

### **Question 2**

*'I pass with relief from the tossing sea of Cause and Theory to the firm ground of Result and Fact'*

*Winston Churchill*

## 6.4 Introduction

This section of the chapter presents the descriptive statistics coupled with the empirical results relating to the second research question which seeks to address whether country characteristics determine SME firm leverage.

## 6.5 Descriptive Statistics

The following section presents the descriptive statistics for the full sample and per country of the sample. Descriptives across industries per country are also presented.

In the sample, the mean total debt ratio is 20.12 per cent. The total debt ratio on average appears to be higher for SMEs from Belgium, Finland and Portugal, in contrast to SMEs from Austria, France and Italy whose total debt ratio is lower on average.

Across firm characteristics, there appears to be significant variation. The sample includes both young and old SMEs with an average age of 19 years. On average, SMEs from Austria appear older whilst SMEs from France are younger. Moreover, SMEs from Finland appear larger in contrast to those in France who are depicted to be smaller. *Ipsa facto*, SMEs from France are both younger and smaller. The average asset tangibility of an SME is 23.80 per cent with SMEs from Finland having the highest level of tangibility on average. French SMEs appear to have the least amount of tangible assets on average which is not surprising given these SMEs are younger and smaller. There is also significant variation across profitability with Italian SMEs appearing to be the most profitable and Portuguese SMEs the least profitable. Further variation is evident across the effective tax rate. Noticeably, SMEs from Italy have the highest effective tax rate on average of 51.61 per cent. SMEs from Finland have the lowest on average of 8.24 per cent.

Across the country characteristics, the credit depth of information index reveals the sharing of credit information is relatively high across the sample with Austria having the highest level of

credit information disclosure. Similarly, private property protection remains relatively high across the sample. Similar to the summary statistics presented under the first research question, Finland has the highest level of private property protection whilst Italy has the lowest. Referring to the efficiency of judicial enforcement, there is significant variation across the number of procedures to enforce a contract, the time to enforce a contract and the cost to enforce a contract. Whilst Italy has the highest number of procedures to enforce a contract, Austria has the lowest. Italy has the longest time and the highest costs to enforce a contract whilst Finland has the shortest time and the lowest costs to enforce a contract. As illustrated in the summary statistics of the first research question, Italy also reveals high levels of judicial inefficiency in terms of more procedures, time and cost to enforce a contract.

Significant variation is also evident in the efficiency of bankruptcy enforcement, as depicted by the time to resolve a debt, the cost to resolve a debt and the recovery rate. Portugal has the longest time to resolve a debt whilst Belgium and Finland have the shortest time. Italy has the highest costs to resolve a debt with Belgium and Finland having the lowest costs. The recovery rate is the highest for Finland but the lowest for France.

Across the measures of social values and trust, there is some variation in the sample albeit fewer observations. Portugal has the highest social values in terms of how wrong it is to make an exaggerated or false insurance claim, to buy something stolen and to commit a traffic offence. Finland has the highest levels of trustworthiness whilst Portugal has the lowest levels. Finally, there is significant variation in the capital regulatory index across the sample. France has the most stringent capital regulation whilst the capital regulation in Austria is the least stringent.

Reflecting economic conditions, GDP per capita, the annual growth rate and domestic demand illustrate signs of a recovery following the aftermath of the recent financial and economic crisis. Noticeably, cross country differences are evident in the recovery. Whilst the recovery appears relatively strong in Austria, Belgium and Finland, the recovery is weaker in Portugal and Italy. The Portuguese average GDP per capita (€20,553) is considerably lower than the sample mean (€31,379). On average, Italy's annual growth rate (0.23 per cent) and domestic demand (1.86 per cent) is lower than the sample mean. The log difference of inflation reveals much instability with a maximum value of 0.5682 and a minimum value of -1.0458. In the sample, Portugal reports the highest value for inflation whilst Finland records the lowest. Capturing the effects of the financial and economic crisis, the government and central bank support measure reveals high levels of support afforded to all countries in the sample. This measure is taken from 2007 to 2010. The systemic banking crisis classification suggests both Austria and Belgium are classified as having a systemic bank crisis whilst the remainder of the sample is not. This measure is taken from 2007-2011. Across the supply of credit conditions, there appears to be significant variation. Portugal has the highest 10 year government bond yield and the lowest domestic savings per GDP, implying a low supply of credit. Finland has the lowest deposits per GDP. Credit supply conditions appear more favourable in Austria and Belgium. Indicative of this, Austria has the highest domestic savings per GDP whilst Belgium has the highest deposits per GDP. Finland has the lowest 10 year government bond yield.

**Table 6.21: Summary Statistics: Full Sample**

	Mean	Median	Standard Deviation	Max	Min	Mode	N
<b>Dependent Variable: Total Debt Ratio (decimal)</b>	0.2012	0.1176	0.2795	8.9741	0.0000	0.0000	33526
<b>Firm Age (years)</b>	19.0433	16.0000	18.6959	910.0000	0.0000	7.0000	34440
<b>Firm Size (log)</b>	12.9533	13.6272	2.5701	19.0067	1.6487	12.6282	34420
<b>Tangibility(decimal)</b>	0.2380	0.1509	0.2414	0.9978	-2.0334*	0.0000	34386
<b>Profitability(decimal)</b>	0.0816	0.0697	0.1536	1.6640	-7.0127*	0.0790	34094
<b>Effective Tax Rate(decimal)</b>	0.4003	0.3503	15.6208	1268.9170	-1460.800*	0.0000	32441
<b>Credit Index (scale)</b>	5.0127	5.0000	0.5797	6.0000	4.0000	5.0000	34440
<b>Private Property (scale)</b>	63.4547	70.0000	11.4986	95.0000	50.0000	70.0000	34440
<b>ProEnforce (No.)</b>	37.1959	38.0000	4.4061	41.0000	25.0000	41.0000	34440
<b>TimeEnforce (days)</b>	944.2871	1210.0000	383.6788	1390.0000	235.0000	1210.0000	34440
<b>CostEnforce %</b>	23.7069	29.9000	7.3985	29.9000	12.7000	29.9000	34440
<b>TimeResolve (years)</b>	1.7954	1.8000	0.2594	2.0000	0.9000	1.8000	34440
<b>CostResolve %</b>	16.3143	22.0000	6.8630	22.0000	4.0000	22.0000	34440
<b>RecoveryRat (\$)</b>	63.8294	62.5000	9.9095	89.4000	44.7000	56.6000	34440
<b>Values Insurance (scale)</b>	3.3487	3.5040	0.2037	3.5040	3.0338	3.5040	2018
<b>Values Stolen (scale)</b>	3.4107	3.5648	0.2043	3.5648	3.1167	3.5648	2018
<b>Values Traffic (scale)</b>	3.2110	3.4220	0.2628	3.4220	2.8564	3.4220	2018
<b>Trust (scale)</b>	4.6543	4.5953	0.6213	6.7987	3.8310	4.7616	11011
<b>Regulatory (scale)</b>	5.7991	6.0000	1.7497	9.0000	3.0000	6.0000	9842
<b>GDP per Cap %</b>	31378.970	32784.840	7265.719	51186.480	17653.570	35073.16	34440
<b>Annual Growth %</b>	0.5413	1.6831	2.3671	5.3352	-8.5386	-5.4944	34440
<b>Domestic Demand %</b>	2.2564	3.0000	2.7100	8.0000	-6.0000	3.000	34440
<b>Inflation (log)</b>	0.3169	0.3617	0.1662	0.5682	-1.0458	0.3222	33219
<b>Gov and CB Support</b>	6.1784	6.0000	0.4040	8.0000	6.0000	6.0000	14766
<b>Systematic Crisis (binary)</b>	0.0549	0.0000	0.2278	1.0000	0.0000	0.0000	14484
<b>10 Year Gov Bond Yield %</b>	4.1581	4.2100	0.4428	5.0000	3.0100	4.3100	34440
<b>Domestic Savings %</b>	18.9838	19.8434	3.4994	28.8618	12.4639	18.1018	34440
<b>Deposits per GDP %</b>	74.5134	71.6000	19.3271	120.3300	47.3700	75.6700	34440

Dependent variable is total debt ratio. All other variables are independent variables i.e. firm characteristics, country characteristics, macroeconomic conditions and credit supply conditions. Dependent variable is from time period (t). Independent variables are lagged (t-1). \* Several firms report negative values on their balance sheets as per the Bureau Van Dijk Amadeus database.

**Table 6.22: Summary Statistics per Country**

	Austria	Belgium	Finland	France	Italy	Portugal	Total
<b>Dependent Variable:</b>							
<b>Total Debt Ratio (decimal)</b>							
Mean	0.0987	0.2917	0.3001	0.1028	0.1944	0.2426	0.2012
Median	0.0000	0.2247	0.2015	0.0340	0.1131	0.1635	0.1176
St. dev.	0.1965	0.3220	0.4119	0.2051	0.2522	0.3354	0.2795
Max	1.2368	5.4589	3.8351	5.4238	5.9833	8.9741	8.9741
Min	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mode	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Firm Age (years)</b>							
Mean	35.6585	18.0613	20.3830	16.1552	17.8587	22.4678	19.0433
Median	22.0000	16.0000	16.0000	14.0000	15.0000	19.0000	16.0000
St. dev.	32.5729	11.1174	16.9748	11.4342	12.5819	29.6285	18.6959
Max	129.0000	53.0000	90.0000	110.0000	91.0000	910.0000	910.0000
Min	0.0000	0.0000	0.0000	0.0000	-3.0000	0.0000	0.0000
Mode	15.0000	9.0000	11.0000	12.0000	7.0000	9.0000	7.0000
<b>Firm Size (log)</b>							
Mean	11.4607	13.4634	14.7749	6.0667	13.9045	13.2315	12.9533
Median	11.2618	13.5295	14.8843	6.0636	13.9441	13.2553	13.6272
St. dev.	2.4945	1.2532	1.5551	1.1059	1.0466	1.3244	2.5701
Max	16.1057	19.0067	18.3889	10.2262	17.8835	17.0828	19.0067
Min	6.9752	7.7209	8.8537	1.6487	9.2048	6.6333	1.6487
Mode	9.2604	12.6049	15.1319	6.0476	12.6282	11.7845	12.6282
<b>Tangibility decimal</b>							
Mean	0.2659	0.3006	0.3159	0.1373	0.2346	0.2675	0.2380
Median	0.2221	0.2364	0.2578	0.0699	0.1394	0.2032	0.1509
St. dev.	0.2105	0.2541	0.2760	0.1753	0.2451	0.2381	0.2414
Max	0.8952	0.9953	0.9962	0.9788	0.9978	0.9958	0.9978
Min	0.0028	0.0000	0.0000	0.0000	-2.0334	0.0000	-2.0334*
Mode	0.0447	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Profitability decimal</b>							
Mean	0.0619	0.0691	0.0593	0.0804	0.1055	0.0310	0.0816
Median	0.0397	0.0576	0.0609	0.0629	0.0888	0.0325	0.0697
St. dev.	0.0997	0.2314	0.2461	0.1772	0.1264	0.1616	0.1536
Max	0.3858	0.8540	1.1056	1.1092	1.4723	1.6640	1.6640
Min	-0.2753	-7.0127	-2.5685	-4.0308	-3.6559	-5.7434	-7.0127*
Mode	0.1369	NA	0.3116	0.0000	0.0790	-0.0053	0.0790
<b>Effective Tax Rate decimal</b>							
Mean	0.2267	0.3075	0.0824	0.2015	0.5161	0.2111	0.4003
Median	0.1418	0.2643	0.2599	0.1538	0.5032	0.2305	0.3503
St. dev.	0.4028	2.2192	1.7092	2.9355	19.7408	3.1601	15.6208
Max	2.5963	50.5152	6.5744	108.4381	1268.9170	94.7137	1268.9170
Min	-0.4157	-32.5882	-31.0751	-78.5540	-1460.80	-188.5833	-1460.800*
Mode	0.2093	1.0000	0.0000	0.0000	0.0000	0.2500	0.0000
<b>Credit Index (scale)</b>							
Mean	6.0000	4.0000	4.0000	4.0000	5.2856	5.0000	5.0127
Median	6.0000	4.0000	4.0000	4.0000	5.0000	5.0000	5.0000
St. dev.	0.0000	0.0000	0.0000	0.0000	0.4517	0.0000	0.5797
Max	6.0000	4.0000	4.0000	4.0000	6.0000	5.0000	6.0000
Min	6.0000	4.0000	4.0000	4.0000	5.0000	5.0000	4.0000
Mode	6.0000	4.0000	4.0000	4.0000	5.0000	5.0000	5.0000
<b>Private Property (scale)</b>							
Mean	90.0000	84.2848	90.7143	71.4290	56.4261	70.0000	63.4547
Median	90.0000	80.0000	90.0000	70.0000	50.0000	70.0000	70.0000
St. dev.	0.0000	4.9502	1.7510	3.5002	8.7469	0.0000	11.4986
Max	90.0000	90.0000	95.0000	80.0000	70.0000	70.0000	95.0000
Min	90.0000	80.0000	90.0000	70.0000	50.0000	70.0000	50.0000
Mode	90.0000	80.0000	90.0000	70.0000	50.0000	70.0000	70.0000
<b>ProEnforce (No.)</b>							
Mean	25.8571	27.1418	33.0000	29.0000	39.8561	36.7142	37.1959
Median	26.0000	28.0000	33.0000	29.0000	41.0000	38.0000	38.0000
St. dev.	0.8344	0.9902	0.0000	0.0000	1.8075	1.7497	4.4061
Max	27.0000	28.0000	33.0000	29.0000	41.0000	38.0000	41.0000
Min	25.0000	26.0000	33.0000	29.0000	37.0000	34.0000	25.0000
Mode	25.0000	28.0000	33.0000	29.0000	41.0000	38.0000	41.0000

	Austria	Belgium	Finland	France	Italy	Portugal	Total
<b>TimeEnforce</b>							
<b>(days)</b>							
Mean	397.0000	505.0000	275.0000	390.0000	1261.4020	568.4281	944.2871
Median	397.0000	505.0000	235.0000	390.0000	1210.0000	577.0000	1210.0000
St. dev.	0.0000	0.0000	63.2937	0.0000	81.3050	13.5537	383.6788
Max	397.0000	505.0000	375.0000	390.0000	1390.0000	577.0000	1390.0000
Min	397.0000	505.0000	235.0000	390.0000	1210.0000	547.0000	235.0000
Mode	397.0000	505.0000	235.0000	390.0000	1210.0000	577.0000	1210.0000
<b>CostEnforce %</b>							
Mean	14.9714	17.7000	13.3000	17.4000	29.9000	13.8571	23.7069
Median	12.7000	17.7000	13.3000	17.4000	29.9000	14.2000	29.9000
St. dev.	2.6274	0.0000	0.0000	0.0000	0.0000	0.5421	7.3985
Max	18.0000	17.7000	13.3000	17.4000	29.9000	14.2000	29.9000
Min	12.7000	17.7000	13.3000	17.4000	29.9000	13.0000	12.7000
Mode	12.7000	17.7000	13.3000	17.4000	29.9000	14.2000	29.9000
<b>TimeResolve</b>							
<b>(years)</b>							
Mean	1.1000	0.9000	0.9000	1.9000	1.8000	2.0000	1.7954
Median	1.1000	0.9000	0.9000	1.9000	1.8000	2.0000	1.8000
St. dev.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2594
Max	1.1000	0.9000	0.9000	1.9000	1.8000	2.0000	2.0000
Min	1.1000	0.9000	0.9000	1.9000	1.8000	2.0000	0.9000
Mode	1.1000	0.9000	0.9000	1.9000	1.8000	2.0000	1.8000
<b>CostResolve %</b>							
Mean	18.0000	4.0000	4.0000	9.0000	22.0000	9.0000	16.3143
Median	18.0000	4.0000	4.0000	9.0000	22.0000	9.0000	22.0000
St. dev.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	6.8630
Max	18.0000	4.0000	4.0000	9.0000	22.0000	9.0000	22.0000
Min	18.0000	4.0000	4.0000	9.0000	22.0000	9.0000	4.0000
Mode	18.0000	4.0000	4.0000	9.0000	22.0000	9.0000	22.0000
<b>RecoveryRat (\$)</b>							
Mean	72.5714	86.4577	88.3286	46.1859	60.3274	72.6143	63.8294
Median	72.5000	86.4000	88.2000	45.7000	61.8000	73.2000	62.5000
St. dev.	0.7955	0.5729	0.7965	1.3307	2.9046	2.1704	9.9095
Max	73.7000	87.6000	89.4000	48.0000	63.6000	75.0000	89.4000
Min	71.5000	85.5000	87.3000	44.7000	56.6000	69.4000	44.7000
Mode	71.5000	86.3000	87.3000	44.7000	56.6000	69.4000	56.6000
<b>Value</b>							
<b>Insurance</b>							
<b>(scale)*</b>							
Mean	NA	3.1749	3.3456	3.0338	NA	3.5040	3.3487
Median	NA	3.1749	3.3456	3.0338	NA	3.5040	3.5040
St. dev.	NA	0.0000	0.0000	0.0000	NA	0.0000	0.2037
Max	NA	3.1749	3.3456	3.0338	NA	3.5040	3.5040
Min	NA	3.1749	3.3456	3.0338	NA	3.5040	3.0338
Mode	NA	3.1749	3.3456	3.0338	NA	3.5040	3.5040
<b>Values</b>							
<b>Stolen (scale)*</b>							
Mean	NA	3.1667	3.4830	3.1167	NA	3.5648	3.4107
Median	NA	3.1667	3.4830	3.1167	NA	3.5648	3.5648
St. dev.	NA	0.0000	0.0000	0.0000	NA	0.0000	0.2043
Max	NA	3.1667	3.4830	3.1167	NA	3.5648	3.5648
Min	NA	3.1667	3.4830	3.1167	NA	3.5648	3.1167
Mode	NA	3.1667	3.4830	3.1167	NA	3.5648	3.5648
<b>Values</b>							
<b>Traffic (scale)*</b>							
Mean	NA	2.9560	2.8802	2.8564	NA	3.4220	3.2110
Median	NA	2.9560	2.8802	2.8564	NA	3.4220	3.4220
St. dev.	NA	0.0000	0.0000	0.0000	NA	0.0000	0.2628
Max	NA	2.9560	2.8802	2.8564	NA	3.4220	3.4220
Min	NA	2.9560	2.8802	2.8564	NA	3.4220	2.8564
Mode	NA	2.9560	2.8802	2.8564	NA	3.4220	3.4220
<b>Trust (scale)</b>							
Mean	5.7892	5.0234	6.6195	4.5091	4.7616	4.4104	4.6543
Median	5.7892	5.0137	6.5791	4.5960	4.7616	4.2285	4.5953
St. dev.	0.1273	0.1054	0.1086	0.0790	0.0000	0.6678	0.6213
Max	5.9157	5.1783	6.7987	4.5953	4.7616	5.5407	6.7987
Min	5.6627	4.8881	6.5212	4.3869	4.7616	3.8310	3.8310
Mode	5.9157	5.1783	6.5474	4.4960	4.7616	5.5407	4.7616
<b>Regulatory</b>							
<b>(scale)</b>							
Mean	4.5000	5.5000	5.0000	8.0000	5.2006	6.5000	5.7991
Median	4.5000	5.5000	5.0000	8.0000	6.0000	6.5000	6.0000
St. dev.	0.5031	2.5028	1.0027	0.0000	0.8001	2.5005	1.7497
Max	5.0000	8.0000	6.0000	8.0000	6.0000	9.0000	9.0000
Min	4.0000	3.0000	4.0000	8.0000	4.4000	4.0000	3.0000
Mode	4.0000	8.0000	6.0000	8.0000	6.0000	9.0000	6.0000

	Austria	Belgium	Finland	France	Italy	Portugal	Total
<b>GDP per Cap</b>							
%							
Mean	42497.88	40867.47	42768.17	38011.33	33616.71	20553.21	31378.9700
Median	44723.20	42960.42	43846.30	39186.02	33760.59	21381.90	32784.8400
St. dev.	4812.50	4335.5020	4998.375	3782.080	2903.743	2095.4750	7265.7190
Max	49679.11	47374.45	51186.48	43991.70	38563.05	23716.39	51186.4800
Min	35662.21	34706.70	36162.66	32784.84	29832.61	17653.57	17653.5700
Mode	45181.47	47374.75	43846.30	35457.05	35073.16	19064.99	35073.1600
<b>Annual Growth%</b>							
Mean	1.6785	1.5823	1.7007	1.0882	0.2300	0.7386	0.5413
Median	2.4007	2.3232	3.3630	1.8265	1.6831	1.4483	1.6831
St. dev.	2.3871	1.9241	4.4353	1.9169	2.5547	1.6527	2.3671
Max	3.7059	3.2743	5.3352	2.5447	2.1989	2.3654	5.3352
Min	-3.8219	-2.8006	-8.5386	-3.1471	-5.4944	-2.9084	-8.5386
Mode	3.7059	0.9852	3.3630	2.4669	-5.4944	1.4483	-5.4944
<b>Domestic Demand %</b>							
Mean	2.8571	3.7133	3.5714	2.8568	1.8561	2.5715	2.2564
Median	3.0000	5.0000	4.0000	4.0000	3.0000	3.0000	3.0000
St. dev.	1.7292	3.2417	4.1386	2.4750	2.5324	2.7697	2.7100
Max	5.0000	6.0000	8.0000	5.0000	4.0000	5.0000	8.0000
Min	-1.0000	-4.0000	-6.0000	-3.0000	-4.0000	-4.0000	-6.0000
Mode	3.0000	6.0000	4.0000	4.0000	3.0000	3.0000	3.0000
<b>Inflation(log)</b>							
Mean	0.2797	0.3008	0.0960	0.2497	0.3296	0.3377	0.3169
Median	0.2068	0.4362	0.2856	0.2405	0.3617	0.4031	0.3617
St. dev.	0.1542	0.3233	0.4979	0.1361	0.1117	0.1726	0.1662
Max	0.5515	0.5682	0.5453	0.4579	0.4624	0.4533	0.5682
Min	0.0531	-0.4559	-1.0458	0.0374	0.0792	-0.0458	-1.0458
Mode	0.5515	0.4594	0.4800	0.2304	0.3617	0.3979	0.3222
<b>Gov and CB Support (scale)</b>							
Mean	8.0000	7.0000	7.0000	7.0000	6.0000	6.0000	6.1784
Median	8.0000	7.0000	7.0000	7.0000	6.0000	6.0000	6.0000
St. dev.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4040
Max	8.0000	7.0000	7.0000	7.0000	6.0000	6.0000	8.0000
Min	8.0000	7.0000	7.0000	7.0000	6.0000	6.0000	6.0000
Mode	8.0000	7.0000	7.0000	7.0000	6.0000	6.0000	6.0000
<b>Systematic Crisis (binary)*</b>							
Mean	1.0000	1.0000	NA	0.0000	0.0000	0.0000	0.0549
Median	1.0000	1.0000	NA	0.0000	0.0000	0.0000	0.0000
St. dev.	0.0000	0.0000	NA	0.0000	0.0000	0.0000	0.2278
Max	1.0000	1.0000	NA	0.0000	0.0000	0.0000	1.0000
Min	1.0000	1.0000	NA	0.0000	0.0000	0.0000	0.0000
Mode	1.0000	1.0000	NA	0.0000	0.0000	0.0000	0.0000
<b>10 Year Gov Bond Yield %</b>							
Mean	3.8814	3.8772	3.7957	3.8013	4.1986	4.2916	4.1581
Median	3.9400	3.8200	3.7800	3.8000	4.2600	4.2100	4.2100
St. dev.	0.4064	0.3882	0.4486	0.4075	0.3355	0.5604	0.4428
Max	4.3600	4.4000	4.2900	4.3000	4.6800	5.4000	5.0000
Min	3.2300	3.3500	3.0100	3.1200	3.5600	3.4400	3.0100
Mode	4.3000	4.4000	4.2900	3.8000	4.3100	3.9100	4.3100
<b>Domestic Savings %</b>							
Mean	27.0555	24.9975	24.6434	19.0264	20.3728	13.9043	18.9838
Median	26.6949	25.8096	26.0128	19.6210	20.8326	14.1336	19.8434
St. dev.	1.1884	1.5619	3.0139	1.2701	1.4213	1.0820	3.4994
Max	28.8618	26.8204	28.0115	20.4158	21.8653	15.6658	28.8618
Min	25.5521	22.5281	19.8125	17.0293	18.1018	12.4639	12.4639
Mode	28.8618	24.8592	19.8125	19.8174	18.3206	14.3641	18.1018
<b>Deposits per GDP %</b>							
Mean	90.4000	98.8109	53.1743	71.1356	63.6776	97.8834	74.5134
Median	88.3500	97.9200	49.3200	67.6700	60.0700	92.3700	71.6000
St. dev.	5.6721	3.7054	5.9803	4.8833	11.8080	13.5967	19.3271
Max	99.0600	104.2000	61.9900	79.6800	83.9100	120.3300	120.3300
Min	83.0400	92.5600	47.3700	66.8600	50.8500	81.9400	47.3700
Mode	88.3500	99.6700	61.9500	67.3800	75.67	89.4200	75.6700
<b>Number of obs.</b>	251	1122	469	3345	20034	8305	33526

Dependent variable is total debt ratio. All other variables are independent variables i.e. firm characteristics, country characteristics, macroeconomic conditions and credit supply conditions. Dependent variable is from time period (t). Independent variables are lagged (t-1). \*Social values are not available for Austria and Italy. Systemic banking crisis not available for Finland.

