AARHUS UNIVERSITY, SCHOOL OF BUSINESS & SOCIAL SCIENCES

MASTER THESIS

An Investigation of the Relationship between Firm Size and Export Performance
A Meta-Regression Analysis

September 1, 2015

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Number of characters, excluding spaces: 131,985
Abstract

The export performance literature lacks a sound theoretical foundation and suffers from inconclusive findings. It is evident that particularly the effect of firm size on export performance causes discrepancy across the literature to inconvenience for public-policy makers and managers. This thesis provides an updated preliminary theoretical model of all determinants of export performance that reflects the current state of the literature and forms a basis for a conceptual firm size-export performance model. The conceptual model hypothesizes a positive relationship between firm size and export performance with root in resource-based theory, but acknowledge that the relationship is subject to three negative moderating effects (high-tech firms, institutional quality and industry).

The positive relationship is confirmed through a Meta-Regression Analysis (MRA) when firm size and export performance is operationalized as number of employees and export intensity, respectively. The MRA also confirms the negative moderating effects of high-tech firms and institutional quality, but find no evidence of industry as a moderator. The MRA neither reveals substantial nor severe publication bias in the literature, but finds that an author’s choice of methodology in primary research (estimation technique, data structure and model specification) significantly influence the central findings.

Key Words: Export Performance, Determinants, Moderating Effects, Meta-Regression Analysis, Meta-Analysis and Firm Size
## Contents

1 Introduction 1
   1.1 Objectives and Research Questions 2
   1.2 Research Design 2
   1.3 Structure 3

2 Theoretical Framework 5
   2.1 A Review of the Export Performance Literature 5
      2.1.1 Export Performance 7
      2.1.2 Background Determinants 8
      2.1.3 Conceptual Moderators and Controls 13
   2.2 Firm Size and Export Performance 15
      2.2.1 Relationship between Firm Size and Export Performance 15
      2.2.2 Relationship-Specific Moderators and Controls 18
   2.3 Towards a Conceptual Model 20

3 Methodological Framework 22
   3.1 Introduction to Meta-Regression Analysis 22
      3.1.1 Effect Size 23
      3.1.2 Dependency Issues 24
   3.2 Literature Identification, Compilation and Coding 25
      3.2.1 Criteria for Inclusion 25
      3.2.2 Literature Search 26
      3.2.3 Coding of the Literature 28
   3.3 Modeling the Meta-Regression Analysis 30
      3.3.1 Summarizing Meta-Data 30
      3.3.2 Funnel-Asymmetry and Precision-Effect Testing 32
      3.3.3 Explanatory Meta-Regression Analysis 34

4 Empirical Findings 36
   4.1 Meta-Regression Results 36
   4.2 Discussion and Limitations 39
      4.2.1 Empirical Firm Size-Export Performance Relationship 39
      4.2.2 Conceptual Moderators 41
      4.2.3 Publication Bias 44
      4.2.4 Methodological Moderators 44

5 Directions for Future Research 46

6 Conclusion 47

References 48
# Appendices

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>References to the Meta-Sample</td>
<td>61</td>
</tr>
<tr>
<td>B</td>
<td>Search Strategy</td>
<td>65</td>
</tr>
<tr>
<td>C</td>
<td>Coding Manual</td>
<td>67</td>
</tr>
<tr>
<td>D</td>
<td>Funnel Plots (avg.-sets)</td>
<td>70</td>
</tr>
<tr>
<td>E</td>
<td>Sets of Effects</td>
<td>71</td>
</tr>
<tr>
<td>F</td>
<td>Author Fixed-Effects</td>
<td>72</td>
</tr>
<tr>
<td>G</td>
<td>Meta-Sample</td>
<td>73</td>
</tr>
<tr>
<td>H</td>
<td>Econometrics of FAT-PET MRA</td>
<td>77</td>
</tr>
<tr>
<td>I</td>
<td>Stata Do-Files</td>
<td>80</td>
</tr>
</tbody>
</table>
List of Figures

1  Process of Meta-Regression Analysis  . . . . . . . . . . . . . . . . . 3
2  A Preliminary Theoretical Model of Export Performance  . . 7
3  Internal and External Determinants of Export Performance  . . 8
4  The Relationship between Firm Size and Export Performance . 15
5  A Conceptual Firm Size-Export Performance Model  . . . . . 20
6  Funnel Plot (all-sets)  . . . . . . . . . . . . . . . . . . . . . . . . 31
7  Illustration of Non-Linearity  . . . . . . . . . . . . . . . . . . . . 40

List of Tables

1  Steps in Meta-Regression Analysis  . . . . . . . . . . . . . . . . . 22
2  Inclusion Criteria  . . . . . . . . . . . . . . . . . . . . . . . . . . 25
3  Process and Documentation of Literature Search  . . . . . . . . . 27
4  Coded Variables based on the Meta-Sample  . . . . . . . . . . . . 29
5  Vote-Count (Descriptive Statistics)  . . . . . . . . . . . . . . . . . 30
6  Simple Funnel-Asymmetry and Precision-Effect MRA Results  . 36
7  Explanatory Funnel-Asymmetry and Precision-Effect MRA Results 37
8  Summary of Meta-Regression Results  . . . . . . . . . . . . . . . . 39
1 Introduction

The trend towards liberalization and globalization of trade together with advances in information and communications technology challenges the ability to unleash the potential of the international markets for both countries and firms.