## **Descriptives across Industries per Country**

There appears to be significant variation across the industries of the sample. In Austria, Belgium, France, Germany and Portugal, wholesale or retail trade is the most dominant industry whilst manufacturing is the most dominant industry in Finland and Italy. The following presents descriptives across the key industries, namely, manufacturing, other services to businesses or persons, wholesale or retail trade, transport, professional, scientific and technical activities, construction and information and communication. On average, firms in the construction sector have the highest total debt ratio whilst those in the professional, scientific and technical activities have the lowest debt ratio. SMEs from the transport industry are deemed the oldest and have the highest tangible assets but are the least profitable. In contrast, SMEs from the professional, scientific and technical activities sector appear the youngest, are the most profitable. SMEs from construction have the lowest tangible assets. SMEs from manufacturing appear to be the largest whilst other services category appears to have smaller SMEs (unreported).

**Table 6.23: Descriptives across Industries per Country**

	Austria	Belgium	Finland	France	Italy	Portugal
<b>Manufacturing</b>	70 (24.4)	168 (10.7)	217 (33)	553 (16.5)	6754 (33.7)	2372 (27.7)
<b>Other Services to businesses or persons</b>	7 (2.4)	21 (1.3)	0 (0)	91 (2.7)	245 (1.2)	49 (0.6)
<b>Wholesale or Retail Trade</b>	133 (46.3)	378 (24.1)	49 (7.4)	1015 (30.3)	4611 (23)	3190 (37.3)
<b>Transport</b>	14 (4.9)	161 (10.3)	42 (6.4)	105 (3.1)	630 (3.1)	329 (3.8)
<b>Professional, Scientific, Technical Activities</b>	14 (4.9)	266 (17)	70 (10.6)	189 (5.7)	1197 (6.0)	378 (4.4)
<b>Construction</b>	35 (12.2)	189 (12.1)	63 (9.6)	588 (17.6)	2030 (10.1)	742 (8.7)
<b>Information and Communication</b>	14 (4.9)	56 (3.6)	84 (12.8)	153 (4.6)	1190 (5.9)	154 (1.8)
<b>Administrative</b>	0	75 (4.8)	35 (5.3)	175 (5.2)	406 (2.0)	161 (1.9)
<b>Arts, Entertainment and Recreation</b>	0	21 (1.3)	28 (4.3)	21 (0.6)	315 (1.6)	28 (0.3)
<b>Accommodation and Food Service Activities</b>	0	119 (7.6)	7 (1.1)	203 (6.1)	1117 (5.6)	665 (7.8)
<b>Human Health and Social Work Activities</b>	0	63 (4)	21 (3.2)	70 (2.1)	411 (2.1)	237 (2.8)
<b>Water Supply, Sewerage, Waste Management</b>	0	14 (0.9)	7 (1.1)	21 (0.6)	133 (0.7)	7 (0.1)
<b>Education</b>	0	14 (0.9)	14 (2.1)	7 (0.2)	77 (0.4)	98 (1.1)
<b>Real Estate Activities</b>	0	21 (1.3)	7 (1.1)	133 (4.0)	728 (3.6)	84 (1.0)
<b>Electricity, Gas, Steam and Air Conditioning Supply</b>	0	0	14 (2.1)	7 (0.2)	14 (0.1)	0
<b>Mining</b>	0	0	0	14 (0.4)	175 (0.9)	56 (0.7)
<b>Missing</b>	0	0	0	0	0	0
<b>Total</b>	287 (100)	1566 (100)	658 (100)	3345 (100)	20033 (100)	8550 (100)

Table 6.23 reports the number of firms by country and sector. Percentages are in parentheses.

## 6.6 Empirical Results

To evaluate the effect of country characteristics on SME firm leverage, the following classes of panel estimators are conducted, the fixed effects model and the random effects model. The fixed effects model is estimated as

$$\gamma_{it} = \alpha + \beta x_{it} + \mu_i + v_{it} \quad (\text{Fixed Effects})$$

where ‘ $\gamma_{it}$ ’ is the dependent variable (SME firm leverage),  $\alpha$  is the intercept,  $\beta$  is a  $k \times 1$  vector of parameters to be estimated on the independent variables,  $x_{it}$  is a  $k \times 1$  vector of observations on the independent variables,  $\mu_i$  is the individual specific effect of the disturbance term and  $v_{it}$  is the remainder disturbance’ (Brooks 2008, pp.488-490). The random effects model is estimated as

$$\gamma_{it} = \alpha + \beta x_{it} + \varepsilon_i + v_{it} \quad (\text{Random Effects})$$

where  $\varepsilon_i$  is a ‘random variable that varies cross sectionally but is constant over time’ (Brooks 2008, pp. 498).  $\varepsilon_i$  is ‘independent of the individual observation error term ( $v_{it}$ ) has a constant variance  $\sigma^2_\varepsilon$  and is independent of the explanatory variables,  $x_{it}$  (Brooks 2008, pp. 498).

In addressing the first research question i.e. credit availability where several equations are conducted, a similar approach is mirrored here in order to address the second research question. More specifically, to evaluate if differences across firm characteristics in SME firm leverage are present, leverage is first regressed on firm specific characteristics (Eq. 1)

$$\gamma_{it} = \alpha + \beta(\text{Firm Factors})_{it} + \mu_i + v_{it} \quad (\text{Eq. 1 Fixed Effects})$$

$$\gamma_{it} = \alpha + \beta(\text{Firm Factors})_{it} + \varepsilon_i + v_{it} \quad (\text{Eq. 1 Random Effects})$$

Equation 2 sees the inclusion of industry dummies where ‘other services’ industry is chosen as the base category. The selection of this base category is similar to that taken earlier and concurs with Hernandez and Koëter-Kant (2010) who posits that be the group whose mean for the dependent variable, total debt ratio (20.15 per cent) appears closest to the sample mean (20.12 per cent). (Appendix 5 provides details of the group mean and the sample mean of the total debt ratio). The employment of a base category following the inclusion of dummy variables is common practice in research. In particular, Degryse *et al.* (2012) employ industry dummies in evaluating industry effects.

$$\gamma_{it} = \alpha + \beta(\text{Firm Factors})_{it} + \beta(\text{Industry Dum})_{it} + \mu_i + v_{it} \quad (\text{Eq. 2 Fixed Effects})$$

$$\gamma_{it} = \alpha + \beta(\text{Firm Factors})_{it} + \beta(\text{Industry Dum})_{it} + \varepsilon_i + v_{it} \quad (\text{Eq. 2 Random Effects})$$

Equation 3 includes country dummies for all countries in the sample except Italy which is the base category. Italy is selected as the base category given the mean of the total debt ratio for Italian SMEs (19.44 per cent) is the closest to the sample mean (20.12 per cent). This again mirrors the approach taken by Hernandez and Koëter-Kant (2010).

$$\gamma_{it} = \alpha + \beta(\text{Firm Factors})_{it} + \beta(\text{Industry Dum})_{it} + \beta(\text{Country Dum})_{it} + \mu_i + \nu_{it} \quad (\text{Eq. 3 Fixed Effects})$$

$$\gamma_{it} = \alpha + \beta(\text{Firm Factors})_{it} + \beta(\text{Industry Dum})_{it} + \beta(\text{Country Dum})_{it} + \varepsilon_i + \nu_{it} \quad (\text{Eq. 3 Random Effects})$$

Equation 4 omits country dummies whilst the country characteristics of credit depth of information index, private property protection, time to enforce, time to resolve, values stolen, trust and the capital regulatory index are included in equations 4(a) – 4(f) respectively.

$$\gamma_{it} = \alpha + \beta(\text{Firm Factors})_{it} + \beta(\text{Industry Dum})_{it} + \beta(\text{Country Chars})_{it} + \mu_i + \nu_{it} \quad (\text{Eq. 4 Fixed Effects})$$

$$\gamma_{it} = \alpha + \beta(\text{Firm Factors})_{it} + \beta(\text{Industry Dum})_{it} + \beta(\text{Country Chars})_{it} + \varepsilon_i + \nu_{it} \quad (\text{Eq. 4 Random Effects})$$

Finally, in equation 5, macroeconomic conditions are considered.

$$\gamma_{it} = \alpha + \beta(\text{Firm Factors})_{it} + \beta(\text{Industry Dum})_{it} + \beta(\text{Macro})_{it} + \mu_i + \nu_{it} \quad (\text{Eq. 5 Fixed Effects})$$

$$\gamma_{it} = \alpha + \beta(\text{Firm Factors})_{it} + \beta(\text{Industry Dum})_{it} + \beta(\text{Macro})_{it} + \varepsilon_i + \nu_{it} \quad (\text{Eq. 5 Random Effects})$$

These five equations are conducted on a balanced dataset where no population weights are applied. The formulation of the above equations (Eq1 to Eq5) arises from steps taken to address issues of multicollinearity. This is explained in the following paragraphs.

Initially, equations were conducted to include firm characteristics, industry dummies, country dummies, country characteristics as well as macroeconomic conditions (See Appendix 6).

Following tests of multicollinearity which include the variance inflation factor (VIF) and tolerance (Table 6.24) coupled with a correlation matrix (Table 6.25), its presence was

confirmed. More specifically, a VIF value of greater than 10 and a tolerance value of less than 0.10 are indicative of serious multicollinearity (UCLA, 2014). Furthermore, a correlation matrix which reveals a correlation value equal to or greater than 0.70 suggest multicollinearity is present (Pollner, 2012) (See Table 6.25).

Table 6.24: Variance Inflation Factors and Tolerance

	(1)		(2)		(3) <sup>16</sup>	
	VIF	Tolerance	VIF	Tolerance	VIF	Tolerance
<b>Firm Variables</b>						
Age	1.08	0.9273	1.09	0.9147		
Log Assets	6.72	0.1487	7.41	0.135		
Tangibility	1.1	0.9068	1.28	0.7804		
Profitability	1.04	0.9625	1.06	0.947		
Effective Tax Rate	1	0.9996	1	0.9986		
<b>Macroeconomic Factors</b>						
GDP Per Capita	98.31	0.0102	98.68	0.0101		
Annual Growth Rate	47.42	0.0211	47.44	0.0211		
Domestic Demand	28.86	0.0347	28.86	0.0346		
Inflation	4.07	0.2457	4.07	0.2457		
Gov and Central Bank Support	21.35	0.0468	21.88	0.0457		
Systemic Crisis	41.82	0.0239	42.01	0.0238		
10 Year Gov Bond	6.35	0.1575	6.37	0.1569		
Domestic Savings	111.3	0.009	111.94	0.0089		
Deposits per GDP	11.03	0.009	111.14	0.009		
<b>Industry Dummies</b>						
Manufacturing			17.66	0.0566		
Wholesale			16.32	0.0613		
Transport			3.61	0.2771		
Professional, Scientific			5.5	0.1817		
Construction			8.63	0.1159		
Info and Communication			4.74	0.211		
Administrative			2.88	0.3475		
Arts, Entertainment			1.93	0.5168		
Accommodation			5.28	0.1895		
Human Health			2.71	0.3689		
Water Supply			1.46	0.6835		
Education			1.41	0.7112		
Real Estate			3.4	0.2939		
Electricity, Gas			1.06	0.943		
Mining			1.61	0.6201		
<b>Country Dummies</b>						
Austria						
Belgium						
Finland						
France						
Portugal						

<sup>16</sup> Unable to run VIF and Tolerance for Equation 3 as correlation matrix has zero or negative values on diagonal.

	(4a)		(4b)		(4c)	
	VIF	Tolerance	VIF	Tolerance	VIF	Tolerance
<b>Firm Variables</b>						
Age	1.04	0.9641	1.08	0.9286	1.04	0.9639
Log Assets	9.66	0.1035	6.97	0.1434	10.17	0.0983
Tangibility	1.32	0.7551	1.29	0.7764	1.37	0.7316
Profitability	1.07	0.9359	1.07	0.9337	1.08	0.9222
Effective Tax Rate	1.01	0.995	1	0.9961	1.03	0.9732
<b>Macroeconomic Variables</b>						
GDP Per Capita	-1.29E+13	0	4.39E+12	0	4.55E+12	0
Annual Growth Rate	-1.66E+13	0	-2.66E+12	0	-4.13E+12	0
Domestic Demand	-1.60E+12	0	7.58E+12	0	4.17E+15	0
Inflation	-1.13E+14	0	-1.97E+12	0	-5.34E+12	0
Gov and Central Bank Support	-2.25E+15	0	1.54E+12	0	-1.75E+13	0
Systemic Crisis	-1.54E+13	0	1.58E+12	0	4.20E+15	0
10 Year Gov Bond	-4.87E+11	0	1.72E+12	0	7.25E+12	0
Domestic Savings	-1.68E+13	0	3.07E+12	0	-1.64E+13	0
Deposits per GDP	-5.93E+13	0	6.32E+12	0	-3.21E+13	0
<b>Industry Dummies</b>						
Manufacturing	17.35	0.0576	18.34	0.0545	16.97	0.0589
Wholesale	21.9	0.0457	17.26	0.0579	21.46	0.0466
Transport	4.55	0.22	3.71	0.2696	4.39	0.2277
Professional, Scientific	6.09	0.1643	5.57	0.1794	5.92	0.1691
Construction	10.52	0.095	8.96	0.1116	10.62	0.0942
Info and Communication	3.51	0.2851	4.75	0.2104	3.44	0.2905
Administrative	3.79	0.2638	2.89	0.3464	3.64	0.2751
Arts, Entertainment	1.4	0.7126	1.94	0.5163	1.36	0.7328
Accommodation	6.43	0.1554	5.49	0.182	6.23	0.1606
Human Health	3.31	0.3017	2.81	0.3558	3.27	0.3054
Water Supply	1.29	0.7766	1.46	0.6841	1.29	0.7724
Education	1.79	0.5588	1.46	0.6863	1.79	0.5596
Real Estate	2.59	0.3863	3.38	0.2962	2.51	0.3978
Electricity, Gas	1.06	0.9405	1.06	0.9437	1.07	0.9387
Mining	1.51	0.6616	1.65	0.605	1.56	0.6424
<b>Country Characteristics</b>						
Credit Index	-2.25E+15	0				
Private Property	-1.21E+12	0				
Procedures to Enforce	-1.17E+13	0				
Time to Enforce	1.33E+12	0				
Cost to Enforce	1.79E+12	0				
Cost to Resolve	-5.65E+12	0				
Time to Resolve	-3.19E+13	0				
Recovery Rate	-3.61E+13	0				
Trust	-7.54E+12	0				
Capital Regulatory			6.96E+12	0		
Value (Insurance)					-2.63E+12	0
Value (Stolen)					9.45E+12	0
Value (Traffic)					8.79E+11	0

Table 6.25: Correlation Matrix

	Age	LA	Tang	Profit	ETR	GDP	AGR	DD	Inflat	GovCB	SBC	Depot	DS	Gov Bond	Value Ins	Value Stol	Value Traf	TT	CI	PP	Proc	TE	CE	TR	CR	RR	RG
Age	1.00																										
LA	0.13	1.00																									
Tang	0.02	0.28	1.00																								
Profit	-0.05	-0.08	-0.10	1.00																							
ETR	0.02	0.05	0.04	0.03	1.00																						
GDP	-0.11	-0.72	-0.15	0.14	-0.05	1.00																					
AGR	0.06	0.73	0.28	-0.03	0.06	-0.19	1.00																				
DD	-0.02	0.21	0.16	0.06	0.03	0.46	0.79	1.00																			
Inflat	0.06	0.75	0.28	-0.04	0.06	-0.22	1.00	0.77	1.00																		
GovCB	-0.11	-0.78	-0.17	0.14	-0.05	0.99	-0.29	0.36	-0.32	1.00																	
SBC	-0.02	0.21	0.16	0.06	0.03	0.46	0.79	1.00	0.77	0.36	1.00																
Depot	0.12	0.91	0.24	-0.13	0.07	-0.90	0.59	-0.03	0.61	-0.94	-0.03	1.00															
DS	-0.09	-0.45	-0.04	0.13	-0.02	0.93	0.19	0.75	0.16	0.89	0.75	-0.68	1.00														
Gov Bond	0.12	0.81	0.18	-0.14	0.06	-0.99	0.34	-0.31	0.37	-1.00	-0.31	0.96	-0.86	1.00													
Value Ins	0.12	0.86	0.21	-0.14	0.06	-0.96	0.44	-0.20	0.47	-0.99	-0.20	0.98	-0.80	0.99	1.00												
Value Stol	0.12	0.81	0.18	-0.14	0.06	-0.99	0.34	-0.31	0.37	-1.00	-0.31	0.96	-0.86	1.00	0.99	1.00											
Value Traf	0.12	0.83	0.19	-0.14	0.06	-0.98	0.38	-0.27	0.40	-1.00	-0.27	0.97	-0.84	1.00	1.00	1.00	1.00										
TT	-0.06	-0.11	0.07	0.10	0.00	0.73	0.54	0.94	0.52	0.65	0.94	-0.36	0.93	-0.61	-0.52	-0.60	-0.58	1.00									
CI	0.11	0.78	0.17	-0.14	0.05	-0.99	0.29	-0.36	0.32	-1.00	-0.36	0.94	-0.89	1.00	0.99	1.00	1.00	-0.65	1.00								
PP	-0.11	-0.78	-0.17	0.14	-0.05	0.99	-0.29	0.36	-0.32	1.00	0.36	-0.94	0.89	-1.00	-0.99	-1.00	-1.00	0.65	-1.00	1.00							
Proc	0.10	0.61	0.10	-0.14	0.04	-0.99	0.02	-0.60	0.05	-0.96	-0.60	0.82	-0.98	0.95	0.91	0.95	0.93	-0.83	0.96	-0.96	1.00						
TE	0.11	0.93	0.25	-0.13	0.07	-0.87	0.65	0.05	0.67	-0.91	0.05	1.00	-0.62	0.93	0.97	0.94	0.95	-0.29	0.91	-0.91	0.77	1.00					
CE	-0.11	-0.76	-0.16	0.14	-0.05	1.00	-0.25	0.39	-0.28	1.00	0.39	-0.93	0.90	-1.00	-0.98	-1.00	-0.99	0.68	-1.00	1.00	-0.97	-0.90	1.00				
TR	0.04	-0.06	-0.12	-0.08	-0.02	-0.59	-0.68	-0.99	-0.66	-0.50	-0.99	0.19	-0.85	0.46	0.36	0.45	0.42	-0.98	0.50	-0.50	0.71	0.11	-0.53	1			
CR	0.02	-0.21	-0.16	-0.06	-0.03	-0.46	-0.79	-1.00	-0.77	-0.36	-1.00	0.03	-0.75	0.31	0.20	0.31	0.27	-0.94	0.36	-0.36	0.60	-0.05	-0.39	0.99	1		
RR	0.09	0.91	0.29	-0.09	0.07	-0.57	0.91	0.47	0.92	-0.66	0.47	0.87	-0.23	0.69	0.77	0.70	0.72	0.15	0.66	-0.66	0.43	0.90	-0.63	-0.33	-0.47	1.00	
RG	-0.11	-0.78	-0.17	0.14	-0.05	0.99	-0.29	0.36	-0.32	1.00	0.36	-0.94	0.89	-1.00	-0.99	-1.00	-1.00	0.65	-1.00	1.00	-0.96	-0.91	1.00	-0.50	-0.36	-0.66	1

\* The heading abbreviations are fully explained in Appendix 4.

As depicted in the correlation matrix of table 6.25, multicollinearity exists amongst a number of variables capturing firm size, country characteristics, macroeconomic and credit supply conditions. In relation to the firm size, the log assets appears highly correlated with time to enforce a contract (0.93), the recovery rate (0.91), deposits per GDP (0.91), value (insurance) (0.86), value (traffic) (0.83), value (stolen) (0.81), the 10 year government bond yield (0.81), credit index (0.78), private property protection (-0.78), the capital regulatory index (-0.78), government and central bank support (-0.78), cost to enforce a contract (-0.76), inflation (0.75), the annual growth rate (0.73) and GDP per capita (-0.72). As a corollary of this, the log assets (firm) is only included in the equations where it has a low correlation with variables i.e. equations (1), (2), (3a), and (4e).

In particular, many of the country characteristics are highly correlated with each other. In relation to the judicial environment where three measures were identified to illustrate the efficiency of enforcement, high correlation is present. Procedures to enforce a contract appears to be highly correlated with GDP per capita (-0.99), domestic savings (-0.98), cost to enforce a contract (-0.97), the capital regulatory index (-0.96), the credit index of information index (0.96), private property protection (-0.96), government and central bank support(-0.96), value (stolen) (0.95), the 10 year government bond yield (0.95), value (traffic) (0.93), value (insurance) (0.91), trust (-0.83), deposits per GDP (0.82), time to enforce a contract (0.77), time to resolve a contract (0.71). Time to enforce appears to be highly correlated with deposits per GDP (1.00), value (insurance) (0.97), value (traffic), (0.95), value (stolen) (0.94), the 10 year government bond yield (0.93), the credit index of information index (0.91), private property protection (-0.91), the capital regulatory index (-0.91), government and central bank support (-0.91), the cost to enforce a contract (-0.90), the recovery rate (0.90), GDP per capita (-0.87) and procedures to enforce (0.77). The cost to enforce a contract is also illustrated to be highly correlated the credit index of information index

(-1.00), private property protection (1.00), the capital regulatory index (1.00), value (stolen) (-1.00), GDP per capita (1.00) , the 10 year government bond yield (-1.00), government and central bank support (1.00), value (traffic) (-0.99), value (insurance) (-0.98), procedures to enforce a contract (-0.97), deposits per GDP (-0.93), time to enforce a contract (-0.90) and domestic savings (0.90). As a corollary of this, the measure which commands the least high correlations with the other explanatory variables is selected for the final analysis. More specifically, both time to enforce a contract and cost to enforce a contract have the same number of high correlations so hence time to enforce a contract was selected (Table 6.26).

Table 6.26: Judicial Environment

<b>Original Measures of Judicial Environment</b>	<b>Final Measure of Judicial Environment after Dealing with Multicollinearity</b>
<b>Procedures to Enforce a Contract (No.)</b>	<b>Time to Enforce a Contract (days)</b>
<b>Time to Enforce a Contract (days)</b>	
<b>Cost to Enforce a Contract %</b>	

In relation to the bankruptcy environment where three measures were identified to illustrate the efficiency of enforcement, high correlation is also present. The time to resolve a debt appears to be highly correlated with cost to resolve a debt (0.99), domestic demand (-0.99), systemic banking crisis (-0.99), trust (-0.98), domestic savings (-0.85), procedures to enforce a contract (0.71). The cost to enforce a contract appears to be highly correlated with domestic demand (-1.00), systemic banking crisis (-1.00), time to resolve a debt (0.99), trust (-0.94), time to enforce a contract (0.90), the annual growth rate (-0.79), inflation (-0.77), domestic savings (-0.75). The recovery rate is also illustrated to be highly correlated inflation (0.92), firm assets (0.91), the annual growth rate (0.91), deposits per GDP (0.87), value (insurance) (0.77), value (traffic) (0.72) and value (stolen) (0.70). As a corollary of this, the measure which commands the least high correlations with the other explanatory variables is selected

for the final analysis. *Ipsa facto*, the time to resolve a debt is selected. This is outlined in Table 6.27.

Table 6.27: Bankruptcy Environment

<b>Original Measures of Bankruptcy Environment</b>	<b>Final Measure of Bankruptcy Environment after Dealing with Multicollinearity</b>
<b>Time to Resolve a Debt (years)</b>	<b>Time to Resolve a Debt (years)</b>
<b>Cost to Resolve a Debt %</b>	
<b>Recovery Rate (\$)</b>	

The three measures representing social values are also highly correlated. The value (insurance) appears to be highly correlated with value (traffic) (1.00), value (stolen) (0.99), credit depth of information index (0.99), private property protection (-0.99), the capital regulatory index (-0.99), government and central bank support (-0.99), the 10 year government bond yield (0.99), cost to enforce a contract (-0.98), deposits per GDP (0.98), time to enforce a contract (0.97), GDP per capita (-0.96), procedures to enforce a contract (0.91), firm size (0.86), domestic savings (-0.80) and the recovery rate (0.77).