Exporting has historically been the most frequently used mode of foreign market entry, because it constitutes a viable strategic option for a firm to expand its operations beyond domestic borders at a low risk (Leonidou et al., 2002). This has caught the attention of particularly two interest groups: public-policy makers and managers. Public-policy makers perceive exporting as a mean of augmenting national prosperity, while managers use exporting as an internationalization strategy to ensure corporate growth and repel competition. Common to both interest groups remain a strong desire of more clarity regarding the determinants of export performance (Czinkota, 1994; Samiee and Walters, 1990).

The literature on export performance generally lacks a comprehensive theory base and remains fragmented to this day. This fragmentation and lack of a general theory originates in (i) numerous studies that adopt inconsistent methodological and analytical approaches, (ii) substantial number of determinants of export performance, and (iii) contradicting, inconsistent and confusing findings on the implications of the different determinants of export performance (Sousa et al., 2008). Madsen (1987); Chetty and Hamilton (1993); Zou and Stan (1998); Katsikeas et al. (2000) and Sousa et al. (2008) have all contributed with noteworthy efforts to synthesize the export performance literature through traditional literature reviews and hybrid approaches, which combine vote-counts with narrative reviews, to reveal discrepancies in the literature. It is evident from the reviews that particularly one determinant of export performance stands out as the most widely discussed, but least understood. That determinant is firm size. Many arguments suggest that a firm’s size reflects its capacity to compete in the export market, but no consensus has yet been reached. This lack of consensus leaves both public-policy makers and managers without theoretical guidelines for improving domestic policies and adapting firms toward exporting. Some consider, for example, strict immigration policies an obstacle to population growth, which restrict the size of firms and by this means export performance (Gabbitas and Gretton, 2003).

The conventional narrative reviews indeed provide indications of the current state of the literature, but suffer from subjectivity and all too easily ignore findings that is not in alignment with ideology and theory (Stanley and Jarrell, 1989; Stanley and Doucouliagos, 2012). Narrative reviews remain unprincipled. They use no scientific standards for the inclusion of studies, neglect probability-based rules for weighting studies and cannot be replicated (Rhodes, 2012). Practical policy nevertheless demands clarity, although conflicting findings characterize academia. This thesis accommodates the shortcomings of narrative reviews by investigating the relationship between firm size and export performance through a principled and objective Meta-Regression Analysis (hereinafter MRA).

The starting point constitutes the development of a preliminary theoretical model of all determinants of export performance, which serves as a basis for developing a conceptual firm size-export performance model. The conceptual model hypothesizes the relationship between firm size and export performance together with factors that may moderate the relationship (i.e. moderating effects). The conceptual model forms by this the empirical inquiry for MRA.
1.1 Objectives and Research Questions

The MRA constitutes a quantitative synthesis of all existing studies on the relationship between firm size and export performance. This allows for an investigation of the effect of firm size on export performance across a population of studies, potential conceptual moderating effects, and the significance of different methodological and analytical approaches. This contributes altogether to consensus-building within the export performance literature for the benefit of both public-policy makers and managers.

“There is a need to synthesize the extant knowledge on the determinants of export performance to facilitate theory development and improvement in management practice in the field” – Sousa et al. (2008; p.344)

This thesis does therefore not, unlike the conventional narrative reviews, embrace all determinants of export performance empirically, but provide a sound research approach to investigate individual determinants of export performance. The approach should serve as an inspiration for other scholars to investigate the remaining determinants of export performance for the literature to move towards maturity.

This thesis accordingly attempts to answer the following two research questions to meet the request of Sousa et al. (2008) and unveil the true relationship between firm size and export performance:

Research Question 1 (RQ1): How does firm size affect export performance?

Research Question 2 (RQ2): Is the effect of firm size on export performance subject to conceptual moderating effects?

The purpose is therefore threefold: (i) to substantiate the empirical link between firm size and export performance; (ii) to analyze the firm size-export performance relationship against different moderating effects to enlighten the contexts, which significantly moderates the relationship; and, (iii) to contribute with a new research approach towards theory development in the field on which future research can be based.