The value (stolen) appears to be highly correlated with value (traffic) (1.00), credit depth of information index (1.00), private property protection (-1.00), the cost to enforce a contract (-1.00), the capital regulatory index (-1.00), the 10 year government bond yield (1.00), government and central bank support (-1.00), value (insurance) (0.99), GDP per capita (-0.99), deposits per GDP (0.96), procedures to enforce a contract (0.95), time to enforce a contract (0.94), domestic savings (-0.86), firm size (0.81) and the recovery rate (0.70).

Finally, the value (traffic) is also illustrated to be highly correlated with value (insurance) (1.00), value (stolen) (1.00), credit depth of information index (1.00), private property protection (-1.00), the capital regulatory index (-1.00), the 10 year government bond yield (1.00), government and central bank support (-1.00), cost to enforce a contract (-0.99), deposits per GDP (0.97), GDP per capita (-0.98), time to enforce a contract (0.95),

procedures to enforce a contract (0.93), domestic savings (-0.84), firm size (0.83) and the recovery rate (0.72). As a corollary of this, the measure which commands the least high correlations with the other explanatory variables is selected for the final analysis. Considering value (insurance), value (stolen) and value (traffic), value (stolen) is selected presented in Table 6.28.

Table 6.28: Social Environment

<b>Original Measures of Social Environment</b>	<b>Final Measure of Social Environment after Dealing with Multicollinearity</b>
<b>Values (Insurance) (scale)</b>	<b>Values (Stolen) (scale)</b>
<b>Values (Stolen) (scale)</b>	
<b>Values (Traffic) (scale)</b>	

The presence of high correlation found between the remaining country characteristics must also be noted. In particular, the credit depth of information index is shown to be highly correlated with private property protection (-1.00), cost to enforce a contract (-1.00), the capital regulatory index (-1.00), value (stolen) (1.00), value (traffic) (1.00), the ten year government bond (1.00), government and central bank support (-1.00), value (insurance) (0.99), GDP per capita (-0.99), procedures to enforce a contract (0.96), deposits per GDP (0.94), time to enforce a contract (0.91), domestic savings (-0.89) and firm size (0.78). Private property protection is shown to be highly correlated with the credit depth of information index (-1.00), cost to enforce a contract (1.00), the capital regulatory index (1.00), value (stolen) (-1.00), value (traffic) (-1.00), the ten year government bond (-1.00), government and central bank support (1.00), value (insurance) (-0.99), GDP per capita (0.99), procedures to enforce a contract (-0.96), deposits per GDP (-0.94), time to enforce a contract (-0.91), domestic savings (0.89) and firm size (-0.78). Trust is also shown to be highly correlated with the cost to resolve a debt (-0.94), systemic banking crisis (0.94), domestic demand (0.94), domestic savings (0.93), procedures to enforce a contract (-0.83) and GDP

per capita (0.73). The capital regulatory index is also illustrated to be highly correlated with value (stolen) (-1.00), value (traffic) (-1.00), the credit depth of information index (-1.00), private property protection (1.00), cost to enforce a contract (1.00), the ten year government bond (-1.00), government and central bank support (1.00), value (insurance) (-0.99), GDP per capita (0.99), procedures to enforce a contract (-0.96), deposits per GDP (-0.94), time to enforce a contract (-0.91), domestic savings (0.89), and firm size (-0.78).

As a corollary of this, several equations must be conducted to facilitate the analysis of the second research question. Equation 4(a) includes credit depth of information index. Equation 4 (b) includes private property protection. The time to enforce a contract and the time to resolve a debt are included in equation 4(c). Equation 4(d) includes value (stolen). Equation 4 (e) includes trust and equation 4 (f) includes the capital regulatory index.

Unsurprisingly, the majority of control variables including macroeconomic variables and credit supply variables are highly correlated and are thus evaluated in equation 5 (a) and 5 (b) only. However, the annual growth rate is included in the equations; 4(a) to 4(f) given this is the only macroeconomic variable which has a low correlation with the country characteristics.

Finally, evaluating the distribution of the dependent variable, several observations (28) are omitted where negative values are recorded for the total debt ratio or values of the total debt ratio represent outliers.

In summary, the following tables 6.29 (a) and 6.29 (b) presents the variables used in the models conducted under research question 2 after dealing with multicollinearity. The statistical package, Stata also influences the construction of equations where some variables are omitted due to collinearity issues.

Table 6.29 (a): Equations (1- 4c) of Research Question 2

	(1)	(2)	(3a)	(3b)	(4a)	(4b)	(4c)
<b>Firm Variables</b>							
Firm Age	X	X	X	X	X	X	X
Log Assets	X	X	X				
Tangibility	X	X	X	X	X		
Profitability	X	X	X	X	X		
EffectiveTax	X	X				X	X
<b>Industry Dummies</b>							
Manufacturing		X	X	X	X	X	X
Wholesale		X	X	X	X	X	X
Transport		X	X	X	X	X	X
Professional, Scientific		X	X	X	X	X	X
Construction		X	X	X	X	X	X
Info and Communication		X	X	X	X	X	X
Administrative		X	X	X	X	X	X
Arts, Entertainment		X	X	X	X	X	X
Accommodation		X	X	X	X	X	X
Human Health		X	X	X	X	X	X
Water Supply		X	X	X	X	X	X
Education		X	X	X	X	X	X
Real Estate		X	X	X	X	X	X
Electricity, Gas		X	X	X	X	X	X
Mining		X	X	X	X	X	X
<b>Country Dummies</b>							
Austria			X	X			
Belgium			X	X			
Finland			X	X			
France			X	X			
Portugal			X	X			
<b>Country Characteristics</b>							
Credit Index					X		
Private Property Protection						X	
Time to Enforce a Contract							X
Time to Resolve a Debt							X
Values Stolen							
<b>Trust</b>							
Capital Regulatory Index							
<b>Controls:</b>							
Annual Growth					X	X	X

	(4d)	(4e)	(4f)	(5a)	(5b)
<b>Firm Variables</b>					
Firm Age	X	X	X	X	X
Log Assets		X			
Tangibility	X	X	X	X	X
Profitability	X	X	X	X	X
Effective Tax	X	X	X		
<b>Industry Dummies</b>					
Manufacturing	X	X	X	X	X
Wholesale	X	X	X	X	X
Transport	X	X	X	X	X
Professional, Scientific	X	X	X	X	X
Construction	X	X	X	X	X
Info and Communication	X	X	X	X	X
Administrative	X	X	X	X	X
Arts, Entertainment	X	X	X	X	X
Accommodation	X	X	X	X	X
Human Health	X	X	X	X	X
Water Supply	X	X	X	X	X
Education	X	X	X	X	X
Real Estate	X	X	X	X	X
Electricity, Gas	X	X	X	X	X
Mining	X	X	X	X	X
<b>Country Dummies</b>					
Austria					
Belgium					
Finland					
France					
Portugal					
<b>Country Characteristics</b>					
Credit Index					
Private Property Protection					
Time to Enforce a Contract					
Time to Resolve a Debt					
Values Stolen	X				
Trust		X			
Capital Regulatory Index			X		
<b>Controls:</b>					
Annual Growth Rate	X		X		
Domestic Demand				X	
Gov and CB Support				X	
10 Year Gov Bond Yield					X
Inflation					X

In choosing between fixed or random effects models, a number of points must be considered. Hsiao (2003, pp.43) posits ‘the fixed effects model is viewed as one in which investigators make inferences conditional on the effects that are in the sample’ whilst ‘the random effects model is viewed as one in which investigators make unconditional or marginal inferences with respect to the population of all effects’. Furthermore, the number of observations (N) and time periods (T) are also important where Worrall (2012) states the fixed effects model can prove more unwieldy in large samples and can thus jeopardise degrees of freedom. The random effects model is perceived to be more efficient albeit assumes no correlation between the predictor variables and the unobserved error term (Worrall, 2012). Finally, emphasis must be placed on the variability of predictors over time. Worrall (2012, pp.84) stipulates if a predictor ‘does not vary over time, it will be perfectly collinear with the unit dummies in a fixed effects setting’. Allison (2009) purports estimates of the effects of variables which do not vary will not be produced under the fixed effects model. In particular, Allison (2009 pp.3) states if predictive values have little variation over time, the ‘fixed effects estimates will be very imprecise’.

Moreover, predictors which change slowly over time can also prove arduous for the fixed effects model (Worrall, 2012). Many of the predictor variables, namely the country characteristics have variation across the sample as verified by the descriptives. However, over time, these variables have little variation. In addition, the Hausman test can be conducted to justify the choice of fixed or random effects model. Previous SME studies including Sogorb-Mira (2005), Heyman *et al.* (2007) and Degryse *et al.* (2012) also perform this test. Conducting the Hausman test, results favour the fixed effects model. Notwithstanding this, the distribution of the dependent variable is also a key factor in the decision between fixed or random. With little variation in the distribution of the total debt ratio, the random effects model is perceived more appropriate and the results are reported using these. Clark and

Linzer (2013) posit the Hausman test is not a sufficient statistic for choosing between fixed and random effects. However, for completeness, the study presents the results of both the fixed effects<sup>17</sup> and random effects model but discussed under the random effects model.

In equation 1 where firm characteristics are included, all firm factors except for the effective tax rate appear statistically significant at the 5 per cent level (See Table 6.30). Particularising this, the results under the random effects model suggest firm age is negatively related to the total debt ratio whereby older SMEs appear to employ less leverage. Considering firm size which is positively related to the total debt ratio, larger SMEs employ more leverage.

Moreover, the positive association between asset tangibility and the total debt ratio suggests SMEs with more tangible assets employ more leverage. Furthermore, the negative coefficient of profitability implies profitable SMEs have low leverage. In summary, SMEs who are younger, are larger, who have more tangible assets and are less profitable appear to employ more leverage. Following the inclusion of industry dummies in equation 2, similar results for firm factors appear as in equation 1. The insignificant results for the industry dummies suggest no industry differences are present in SME firm leverage (see Table 6.30)

<sup>17</sup> In the fixed effects model, all dummy variables are dropped from the equations. Egan (2014) posits that ‘factors which are fixed (such as country or industry) will drop out – this simply means that with panel data and assuming that each row represents a country in a given year, all of the records for that country have the same values of country 1 – so one cannot then work out a slope coefficient for that variable’.

Table 6.30: Fixed and Random Effects Models

Model	(1)		(2)	
	Fixed	Random	Fixed	Random
<b>Firm Variables</b>				
Age	0.0026* (0.0005)	-0.0009* (0.0001)	0.0026* (0.0005)	-0.0009* (0.0001)
Log Assets	-0.1007* (0.0039)	0.0056* (0.0010)	-0.1007* (0.0039)	0.0057* (0.0011)
Tangibility	0.0686* (0.0121)	0.1044* (0.0087)	0.0686* (0.0121)	0.1003* (0.0091)
Profitability	-0.0389* (0.0111)	-0.0953* (0.0103)	-0.0389* (0.0111)	-0.0954* (0.0104)
Effective Tax Rate	0.0000 (0.0001)	0.0000 (0.0001)	0.0000 (0.0001)	0.0000 (0.0001)
<b>Industry Dummies<sup>18</sup></b>				
Manufacturing			(dropped)	-0.0046 (0.0259)
Wholesale			(dropped)	-0.0178 (0.0259)
Transport			(dropped)	-0.0083 (0.0292)
Professional, Scientific			(dropped)	-0.0257 (0.0276)
Construction			(dropped)	0.0326 (0.0267)
Info and Communication			(dropped)	-0.0390 (0.0282)
Administrative			(dropped)	-0.0096 (0.0307)
Arts, Entertainment			(dropped)	0.0124 (0.0357)
Accommodation			(dropped)	0.0082 (0.0277)
Human Health			(dropped)	-0.0222 (0.0311)
Water Supply			(dropped)	-0.0624 (0.0449)
Education			(dropped)	0.0020 (0.0438)
Real Estate			(dropped)	0.0428 (0.0301)
Electricity, Gas			(dropped)	-0.1237 (0.0882)
Mining			(dropped)	-0.0186 (0.0410)
<b>Constant</b>	1.4379* (0.0468)	0.1252* (0.0136)	1.4379* (0.0468)	0.1306* (0.0278)
<b>N</b>	31507	31507	31507	31507
<b>R squared</b>	0.0212	0.0559	0.0212	0.0598

\*5 per cent level of significance. The standard error is presented in the parentheses.

<sup>18</sup>Other Services' omitted as it is the base category.

Following the inclusion of firm characteristics, industry dummies and country dummies in equation 3, the random effects model reveals statistically significant results for all firm factors except for the effective tax rate (See Table 6.31). Similar results appear as per equation 1 and 2 albeit the log coefficient of the assets of a firm now appears to be negatively related to the total debt ratio. This implies following the inclusion of country dummies, smaller SMEs appear to employ more leverage. Moreover, the real estate industry appears significant, suggesting SMEs from real estate employ more leverage than SMEs from the other services industry, the base category. Notwithstanding this, when the log assets of a firm

is omitted as per equation 3 (b), the real estate industry becomes insignificant. Finally, several of the country dummies are statistically significant, implying there are country differences in SME firm leverage. Omitting the log assets of a firm in equation 3 (b) due to collinearity issues, firm age, firm asset tangibility and firm profitability still remain significant under the random effects model. All country dummies now appear statistically significant whilst all industry dummies are not.

Table 6.31: Fixed and Random Effects Models

Model	(3a)		(3b)		(4a)	
	Fixed	Random	Fixed	Random	Fixed	Random
<b>Firm Variables</b>						
Age	0.0026* (0.0005)	-0.0008* (0.0001)	-0.0029* (0.0005)	-0.0010* (0.001)	-0.0007 (0.0007)	-0.0006* (0.0001)
Log Assets	-0.1007* (0.0039)	-0.0150* (0.0022)				
Tangibility	0.0686* (0.0121)	0.1052* (0.0091)	0.0158 (0.0121)	0.0953* (0.0090)	0.0192 (0.0121)	0.1099* (0.0090)
Profitability	-0.0389* (0.0111)	-0.0897* (0.0104)	-0.0706* (0.0112)	-0.0913* (0.0104)	-0.0722* (0.0112)	-0.1012* (0.0104)
Effective Tax Rate	0.0000 (0.0001)	0.0000 (0.0001)	0.0000 (0.0001)	0.0000 (0.0001)	0.0000 (0.0001)	0.0000 (0.0001)
<b>Industry Dummies</b>						
Manufacturing	(dropped)	0.0061 (0.0257)	(dropped)	-0.0088 (0.0255)	(dropped)	0.0049 (0.0257)
Wholesale	(dropped)	-0.0134 (0.0257)	(dropped)	-0.0261 (0.0256)	(dropped)	-0.0101 (0.0258)
Transport	(dropped)	-0.0074 (0.0290)	(dropped)	-0.0189 (0.0289)	(dropped)	-0.0002 (0.0291)
Professional, Scientific	(dropped)	-0.0319 (0.0275)	(dropped)	-0.0383 (0.0274)	(dropped)	-0.0172 (0.0276)
Construction	(dropped)	0.0467 (0.0265)	(dropped)	0.0314 (0.0264)	(dropped)	0.0412 (0.0266)
Info and Communication	(dropped)	-0.0381 (0.0280)	(dropped)	-0.0428 (0.0279)	(dropped)	-0.0319 (0.0282)
Administrative	(dropped)	-0.0044 (0.0305)	(dropped)	-0.0134 (0.0304)	(dropped)	-0.0041 (0.0306)
Arts, Entertainment	(dropped)	0.0073 (0.0354)	(dropped)	0.0072 (0.0353)	(dropped)	0.0174 (0.0356)
Accommodation	(dropped)	-0.0001 (0.0276)	(dropped)	-0.0012 (0.0275)	(dropped)	0.0111 (0.0277)
Human Health	(dropped)	-0.0283 (0.0309)	(dropped)	-0.0335 (0.0308)	(dropped)	-0.0159 (0.0311)
Water Supply	(dropped)	-0.0427 (0.0446)	(dropped)	-0.0600 (0.0444)	(dropped)	-0.0514 (0.0448)
Education	(dropped)	-0.0214 (0.0436)	(dropped)	-0.0211 (0.0434)	(dropped)	0.0074 (0.0438)
Real Estate	(dropped)	0.0709* (0.0300)	(dropped)	0.0520 (0.0297)	(dropped)	0.0501 (0.0300)
Electricity, Gas	(dropped)	-0.0917 (0.0880)	(dropped)	-0.1178 (0.0877)	(dropped)	-0.1136 (0.0881)
Mining	(dropped)	0.0033 (0.0407)	(dropped)	-0.0163 (0.0405)	(dropped)	-0.0098 (0.0881)
<b>Country Dummies</b>						
Austria	(dropped)	0.0240 (0.0474)	(dropped)	0.0951* (0.0462)		
Belgium	(dropped)	0.0668* (0.0146)	(dropped)	0.0705* (0.0146)		
Finland	(dropped)	0.0621* (0.0229)	(dropped)	0.0477* (0.0228)		
France	(dropped)	-0.2036* (0.0192)	(dropped)	-0.878* (0.0094)		
Portugal	(dropped)	0.0249* (0.0069)	(dropped)	-0.0347* (0.0067)		
<b>Macroeconomic</b>						
Annual Growth Rate					0.0021* (0.0005)	0.0023* (0.0004)
<b>Country Characteristics</b>						
Credit Index					0.0094* (0.0035)	0.0135* (0.0025)
<b>Constant</b>	1.4379* (0.0468)	0.4002* (0.0376)	0.2514* (0.0101)	0.2096* (0.0253)	0.1617* (0.0283)	0.1206* (0.0285)
<b>N</b>	31507	31507	31507	31507	31507	31507
<b>R squared</b>	0.0212	0.0465	0.0048	0.0613	0.0234	0.0505

\*5 per cent level of significance. The standard error is presented in the parentheses.

In equation 4 (a) to 4 (f), country characteristics are included along with the macroeconomic variable, the annual growth rate. The log assets of the firm are omitted due to collinearity issues. This holds for all except for equation 4 (e) when trust is included. Here, the log assets of the firm is added but the annual growth rate is omitted. Under the random effects model, equation 4 (a) in Table 6.31 reveals that firm age, firm tangibility and firm profitability all prove statistically significant at the 5 per cent level with similar results found as per equation 1, 2 and 3. The positive association depicted between the annual growth rate and GDP suggests higher annual growth in a country results in a higher SME debt ratio. Considering the first country characteristic, credit depth of information index, the significant positive result suggests with greater sharing of credit information, SMEs firm leverage increases.

Concurring with equation 4 (a), similar significant results emerge for firm characteristics and the annual growth rate in equation 4 (b) under the random effects model. Evaluating the country characteristic, private property protection, the significant positive result suggests with an increase in the protection of private property rights, SMEs employ more leverage (See Table 6.32).

As per the results for firm characteristics and the annual growth rate in equation 4(a) and 4(b), equation 4(c) also presents similar significant findings. Considering the country characteristics of time to enforce a contract (proxy for judicial efficiency) and time to resolve a debt (proxy for bankruptcy efficiency), both appear statistically significant under the random effects model. Whilst the time to enforce a contract is positively related to the total debt ratio, the magnitude of time to enforce is effectively zero. Moreover, time to resolve a debt is negatively related to the total debt ratio, suggesting with an increase in the time taken to resolve insolvency, SMEs employ less leverage. Equation 4 (d) includes the country

characteristic, value (stolen) which represents the social environment. However, due to insufficient observations, the random effects model is unable to conduct this regression.

Table 6.32: Fixed and Random Effects Models

Model	(4b)				(4c)				(4d) <sup>19</sup>	
	Fixed		Random		Fixed		Random		Fixed	Random
<b>Firm Variables</b>										
Age	-0.0012	(0.0006)	-0.0007*	(0.0001)	-0.0008	(0.0007)	-0.0007*	(0.0001)		
Log Assets										
Tangibility	0.0188	(0.0121)	0.1095*	(0.0090)	0.0189	(0.0121)	0.1082*	(0.0090)		
Profitability	-0.0721*	(0.0112)	-0.0979*	(0.0104)	-0.0722*	(0.0112)	-0.1013*	(0.0104)		
Effective Tax Rate	0.0000	(0.0001)	0.0000	(0.0001)	0.0000	(0.0001)	0.0000	(0.0001)		
<b>Industry Dummies</b>										
Manufacturing	(dropped)		0.0083	(0.0258)	(dropped)		0.0074	(0.0258)		
Wholesale	(dropped)		-0.0094	(0.0258)	(dropped)		-0.0065	(0.0258)		
Transport	(dropped)		0.0005	(0.0292)	(dropped)		-0.0014	(0.0292)		
Professional, Scientific	(dropped)		-0.0177	(0.0276)	(dropped)		-0.0205	(0.0276)		
Construction	(dropped)		0.0411	(0.0267)	(dropped)		0.0416	(0.0266)		
Info and Communication	(dropped)		-0.0294	(0.0282)	(dropped)		-0.0327	(0.0282)		
Administrative	(dropped)		-0.0067	(0.0307)	(dropped)		-0.0060	(0.0307)		
Arts, Entertainment	(dropped)		0.0205	(0.0357)	(dropped)		0.0156	(0.0357)		
Accommodation	(dropped)		0.0122	(0.0278)	(dropped)		0.0137	(0.0277)		
Human Health	(dropped)		-0.0160	(0.0311)	(dropped)		-0.0155	(0.0311)		
Water Supply	(dropped)		-0.0505	(0.0449)	(dropped)		-0.0554	(0.0449)		
Education	(dropped)		0.0060	(0.0439)	(dropped)		0.0088	(0.0438)		
Real Estate	(dropped)		0.0535	(0.0301)	(dropped)		0.0515	(0.0301)		
Electricity, Gas	(dropped)		-0.1219	(0.0883)	(dropped)		-0.1284	(0.0883)		
Mining	(dropped)		-0.0047	(0.0409)	(dropped)		-0.0051	(0.0409)		
<b>Country Dummies</b>										
Austria										
Belgium										
Finland										
France										
Portugal										
<b>Macroeconomic</b>										
Annual Growth Rate	0.0019*	(0.0005)	0.0023*	(0.0004)	0.0021*	(0.0005)	0.0026*	(0.0004)		
<b>Country Characteristics</b>										
Credit Index										
Private Property	0.0004*	(0.0002)	0.0005*	(0.0001)						
Time to Enforce					0.0000*	(0.0000)	0.0000*	(0.0000)		
Time to Resolve					(dropped)		-0.0447*	(0.0119)		
Values Insurance										
Values Stolen										
Values Traffic										
<b>Constant</b>	0.1948*	(0.0194)	0.1578*	(0.0268)	0.1638*	(0.0304)	0.2565*	(0.0339)		
<b>N</b>	31507		31507		31507		31507			
<b>R squared</b>	0.0132		0.047		0.0119		0.0484			

\*5 per cent level of significance . Standard error in parentheses. <sup>19</sup> Unable to run equation 4 (d) due to insufficient observations.

Table 6.33: Fixed and Random Effects Models

	(4e)				(4f)			
Model	Fixed		Random		Fixed		Random	
<b>Firm Variables</b>								
Age	0.0066*	(0.0012)	-0.0007*	(0.0002)	-0.0045*	(0.0018)	-0.0009*	(0.0002)
Log Assets	-0.0850*	(0.0093)	0.0111*	(0.0013)				
Tangibility	0.1774*	(0.0305)	0.1871*	(0.0150)	-0.0138	(0.0265)	0.1598*	(0.0126)
Profitability	-0.0880*	(0.0274)	-0.2033*	(0.0194)	-0.0632*	(0.0319)	-0.1594*	(0.0224)
Effective Tax Rate	-0.0003	(0.0007)	-0.0001	(0.0002)	-0.0001	(0.0002)	0.0000	(0.0002)
<b>Industry Dummies</b>								
Manufacturing	(dropped)		0.0132	(0.0336)	(dropped)		-0.0055	(0.0284)
Wholesale	(dropped)		0.0077	(0.0336)	(dropped)		-0.0202	(0.0285)
Transport	(dropped)		-0.0081	(0.0377)	(dropped)		-0.0111	(0.0322)
Professional, Scientific	(dropped)		0.0205	(0.0358)	(dropped)		-0.0322	(0.0305)
Construction	(dropped)		0.0660	(0.0346)	(dropped)		0.0377	(0.0294)
Info and Communication	(dropped)		-0.0001	(0.0368)	(dropped)		-0.0484	(0.0311)
Administrative	(dropped)		0.0290	(0.0393)	(dropped)		-0.0179	(0.0339)
Arts, Entertainment	(dropped)		0.0300	(0.0469)	(dropped)		-0.0239	(0.0396)
Accommodation	(dropped)		0.0061	(0.0360)	(dropped)		-0.0038	(0.0308)
Human Health	(dropped)		0.0299	(0.0401)	(dropped)		-0.0262	(0.0343)
Water Supply	(dropped)		-0.0486	(0.0589)	(dropped)		-0.1120*	(0.0495)
Education	(dropped)		-0.0046	(0.0546)	(dropped)		-0.0288	(0.0493)
Real Estate	(dropped)		0.0526	(0.0393)	(dropped)		0.0322	(0.0332)
Electricity, Gas	(dropped)		-0.1184	(0.1081)	(dropped)		-0.1566	(0.0959)
Mining	(dropped)		-0.0220	(0.0535)	(dropped)		-0.0227	(0.0447)
<b>Country Dummies</b>								
Austria								
Belgium								
Finland								
France								
Portugal								
<b>Macroeconomic</b>								
Annual Growth Rate					-0.0007	(0.0191)	0.0034	(0.0078)
<b>Country Characteristics</b>								
Credit Index								
Private Property								
Time to Enforce								
Time to Resolve								
Value (Insurance) <sup>20</sup>								
Value (Stolen) <sup>20</sup>								
Value (Traffic) <sup>20</sup>								
Trust	0.0081	(0.0044)	0.0037	(0.0040)				
Capital Regulatory					-0.0034	(0.0030)	-0.0076*	(0.0016)
<b>Constant</b>	1.0229*	(0.1062)	0.0094	(0.0396)	0.3214*	(0.0836)	0.2450*	(0.0363)
<b>N</b>	9441		9447		8920		8920	
<b>R squared</b>	0.0243		0.0893		0.0026		0.057	

\*5 per cent level of significance . Standard error in parentheses. <sup>20</sup> Values/ Beliefs omitted due to insufficient observations.

Evaluating equation 4 (e) in which the log assets of the firm is added whilst the annual growth rate is omitted due to collinearity, significant results for firm age, firm tangibility and firm profitability appear, similar to equations 4 (a), 4 (b) and 4 (c). The significant positive result for firm size suggest larger SMEs employ more leverage. This concurs with equation 1 and 2. Considering the country characteristic, trust, this appears insignificant. In equation 4 (f), significant results appear for firm characteristics, similar to those found in equation 4 (a), 4 (b), 4 (c) and 4 (e). In contrast to previous findings on the annual growth rate, the annual growth rate is now insignificant following the inclusion of the capital regulatory index. Moreover, the capital regulatory index is statistically significant with the negative coefficient suggesting with a greater stringency in capital regulation, SMEs employ less leverage (See Table 6.33). Interestingly, of all the industry dummies, the water supply industry now appears significant. This implies SMEs from the water supply industry employ less leverage than SMEs from other services industry.

Finally, evaluating macroeconomic variables in equation 5 where domestic demand, inflation, government and central bank support and the 10 year government bond yield are considered, the latter two variables prove statistically significant. Particularising this, the government and central bank support measure is negatively related to the total debt ratio suggesting with an increase in significant interventions and support measures by governments and central banks which implies a greater severity of the financial crisis, SMEs employ less leverage. Moreover, the 10 year government bond yield is negatively related to the total debt ratio which suggests higher yield has adverse effects on credit supply hence SMEs employ less total debt (See Table 6.34). In equation 5 (a), following the inclusion of domestic demand and government and central bank support, the water supply industry appears statistically significant.

Table 6.34: Fixed and Random Effects Models

Model	(5a)				(5b)			
	Fixed		Random		Fixed		Random	
<b>Firm Variables</b>								
Age	0.0060*	(0.0014)	-0.0006*	(0.0002)	-0.0020*	(0.0006)	-0.0008*	(0.0001)
Log Assets								
Tangibility	-0.0204	(0.0254)	0.1311*	(0.0116)	0.0117	(0.0123)	0.1065*	(0.0091)
Profitability	-0.0098	(0.0173)	-0.0826*	(0.0146)	-0.0684*	(0.0113)	-0.0940*	(0.0105)
Effective Tax Rate	0.0001	(0.0001)	0.0001	(0.0001)	0.0000	(0.0001)	0.0000	(0.0001)
<b>Macroeconomic</b>								
Domestic Demand	0.0000	(0.0004)	0.0006	(0.0004)				
Gov and Central Bank Support	(dropped)		-0.0313*	(0.0080)				
10 Year Gov Bond Yield					-0.0141*	(0.0027)	-0.0129*	(0.0025)
Inflation					0.0047	(0.0069)	0.0128	(0.0067)
<b>Industry Dummies</b>								
Manufacturing	(dropped)		-0.0203	(0.0275)	(dropped)		0.0097	(0.0260)
Wholesale	(dropped)		-0.0264	(0.0275)	(dropped)		-0.0074	(0.0260)
Transport	(dropped)		-0.0123	(0.0311)	(dropped)		0.0020	(0.0294)
Professional, Scientific	(dropped)		-0.0381	(0.0295)	(dropped)		-0.0139	(0.0278)
Construction	(dropped)		0.0149	(0.0284)	(dropped)		0.0436	(0.0269)
Info and Communication	(dropped)		-0.0427	(0.0301)	(dropped)		-0.0288	(0.0284)
Administrative	(dropped)		-0.0261	(0.0328)	(dropped)		0.0030	(0.0309)
Arts, Entertainment	(dropped)		-0.0415	(0.0385)	(dropped)		0.0244	(0.0359)
Accommodation	(dropped)		-0.0171	(0.0297)	(dropped)		0.0154	(0.0280)
Human Health	(dropped)		-0.0426	(0.0332)	(dropped)		-0.0179	(0.0314)
Water Supply	(dropped)		-0.1418*	(0.0478)	(dropped)		-0.0466	(0.0452)
Education	(dropped)		-0.0236	(0.0469)	(dropped)		0.0092	(0.0443)
Real Estate	(dropped)		-0.0035	(0.0322)	(dropped)		0.0556	(0.0303)
Electricity, Gas	(dropped)		-0.1562	(0.0936)	(dropped)		-0.1119	(0.0888)
Mining	(dropped)		-0.0373	(0.0435)	(dropped)		-0.0013	(0.0413)
<b>Country Dummies</b>								
Austria								
Belgium								
Finland								
France								
Portugal								
<b>Country Characteristics</b>								
Credit Index								
Private Property								
Time to Enforce								
Time to Resolve								
Values Insurance								
Values Stolen								
Values Traffic								
Trust								
Capital Regulatory								
<b>Constant</b>	0.0693*	(0.0309)	0.3900*	(0.0572)	0.2919*	(0.0130)	0.2383*	(0.0276)
<b>N</b>	13403		13403		30538		30538	
<b>R squared</b>	0.0017		0.0514		0.0056		0.0439	

\*5 per cent level of significance. Standard errors in parentheses.

In summary, several equations were conducted where significant results emerge for firm characteristics, industry dummies, country dummies, macroeconomic conditions and credit supply conditions. In particular, country characteristics appear to determine SME firm leverage where the information, legal, judicial, bankruptcy and regulatory are deemed important. In chapter seven, several robustness tests are conducted including the employment of both short term and long term debt. The next chapter now presents a discussion of the findings found in this chapter.

## **Chapter Seven: Discussion**

*'When I get ready to talk to people, I spend two thirds of the time thinking what they want to hear and one third thinking about what I want to say.'*

*Abraham Lincoln*

## 7.1 Introduction

The preceding chapter presented the empirical findings of this study. More specifically, the influence of country characteristics on the likelihood of bank credit availability for SMEs was evaluated. Furthermore, country characteristics as determinants of SME firm leverage were also analysed. This chapter presents a summary of the empirical findings where an evaluation of the empirics is conducted relative to the hypotheses and the conceptual framework of this study and the extant literature as discussed in chapter three. Some emphasis is placed on policy implications which will be discussed in greater detail in the next chapter. Finally, the chapter concludes with a summary of the key points.

## 7.2 Country Characteristics and ‘A More Complete Conceptual Framework for SME Finance’ (Berger and Udell, 2006).

Table 7.1 presents a summary of the empirical findings underpinning research question 1. Evaluating country characteristics in the likelihood of bank credit denial, the credit depth of information index, private property protection, cost to enforce a contract, cost to resolve a debt and the capital regulatory index appear statistically significant at the 5 per cent level.

Table 7.1: Research Question 1 - Summary of Empirical Findings

Dependent Variable	Independent Variable	Direction of Relationship
Probability of Credit Denial	Credit Depth of Information Index	(+) *
Probability of Credit Denial	Private Property Protection	(-) *
Probability of Credit Denial	Cost to Enforce A Contract	(+) *
Probability of Credit Denial	Cost to Resolve a Debt	(-) *
Probability of Credit Denial	Value (Stolen)	(-)
Probability of Credit Denial	Trust	(+)
Probability of Credit Denial	Capital Regulatory Index	(-) *

\*5 per cent level of significance.

Indicative of this, SMEs are more likely to be denied credit the higher the value of the credit depth of information index and higher costs to enforce a contract. Moreover, SMEs are less

likely to be denied credit the greater private property protection is, higher costs to resolve a debt and a higher value of the capital regulatory index.

### **7.2.1 Information Environment**

The significant positive relationship depicted between the credit depth of information index, a proxy for the information environment and credit denial implies that greater sharing of credit information in the market is more likely to increase the probability of credit denial and thereby reduce SME bank credit availability. This result appears to contradict the complete conceptual framework for SME finance of Berger and Udell (2006). Indeed, this result appears to refute hypothesis 1 of the study where it was expected SME bank credit availability was more likely to increase with greater credit information sharing. In fact, the empirical results suggest bank credit availability for SMEs is less likely to increase with greater credit information sharing.

Reflecting on the empirical work of Jappelli and Pagano (2002) where they evaluate the impact of information sharing through private credit bureaus and public credit registries on the credit market, Jappelli and Pagano (2002) find information sharing is associated with the breadth of the credit markets such that total bank lending to the private sector is larger when the sharing of information is more intense. Whilst the results of this study centre on credit availability, they appear to conflict with Jappelli and Pagano (2002). Moreover, these results appear to contradict Love and Mylenko (2000) who find the existence of private credit registries lowers a firm's perception of financial constraints whilst the existence of public credit registries does not impact on these perceptions.

One possible explanation for this result lies in the type of credit information being made available and what this information reveals about potential borrowers to the lender. *De facto*, the credit information may reflect the likelihood of default coupled with a weak credit

history, thus justifying an increase in credit denial. Furthermore, this is all more likely given the particular economic circumstances that our sample is based on i.e. 2010-2011 time frame. Whilst the sharing of credit information does not impact bank credit availability as expected, the empirical results still illustrate the importance of the information environment on the availability of bank credit. Not only is the level of disclosed credit information important but its revelations are also fundamental in terms of the quality of ‘what’ is shared. As depicted in the conceptual framework of this study, the information environment is shown to influence the likelihood of bank credit availability for SMEs.

An interesting point can be made surrounding the empirical work of Padilla and Pagano (2000) who find the disclosure only of default information (black information) serves as a catalyst in reinforcing a borrower’s efforts to meet loan obligations, dubbed the ‘disciplinary effect’. Indeed, the disclosure of only default information transmits a signal of bad quality, which can adversely impinge on a borrower’s rating with other potential finance sources (Padilla and Pagano, 2000). *Ipsa facto*, borrowers exert more effort to avoid default (Padilla and Pagano, 2000). When all information is shared however, the stigma of defaults is somewhat reduced, weakening the ‘disciplinary effect’ (Padilla and Pagano, 2000). Indicative of the findings of this study where an increase in disclosure of credit information via higher values on the credit depth of information index increases the likelihood of credit denial, these results do appear to support the ‘disciplinary effect’ (Padilla and Pagano, 2000). Such results highlight the importance of the quality of ‘what’ is shared. This is important for policy.

Although it is beyond the scope of this study given that the ‘good’ and ‘bad’ borrowers are not evaluated, it is worth mentioning a point made by Padilla and Pagano (1993). More specifically, Padilla and Pagano (1993) stipulate information sharing does not always increase lending. Indeed, an increase in the lending activity will only occur if in the absence

of shared information, adverse selection prices safe borrowers out of the market (Padilla and Pagano, 1993).

As a form of robustness testing, two checks are conducted. Firstly, the same equation was applied using a probit model, a close substitute to the logistic regression model. Similar results emerge as per the logit model where the same positive significant relationship implies greater sharing of credit information is more likely to increase the probability of credit denial and hence reduce bank credit availability (See Appendix 7).

Secondly, an alternative to the credit depth of information sharing is employed, i.e. the average number of credit reports, based on the author's own construction of a questionnaire. Construction of the questionnaire began in September 2012. Motivation stemmed from the empirical work of Jappelli and Pagano (2002) who sent questionnaires to private credit bureaus and public credit registries. Although adopting a similar approach to Jappelli and Pagano (2002) in which they collect data surrounding the activities of these institutions including the number of credit reports issued, types of information disclosed and information sources, this study follows suit but considers only the number of credit reports issued over a different time frame. Particularising this, whilst Jappelli and Pagano (2002) focus on the number of credit reports issued in 1990 and 1996, this study focuses on the average number of credit reports issued over three time periods (1) 2005 – 2007, (2) 2008 and (3) 2009-2011. These time periods serve as a balance between respecting the sensitivity of the number of credit reports issued and the time frame underpinning the research questions of this study.

A pilot study was sent via email to a private credit bureau which cannot be named for confidentiality purposes. This was completed and received back on the 10<sup>th</sup> October 2012. The questionnaire was then sent via email to the remaining private credit bureaus and public credit registries in Europe occupying our sample along with a cover letter outlining the

purpose of this study. Initially, there were eleven European countries in the sample namely Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Portugal and Spain. This is similar to the sample of countries considered in the first and second research question. Given the response rate of private credit bureaus and public credit registries, this rendered a final sample of six European countries, i.e. Austria, Belgium, France, Germany, Greece and Italy. With a relatively small sample of countries, the average number of credit reports is used as part of a robustness test as opposed to the main proxy of the information environment. Recipients of this email were advised that the questionnaire should be completed by the Bank Superintendent or Director of Banking Supervision of the public credit registry and the Chief Executive Officer or equivalent of the private credit bureau (See Appendix 8). Contacts of these institutions were sourced from the International Finance Corporation, the European Credit Research Institute, the World Bank and general internet searches. In total, 28 questionnaires were distributed among private credit bureaus and public credit registries in the 11 European countries. The response rate was 28.57 per cent.

Including the average number of credit reports, the empirical results reveal a significant positive relationship between credit denial and the sharing of credit information. This result is consistent in both the logit and probit model (See Appendix 9). SMEs appear more likely to be denied credit following an increase in the average number of credit reports issued albeit the magnitude is effectively zero.

In summary, although the results are not aligned with expectations, nonetheless, they do reinforce the importance of disclosed credit information within SME bank credit availability. The level of shared credit information and the typology of information disclosed must be considered.

### 7.2.2 Legal Environment

The result surrounding private property protection, the proxy for the legal environment appears statistically significant where greater levels of private property protection are shown to reduce the likelihood of credit denial and hence increase bank credit availability. This result appears to support the complete conceptual framework for SME finance of Berger and Udell (2006). Indeed, this result appears supportive of hypothesis 2 where it was expected greater levels of private property protection were more likely to increase bank credit availability.

The results of this study concur with the findings of Beck *et al.* (2008). More specifically, Beck *et al.* (2008) evaluate the financing patterns of small, medium and large firms in 48 countries worldwide, analysing the relationship between the financial and legal environment of a country and the use of external finance by a firm. Indeed, the results reveal in countries with better property protection, firms employ more external finance. Moreover, small firms ‘benefit the most from better protection of property rights, in terms of accessing formal sources of external finance, particularly bank finance’ (Beck *et al.* 2008, pp. 485). As depicted in the conceptual framework of this study, the legal environment influences the likelihood of bank credit availability for SMEs.

Although it is beyond the scope of this study to consider the collateral requirements and loan contract terms, it is worth mentioning the empirical work of Qian and Strahan (2007). In their study where a sample of bank loans to large borrowers in 43 countries excluding the US are evaluated, the empirical results find in countries with strong creditor protection, bank loans have more concentrated ownership, longer maturity and lower interest rates. Furthermore, creditor rights have a greater impact on the loan’s price, maturity and collateral requirements for firms with more tangible assets as ‘an increased capacity to pledge assets

makes collateral more effective, increasing creditor protection and in turn enhancing loan availability' (Qian and Strahan 2007, pp. 2805). Overall, Qian and Strahan (2007) posit the availability of loans is enhanced with strong creditor rights.

As a form of robustness testing, two checks are conducted. Firstly, the same equation was applied using a probit model, a close substitute to the logistic regression model. Similar results emerge as per the logit model where a negative significant relationship implies greater levels of private property protection are more likely to increase bank credit availability for SMEs (See Appendix 7).

Secondly, an additional measure to represent the legal environment is considered, i.e. law and order. Derived from the PRS Group (2013), 'the law sub-component is an assessment of the strength and impartiality of the legal system, while the order sub-component is an assessment of popular observance of the law'. Higher values imply a stronger and impartial legal system and greater observance of the law (PRS Group, 2013). Similar to the negative results of private property protection, law and order is deemed negatively related to the likelihood of credit denial where statistically significant results materialise. This suggests that an increase in law and order reduces the likelihood of credit denial and hence increases bank credit availability. This result is consistent in both the logit and probit model (See Appendix 10).

In summary, the results highlight the importance of the legal environment within SME credit availability.

### **7.2.3 Judicial Environment**

The result surrounding the cost to enforce a contract, the proxy for judicial environment appears statistically significant where an increase in the cost to enforce a contract increases the likelihood of credit denial and thus reduces bank credit availability. This result appears to support the complete conceptual framework for SME finance of Berger and Udell (2006).

Indeed, this result appears supportive of hypothesis 3 of this study where higher costs imply greater inefficiency in judicial enforcement. Whilst hypothesis 3 expected greater efficiency of enforcement under the judicial environment was more likely to increase the availability of bank credit, it also implies greater inefficiency reduces bank credit availability.

Our results concur with those of Jappelli *et al.* (2005). More specifically, evaluating the impact of judicial efficiency on the availability and cost of bank credit, Jappelli *et al.* (2005) present a theoretical model coupled with empirical evidence from the Italian credit market. Jappelli *et al.* (2005) find in their model, greater judicial efficiency reduced credit constraints and increased the volume of lending. Concurring with their model, the empirical evidence found the judicial efficiency was positively correlated with the volume of lending and negatively correlated with proxies for credit constraints. As depicted in the conceptual framework of this study, the judicial environment is shown to influence the likelihood of bank credit availability for SMEs.

Marrying law and finance, the empirics of La Porta *et al.* (1997; 1998), posit ‘legal rules and their enforcement – matter for the size and extent of a country’s capital markets’ (La Porta *et al.* 1997, pp.1149). Whilst La Porta *et al.* (1997, 1998) do not focus on bank credit availability per se, their empirical work remains applicable given the interconnectedness between bank lending and availability. Constituting enforcement, La Porta *et al.* (1998) refer to the efficiency of the judicial system, the rule of law, corruption, risk of expropriation, repudiation of contracts by governments and accounting standards. Evaluating credit availability, this study finds the likelihood of bank credit availability is not only influenced by legal protection but concomitantly by enforcement, in terms of judicial and bankruptcy efficiency. Arguably, it can be said that the judicial and bankruptcy efficiency appears to

have a greater impact on the likelihood of credit availability than legal protection. This is important for policy.

Indicative of this, the marginal effects of equation (4a) in table 6.19 illustrate that an SME is 0.36 per cent less likely to be denied credit following an increase in private property protection. However, an SME is 1.13 per cent more likely to be credit denied following an increase in the cost to enforce a contract and 1.68 per cent less likely to be credit denied following an increase in the cost to resolve a debt. SMEs from Ireland record the highest credit denial (average of 0.462) despite Ireland having one of the highest private property protection values of the sample. Indeed, Ireland has one of the highest costs to enforce a contract, implying a high level of judicial inefficiency. *Ipsa facto*, both legal protection and enforcement must not be considered mutually exclusive, serving as a dual partite dialogue for SME bank credit availability.

As a form of robustness testing, the same equation was applied using a probit model, a close substitute to the logistic regression model. Similar results emerge as per the logit model where the same positive significant relationship implies an increase in the cost to enforce a contract increases the likelihood of credit denial and thus reduces bank credit availability (See Appendix 7).

In summary, the results highlight the importance of the judicial environment within SME credit availability.

#### **7.2.4 Bankruptcy Environment**

The result surrounding the cost to resolve a debt, the proxy for bankruptcy environment appears statistically significant where an increase in the cost to resolve a debt reduces the likelihood of credit denial and thus increases credit availability. This result appears to refute the complete conceptual framework for SME finance of Berger and Udell (2006). Indeed, this

result appears to conflict with hypothesis 4 of this study where higher costs imply greater inefficiency in bankruptcy enforcement. Whilst hypothesis 4 expected greater efficiency of enforcement under the bankruptcy environment was more likely to increase the availability of bank credit, it also implies greater inefficiency reduces bank credit availability.

As a form of robustness testing, the same equation was applied using a probit model, a close substitute to the logistic regression model. Similar results emerge as per the logit model where the same negative significant relationship implies an increase in the cost to resolve a debt reduces the likelihood of credit denial and thus increases credit availability (See Appendix 7).

#### **7.2.5 Social Environment**

The results surrounding value (stolen) and trust appear statistically insignificant. Social values as proxied by how wrong it is to buy something that might be stolen appear not to influence the likelihood of bank credit availability. Although this result appears to support hypothesis 5, it is insignificant. Similarly, trustworthiness also appears not to influence the likelihood of bank credit availability. Whilst this result appears to contradict hypothesis 6, it is insignificant. These results appear to refute the complete conceptual framework for SME finance of Berger and Udell (2006) surrounding the social environment. Notwithstanding this, Berger and Udell (2006, pp.2960) posit ‘the greatest impact of the social environment is likely on relationship lending’. Although it is beyond the scope of this study to identify the lending technologies, it does raise the question if the impact of the social environment differs across the different types of lending techniques.

As a form of robustness testing, the same equation was applied using a probit model, a close substitute to the logistic regression model. Similar results emerge as per the logit model where the same insignificant relationship materialises (See Appendix 7).

In summary, whilst the results appear to illustrate the unimportance of the social environment within SME bank credit availability, this study cautions the need to focus on the identification of lending technologies.

### **7.2.6 Regulatory Environment**

The result surrounding the capital regulatory index, the proxy for the regulatory environment appears statistically significant. Indeed, the negative relationship implies greater stringency in terms of the capital regulatory requirements reduces the likelihood of credit denial and hence increases credit availability. This result appears not to support the complete conceptual framework for SME finance of Berger and Udell (2006). Moreover, this result appears to refute hypothesis 7 where it was expected greater capital regulatory requirements were more likely to decrease bank credit availability. Indeed, this result appears contrary to the work of Scellato and Ughetto (2010) where new regulatory capital requirements impinged adversely on the lending conditions for younger and smaller SMEs.

One possible explanation for this is the effects of the increase in the capital regulatory index have not have spilled over into SME credit availability yet and that there could potentially be adverse effects in the longer term.

As a form of robustness testing, the same equation was applied using a probit model, a close substitute to the logistic regression model. Similar results emerge as per the logit model where the same negative significant relationship implies greater capital regulatory requirements reduces the likelihood of credit denial and thus increases credit availability (See Appendix 7).

### **7.3 Bank Structure and ‘A More Complete Conceptual Framework for SME Finance’ (Berger and Udell, 2006).**

Appreciating the importance of country characteristics in SME bank credit availability, emphasis is placed on whether bank structure differences in the denial of bank credit to small and medium sized enterprises are evident. Indicative of this, the empirical findings reveal significant results for both bank size and bank ownership whereby an increase in the assets of domestic banks and foreign banks appears to reduce the likelihood of credit denial. Interestingly, results for the assets of domestic banks only appear significant in equation 1 and 2 of table 6.15 where macroeconomic variables and industry dummies are included yet the results appear insignificant following the inclusion of country dummies and country characteristics. The assets of foreign banks appear significant in equation 2 of table 6.15 and equation 4(a) and 4(c) of table 6.18 where industry dummies and several country characteristics are included.