1.2 Research Design

MRA is a product of meta-analysis, which refers to the overall process of compiling and combining quantitative data from multiple studies (Andrel et al., 2009). It shares apart from the classification of secondary research only limited features with the conventional narrative reviews. MRA offers instead a principled, critical and objective methodology to integrate and unveil the truth of inconclusive findings among a population of existing studies (Stanley and Doucouliagos, 2012).

The historical roots of meta-analysis dates back to the statisticians Karl Pearson (1904) and R. A. Fisher (1932), but it was not formalized into a rigorous research approach in medical science until 1976 (Stanley and Doucouliagos, 2012). Meta-analysis is defined as a systematic review of all published and unpublished scientific knowledge on a given subject that provides a basis for statistical analysis on an empirical effect, phenomenon or hypothesis. The strength
of a systematic review opposite to conventional narrative reviews is rooted in its replicability. This is possible, because it builds on an exhaustive literature search that integrates all studies meeting a set of inclusion criteria (Stanley and Doucouliagos, 2012). Stanley and Jarrell (1989) introduced MRA in 1989 as an extension to meta-analysis in the economic literature. MRA is used in economics, because it provides meta-analysts with a comprehensive framework for quantitatively reviewing, replicating and analyzing the empirical literature. It constitutes a multivariate empirical investigation of a population effect together with the causes of variation among standardized regression estimates (Stanley and Doucouliagos, 2012). The effect of the variables that causes the variation are commonly coined moderating effects. The conceptual moderating effects are related to theory, while methodological moderating effects are related to researchers selection of methodology, sample and data structure in primary research. MRAs routinely investigate methodological moderating effects along with conceptual moderating effects to explain the heterogeneity among findings caused by researchers selection (O’Boyle et al., 2012).

The meta-dataset (see appendix G) on which the MRA is based is a product of the entire research process. The meta-dataset includes all regression estimates of the population of studies, which investigate the relationship between firm size and export performance. The development of a preliminary theoretical model and resultant conceptual model forms the foundation for deductively developing hypotheses. This shapes the empirical inquiry, including the collection of meta-literature to the meta-sample, coding of the meta-sample into a meta-dataset and statistical analysis, interpretation of findings, and formulation of directions for future research (Stanley and Doucouliagos, 2012). Stata/SE 12.0 is used for all statistical analysis. The do-files with codes are attached in appendix I.

1.3 Structure

The structure of this thesis follows a systematic research process and is outlined in figure 1.

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<tr>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Research Questions</td>
<td>Preliminary Theoretical Model</td>
<td>Introducing Meta-Regression Analysis</td>
<td>Meta-Regression Results</td>
<td>Directions for Future Research</td>
</tr>
<tr>
<td>2.1 Firm Size- Export Performance</td>
<td>3.2 Literature Search, Compilation, Coding</td>
<td>4.2 Discussion and Limitations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2 Conceptual Model (Hypotheses)</td>
<td>3.3 Modeling the Meta-Regression Analysis</td>
<td></td>
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</tbody>
</table>

Source: Author’s own creation

The objective and corresponding research questions are presented in section 1.1, which constitutes the starting point of the thesis. The theoretical framework commences with the establishment of a preliminary theoretical model that depicts the determinants of export performance in section 2.1. The preliminary
model forms the theoretical foundation for examining the relationship between firm size and export performance in section 2.2. The theoretical discussion of the firm size-export performance relationship contributes to the development of hypotheses, including the theoretical identification of conceptual moderating effects. These hypotheses are presented in a conceptual model that predicts the relationship between firm size and export performance in section 2.3. The conceptual model hereby provides a basis for empirical inquiry. The methodological framework commences with an introduction to MRA in section 3.1. The meta-literature is subsequently identified, compiled and coded in section 3.2 before the MRA is econometrically modeled suitable to the meta-dataset in section 3.3. The research questions are then answered in conjunction with important theoretical and statistical limitations of MRA in section 4.1 and 4.2. The thesis concludes with a discussion of directions for future research in section 5.
2 Theoretical Framework

This MRA is based on a meta-dataset that is a complex product of the entire research process. The meta-dataset consists of multiple effects of the relationship between firm size and export performance that is linked to key dimensions of the theory that predict the relationship. The natural starting point is therefore, as in any empirical study, a profound theoretical framework that proves eligible for empirical investigation (Stanley and Doucouliagos, 2012).

“Theory provides the topographical map of the terrain to be explored, while meta-analysis provides the tools for extracting the precious ores, should they be present” – Stanley and Doucouliagos (2012; p.12)

The theoretical framework commences in section 2.1 with a discussion of the export performance literature with the purpose of establishing a preliminary theoretical model that reflects the current state. The preliminary theoretical model intends to synthesize all determinants and dimensions of export performance to provide a basis for delineating the role of firm size.