The negative relationship between the assets of domestic and foreign banks and the likelihood of credit denial for small and medium sized enterprises is indicative of the role of large domestic and large foreign banks within SME bank credit. This is important for policy. Whilst it is not the objective of the study to support or refute the small bank advantage hypothesis given the data does not identify the lending technologies employed, the empirical results imply large domestic and foreign banks can help to increase the availability of SME credit. If the small bank advantage hypothesis holds in which large and indeed foreign banks incur a comparative disadvantage in relationship lending, the results from this study suggest these banks are executing alternative technologies including transaction technologies in lending to SMEs. This concurs with the theoretical framework of Berger and Udell (2006) and the empirical results of Berger and Black (2011) and De la Torre *et al.* (2010). Particularising this, Berger and Udell (2006) allude to the comparative advantage of large

banks in transaction lending, availing of economies of scale in the use of hard quantitative information as opposed to soft qualitative information. The empirics of Berger and Udell (2006) reveal large banks experience different comparative advantages in the many transaction technologies. Moreover, large banks have a comparative advantage in lending to small and large firms but not medium sized firms where the use of several forms of hard information facilitates this lending.

It is not the intention of the study to dismiss relationship lending within SME bank credit, inter alia, the idiosyncratic nature of SME credit very much reinforces the importance of the bank – borrower relationship (Udell, 2008). However relationship lending cannot be perceived as the only technique in which banks can execute in lending to SMEs.

Considering bank competition, the bank concentration ratio and the Lerner Index appears statistically significant in equation (4c) and (4d) of Table 6.18. An increase in the bank concentration ratio is more likely to increase credit denial and hence reduce the availability of bank credit. Conversely though, an increase in the Lerner Index which implies less bank competition and more bank concentration is more likely to reduce credit denial and thus increase bank credit availability. Appreciating the specificity of the market power hypothesis and the information hypothesis, the empirical analysis of this study presents conflicting results. The bank concentration ratio appears to support the market power hypothesis where a more concentrated banking market reduces credit availability. Moreover, the Lerner Index appears to support the information hypothesis where a more concentrated banking market increases credit availability.

Owing to the empirical studies which evaluate SME credit availability and bank market power, results are mixed (Berger and Udell, 2006). More specifically, ‘the theoretical and empirical literature is ambiguous about the effect of market structure and competition in the

banking sector on access to finance' (Beck 2013, pp.R30). Berger and Udell (2006) allude to the measurement of market power where Carbó-Valverde *et al.* (2009) find the Lerner Index supports the market power hypothesis but the Herfindahl-Hirschmann Index (HHI) supports the information hypothesis. Our findings appear to contradict Carbó-Valverde *et al.* (2009) and Ryan *et al.* (2014) where our result of the Lerner Index does not support the market power hypothesis but more so the information hypothesis.

#### **7.4 Macroeconomic Controls, Supply Controls and Firm Size and 'A More Complete Conceptual Framework for SME Finance' (Berger and Udell, 2006).**

The result surrounding domestic demand, a proxy for economic growth appears statistically significant only in equation 1 of table 6.15, and in equation (4b), (4c) and (4d) of table 6.18. The result illustrates an increase in domestic demand reduces the likelihood of credit denial and hence increases credit availability. This concurs with Holton *et al.* (2013). The result surrounding systemic banking crisis, a proxy to capture the effects of the recent financial and economic crisis appears statistically significant in equation 1 of table 6.15. The result illustrates credit denial is more likely to fall in countries that have been classified as having a systemic banking crisis. This is an interesting find as it is contrary to the study's expectations but yet it is only significant in one out of the seven equations. The result surrounding deposits per GDP, a proxy for bank credit supply appears statistically significant in equation 1 and 2 of table 6.15 and in equation (4a) of table 6.18. This result appears to suggest an increase in deposits per GDP increases the likelihood of credit denial and thereby reduce credit availability. This is also interesting as it conflicts with the expectations of the study. One possible explanation for this result lies in the banks use of deposits where investments were made in the securities market (Holton, McCann, Prendergast and Purdue, 2014). Finally, firm size appears statistically significant in all equations conducted under the first research

question whereby an increase in firm size is shown to reduce the likelihood of credit denial. This concurs with Holton *et al.* (2012).

## 7.5 Country Characteristics and the Capital Structure Theories

Table 7.2 below presents a summary of the empirical findings underpinning research question 2. Evaluating country characteristics in the determination of SME firm leverage, the credit depth of information index, private property protection, time to enforce a contract, time to resolve a debt and the capital regulatory index appear statistically significant at the 5 per cent level.

Table 7.2: Research Question 2 - Summary of Empirical Findings

Dependent Variable	Independent Variable	Direction of Relationship
Total Debt Ratio	Credit Depth of Information Index	(+) *
Total Debt Ratio	Private Property Protection	(+) *
Total Debt Ratio	Time to Enforce A Contract	(+) *
Total Debt Ratio	Time to Resolve a Debt	(-) *
Total Debt Ratio	Value (Stolen)	NA
Total Debt Ratio	Trust	(+)
Total Debt Ratio	Effective Tax Rate	(+)
Total Debt Ratio	Capital Regulatory Index	(-) *

\*5 per cent level of significance.

Indicative of this, SME firm leverage is shown to be significantly related to the higher value of the credit depth of information index, greater private property protection and longer time to enforce a contract. Moreover, SME firm leverage is shown to be significantly related to longer time to resolve a debt and the higher value of the capital regulatory index.

### 7.5.1 Information Environment

The significant and positive relationship depicted between the coefficient of credit depth of information index, a proxy for the information environment and SME firm leverage implies that greater sharing of credit information increases SME firm leverage. This result appears to support both the pecking order theory and the agency theory. Moreover, the result concurs

with hypothesis 8 where it was expected SME firm leverage would be positively related to greater credit information sharing.

Greater information sharing alleges to reduce information asymmetries and concomitantly, the costs of external financing. This reinforces the pecking order theorem. Moreover, greater information sharing minimises conflicts of interest, in particular moral hazard. As outlined earlier in the disciplinary effect, borrowers are more determined to meet their loan obligations following the disclosure of default information only (Padilla and Pagano, 2000). This ensures conflicts of interest are minimal between the lender and borrower, reinforcing the agency theory.

As a form of robustness testing, two checks are conducted. Firstly, the same equation was applied where the dependent variable is no longer the total debt ratio but that of the long term debt ratio and the short term debt ratio respectively (See Appendix 11). Whilst support for the significance of the credit depth of information index is provided, evidence is mixed. Similar to that found for the total debt ratio, the short term debt ratio is shown to be positively related to the credit depth of information index with statistically significant results materialising. However, the long term debt ratio is shown to be negatively related to the credit depth of information index where results are also significant. Indicative of this, greater sharing of credit information increases short term SME firm leverage whilst reducing long term SME firm leverage. This result seems to suggest banks are more willing to lend short term based on information shared but it has adverse consequences for long term debt. This could be symbolic of the nature of the environment, highlighting the banks' approach to risk. As found in the results of the first research question, the type of credit information being made available and what this information reveals about potential borrowers to the lender appears important. Indeed, the disclosure of a weak credit history and the likelihood of default may

justify a fall in long term debt. Given short term debt has a lower maturity and is perceived less risky than long term debt, the stigma of a weak credit history and the likelihood of default is somewhat lessened.

Reconciling this result back to the result surrounding the total debt ratio, the composition of which includes more short term debt justifies the positive relationship found between the credit depth of information index and the total debt ratio. Indeed, informational asymmetry costs and agency costs following the revelation of weak credit history and the likelihood of default would be more important for long term debt than short term debt. Given short term debt accounts for more of the total debt, the argument for the quality of ‘what’ is shared still holds when evaluating the results of the total debt ratio.

The second robustness test involves using the average number of credit reports, based on the author’s own construction of a questionnaire as used in research question 1.

Including the average number of credit reports, the empirical results reveal a significant negative relationship between SME firm leverage and the sharing of credit information (See Appendix 12). This suggests that an increase in the average number of credit reports appears to reduce SME firm leverage albeit the magnitude is effectively zero.

In summary, the sharing of credit information is deemed important in the determination of SME firm leverage.

### **7.5.2 Legal Environment**

The significant positive relationship depicted between the coefficient of private property protection and firm leverage implies greater levels of private property protection increase firm leverage. This result appears to support the agency theory. Moreover, the result concurs with hypothesis 9 where it was expected SME firm leverage would be positively related to

greater levels of private property protection. This result concurs with Beck *et al.* (2008). More specifically, greater levels of private property protection minimises opportunistic behaviour of borrowers', reducing conflicts of interest (Dermirüç –Kunt and Maksimovic, 1998).

Reflecting on the empirical work of Jõeveer (2013b), the effects of firm and country characteristics on the leverage of large, small, listed and unlisted firms in ten Western European countries are evaluated. Jõeveer (2013b) finds for unlisted firms, shareholder rights protection and creditor right protection are negatively related to leverage. In a further study, Jõeveer (2013a) evaluates firm, country and macroeconomic determinants of the capital structure for listed and unlisted firms in nine Eastern European countries. Here shareholder rights protection index is negatively related to leverage for unlisted firms. The negative relationship between the shareholder rights protection index and firm leverage concurs with Jõeveer's (2013a) expectation where higher shareholder rights protection makes equity capital more attractive and leverage less appealing. In our study, the shareholder rights protection index is not included. The focus on equity is beyond the scope of this study.

Although our study does not include the creditor rights protection, the results of Jõeveer (2013b) surrounding the creditor protection index appear contrary to our findings.

As a form of robustness testing, two checks are conducted. Firstly, the same equation was applied where the dependent variable is no longer the total debt ratio but the long term debt ratio and the short term debt ratio respectively (See Appendix 11). Interestingly, both the short term debt ratio and the long term debt ratio are positively related to SME firm leverage albeit statistically significant results appear for the long term debt ratio only. This suggests private property protection is more important for long term debt than short term debt.

Secondly, an additional measure to represent the legal environment is considered, i.e. law and order. Derived from the PRS Group (2013), ‘the law sub-component is an assessment of the strength and impartiality of the legal system, while the order sub-component is an assessment of popular observance of the law. Higher values imply a stronger and impartial legal system and greater observance of the law. Similar to the positive results of private property protection, law and order is deemed positively related to SME firm leverage where statistically significant results materialise. This suggests that an increase in law and order increases SME firm leverage (See Appendix 13).

In summary, the results appear to highlight the importance of the legal environment in the determination of SME firm leverage.

### **7.5.3 Judicial Environment**

The significant positive relationship depicted between the coefficient of the time to enforce a contract, a proxy for the judicial environment and SME firm leverage implies that the longer the time to enforce a contract increases SME firm leverage. This result appears to refute hypothesis 10 of this study where longer time implies greater inefficiency in judicial enforcement. Whilst hypothesis 10 expected greater efficiency of enforcement under the judicial environment to be positively related to SME firm leverage, it also implies greater inefficiency will be negatively related to SME firm leverage. This finding appears unresponsive of the agency theory. Despite the positive relationship found between the time to enforce a contract and SME firm leverage, the magnitude of the coefficient is effectively zero.

As a form of robustness testing, a check is conducted. Two equations are performed where the dependent variable is no longer the total debt ratio but the long term debt ratio and the

short term debt ratio respectively (See Appendix 11). The time to enforce a contract is negatively related to long term debt ratio whilst the time to enforce a contract is positively related to short term debt ratio. These results are statistically significant. However, the magnitude of the coefficient is effectively zero.

In summary, the results appear to highlight the importance of the judicial environment in the determination of SME firm leverage.

#### **7.5.4 Bankruptcy Environment**

The significant negative relationship depicted between the coefficient of the time to resolve a debt, a proxy for the bankruptcy environment and SME firm leverage implies that longer time to resolve a debt reduces SME firm leverage. This result appears to support hypothesis 11 of this study where longer time implies greater inefficiency in bankruptcy enforcement. This finding appears supportive of the agency theory and the trade-off theory. More specifically, greater bankruptcy efficiency strengthens the enforcement of the legal environment, thus minimising conflicts of interest. Moreover, balancing the debt tax advantages against bankruptcy costs, a reduction in time to resolve a debt which implies lower bankruptcy costs increases firm leverage, illustrative of the trade-off theory.

As a form of robustness testing, a check is conducted. Two equations are performed where the dependent variable is no longer the total debt ratio but the long term debt ratio and the short term debt ratio respectively (See Appendix 11). Interestingly, both the short term debt ratio and the long term debt ratio are negatively related to firm leverage albeit results appear statistically significant only for long term debt. This suggests bankruptcy efficiency appears to be more important for long term debt than short term debt.

In summary, the results appear to highlight the importance of the bankruptcy environment in the determination of SME firm leverage.

#### **7.5.5 Social Environment**

The insignificant relationship depicted between the coefficient of trust, a proxy for the social environment and SME firm leverage appears to suggest that trustworthiness does not influence SME firm leverage. Nonetheless, reiterating a point made by Berger and Udell (2006) where they state the social environment has the highest impact on relationship lending. Although it is beyond the scope of this study to identify the lending technologies, it does raise the question again if the impact of the social environment differs across the different types of lending techniques.

As a form of robustness testing, the same equation was applied where the dependent variable is no longer the total debt ratio but the long term debt ratio and the short term debt ratio (See Appendix 11). Similar insignificant results appeared.

In summary, whilst the results appear to illustrate the unimportance of the social environment within SME firm leverage, this study cautions the need to focus on the identification of lending technologies.

#### **7.5.6 Tax Environment**

The insignificant relationship depicted between the coefficient of the effective tax rate, a proxy for the tax environment and SME firm leverage appears to suggest that tax does not influence SME firm leverage.

As a form of robustness testing, the same equation was applied where the dependent variable is no longer the total debt ratio but the long term debt ratio and the short term debt ratio (See Appendix 11). Similar insignificant results appeared.

### **7.5.7 Regulatory Environment**

The significant and negative relationship depicted between the coefficient of the capital regulatory index, a proxy for the regulatory environment and SME firm leverage implies greater capital regulatory requirements reduces SME firm leverage. This result appears to support the agency theory. Moreover, the result concurs with hypothesis 15 where it was expected SME firm leverage would be negatively related to greater capital regulatory requirements. This suggests greater stringency of capital requirements reduces SME firm leverage.

Mac an Bhaird and Lucey (2009) stipulate with more stringent capital requirements for banks, this can result in the use of more personal assets by SMEs to secure bank credit. Whilst collateral is perceived to reduce agency costs and thus increase firm leverage, the use of personal assets can generate personal distress and loss for the SME, resulting in a reduction of firm leverage. The findings of this study are illustrative of this and thus lead to the question of whether personal assets should be used as collateral. Furthermore, is there an appropriate threshold that should be applied to personal assets?

As a form of robustness testing, two equations are performed where the dependent variable is no longer the total debt ratio but the long term debt ratio and the short term debt ratio respectively (See Appendix 11). Interestingly, the capital regulatory index is shown to be positively related to the long term debt ratio whilst the capital regulatory index is shown to be negatively related to the short term debt ratio. The results however are significant only for the short term debt ratio. This suggests the capital regulatory requirements are more important for short term debt than for long term debt.

## 7.6 Firm Characteristics and the Capital Structure Theories

The result surrounding SME firm age appear statistically significant where the result suggests an increase in firm age is negatively related to SME firm leverage. This is in line with the study's expectations. Moreover, a significant negative relationship is evident between firm age and long term debt and between firm age and short term debt. This concurs with the hypotheses of Hall *et al.* (2004) where young firms are depicted to have less time to retain earnings and thus need to borrow. Mac an Bhaird and Lucey (2009) stipulate the negative relationship between long term debt and firm age is indicative of maturity matching and posit over time, SMEs employ more retained profits than debt to fund investment projects.

The result surrounding SME firm size appears statistically significant where the result suggests an increase in firm size is positively related to SME firm leverage. This concurs with Cassar and Holmes (2003). Furthermore, a positive relationship occurs between firm size and long term debt and a negative relationship between firm size and short term debt albeit the results appear only significant for long term debt. The result surrounding long term debt and firm size is similar to that of Hall *et al.* (2004) and Mac an Bhaird and Lucey (2009). The negative result of short term debt and firm size found in this study also concurs with Hall *et al.* (2004) but our results are insignificant. Indeed Cassar and Holmes (2003) who find little support for short term debt and firm size stipulate the nature of financing such as the duration may be important.

The result surrounding SME firm tangibility appears statistically significant where it is suggested that an increase in the tangible assets of SMEs is positively related to SME firm leverage. This is in line with the study's expectations and concurs with Michaelas *et al.* (1999), Cassar and Holmes (2003) and Sogorb-Mira (2005). Moreover, a significant positive relationship is evident between SME firm tangibility and long term debt. Yet however,

significant negative relationship is evident between SME firm tangibility and short term debt. This concurs with the empirical results of Hall *et al.* (2004).

Finally, the result surrounding SME firm profitability appears statistically significant where it is suggested that more profitable SMEs use less leverage. This is in line with the study's expectations and concurs with López-Gracia and Sogorb- Mira (2008). Moreover, a significant negative relationship is evident between SME firm profitability and long term debt and between SME firm profitability and short term debt. This concurs with the hypotheses from Hall *et al.* (2004).

### **7.7 Macroeconomic Controls, Supply Controls and the Capital Structure Theories**

The result surrounding the annual growth rate, a proxy for economic growth appears statistically significant in equation (4a) of table 6.31, and in equation (4b) and (4c) of table 6.32. The result appears to illustrate that an increase in the annual growth rate increases SME firm leverage. This was the expected direction of the study. The result surrounding the government and central bank support, a proxy to capture the effects of the recent financial and economic crisis appears statistically significant in equation (5a) of table 6.34. The result appears to illustrate that an increase in significant interventions and support measures by governments and central banks reduce SME firm leverage. As expected, SME firm leverage falls with a greater severity of the financial crisis. The result surrounding the 10 year government bond yield, a proxy for bank credit supply appears statistically significant in equation (5b) of table 6.34. This result appears to suggest a higher bond yield which implies a fall in credit supply reduces SME firm leverage. This result was expected.

In summary, the empirical results find the information, legal, judicial, bankruptcy and regulatory environments are important under research question 1. In particular, the information, legal, judicial, bankruptcy and regulatory environments are found to influence

the likelihood of SME bank credit availability. Whilst the results surrounding the information, legal and judicial are in line with expectations, the results surrounding the bankruptcy and regulation warrant further consideration.

The empirical results also find the information, legal, judicial, bankruptcy and regulatory environments are important under research question 2. In particular, the information, legal, judicial, bankruptcy and regulatory environments are deemed determinants of SME firm leverage. Indeed, the results provide support for the pecking order theory, the agency theory and the trade-off theory. Whilst the results surrounding the information, legal, bankruptcy and regulation are in line with expectations, the results surrounding the judicial environment warrant further consideration. The next chapter now concludes.

## **Chapter Eight: Conclusion**

*'Today I speak the truth as I know it to be, tomorrow I may know better.'*  
*T Jay Taylor*

## **8.1 Introduction**

The preceding chapter presented a discussion of the empirical findings underpinning this study. This chapter reiterates the research objective and research questions of the study along with the main conclusions. This shapes the contribution of the study. The chapter then presents key policy implications inherent to the empirical findings. Finally, the chapter concludes with the study's limitations and potential avenues for future research.

## **8.2 Research Objective and Research Questions**

The research objective of this study is to evaluate a comprehensive set of country characteristics on the availability of SME bank credit and on SMEs capital structure. This study aims to provide a deeper understanding of SME bank credit availability where the focus shifts solely from the structure of banking institutions to include the environments (country characteristics) in which SMEs and indeed banking institutions operate. In addition, this study aims to investigate SMEs capital structure by moving the focus from the owner, firm and industry characteristics to include the environments (country characteristics). The country characteristics evaluated include the information, legal, judicial, bankruptcy, social, tax and regulatory environments, derived from a US conceptual framework by Berger and Udell, (2006). The study has two research questions which are

- 1. Do country characteristics influence the likelihood of bank credit availability for SMEs?**
- 2. Do country characteristics determine SME firm leverage?**

## **8.3 Main Conclusions of the Study**

Evaluating the research questions, this study finds country characteristics do appear to influence the likelihood of bank credit availability for SMEs and also are depicted to determine SME firm leverage. In particular, SMEs appear more likely to be able to secure

credit when there is a less sharing of credit information, greater private property protection, lower costs to enforcement of a contract, higher costs to resolving a debt and more stringent capital requirements. Furthermore, bank size appears to matter for SME bank credit availability regardless of their nationality. Similarly, in the context of SME firm leverage, country characteristics are once again shown to be influential having controlled for firm and industry characteristics and macroeconomic and credit supply conditions. In particular, SME debt levels appear higher the greater the sharing of credit information, the greater the extent of private property protection, the more time it takes to enforce a contract, the less time needed to resolve a debt and when there are less stringent capital requirements. Firm characteristics also appear to be important determinants of SME firm leverage.

#### **8.4 Contribution of Research**

Given the main conclusions, this study contributes to the literature in a number of ways. Firstly, this study develops a conceptual framework illustrating the impact of country characteristics on the landscape of SME bank credit availability and SME firm leverage. Indeed the results surrounding the availability of SME bank credit appear to highlight the importance of the structure of banking institutions and concomitantly the environments in which SMEs and banking institutions operate. This builds on existing literature, illustrating how the factors of SME bank credit availability adopt a concentric design. This is also true of the SME capital structure where the results of this study appear to support firm characteristics, industry characteristics and country characteristics in the determination of SME firm leverage. This adds to the existing model of literature on country characteristics which to date are relatively few in the SME domain. Indeed, the results illustrate how the determinants of SME firm leverage also adopt a concentric design.

Secondly, this study provides the opportunity to extend the theoretical basis of the US conceptual framework developed by Berger and Udell (2006) where the environments constituting their lending infrastructure are evaluated in the context of the availability of SME bank credit in Europe. The results illustrate the applicability of Berger and Udell's (2006) conceptual framework not only in the US context but also in the European context.

### **8.5 Implications for Policy**

Given the empirical results of this study, a number of policy implications are presented. Firstly, given the significance of country characteristics on the availability of SME bank credit and SME capital structure, attention needs to be placed more on such characteristics. In particular, results surrounding the information environment appear to suggest the level of disclosed credit information and the quality of 'what' is shared is important. Jappelli and Pagano (2002) allude to the activities of private credit bureaus around the world and find differences in the type of information shared i.e. some report black information (default) whilst others report white information (all). Empirical evidence shows the impact of sharing default information only through the 'disciplinary effect'.

More recently, there does appear to be a move towards developing the information environment of a country. Indeed, the establishment of a statutory Central Credit Register in Ireland earlier this year is illustrative of this. However, government policy needs to appreciate the importance of not only the level of information sharing but concomitantly, the quality of information shared.

Secondly, the results of this study appear to highlight the importance of the legal, judicial and bankruptcy environment. Indeed, government policy should continue to focus on the strength of the legal environment but perhaps more importantly focus on the efficiency of

enforcement under the judicial and bankruptcy environment. In particular, increased effort needs to be made to ensure the cost, time and procedures of enforcement are efficient.

Thirdly, the regulatory environment proves significant in both the availability of SME bank credit and SME capital structure. In particular, the impact of stringent capital regulatory requirements on SME firm leverage is an on-going concern. The results depicted here appear to suggest that more stringent capital regulations reduce SME firm leverage. This spillover effect illustrates a possible trade-off between the goals of bank stability and funding enterprise

Finally, given the results surrounding bank structure, government policy may seek to encourage the presence of foreign banks in a country. This is all the more poignant given the recent departure of many foreign banks from such as Ireland. Indeed, the results appear to suggest that an increase in the size of foreign banks reduces the likelihood of credit denial. Given the vital contribution of SMEs and the importance of bank credit to the sector, more policy consideration should be placed on foreign banks.

### **8.6 Limitations of this Study**

Lending credence to the research objective and research questions of this study coupled with the study's main contribution, several limitations must be noted. Firstly, despite the merits of the EC/ECB Survey on Access to Finance for SMEs (ECB, 2012), it provides an unbalanced dataset unlike the Bureau Van Dijk Amadeus database which presents a balanced sample of firms. Indeed, given only three waves of the EC/ECB Survey on Access to Finance for SMEs (ECB, 2012) are employed, this provides only a snapshot of credit availability in Europe. Moreover, this survey is a relatively new instrument where the data is self-reported. Despite the benefits of the Bureau Van Dijk Amadeus database, a number of countries are poorly represented namely, Germany, Greece, Ireland and the Netherlands. Furthermore, there

appears to be over representation of some industries whilst under representation of others in the database. Considering the two sources of data, both differ in terms of time periods and sample of countries.

Secondly, whilst this study empirically evaluates what Berger and Udell (2006) dub the lending infrastructure in the availability of SME bank credit, Berger and Udell (2006, pp. 2963) posit ‘a key issue in testing the framework is the identification of the lending technologies’. Given that it was the primary focus of the study to evaluate the country characteristics of Berger and Udell’s (2006) conceptual model, the results of this study suggest there is a need to consider the type of technologies used to further understand the impact of country characteristics.

Finally, the study does not control for role of culture or for the growth prospects of SMEs.

## **8.7 Future Research**

In light of the above limitations outlined, several avenues of future research are proposed. Firstly, given the significant results surrounding the information environment, increased attention needs to be placed on the typology of credit information shared and its impact on identifying the good and bad borrower. This is fundamental not only in the availability of SME bank credit but also in the determination of SME capital structure to further evaluate the disciplinary effect. This could be made possible via the employment of bank data. Secondly, identification of various lending technologies deployed is warranted which will facilitate further analysis of country characteristics and indeed bank structure on the availability of SME bank credit. Finally, attention needs to encapsulate the impact of the political environment on SME bank credit as alluded to by Calomiris and Haber (2014) in their analysis of the fragility of banking systems. Much of these avenues of research are subject to

the availability of SME data which the European Banking Federation (EBF, 2013) coin this the SME data challenge.

## **8.8 Conclusion**

This chapter has reiterated the research objective and research questions of this study and its main conclusions. This defines the contribution of the study. The chapter then presents key policy implications along with the study's limitations. Finally, future avenues for research are evaluated. The availability of SME bank credit and the SME capital structure are two fundamental areas within the domain of SME finance and attract the interest of academics and practitioners. Given the significance of small and medium sized enterprises within Europe and their reliance on bank credit, both areas will continue to attract much attention in the ever - evolving landscape.

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## Appendix 1: Definitions and Sources of Dependent and Independent Variables

SME Bank Credit Denial	The dependent variable relates to question 7 (b) part (a) of the <i>EC/ECB Survey on the Access to Finance of SMEs</i> (ECB, 2012) in which SMEs were asked, ‘If you applied and tried to negotiate for this type of financing over the past 6 months, did you: receive all the financing you requested; receive only part of the financing you requested; refuse to proceed because of unacceptable costs or terms and conditions; or have you not received anything at all?’	Source: <i>EC/ECB Survey on the Access to Finance of SMEs</i> .
Total Debt Ratio	This is defined as total debt to total assets. Total debt includes short term debt and long term debt	Source: <i>The Bureau Van Dijk Amadeus database</i>
Bank Size	This defines a large domestic bank as a bank with total assets greater than 0.5 per cent of the total consolidated assets of EU banks, medium sized banks as a bank with total assets of between 0.5 per cent and 0.005 per cent of the total consolidated assets and small banks with total assets of less than 0.005 per cent of total consolidated assets (ECB, 2013b).	Source: <i>European Central Bank</i> .
Bank Ownership	This distinguishes between domestic and foreign banks. A bank is defined as foreign if its subsidiaries and branches are controlled by a parent who is foreign from the reporting country’s perspective (ECB, 2013b).	Source: <i>European Central Bank</i> .
Bank Concentration Ratio	This is defined by ‘the assets of three largest commercial banks as a share of total commercial banking assets. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax assets, discontinued operations and other assets’. (Bankscope)	Source: <i>Global Financial Development Report, World Bank</i> .
Lerner Index	This is ‘a measure of market power in the banking market. It is defined as the difference between output prices and marginal costs (relative to prices). Prices are calculated as total bank revenue over assets, whereas marginal costs are obtained from an estimated translog cost function with respect to output. Higher values of the Lerner index indicate less	Source: <i>Global Financial Development Report, World Bank</i> .

	bank competition'. (Bankscope)	
Firm Age	This is defined as year of Bureau Van Dijk Amadeus Database- Year of Firm's Birth. Source: Bureau Van Dijk Amadeus Database.	Source: <i>The Bureau Van Dijk Amadeus database</i>
Firm Size	This is defined as the natural log of total assets. Source: Bureau Van Dijk Amadeus Database.	Source: <i>The Bureau Van Dijk Amadeus database</i>
Tangibility	This is defined as tangible assets/total assets. Source: Bureau Van Dijk Amadeus Database.	Source: <i>The Bureau Van Dijk Amadeus database</i>
Profitability	This is defined as earnings before interest and taxes/total assets. Source: Bureau Van Dijk Amadeus Database.	Source: <i>The Bureau Van Dijk Amadeus database</i>
Effective Tax Rate	This is defined as total tax/ earnings before taxes. Source: Bureau Van Dijk Amadeus Database.	Source: <i>The Bureau Van Dijk Amadeus database</i>
Credit Depth of Information Index	The credit depth of information index created by the World Bank measures the 'scope, accessibility, and quality of credit information' (World Bank, 2012a). Higher values on this scale (0-6) imply greater availability of credit information (World Bank, 2012a).	Source: <i>Doing Business World Bank.</i>
Average number of Credit Reports per Population	The average number of credit reports per population issued by private credit bureaus and public credit registries.	Source: <i>Author's own calculations.</i>
Private Property Rights	Private property rights measures 'the ability of individuals to accumulate private property, secured by clear laws that are fully enforced by the state' (Heritage Foundation, 2013). Such a measure reveals 'the degree to which a country's laws protect private property rights and the degree to which its government enforces those laws' (Heritage Foundation, 2013).	Source: <i>Heritage Foundation.</i>
Law and Order	'The Law sub-component is an assessment of the strength and impartiality of the legal system, while the Order sub-component is an assessment of popular observance of the law'. (PRS Group, 2013).	Source: <i>The PRS Group.</i>

	Source: The PRS Group.	
Cost to Enforce a Contract	The cost required to enforce a contract include attorney fees (average), court costs and expert fees and enforcement fees (Doing Business, 2012c).	Source: <i>Doing Business World Bank.</i>
Time to Enforce a Contract	The time required to enforce a contract includes the time period to file and serve the case, the time period for trial and obtaining judgement and the time period to enforce the judgement (Doing Business, 2012c). Measured in calendar days, this indicator records the time from the filing of a lawsuit to payment (Doing Business, 2012c).	Source: <i>Doing Business World Bank.</i>
Procedures to Enforce a Contract	Procedures required to enforce a contract include any engagement between the parties involved in a commercial dispute. (Doing Business, 2012c). This comprises of procedures to file and serve the case, procedures for trial and judgement and procedures to enforce the judgement (Doing Business, 2012c). The lower the costs, time and the complex nature of procedures, the more effective the commercial dispute resolution will be (Doing Business, 2012b).	Source: <i>Doing Business World Bank.</i>
Time to Resolve a Debt	The time required to recover a debt records the time period from the company's default to payment of all or some of the debt. (Doing Business, 2012d).	Source: <i>Doing Business World Bank.</i>
Cost to Resolve a Debt	The cost required to recover a debt include court fees, insolvency administrator fees, lawyers' fees, assessors and auctioneers' fees (Doing Business, 2012d).	Source: <i>Doing Business World Bank.</i>
Recovery Rate	The recovery rate, recorded as the cents on the dollar recovered by creditors includes the resulting outcome i.e. whether the business remains a going concern or the assets are sold gradually (Doing Business, 2012d). The lower the costs, time and the higher the recovery rate, the more effective the commercial dispute resolution will be (Doing Business, 2012d).	Source: <i>Doing Business World Bank.</i>
Social Values Insurance	This variable relates to the following question: 'please tell me how wrong it is to make an exaggerated or false insurance claim? (European Social Survey, 2012)	Source: <i>European Social Survey.</i>
Social Values Stolen	This variable relates to the following question: 'please tell me how	Source: <i>European Social Survey.</i>

	wrong it is to buy something you thought might be stolen? (European Social Survey, 2012)	
Social Values Traffic	This variable relates to the following question: ‘please tell me how wrong it is to commit a traffic offence like speeding or crossing a red light? (European Social Survey, 2012)	Source: <i>European Social Survey</i> .
Trust	This variable relates to the following question: ‘ <i>Generally speaking, would you say that most people can be trusted, or that you can’t be too careful in dealing with people? Please tell me on a score of 0 to 10, where 0 means you can’t be too careful and 10 means that most people can be trusted</i> ’ (European Social Survey, 2012)	Source: <i>European Social Survey</i> .
Capital Regulatory Index	This is the sum of the overall capital stringency and the initial capital stringency. The overall capital stringency indicates ‘whether the capital requirement reflects certain risk elements and deducts certain market value losses from capital before minimum capital adequacy is determined’. The initial capital stringency indicates ‘whether certain funds may be used to initially capitalize a bank and whether they are official’ ( <i>Bank Regulation and Supervisory Survey, 2001</i> )	Source: <i>Bank Regulation and Supervisory Survey</i> .
GDP Annual Growth Rate	The GDP growth rate is the ‘annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2005 U.S. dollars’ (World Bank, 2013 a).	Source: <i>World Bank</i> .
GDP per Capita (current US \$)	The GDP per capita is ‘gross domestic product divided by midyear population’ (World Bank, 2013b).	Source: <i>World Bank</i> .
Domestic Demand	This is the ‘growth of domestic demand component of GDP (at current prices)’.	Source: <i>Eurostat</i> .
Inflation	Inflation is the log difference of the Consumer Price Index (ECB, 2013c, Beck <i>et al.</i> 2008).	Source: <i>European Central Bank</i> .
Gross Domestic Savings (%GDP)	Gross Domestic Savings are ‘calculated as GDP less final consumption expenditure (total consumption)’ (World Bank, 2013c).	Source: <i>World Bank</i> .
10 Year Government Bond Yield	10 year Government Bond Yield (annual %)	Source: <i>Thomson One</i>
Deposits per GDP	This is defined as ‘the total value of demand, time and saving deposits at domestic deposit money banks as a share of GDP. Deposit money banks	Source: <i>Global Financial Development Database, World Bank</i> .

	comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits’.	
Government and Central Bank Support	This is a scale measurement, ranging from 4-8. This measure is defined as the number of support measures (scale of 4-8 across Europe) taken by government and central banks during the banking crisis, 2007-10, including deposit insurance and bank guarantees, capital injections, asset purchases, liquidity support measures, reduction of policy rates to the purchase of private securities.	Source: <i>Laeven and Valencia (2012)</i> .
Systemic Banking Crisis	Classification of a systemic banking crisis where 1 means a country is classified as having a systemic banking crisis and 0 means a country is classified as not having a systemic banking crisis.	Source: <i>Laeven and Valencia (2012)</i> .

## Appendix 2: Group Mean and Sample Mean of Credit Denial (Research Question 1)

### Group Mean and Sample Mean of Credit Denial

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Base Category for Industry	
<b>Sample Mean of Credit Denial</b>	<b>0.223</b>
Group 'Construction' Mean of Credit Denial	0.2860
Group 'Manufacturing' Mean of Credit Denial	0.2074
Group 'Wholesale' Mean of Credit Denial	0.2575
Group 'Other Services' Mean of Credit Denial	<b>0.2169</b>

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Base Category for Country	
<b>Sample Mean of Credit Denial</b>	<b>0.223</b>
Group 'Austria' Mean of Credit Denial	0.0701
Group 'Belgium' Mean of Credit Denial	0.137
Group 'Finland' Mean of Credit Denial	0.052
Group 'France' Mean of Credit Denial	0.159
Group 'Germany' Mean of Credit Denial	0.142
Group 'Greece' Mean of Credit Denial	0.377
Group 'Ireland' Mean of Credit Denial	0.462
Group 'Italy' Mean of Credit Denial	<b>0.213</b>
Group 'Netherlands' Mean of Credit Denial	0.352
Group 'Portugal' Mean of Credit Denial	0.304
Group 'Spain' Mean of Credit Denial	0.302

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**Appendix 3: The Logit Coefficients, Marginal Effects and the Odds Ratio of the 4 Equations Conducted in Research Question 1 before Tests of Multicollinearity.**

**Logit Coefficients<sup>14</sup>**

	(1)		(2)		(3)	
<b>Constant</b>	-0.5390	(4.9167)	-1.0364	(4.1432)	285.9683	(0.0000)
<b>Bank Structure Variables</b>						
Large Bank	0.0002	(0.0012)	0.0007	(0.0010)	0.0473*	(0.0095)
Small Bank	0.0017	(0.0040)	0.0040	(0.0034)	-0.0481	(0.0286)
Domestic	-0.0003	(0.0012)	-0.0008	(0.0010)	-0.0338*	(0.0096)
Foreign	0.0019*	(0.0006)	0.0005	(0.0006)	-0.0193*	(0.0030)
Bank Concentration	-0.0405	(0.0270)	-0.0376	(0.0219)	-0.5330*	(0.0460)
Lerner Index	-5.6106	(6.2884)	-3.3762	(5.3991)	-90.2499*	(9.3509)
<b>Macroeconomic Variables</b>						
GDP Per Capita	0.0002*	(0.0000)	0.0002*	(0.0000)	0.0019*	(0.0002)
Annual Growth Rate	0.2359*	(0.1004)	0.2027*	(0.0863)	2.5100*	(0.1280)
Domestic Demand	-0.1367	(0.0831)	-0.1360	(0.0718)	-1.1981*	(0.2002)
Inflation	-0.5498	(0.5044)	-0.0831	(0.4422)	-3.2865*	(0.5134)
Government and Central Bank Support	-0.7455	(0.4689)	-0.8198*	(0.3437)	-73.302*	(2.4176)
Systemic Crisis	-2.0915*	(0.6112)	-1.687*	(0.5484)	101.0954*	(3.8061)
10 Year Government Bond	0.3157*	(0.1037)	0.3858*	(0.0973)	-0.0719	(0.3107)
Domestic Savings	-0.2144*	(0.0791)	-0.1493*	(0.0747)	6.9871*	(0.5621)
Deposits per GDP	0.0625*	(0.0165)	0.0594*	(0.0127)	0.2486	(0.2200)
<b>Firm Variables</b>						
Firm Size	-0.3504*	(0.0514)	-0.4507*	(0.0598)	-0.4528*	(0.0598)
<b>Industry Dummies</b>						
Construction			0.5305*	(0.1485)	0.5312*	(0.1486)
Manufacturing			0.0508	(0.1175)	0.0532	(0.1177)
Wholesale			0.0012	(0.1197)	-0.0019	(0.1201)
<b>Country Dummies</b>						
Belgium					-67.5733*	(5.5737)
Ireland					-47.8002*	(6.5741)
Netherlands					-125.568*	(10.4722)
Portugal					81.68172*	(10.3454)
Spain					-40.9734*	(9.8169)
N		4755		4244		4244
<b>Pseudo R<sup>2</sup></b>		0.0722		0.0677		0.0687

\*5 per cent level of significance. The standard error is presented in the parentheses.

<sup>14</sup>Conducting logistic regressions in Stata, some independent variables are dropped by the statistical package automatically due to collinearity. In equation 1 and 2, the number of employees and medium banks are dropped. In equation 3, the number of employees, medium banks and several country dummies including Austria, Finland, France, Germany and Greece are dropped. In equation 4, the number of employees, medium banks, systemic crisis, Lerner index and time to resolve are dropped.

## Marginal Effects

	(1)		(2)		(3)	
<b>Bank Structure Variables</b>						
Large Bank	0.0000	(0.0002)	0.0008	(0.0001)	0.0081*	(0.0017)
Small Bank	0.0002	(0.0006)	0.0007	(0.0006)	-0.0083	(0.0049)
Domestic	-0.0000	(0.0002)	-0.0001	(0.0002)	-0.0058*	(0.0017)
Foreign	0.0003*	(0.0001)	0.0000	(0.0001)	-0.0033*	(0.0005)
Bank Concentration	-0.0058	(0.0039)	-0.0065	(0.0038)	-0.0917*	(0.0083)
Lerner Index	-0.8004	(0.8949)	-0.5816	(0.9296)	-15.5239*	(1.6171)
<b>Macroeconomic Variables</b>						
GDP Per Capita	0.0000*	(0.0000)	0.000*	(0.0000)	0.0003*	(0.0000)
Annual Growth Rate	0.0337*	(0.0142)	0.0349*	(0.0149)	0.4317*	(0.0247)
Domestic Demand	-0.0195	(0.0118)	-0.0234	(0.0124)	-0.2061*	(0.0352)
Inflation	-0.0784	(0.0719)	-0.0143	(0.0761)	-0.5657*	(0.0896)
Government and Central Bank Support	-0.1063	(0.0672)	-0.1412*	(0.0594)	-12.6087*	(0.5548)
Systemic Crisis	-0.3243*	(0.1015)	-0.2945*	(0.0955)	1	(0.0000)
10 Year Government Bond	0.0450*	(0.015)	0.0665*	(0.0168)	-0.0124	(0.0535)
Domestic Savings	-0.0306*	(0.0114)	-0.0257*	(0.0129)	1.2019*	(0.1048)
Deposits per GDP	0.0089*	(0.0024)	0.0102*	(0.0022)	0.0428	(0.0380)
<b>Firm Variables</b>						
Firm Size	-0.0500*	(0.0064)	-0.0776*	(0.0107)	-0.0779*	(0.0107)
<b>Industry Dummies</b>						
Construction			0.1014*	(0.0307)	0.1014*	(0.0308)
Manufacturing			0.0088	(0.0205)	0.0092	(0.0206)
Wholesale			0.0002	(0.0206)	-0.0003	(0.0206)
<b>Country Dummies</b>						
Belgium					-0.6287*	(0.0372)
Ireland					-0.3228*	(0.0196)
Netherlands					-0.8677*	(0.0315)
Portugal					0.9824*	(0.0062)
Spain					-0.9993*	(0.0013)

\*5 per cent level of significance. The standard error is presented in the parentheses.

## Odds Ratio

	(1)		(2)		(3)	
<b>Bank Structure Variables</b>						
Large Bank	1.0002	(0.0012)	1.0007	(0.0010)	1.0484*	(0.0100)
Small Bank	1.0017	(0.0040)	1.0040	(0.0034)	0.9530	(0.0273)
Domestic	0.9997	(0.0012)	(0.9992)	(0.001)	0.9668*	(0.0093)
Foreign	1.0019*	(0.0006)	1.0005	(0.0006)	0.9809*	(0.0029)
Bank Concentration	0.9603	(0.0259)	0.9631	(0.0211)	0.5868*	(0.0270)
Lerner Index	0.0037	(0.0230)	0.0342	(0.1845)	0.000*	(0.000)
<b>Macroeconomic Variables</b>						
GDP Per Capita	1.0002*	(0.0000)	1.0002*	(0.0000)	1.0019*	(0.0002)
Annual Growth Rate	1.2661*	(0.1271)	1.2247*	(0.1057)	12.3046*	(1.5754)
Domestic Demand	0.8723	(0.0725)	0.8729	(0.0627)	0.3018*	(0.0604)
Inflation	0.57706	(0.2911)	0.9203	(0.4069)	0.0373*	(0.0191)
Government and Central Bank Support	0.4745	(0.2225)	0.4405*	(0.1514)	0.0000*	(0.0000)
Systemic Crisis	0.1235*	(0.0755)	0.1851*	(0.1015)	0.0000*	(0.0000)
10 Year Government Bond	1.3712*	(0.1422)	1.4708*	(0.1432)	0.9306	(0.2891)
Domestic Savings	0.8071*	(0.0638)	0.8613*	(0.0643)	1082.578*	(608.5978)
Deposits per GDP	1.0644*	(0.0176)	1.0612*	(0.0135)	1.2823	(0.2822)
<b>Firm Variables</b>						
Firm Size	0.7044*	(0.0362)	0.6372*	(0.0381)	0.6359*	(0.0381)
<b>Industry Dummies</b>						
Construction			1.6998*	(0.2524)	1.7009*	(0.2527)
Manufacturing			1.0521	(0.1236)	1.0546	(0.1242)
Wholesale			1.0012	(0.1199)	0.9981	(0.1198)
<b>Country Dummies</b>						
Belgium					0.0000*	(0.0000)
Ireland					0.0000*	(0.0000)
Netherlands					0.0000*	(0.0000)
Portugal					2.98E+35*	(3.08E+36)
Spain					0.0000*	(0.0000)
N		4755		4244		4244
Pseudo R <sup>2</sup>		0.0722		0.0677		0.0687

\*5 per cent level of significance. The standard error is presented in the parentheses.

### Logit Coefficients, Marginal Effects and Odds Ratio of Equation 4

	(4) Coefficients (Logit)		(4) Marginal Effects		(4) Odds Ratio	
Constant	-227.95					
<b>Bank Structure Variables</b>						
Large Bank	0.4713*	(0.0340)	0.0811*	(0.0062)	1.6023*	(0.0545)
Small Bank	1.1500*	(0.0837)	0.1978*	(0.0152)	3.1589*	(0.2646)
Domestic	-0.3949*	(0.0282)	-0.0680*	(0.0051)	0.6737*	(0.0190)
Foreign	-0.1568*	(0.0127)	-0.0269*	(0.0023)	0.8548*	(0.0109)
Bank Concentration	-3.5673*	(0.3006)	-0.6135*	(0.0540)	2.82E-02*	(0.0085)
<b>Macroeconomic Variables</b>						
GDP Per Capita	-0.0048*	(0.0004)	-0.0008*	(0.0001)	9.95E-01*	(0.0004)
Annual Growth Rate	14.1113*	(1.0003)	2.4269*	(0.1825)	1.35E+06*	(1348312)
Domestic Demand	-16.3901*	(1.2061)	-2.8188*	(0.2192)	7.59E-08*	(9.16E-08)
Inflation	20.5783*	(1.6037)	3.5389*	(0.2899)	8.68E+08*	(1.39E+09)
Government and Central Bank Support	58.6748*	(4.2869)	10.0907*	(0.7818)	3.07E+25*	(1.32E+26)
10 Year Government Bond	-14.398*	(1.3000)	-2.4761	(0.2320)	0.0000*	(7.24E-07)
Domestic Savings	0.7671*	(0.2912)	0.1319*	(0.0500)	2.1539*	(0.6272)
Deposits per GDP	7.0964*	(0.5678)	1.2204 *	(0.1022)	1.21E+03*	(686.5786)
<b>Firm Variables</b>						
Firm Size	-0.4528*	(0.0598)	-0.0779*	(0.0107)	0.6359*	(0.0381)
<b>Industry Dummies</b>						
Construction	0.5312*	(0.1486)	0.1014*	(0.0308)	1.70*	(0.2527)
Manufacturing	0.0532	(0.1177)	0.0092	(0.0206)	1.05E+00	(0.1242)
Wholesale	-0.0019	(0.1201)	-0.00033	(0.0206)	9.98E-01	(0.1198)
<b>Country Characteristics</b>						
Credit Index	-35.9887*	(3.6479)	-6.1892*	(0.6473)	2.33E-16*	(8.50E-16)
Private Property Protection	-1.04643*	(0.0978)	-0.1800*	(0.0172)	3.51E-01*	(0.034349)
Procedures to Enforce a Contract	-24.3542*	(2.2090)	-4.1884*	(0.3936)	2.64E-11*	(5.82E-11)
Time to Enforce a Contract	0.876459*	(0.0733)	0.15073*	(0.0132)	2.40 *	(0.176222)
Cost to Enforce a Contract	-28.9784*	(2.4714)	-4.9836*	(0.4425)	2.58E-13*	(6.39E-13)
Cost to Resolve a Debt	22.2054*	(1.7047)	3.8188*	(0.3083)	4.42E+09*	(7.54E+09)
Recovery Rate	6.391*	(0.4946)	1.0990*	(0.0897)	5.97E+02*	(295.2654)
N	4244				4244	
Pseudo R <sup>2</sup>	0.0687				0.0687	

\*5 per cent level of significance. The standard error is presented in the parentheses.

#### Appendix 4: Heading Abbreviations in the Correlation Matrices

<b>LB</b>	<b>Large Bank Assets</b>
<b>MB</b>	Medium Bank Assets
<b>SB</b>	Small Bank Assets
<b>DB</b>	Domestic Bank Assets
<b>FB</b>	Foreign Bank Assets
<b>LA</b>	Log Assets
<b>Tang</b>	Tangibility
<b>Profit</b>	Profitability
<b>ETR</b>	Effective Tax Rate
<b>GDP</b>	GDP Per Capita
<b>AGR</b>	Annual Growth Rate
<b>DD</b>	Domestic Demand
<b>Inflat</b>	Inflation
<b>GovCB</b>	Government and Central Bank Support
<b>SBC</b>	Systemic Banking Crisis
<b>Depot</b>	Deposits per GDP
<b>DS</b>	Domestic Savings
<b>Gov Bond</b>	10 Year Government Bond Yield
<b>Con</b>	Concentration
<b>LI</b>	Lerner Index
<b>Value Ins</b>	Values (Insurance)
<b>Value Stol</b>	Values (Stolen)
<b>Value Traf</b>	Values (Traffic)
<b>TT</b>	Trust
<b>CI</b>	Credit Depth of Information Index
<b>PP</b>	Private Property Rights
<b>Proc</b>	Procedures to Enforce a Contract
<b>TE</b>	Time to Enforce a Contract
<b>CE</b>	Cost to Enforce a Contract
<b>TR</b>	Time to Resolve a Debt
<b>CR</b>	Cost to Resolve a Debt
<b>RR</b>	Recovery Rate
<b>RG</b>	Capital Regulatory Index

## Appendix 5: Group Mean and Sample Mean of the Total Debt Ratio

Base Category for Industry	
<b>Sample Mean of Total Debt Ratio</b>	<b>0.2012</b>
Group 'Manufacturing' Mean of Total Debt Ratio	0.2061
<b>Group 'Other Services' Mean of Total Debt Ratio</b>	<b>0.2015</b>
Group 'Wholesale' Mean of Total Debt Ratio	0.1792
Group 'Transport' Mean of Total Debt Ratio	0.2026
Group 'Professional' Mean of Total Debt Ratio	0.1792
Group 'Construction' Mean of Total Debt Ratio	0.2299
Group 'Information and Communication' Mean of Total Debt Ratio	0.1607
Group 'Administrative' Mean of Total Debt Ratio	0.1959
Group 'Arts, Entertainment and Recreation' Mean of Total Debt Ratio	0.2334
Group 'Accommodation and Food Service' Mean of Total Debt Ratio	0.2439
Group 'Human Health and Social Work' Mean of Total Debt Ratio	0.1858
Group 'Water Supply, Sewerage and Waste' Mean of Total Debt Ratio	0.1627
Group 'Education' Mean of Total Debt Ratio	0.3302
Group 'Real Estate' Mean of Credit Denial	0.2630
Group 'Electricity, Gas, Steam' Mean of Total Debt Ratio	0.0704
Group 'Mining' Mean of Total Debt Ratio	0.1937

Base Category for Country	
<b>Sample Mean of Total Debt Ratio</b>	<b>0.2012</b>
Group 'Austria' Mean of Total Debt Ratio	0.0987
Group 'Belgium' Mean of Total Debt Ratio	0.2917
Group 'Finland' Mean of Total Debt Ratio	0.3001
Group 'France' Mean of Total Debt Ratio	0.1028
Group 'Italy' Mean of Total Debt Ratio	<b>0.1944</b>
Group 'Portugal' Mean of Total Debt Ratio	0.2426

## Appendix 6: Fixed and Random Effect Models (Initial Equations)

Model	(1)				(2)			
	Fixed		Random		Fixed		Random	
<b>Firm Variables</b>								
Age	-0.0771	(0.0910)	-0.0009*	(0.0002)	-0.0771	(0.0910)	-0.0009*	(0.0002)
Log Assets	-0.1248*	(0.0083)	0.0103*	(0.0025)	-0.1248*	(0.0083)	0.0092*	(0.0027)
Tangibility	0.0166	(0.0272)	0.1121*	(0.0112)	0.0166	(0.0272)	0.1109*	(0.0119)
Profitability	0.0407*	(0.0182)	-0.0576*	(0.0151)	0.0407*	(0.0182)	-0.0557*	(0.0151)
Effective Tax Rate	0.0001	(0.0001)	0.0001	(0.0001)	0.0001	(0.0001)	0.0001	(0.0001)
<b>Macroeconomic</b>								
GDP per Cap	-0.0001	(0.0001)	0.0000	(0.0000)	-0.0001	(0.0001)	0.0000	(0.0000)
Annual Growth Rate	0.0152	(0.0118)	0.0000	(0.0031)	0.0152	(0.0118)	0.0000	(0.0031)
Domestic Demand	0.0044	(0.0055)	0.0019	(0.0022)	0.0044	(0.0055)	0.0019	(0.0022)
Inflation	0.0217	(0.0435)	-0.0046	(0.0137)	0.0217	(0.0055)	-0.0052	(0.0137)
Gov and CB Support		(dropped)	0.0211	(0.0318)		(dropped)	0.0126	(0.0322)
Systemic Crisis		(dropped)	0.1218*	(0.0593)		(dropped)	0.1342*	(0.0596)
Deposits per GDP	-0.0134	(0.0127)	-0.0003	(0.0009)	-0.0134	(0.0127)	-0.0003	(0.0009)
Domestic Savings	-0.273	(0.0640)	-0.0042	(0.0088)	-0.0273	(0.0640)	-0.0036	(0.0089)
10 Year Gov Bond	0.1855	(0.1543)	0.0063	(0.0085)	0.1855	(0.1543)	0.0063	(0.0085)
<b>Industry Dummies</b>								
Manufacturing						(dropped)	-0.0399	(0.0267)
Wholesale						(dropped)	-0.0488	(0.0268)
Transport						(dropped)	-0.0381	(0.0304)
Professional, Scientific						(dropped)	-0.0571*	(0.0286)
Construction						(dropped)	-0.0019	(0.0276)
Info and Communication						(dropped)	-0.0581*	(0.0292)
Administrative						(dropped)	-0.0384	(0.0319)
Arts, Entertainment						(dropped)	-0.0411	(0.0374)
Accommodation						(dropped)	-0.0272	(0.0287)
Human Health						(dropped)	-0.0668*	(0.0324)
Water Supply						(dropped)	-0.1604*	(0.0469)
Education						(dropped)	-0.0671	(0.0467)
Real Estate						(dropped)	-0.0068	(0.0313)
Electricity, Gas						(dropped)	-0.1923	(0.1142)
Mining						(dropped)	-0.0473	(0.0423)
<b>Constant</b>	6.8871	(4.2775)	0.0681	(0.2348)	6.8871	(4.2775)	0.1777	(0.2385)
<b>N</b>	12292		12292		12292		12292	
<b>R squared</b>	0.0005		0.0706		0.0005		0.0773	

\*5 per cent level of significance. The standard error is presented in the parentheses.

	(3)				(4)			
Model	Fixed		Random		Fixed		Random	
<b>Firm Variables</b>								
Age	-0.0771	(0.0910)	-0.0009*	(0.0002)	(dropped)		-0.0005*	(0.0002)
Log Assets	-0.1248*	(0.0083)	0.0088*	(0.0027)	-0.0897*	(0.0173)	0.0155*	(0.0040)
Tangibility	0.0166	(0.0272)	0.1113*	(0.0119)	-0.1324*	(0.0592)	0.1775*	(0.0222)
Profitability	0.0407*	(0.0182)	-0.0554*	(0.0151)	0.0212	(0.0408)	-0.0979*	(0.0308)
Effective Tax Rate	0.0001	(0.0001)	0.0001	(0.0001)	-0.0002	(0.0012)	-0.0003	(0.0011)
<b>Macroeconomic</b>								
GDP Per Cap	-0.0001	(0.0001)	0.0000	(0.0000)	0.0000	(0.0000)	0.0000	(0.0000)
Annual Growth Rate	0.0152	(0.0118)	0.0160	(0.0103)	(dropped)		(dropped)	
Domestic Demand	0.0044	(0.0055)	0.0084	(0.0052)	(dropped)		(dropped)	
Inflation	0.0217	(0.0435)	-0.0200	(0.0262)	(dropped)		(dropped)	
Gov and CB Support	(dropped)		0.7617	(0.4578)	(dropped)		(dropped)	
Systemic Crisis	(dropped)		(dropped)		(dropped)		(dropped)	
Deposits per GDP	-0.0134	(0.0127)	-0.0175	(0.0124)	(dropped)		0.0016	(0.0031)
Domestic Savings	-0.0273	(0.0640)	-0.0974*	(0.0459)	(dropped)		(dropped)	
10 Year Gov Bond	0.1855	(0.1543)	0.2159	(0.1432)	(dropped)		(dropped)	
<b>Industry Dummies</b>								
Manufacturing	(dropped)		-0.0393	(0.0267)	(dropped)		-0.0237	(0.0473)
Wholesale	(dropped)		-0.0477	(0.0268)	(dropped)		-0.0291	(0.0468)
Transport	(dropped)		-0.0371	(0.0303)	(dropped)		-0.0199	(0.0520)
Professional, Scientific	(dropped)		-0.0562*	(0.0286)	(dropped)		-0.0129	(0.0499)
Construction	(dropped)		-0.0006	(0.0276)	(dropped)		0.0215	(0.0480)
Info and Communication	(dropped)		-0.0575*	(0.0292)	(dropped)		-0.0315	(0.0540)
Administrative	(dropped)		-0.0372	(0.0319)	(dropped)		-0.0159	(0.0529)
Arts, Entertainment	(dropped)		-0.0405	(0.0374)	(dropped)		-0.0617	(0.0820)
Accommodation	(dropped)		-0.0264	(0.0287)	(dropped)		-0.0241	(0.0493)
Human Health	(dropped)		-0.0656*	(0.0324)	(dropped)		0.0294	(0.0544)
Water Supply	(dropped)		-0.1593*	(0.0468)	(dropped)		-0.1217	(0.0941)
Education	(dropped)		-0.0661	(0.0467)	(dropped)		-0.0571	(0.0690)
Real Estate	(dropped)		-0.0057	(0.0313)	(dropped)		0.0365	(0.0578)
Electricity, Gas	(dropped)		-0.1906	(0.1142)	(dropped)		-0.1385	(0.1998)
Mining	(dropped)		-0.0461	(0.0423)	(dropped)		-0.0831	(0.0788)
<b>Country Dummies</b>								
Austria	(dropped)		(dropped)		(dropped)		(dropped)	
Belgium	(dropped)		0.4489	(0.3317)	(dropped)		(dropped)	
Finland	(dropped)		(dropped)		(dropped)		(dropped)	
France	(dropped)		-0.6466*	(0.2935)	(dropped)		(dropped)	
Portugal	(dropped)		-0.4059	(0.3095)	(dropped)		(dropped)	
<b>Country Characteristics</b>								
Credit Index	(dropped)		(dropped)		(dropped)		(dropped)	
Private Property	(dropped)		(dropped)		0.0004	(0.0026)	0.0013	(0.0012)
Time to Enforce	(dropped)		(dropped)		0.0001	(0.0005)	0.0004	(0.0008)

Cost to Enforce			(dropped)	(dropped)
Procedures to Enforce			(dropped)	(dropped)
Time to Resolve			(dropped)	(dropped)
Cost to Resolve			(dropped)	(dropped)
Recovery Rate			(dropped)	-0.0016 (0.0049)
Values Insurance			NA	
Values Stolen			NA	
Values Traffic			NA	
Trust			(dropped)	
Capital Regulatory			NA	
<b>Constant</b>	6.8871 (4.2775)	-1.4793* (0.6706)	1.2415* (0.2884)	-0.4246 (0.6695)
N	12292	12292	3138	3138
R squared	0.0005	0.0773	0.109	0.1573

\*5 per cent level of significance. The standard error is presented in the parentheses.

Fixed and Random Effect Models after multicollinearity tests. Negative values of the dependent variable and outlier values of the dependent variable are not excluded.

	(1)				(2)			
Model	Fixed		Random		Fixed		Random	
<b>Firm Variables</b>								
Age	0.0096*	(0.0012)	-0.0011*	(0.0002)	0.0096*	(0.0012)	-0.0010*	(0.0002)
Log Assets	-0.2786*	(0.0087)	0.0061*	(0.0013)	-0.2786*	(0.0087)	0.0063*	(0.0013)
Tangibility	0.1658*	(0.0274)	0.1449*	(0.0136)	0.1658*	(0.0274)	0.1431*	(0.0144)
Profitability	-0.0016	(0.0251)	-0.1582*	(0.0205)	-0.0016	(0.0251)	-0.1590*	(0.0206)
Effective Tax Rate	0.0001	(0.0001)	0.0001	(0.0001)	0.0001	(0.0001)	0.0001	(0.0001)
<b>Industry Dummies</b>								
Manufacturing					(dropped)		-0.0048	(0.0322)
Wholesale					(dropped)		-0.0181	(0.0322)
Transport					(dropped)		-0.0149	(0.0364)
Professional, Scientific					(dropped)		-0.0237	(0.0344)
Construction					(dropped)		0.0343	(0.0332)
Info and Communication					(dropped)		-0.0070	(0.0351)
Administrative					(dropped)		0.0170	(0.0382)
Arts, Entertainment					(dropped)		0.0073	(0.0444)
Accommodation					(dropped)		-0.0019	(0.0346)
Human Health					(dropped)		-0.0168	(0.0387)
Water Supply					(dropped)		-0.0721	(0.0555)
Education					(dropped)		-0.0035	(0.0550)
Real Estate					(dropped)		0.0332	(0.0375)
Electricity, Gas					(dropped)		-0.1265	(0.1082)
Mining					(dropped)		-0.0266	(0.0509)
<b>Constant</b>	3.5880*	(0.1043)	0.1202*	(0.0172)	3.5880*	(0.1043)	0.1223*	(0.0348)
N	31531		31531		31531		31531	
R squared	0.0052		0.0172		0.0052		0.019	

\*5 per cent level of significance. The standard error is presented in the parentheses.

Fixed and Random Effect Models after multicollinearity tests. Negative values of the dependent variable and outlier values of the dependent variable are not excluded.

	(3)				(4a)			
Model	Fixed		Random		Fixed		Random	
<b>Firm Variables</b>								
Age	0.0096*	(0.0012)	-0.0010*	(0.0002)	-0.0048*	(0.0015)	-0.0009*	(0.0002)
Log Assets	-0.2786*	(0.0087)	-0.0107*	(0.0031)				
Tangibility	0.1658*	(0.0274)	0.1440*	(0.0145)	0.0198	(0.0275)	0.1547*	(0.0141)
Profitability	-0.0016	(0.0251)	-0.1516*	(0.0207)	-0.0891*	(0.0255)	-0.1635*	(0.0206)
Effective Tax Rate	0.0001	(0.0001)	0.0001	(0.0001)	0.0001	(0.0002)	0.0001	(0.0001)
<b>Industry Dummies</b>								
Manufacturing	(dropped)		0.0057	(0.0321)	(dropped)		0.0057	(0.0318)
Wholesale	(dropped)		-0.0145	(0.0321)	(dropped)		-0.0089	(0.0318)
Transport	(dropped)		-0.0142	(0.0363)	(dropped)		-0.0050	(0.0360)
Professional, Scientific	(dropped)		-0.0303	(0.0343)	(dropped)		-0.0147	(0.0340)
Construction	(dropped)		0.0452	(0.0331)	(dropped)		0.0441	(0.0328)
Info and Communication	(dropped)		-0.0057	(0.0349)	(dropped)		-0.0003	(0.0347)
Administrative	(dropped)		0.0194	(0.0380)	(dropped)		0.0235	(0.0378)
Arts, Entertainment	(dropped)		0.0046	(0.0442)	(dropped)		0.0113	(0.0440)
Accommodation	(dropped)		-0.0067	(0.0345)	(dropped)		0.0010	(0.0343)
Human Health	(dropped)		-0.0218	(0.0386)	(dropped)		-0.0098	(0.0383)
Water Supply	(dropped)		-0.0560	(0.0553)	(dropped)		-0.0607	(0.0549)
Education	(dropped)		-0.0225	(0.0548)	(dropped)		0.0026	(0.0544)
Real Estate	(dropped)		0.0583	(0.0374)	(dropped)		0.0417	(0.0370)
Electricity, Gas	(dropped)		-0.0964	(0.1084)	(dropped)		-0.1046	(0.1071)
Mining	(dropped)		-0.0057	(0.0507)	(dropped)		-0.0162	(0.0503)
<b>Country Dummies</b>								
Austria	(dropped)		0.0421	(0.0626)				
Belgium	(dropped)		0.0871*	(0.0193)				
Finland	(dropped)		0.0477	(0.0306)				
France	(dropped)		-0.1563*	(0.0267)				
Portugal	(dropped)		0.0230*	(0.0087)				
<b>Country Characteristics</b>								
Credit Index					0.0062	(0.0081)	0.0215*	(0.0048)
<b>Constant</b>	3.5880*	(0.1043)	0.3430*	(0.0509)	0.2615*	(0.0627)	0.0825*	(0.0395)
N	31531		31531		31531		31531	
R squared	0.0052		0.0188		0.0019		0.0168	

\*5 per cent level of significance. The standard error is presented in the parentheses.

Fixed and Random Effect Models after multicollinearity tests. Negative values of the dependent variable and outlier values of the dependent variable are not excluded.

Model	(4b)		(4c)		(4d)	
	Fixed	Random	Fixed	Random	Fixed	Random
<b>Firm Variables</b>						
Age	-0.0046* (0.0013)	-0.0010* (0.0002)	-0.005* (0.0015)	-0.0009* (0.0002)		
Log Assets						
Tangibility	0.0199 (0.0275)	0.1551* (0.0141)	0.0196 (0.0275)	0.1523* (0.0141)		
Profitability	-0.0886* (0.0255)	-0.1536* (0.0206)	-0.0892* (0.0255)	-0.1620* (0.0207)		
Effective Tax Rate	0.0001 (0.0002)	0.0001 (0.0001)	9.33E-05 (0.0002)	0.0001 (0.0001)		
<b>Industry Dummies</b>						
Manufacturing	(dropped)	0.0110 (0.0318)	(dropped)	0.0099 (0.0318)		
Wholesale	(dropped)	-0.0082 (0.0318)	(dropped)	-0.0049 (0.0318)		
Transport	(dropped)	-0.0058 (0.0360)	(dropped)	-0.0063 (0.0360)		
Professional, Scientific	(dropped)	-0.0153 (0.0340)	(dropped)	-0.0179 (0.0340)		
Construction	(dropped)	0.0439 (0.0328)	(dropped)	0.0446 (0.0328)		
Info and Communication	(dropped)	0.0042 (0.0347)	(dropped)	0.0006 (0.0347)		
Administrative	(dropped)	0.0193 (0.0378)	(dropped)	0.0208 (0.0378)		
Arts, Entertainment	(dropped)	0.0169 (0.0440)	(dropped)	0.0120 (0.0440)		
Accommodation	(dropped)	0.0026 (0.0343)	(dropped)	0.0046 (0.0343)		
Human Health	(dropped)	-0.0106 (0.0384)	(dropped)	-0.0094 (0.0383)		
Water Supply	(dropped)	-0.0593 (0.0549)	(dropped)	-0.0644 (0.0549)		
Education	(dropped)	0.0002 (0.0545)	(dropped)	0.0046 (0.0544)		
Real Estate	(dropped)	0.0467 (0.0370)	(dropped)	0.0445 (0.0370)		
Electricity, Gas	(dropped)	-0.1233 (0.1072)	(dropped)	-0.1293 (0.1072)		
Mining	(dropped)	-0.0084 (0.0503)	(dropped)	-0.0092 (0.0503)		
<b>Country Dummies</b>						
Austria						
Belgium						
Finland						
France						
Portugal						
<b>Country Characteristics</b>						
Credit Index						
Private Property	0.0005 (0.0004)	0.0010* (0.0002)				
Time to Enforce			2.46E-05 (4.53E-05)	0.0000 (0.0000)		
Time to Resolve			(dropped)	-0.0560* (0.0154)		
Values Insurance						
Values Stolen						
Values Traffic						
<b>Constant</b>	0.2598* (0.0432)	0.1263* (0.0351)	0.2720* (0.0672)	0.2838* (0.0432)		
N	31531	31531	31531	31531		
R squared	0.002	0.0163	0.0018	0.0166		

\*5 per cent level of significance. The standard error is presented in the parentheses.

Fixed and Random Effect Models after multicollinearity tests. Negative values of the dependent variable and outlier values of the dependent variable are not excluded.

Model	(4e)				(4f)			
	Fixed		Random		Fixed		Random	
<b>Firm Variables</b>								
Age	0.0164*	(0.0040)	-0.0009*	(0.0003)	-0.0045*	(0.0010)	-0.0009*	(0.0002)
Log Assets	-0.3615*	(0.0314)	0.0065*	(0.0026)				
Tangibility	0.2685*	(0.1038)	0.1793*	(0.0356)	-0.0137	(0.0265)	0.1595*	(0.0126)
Profitability	-0.0208	(0.0935)	-0.3089*	(0.0525)	-0.0640*	(0.0319)	-0.1590*	(0.0222)
Effective Tax Rate	0.0161*	(0.0025)	0.0002	(0.0004)	-0.0001	(0.0002)	0.0000	(0.0002)
<b>Industry Dummies</b>								
Manufacturing	(dropped)		0.0467	(0.0734)	(dropped)		-0.0061	(0.0285)
Wholesale	(dropped)		0.0190	(0.0732)	(dropped)		-0.0204	(0.0285)
Transport	(dropped)		0.0078	(0.0818)	(dropped)		-0.0110	(0.0322)
Professional, Scientific	(dropped)		0.0407	(0.0780)	(dropped)		-0.0323	(0.0305)
Construction	(dropped)		0.0721	(0.0752)	(dropped)		0.0376	(0.0294)
Info and Communication	(dropped)		0.1199	(0.0807)	(dropped)		-0.0485	(0.0311)
Administrative	(dropped)		0.0358	(0.0846)	(dropped)		-0.0178	(0.0339)
Arts, Entertainment	(dropped)		0.0432	(0.1054)	(dropped)		-0.0240	(0.0396)
Accommodation	(dropped)		0.0201	(0.0783)	(dropped)		-0.0039	(0.0308)
Human Health	(dropped)		0.0528	(0.0866)	(dropped)		-0.0269	(0.0343)
Water Supply	(dropped)		-0.0192	(0.1306)	(dropped)		-0.1118	(0.0495)
Education	(dropped)		0.0082	(0.1154)	(dropped)		-0.0290	(0.0494)
Real Estate	(dropped)		0.0840	(0.0864)	(dropped)		0.0322	(0.0332)
Electricity, Gas	(dropped)		-0.0757	(0.2169)	(dropped)		-0.1540	(0.0958)
Mining	(dropped)		-0.0060	(0.1185)	(dropped)		-0.0230	(0.0447)
<b>Country Dummies</b>								
Austria								
Belgium								
Finland								
France								
Portugal								
<b>Country Characteristics</b>								
Credit Index								
Private Property								
Time to Enforce								
Time to Resolve								
Values Insurance								
Values Stolen								
Values Traffic								
Trust	0.0147	(0.0150)	0.0061	(0.0122)				
Capital Regulatory					-0.0033*	(0.0015)	-0.0080*	(0.0013)
<b>Constant</b>	4.1176*	(0.3587)	0.0563	(0.0924)	0.3183*	(0.0228)	0.2542*	(0.0294)
N	9447		9447		8926		8926	
R squared	0.0026		0.0127		0.0026		0.0571	

\*5 per cent level of significance. The standard error is presented in the parentheses.

Fixed and Random Effect Models after multicollinearity tests. Negative values of the dependent variable and outlier values of the dependent variable are not excluded.

Model	(5a)				(5b)			
	Fixed		Random		Fixed		Random	
<b>Firm Variables</b>								
Age	0.0061*	(0.0014)	-0.0006*	(0.0002)	-0.0051*	(0.0013)	-0.0010*	(0.0002)
Log Assets								
Tangibility	-0.0207	(0.0255)	0.1309*	(0.0116)	0.0164	(0.0284)	0.1560*	(0.0143)
Profitability	-0.0104	(0.0173)	-0.0833*	(0.0146)	-0.0890*	(0.0261)	-0.1613*	(0.0209)
Effective Tax Rate	0.0001	(0.0001)	0.0001	(0.0001)	0.0001	(0.0002)	0.0001	(0.0001)
<b>Macroeconomic</b>								
Domestic Demand	0.0000	(0.0004)	0.0006	(0.0004)				
Gov and Central Bank Support	(dropped)		-0.0312*	(0.0080)				
10 Year Gov Bond Yield					-0.0090	(0.0061)	-0.0073	(0.0055)
Inflation					0.0096	(0.0160)	0.0323*	(0.0151)
<b>Industry Dummies</b>								
Manufacturing	(dropped)		-0.0207	(0.0275)	(dropped)		0.0097	(0.0317)
Wholesale	(dropped)		-0.0265	(0.0275)	(dropped)		-0.0079	(0.0318)
Transport	(dropped)		-0.0124	(0.0311)	(dropped)		-0.0051	(0.0360)
Professional, Scientific	(dropped)		-0.0381	(0.0295)	(dropped)		-0.0125	(0.0340)
Construction	(dropped)		0.0149	(0.0284)	(dropped)		0.0446	(0.0328)
Info and Communication	(dropped)		-0.0427	(0.0301)	(dropped)		0.0031	(0.0347)
Administrative	(dropped)		-0.0261	(0.0328)	(dropped)		0.0227	(0.0378)
Arts, Entertainment	(dropped)		-0.0414	(0.0385)	(dropped)		0.0178	(0.0439)
Accommodation	(dropped)		-0.0171	(0.0297)	(dropped)		0.0025	(0.0343)
Human Health	(dropped)		-0.0426	(0.0332)	(dropped)		-0.0119	(0.0384)
Water Supply	(dropped)		-0.1417*	(0.0478)	(dropped)		-0.0579	(0.0548)
Education	(dropped)		-0.0236	(0.0469)	(dropped)		-0.0001	(0.0549)
Real Estate	(dropped)		-0.0035	(0.0322)	(dropped)		0.0453	(0.0370)
Electricity, Gas	(dropped)		-0.1564	(0.0936)	(dropped)		-0.1091	(0.1066)
Mining	(dropped)		-0.0374	(0.0435)	(dropped)		-0.0090	(0.0503)
<b>Country Dummies</b>								
Austria								
Belgium								
Finland								
France								
Portugal								
<b>Country Characteristics</b>								
Credit Index								
Private Property								
Time to Enforce								
Time to Resolve								
Values Insurance								
Values Stolen								
Values Traffic								
Trust								
Capital Regulatory								
<b>Constant</b>	0.0676*	(0.0309)	0.3895*	(0.0572)	0.3310*	(0.0300)	0.2083*	(0.0388)
<b>N</b>	13409		13409		30561		30561	
<b>R squared</b>	0.0017		0.0514		0.0018		0.0155	

\*5 per cent level of significance. The standard error is presented in the parentheses.

## Appendix 7: Robustness Testing Probit Model

	Coefficients (Probit)		Coefficients (Probit)		Coefficients (Probit)		Coefficients (Probit)	
Constant	0.2990*	(0.0144)	-0.1935	(3.4357)	-3.0546	(2.3004)	-0.6395	(1.1144)
<b>BankStructure Variables</b>								
Domestic	-0.0097	(0.0049)	0.5492	(0.3478)	0.1615	(0.1504)	0.1725	(0.1188)
Foreign	-0.2702*	(0.0838)	-0.9301*	(0.5234)	-0.4838*	(0.1667)	0.1036	(0.1593)
Bank Concentration	-0.0057*	(0.0060)	0.1435	(0.0826)	0.0546*	(0.0252)	0.0599 *	(0.0169)
Lerner Index	2.4146	(1.3025)					-12.5004*	(4.7383)
<b>Macroeconomic Variables</b>								
Domestic Demand	-0.0058	(0.0084)	-0.4021*	(0.1924)	-0.1927*	(0.0590)	-0.2289*	(0.0453)
Systemic Crisis	0.0543	(0.1415)	-0.3039	(0.2043)	-0.2284	(0.1922)	-0.2435	(0.1566)
Deposits per GDP	0.0087*	(0.0023)	-0.0033	(0.0042)	-0.0025	(0.0038)	-0.0094	(0.0051)
<b>Firm Variables</b>								
Firm Size	-0.2616*	(0.0343)	-0.2388*	(0.0657)	-0.2388*	(0.0657)	-0.2031*	(0.0585)
<b>Industry Dummies</b>								
Construction	0.3156*	(0.0891)	0.2693	(0.1696)	0.2693	(0.1696)	0.4964*	(0.1535)
Manufacturing	0.0387	(0.0667)	0.0877	(0.1284)	0.0877	(0.1284)	-0.0073	(0.1128)
Wholesale	0.0065	(0.0686)	-0.0843	(0.1279)	-0.0843	(0.1279)	-0.1125	(0.1195)
<b>Country Characteristics</b>								
Credit Index	0.1755*	(0.0667)						
Private Property Protection	-0.0126*	(0.0038)						
Cost to Enforce a Contract	0.0382*	(0.0082)						
Cost to Resolve a Debt	-0.0591*	(0.0144)						
Value (Stolen)			-2.5367	(2.2604)				
Trust					0.2110	(0.1880)		
Capital Regulatory Index							-0.2160*	(0.0900)
N	4244		1126		1126		1436	
Pseudo R <sup>2</sup>	0.0619		0.0921		0.0921		0.0845	

\*5 per cent level of significance. The standard error is presented in the parentheses.

## Appendix 8: Questionnaires to the Public Credit Registry and Private Credit Bureau

### ‘The Sharing of Credit Information: A Survey of Public Credit Registries’



Waterford Institute of Technology  
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

#### Instructions for Completion:

Please read the following before filling out this 1 page questionnaire.

The purpose of this questionnaire is to identify the shared credit information activities of public credit registries in Europe. There are three sections to this 1 page questionnaire which should be completed by the Bank Superintendent or Director of Banking Supervision. Where appropriate please tick [✓] the boxes that relate to your answer. Please complete all questions and return to the email address [20005025@mail.wit.ie](mailto:20005025@mail.wit.ie).

All information provided will be kept **STRICTLY CONFIDENTIAL** and used only for academic research purposes. Data and results based on the information provided through the survey will be presented at aggregate levels so as to ensure the confidentiality of individual public credit registries is maintained.

**Thank you for your participation.**

**Section 1: Introduction**

The study defines a public credit registry as a database owned by public authorities including Central Banks with compulsory reporting of data on borrowers.

Q1: Based on the above definition of a public credit registry, is your institution a public credit registry? (Please tick [√] the box that relates to your answer)

Yes  No

**Section 2: Background of Public Credit Registry**

Q 2a: In which country does the public credit registry reside in?

Q 2b: Please specify where the public credit registry is located in the country it resides in (Town or City)

Q3: To the best of your knowledge, in what year did the public credit registry commence issuing credit reports?

**Section 3: Activities of the Public Credit Registry**

Q 4: To the best of your knowledge, how many credit reports on average were issued by the public credit registry in the following time periods?

	<u>Personal</u>	<u>Business</u>
Q4a: 2005-2007 Inclusive	a. <input type="text"/>	a. <input type="text"/>
Q4b: 2008	b. <input type="text"/>	b. <input type="text"/>
Q4c: 2009-2011 Inclusive	c. <input type="text"/>	c. <input type="text"/>

## **‘The Sharing of Credit Information: A Survey of Private Credit Bureaus’**



Waterford Institute of Technology  
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

### **Instructions for Completion:**

Please read the following before filling out this 1 page questionnaire.

The purpose of this questionnaire is to identify the shared credit information activities of information sharing mechanisms in Europe. There are three sections to this 1 page questionnaire which should be completed by the Chief Executive Director or equivalent. Where appropriate please tick [✓] the boxes that relate to your answer. Please complete all questions and return to the email address [20005025@mail.wit.ie](mailto:20005025@mail.wit.ie).

All information provided will be kept **STRICTLY CONFIDENTIAL** and used only for academic research. Data and results based on the information provided through the survey will be presented at aggregate levels so as to ensure the confidentiality of individual private credit bureaus is fully maintained.

**Thank you for your participation.**

Considering the operation of private credit bureaus, some private credit bureaus operate in more than 1 country. When completing this survey, please provide information of the private credit bureau in the country in which they reside in only e.g. if a private credit bureau has operations in Ireland, France and Germany and this questionnaire is sent to the Irish office, the information supplied through the survey should only relate to the Irish office.

**Section 1: Introduction**

The study defines a private credit bureau as an information sharing mechanism owned by a private commercial firm or non profit organisation. The exchange of information is voluntary. It collects, files and distributes the information supplied voluntarily by their members.

Q1: Based on this definition of a private credit bureau, is your institution a private credit bureau? (Please tick [√] the box (s) that relate to your answer)

Yes  No

**Section 2: Background of Private Credit Bureau**

Q 2a: In which country does the private credit bureau reside in?

Q 2b: Please specify where the private credit bureau is located in the country it resides in (Town or City)

Q3: To the best of your knowledge, in what year did the private credit bureau  commence issuing credit reports?

**Section 3: Activities of the Private Credit Bureau**

Q 4: To the best of your knowledge, how many credit reports on average were issued by the private credit bureau in the following time periods?

	<u>Personal</u>	<u>Business</u>
Q4a: 2005-2007 Inclusive	a. <input type="text"/>	a. <input type="text"/>
Q4b: 2008	b. <input type="text"/>	b. <input type="text"/>
Q4c: 2009-2011 Inclusive	c. <input type="text"/>	c. <input type="text"/>

### Appendix 9: Robustness Testing (Average Number of Credit Reports)

	<b>Coefficients (Logit)</b>	<b>Coefficients (Probit)</b>
Constant	-1.9184* (0.1016)	-1.1354* (0.0546)
<b>Av. Number of Credit Reports</b>	0.0000* (0.0000)	0.0000* (0.0000)
N	3296	3296
Pseudo R <sup>2</sup>	0.0124	0.0121

\*5 per cent level of significance. The standard error is presented in the parentheses.

### Appendix 10: Robustness Testing (Law and Order)

	<b>Coefficients (Logit)</b>	<b>Coefficients (Probit)</b>
Constant	-0.2150 (0.5074)	-0.1883 (0.2841)
<b>Law and Order</b>	-1.5010* (0.6299)	-0.8371* (0.3514)
N	4909	4909
Pseudo R <sup>2</sup>	0.0025	0.0024

\*5 per cent level of significance. The standard error is presented in the parentheses.

**Appendix 11: Robustness Testing (Long Term Debt Ratio and Short Term Debt Ratio)  
Information Environment**

Model	(Long Term Debt Ratio)				(Short Term Debt Ratio)			
	Fixed		Random		Fixed		Random	
<b>Firm Variables</b>								
Age	0.0002	(0.0006)	-0.0004*	(0.0001)	-0.0017*	(0.0005)	-0.0003*	(0.0001)
Log Assets								
Tangibility	0.0455*	(0.0097)	0.1395*	(0.0068)	-0.0184	(0.0094)	-0.0145*	(0.0066)
Profitability	-0.0159	(0.0090)	-0.0402*	(0.0082)	-0.0422*	(0.0086)	-0.0537*	(0.0078)
Effective Tax Rate	0.0000	(0.0001)	0.0000	(0.0001)	0.0000	(0.0001)	0.0000	(0.0001)
<b>Industry Dummies</b>								
Manufacturing	(dropped)		-0.0075	(0.0184)	(dropped)		0.0110	(0.0182)
Wholesale	(dropped)		-0.0074	(0.0184)	(dropped)		-0.0030	(0.0183)
Transport	(dropped)		0.0051	(0.0209)	(dropped)		-0.0080	(0.0206)
Professional, Scientific	(dropped)		0.0057	(0.0197)	(dropped)		-0.0208	(0.0195)
Construction	(dropped)		0.0278	(0.0190)	(dropped)		0.0165	(0.0188)
Info and Communication	(dropped)		-0.0188	(0.0202)	(dropped)		-0.0143	(0.0199)
Administrative	(dropped)		-0.0024	(0.0220)	(dropped)		0.0070	(0.0216)
Arts, Entertainment	(dropped)		0.0294	(0.0256)	(dropped)		-0.0181	(0.0252)
Accommodation	(dropped)		0.0129	(0.0198)	(dropped)		-0.0069	(0.0196)
Human Health	(dropped)		0.0052	(0.0223)	(dropped)		-0.0251	(0.0220)
Water Supply	(dropped)		-0.0209	(0.0322)	(dropped)		-0.0351	(0.0318)
Education	(dropped)		0.0262	(0.0315)	(dropped)		-0.0221	(0.0310)
Real Estate	(dropped)		0.0308	(0.0215)	(dropped)		0.0146	(0.0213)
Electricity, Gas	(dropped)		-0.0598	(0.0634)	(dropped)		-0.0558	(0.0624)
Mining	(dropped)		-0.0412	(0.0293)	(dropped)		0.0287	(0.0290)
<b>Country Characteristics</b>								
Credit Index	-0.0053	(0.0029)	-0.0112*	(0.0020)	0.0119*	(0.0028)	0.0240*	(0.0019)
<b>Macroeconomic</b>								
Annual Growth	0.0002	(0.0004)	0.0008*	(0.0003)	0.0017*	(0.0004)	0.0017*	(0.0003)
Constant	0.1068*	(0.0227)	0.1293*	(0.0208)	0.0815*	(0.0219)	0.1306*	(0.0278)
N	31821		31821		31861		31861	
R squared	0.0563		0.0743		0.0046		0.0243	

\*5 per cent level of significance. Standard errors are in parentheses.

## Legal Environment

Model	(Long Term Debt Ratio)				(Short Term Debt Ratio)			
	Fixed		Random		Fixed		Random	
<b>Firm Variables</b>								
Age	0.0006	(0.0005)	-0.0003*	(0.0001)	-0.0023*	(0.0005)	-0.0005*	(0.0001)
Log Assets								
Tangibility	0.0458*	(0.0097)	0.1394*	(0.0068)	-0.0190*	(0.0094)	-0.0135*	(0.0067)
Profitability	-0.0157	(0.0090)	-0.0412*	(0.0082)	-0.0420*	(0.0086)	-0.0496*	(0.0079)
Effective Tax Rate	0.0000	(0.0001)	0.0000	(0.0001)	0.0000	(0.0001)	0.0000	(0.0001)
<b>Industry Dummies</b>								
Manufacturing	(dropped)		-0.0097	(0.0183)	(dropped)		0.0165	(0.0183)
Wholesale	(dropped)		-0.0092	(0.0183)	(dropped)		-0.0007	(0.0184)
Transport	(dropped)		0.0031	(0.0207)	(dropped)		-0.0073	(0.0207)
Professional, Scientific	(dropped)		0.0050	(0.0196)	(dropped)		-0.0212	(0.0196)
Construction	(dropped)		0.0272	(0.0189)	(dropped)		0.0168	(0.0189)
Info and Communication	(dropped)		-0.0196	(0.0200)	(dropped)		-0.0115	(0.0200)
Administrative	(dropped)		-0.0024	(0.0218)	(dropped)		0.0038	(0.0218)
Arts, Entertainment	(dropped)		0.0283	(0.0254)	(dropped)		-0.0143	(0.0253)
Accommodation	(dropped)		0.0117	(0.0197)	(dropped)		-0.0050	(0.0197)
Human Health	(dropped)		0.0038	(0.0221)	(dropped)		-0.0244	(0.0221)
Water Supply	(dropped)		-0.0211	(0.0319)	(dropped)		-0.0341	(0.0320)
Education	(dropped)		0.0240	(0.0313)	(dropped)		-0.0218	(0.0312)
Real Estate	(dropped)		0.0296	(0.0213)	(dropped)		0.0189	(0.0214)
Electricity, Gas	(dropped)		-0.0631	(0.0628)	(dropped)		-0.0621	(0.0628)
Mining	(dropped)		-0.0438	(0.0291)	(dropped)		0.0364	(0.0291)
<b>Country Characteristics</b>								
Private Property	-0.0001	(0.0001)	0.0005*	(0.0001)	0.0005*	(0.0001)	0.0001	(0.0001)
<b>Macroeconomic</b>								
Annual Growth	0.0003	(0.0004)	0.0000	(0.0004)	0.0015*	(0.0004)	0.0023*	(0.0003)
Constant	0.0789*	(0.0156)	0.0437*	(0.0193)	0.1212*	(0.0150)	0.1051*	(0.0192)
N	31821		31821		31861		31861	
R squared	0.0216		0.0771		0.001		0.0083	

\*5 per cent level of significance. Standard errors are in parentheses.

## Judicial and Bankruptcy Environment

Model	(Long Term Debt Ratio)				(Short Term Debt Ratio)			
	Fixed		Random		Fixed		Random	
<b>Firm Variables</b>								
Age	0.0000	(0.0000)	-0.0005*	(0.0001)	-0.0017*	(0.0005)	-0.0003*	(0.0001)
Log Assets								
Tangibility	0.04563*	0.0097)	0.1369*	(0.0068)	-0.0187*	(0.0094)	-0.0136*	(0.0067)
Profitability	-0.0160	(0.0090)	-0.0348*	(0.0082)	-0.0421*	(0.0086)	-0.0593*	(0.0079)
Effective Tax Rate	0.0000	(0.0001)	0.0000	(0.0001)	0.0000	(0.0001)	0.0000	(0.0001)
<b>Industry Dummies</b>								
Manufacturing	(dropped)		-0.0034	(0.0183)	(dropped)		0.0104	(0.0182)
Wholesale	(dropped)		-0.0080	(0.0183)	(dropped)		0.0024	(0.0183)
Transport	(dropped)		0.0010	(0.0207)	(dropped)		-0.0049	(0.0206)
Professional, Scientific	(dropped)		0.0018	(0.0196)	(dropped)		-0.0199	(0.0195)
Construction	(dropped)		0.0272	(0.0189)	(dropped)		0.0185	(0.0188)
Info and Communication	(dropped)		-0.0149	(0.0200)	(dropped)		-0.0177	(0.0199)
Administrative	(dropped)		-0.0072	(0.0218)	(dropped)		0.0107	(0.0216)
Arts, Entertainment	(dropped)		0.0337	(0.0253)	(dropped)		-0.0234	(0.0251)
Accommodation	(dropped)		0.0137	(0.0197)	(dropped)		-0.0040	(0.0196)
Human Health	(dropped)		0.0026	(0.0221)	(dropped)		-0.0216	(0.0220)
Water Supply	(dropped)		-0.0201	(0.0319)	(dropped)		-0.0401	(0.0318)
Education	(dropped)		0.0191	(0.0312)	(dropped)		-0.0129	(0.0310)
Real Estate	(dropped)		0.0378	(0.0213)	(dropped)		0.0100	(0.0213)
Electricity, Gas	(dropped)		-0.0842	(0.0628)	(dropped)		-0.0503	(0.0624)
Mining	(dropped)		-0.0328	(0.0291)	(dropped)		0.0266	(0.0290)
<b>Country Characteristics</b>								
Time to Enforce	-0.0000	(0.0000)	-0.0001*	(0.0000)	0.0001*	(0.0000)	0.0001*	(0.0000)
Time to Resolve	(dropped)		-0.0534*	(0.0084)	(dropped)		-0.0039	(0.0080)
<b>Macroeconomic</b>								
Annual Growth	0.0002	(0.0004)	0.0004	(0.0003)	0.0017*	(0.0004)	0.0023*	(0.0003)
Constant	0.1125*	(0.0243)	0.2251*	(0.0240)	0.0773*	(0.0232)	0.0532*	(0.0234)
N	31821		31821		31861		31861	
R squared	0.0586		0.0843		0.0125		0.0281	

\*5 per cent level of significance. Standard errors are in parentheses.

## Social Environment

Model	(Long Term Debt Ratio)				(Short Term Debt Ratio)			
	Fixed		Random		Fixed		Random	
<b>Firm Variables</b>								
Age	0.0032*	(0.0010)	-0.0003*	(0.0001)	0.0022*	(0.0008)	-0.0005*	(0.0002)
Log Assets	-0.0376*	(0.0078)	0.0046*	(0.0009)	-0.0403*	(0.0063)	0.0056*	(0.0011)
Tangibility	0.0741*	(0.0250)	0.1832*	(0.0112)	0.1109*	(0.0219)	0.0313*	(0.0122)
Profitability	-0.0162	(0.0230)	-0.0915*	(0.0152)	-0.0706*	(0.0190)	-0.1072*	(0.0146)
Effective Tax Rate	-0.0007	(0.0006)	0.0000	(0.0001)	0.0005	(0.0005)	0.0000	(0.0001)
<b>Industry Dummies</b>								
Manufacturing	(dropped)		0.0071	(0.0243)	(dropped)		0.0102	(0.0290)
Wholesale	(dropped)		0.0164	(0.0243)	(dropped)		-0.0038	(0.0289)
Transport	(dropped)		0.0151	(0.0272)	(dropped)		-0.0217	(0.0324)
Professional, Scientific	(dropped)		0.0350	(0.0259)	(dropped)		-0.0161	(0.0308)
Construction	(dropped)		0.0548	(0.0250)	(dropped)		0.0278	(0.0298)
Info and Communication	(dropped)		0.0055	(0.0266)	(dropped)		-0.0020	(0.0316)
Administrative	(dropped)		0.0279	(0.0283)	(dropped)		0.0203	(0.0339)
Arts, Entertainment	(dropped)		0.0377	(0.0342)	(dropped)		-0.0165	(0.0402)
Accommodation	(dropped)		0.0150	(0.0260)	(dropped)		-0.0147	(0.0310)
Human Health	(dropped)		0.0305	(0.0289)	(dropped)		-0.0003	(0.0346)
Water Supply	(dropped)		-0.0172	(0.0426)	(dropped)		-0.0311	(0.0506)
Education	(dropped)		0.0096	(0.0391)	(dropped)		-0.0179	(0.0474)
Real Estate	(dropped)		0.0189	(0.0285)	(dropped)		0.0268	(0.0338)
Electricity, Gas	(dropped)		-0.0429	(0.0764)	(dropped)		-0.0752	(0.0950)
Mining	(dropped)		-0.0422	(0.0388)	(dropped)		0.0211	(0.0460)
<b>Country Characteristics</b>								
Trust	0.0037	(0.0038)	0.0014	(0.0033)	0.0046	(0.0032)	0.0041	(0.0030)
Constant	0.4660*	(0.0894)	-0.0141*	(0.0293)	0.4925*	(0.0727)	0.0214	(0.0333)
N	9634		9634		9650		9650	
R squared	0.0101		0.0773		0.0095		0.0194	

\*5 per cent level of significance. Standard errors are in parentheses.

## Regulatory Environment

Model	(Long Term Debt Ratio)				(Short Term Debt Ratio)			
	Fixed		Random		Fixed		Random	
<b>Firm Variables</b>								
Age	-0.0019	(0.0013)	-0.0006*	(0.0001)	-0.0036*	(0.0012)	-0.0004*	(0.0001)
Log Assets								
Tangibility	0.0627*	(0.0204)	0.1863*	(0.0093)	-0.0681*	(0.0183)	-0.0219*	(0.0104)
Profitability	-0.0408	(0.0247)	-0.0952*	(0.0167)	-0.0246	(0.0217)	-0.0384*	(0.0168)
<b>Effective Tax Rate</b>	-0.0000	(0.0002)	0.0000	(0.0001)	0.0000	(0.0001)	0.0000	(0.0001)
<b>Industry Dummies</b>								
Manufacturing	(dropped)		-0.0188	(0.0208)	(dropped)		0.0171	(0.0251)
Wholesale	(dropped)		-0.0188	(0.0208)	(dropped)		0.0024	(0.0252)
Transport	(dropped)		-0.0058	(0.0235)	(dropped)		-0.0023	(0.0285)
Professional, Scientific	(dropped)		-0.0107	(0.0222)	(dropped)		-0.0238	(0.0269)
Construction	(dropped)		0.0228	(0.0214)	(dropped)		0.0308	(0.0260)
Info and Communication	(dropped)		-0.0365	(0.0227)	(dropped)		-0.0096	(0.0275)
Administrative	(dropped)		0.0003	(0.0247)	(dropped)		-0.0190	(0.0300)
Arts, Entertainment	(dropped)		-0.0041	(0.0289)	(dropped)		-0.0188	(0.0350)
Accommodation	(dropped)		0.0146	(0.0224)	(dropped)		-0.0181	(0.0272)
Human Health	(dropped)		0.0075	(0.0250)	(dropped)		-0.0328	(0.0304)
Water Supply	(dropped)		-0.0588	(0.0357)	(dropped)		-0.0495	(0.0442)
Education	(dropped)		-0.0162	(0.0360)	(dropped)		-0.0101	(0.0436)
Real Estate	(dropped)		0.0142	(0.0242)	(dropped)		0.0182	(0.0294)
Electricity, Gas	(dropped)		-0.0841	(0.0703)	(dropped)		-0.0732	(0.0860)
Mining	(dropped)		-0.0559	(0.0326)	(dropped)		0.0403	(0.0398)
<b>Country Characteristics</b>								
Regulatory Index	-0.0034	(0.0023)	0.0003	(0.0012)	0.0003*	(0.0020)	-0.0043*	(0.0012)
<b>Macroeconomic</b>								
Annual Growth	-0.0177	(0.0145)	0.0065	(0.0059)	0.0104*	(0.0127)	0.0062*	(0.0058)
Constant	0.1764*	(0.0634)	0.0693*	(0.0267)	0.1734*	(0.0558)	0.1311*	(0.0302)
N	9091		9091		9019		9019	
R squared	0.0223		0.0853		0.0009		0.0154	

\*5 per cent level of significance. Standard errors are in parentheses.

### Appendix 12: Robustness Testing (Average Number of Credit Reports)

Model	Fixed	Random
Average Number of Credit Reports	-2.59e <sup>-10</sup> * (3.02e <sup>-11</sup> )	-1.20e <sup>-10</sup> * (2.60e <sup>-11</sup> )
Constant	0.2187* (0.0040)	0.201* (0.0046)
N	24752	24752
R squared	0.0017	0.0017

\*5 per cent level of significance. Standard errors are in parentheses.

### Appendix 13: Robustness Testing (Law and Order)

Model	Fixed	Random
Law and Order	(dropped)	0.0889* (0.0344)
Constant	0.2012* (0.0011)	0.1350* (0.0256)
N	33526	33526
R squared	0.0000	0.0010

\*5 per cent level of significance. Standard errors are in parentheses.