With the preliminary theoretical model as the basis for inquiry, the relationship between firm size and export performance is evaluated in section 2.2. The purpose of this section is to investigate the current findings on the relationship and identify possible theoretical explanations hereof.

The theoretical framework concludes in section 2.3 in a conceptual model that integrates the firm size-export performance relationship together with potential moderating effects. This ensures that the empirical findings from the meta-analysis is integrated into the existing body of knowledge. The conceptual model is hereby developed based on a sound theoretical foundation in the preliminary theoretical model and provides a solid basis for hypothesis formulation for the MRA.

2.1 A Review of the Export Performance Literature

The substantial empirical literature on export performance is colloquially referred to as the most widely researched, but least understood area of international marketing (Zou and Stan, 1998; Katsikeas et al., 2000; Sousa et al., 2008). Most of the issues associated with the literature boils down to the lack of a sound theoretical basis and disagreement across studies on the appropriate measure of export performance and the determinants hereof (Leonidou et al., 2002; Sousa et al., 2008). The majority of the export performance literature completely neglects a sound theoretical basis and formulate hypotheses without reference to theoretical arguments, while different conceptual definitions, classifications and measures of the determinants of export performance hinder the comparability of studies. This lack of theoretical guidance and inconsistent use of determinants are among the main causes of the conflicting empirical findings that reflects the literature (Zou and Stan, 1998; Sousa et al., 2008).

The first attempts to synthesize the literature on export performance dates back to Madsen (1987); Aaby and Slater (1989) and Chetty and Hamilton (1993). Aaby and Slater (1989) developed the first conceptual model of causal relationships in their strategic export model, where export performance was evaluated against management influences such as firm characteristics, competencies and strategy. Chetty and Hamilton (1993) extended the strategic export
model in a meta-analysis in an attempt to validate the findings of Aaby and Slater (1989), but most of the findings remained inconclusive. The main points of criticism was related to the inclusion of studies that investigated conceptually broader dimensions of export performance (e.g. propensity to export and export barriers) and the omission of the external environment (Zou and Stan, 1998).

In spite of the criticism, Aaby and Slater (1989) and Chetty and Hamilton (1993) came up with the first attempt to group internal management influences on export performance. Zou and Stan (1998) theoretically justified the influence of internal determinants on export performance through resource-based theory, but contrary to Aaby and Slater (1989) and Chetty and Hamilton (1993), they divided the internal determinants into controllable and uncontrollable determinants. The resource-based theory posits that a firm hold a competitive advantage against its rivals through the firm’s unique bundle of valuable, rare, inimitable and non-substitutable resources (Penrose, 1959; Wernerfelt, 1984; Barney, 1986; 1991). This means essentially that the variations in firm performance is rooted in the heterogeneity between firms capabilities (bundle of skills and knowledge) and assets (accumulated resource endowments) (Zou and Stan, 1998; Zou et al., 2003).

Cavusgil and Zou (1994) addressed the lack of the external environment by establishing a revisited conceptual model that determined export performance based on an evaluation of specific internal factors in interplay with the external environment (e.g. industry and export market characteristics). The incorporation of the external environment builds on contingency theory, which has its roots in the principle of strategy-environment co-alignment of industrial organization that centers around the interaction of firms and markets. Cavusgil and Zou (1994) argues accordingly that external factors influence firms’ strategies and export performance, and refers to the two premises: (i) an organization depends on external forces for recourses, and (ii) an organization can manage this dependency through strategy development. This means that the impact of different firm characteristics on export performance depends on the environment in which the firm operates.

Da Rocha and Christensen (1994); Katsikeas et al. (2000); Leonidou et al. (2002) and Sousa et al. (2008) all assume a unidirectional causal relationship between internal and external determinants of export performance. They identified three core groups: (i) background determinants (e.g. managerial, organizational and external factors), (ii) intervening or moderating variables, and (iii) export performance. The unidirectional mechanism implies that the effect of background variables on export performance is either carried forward through intervening variables such as market selection or marketing mix to export performance or subject to moderating effects. This thesis also assumes a unidirectional relationship, but considers moderating effects rather than intervening variables, because such effects are eligible for statistical methods of MRA. Sharma et al. (1981) define a moderator as a variable that in a systematic way alters the strength and/or direction of the relationship between dependent and independent variables. It should, however, not be confused with a control variable. Control variables are extraneous variables whose effect one wish to control for or eliminate by holding it constant. The inclusion of moderators in the conceptual model is justified, because the moderating effect produced by the moderator contributes with alternative explanations of the relationship between
background determinants and export performance (Sousa et al., 2008).

The preliminary theoretical model is presented in figure 2 and constitutes an updated theoretical model that integrates all relevant determinants of export performance identified across the literature to this day.

**Figure 2: A Preliminary Theoretical Model of Export Performance**

2.1.1 Export Performance

It is acknowledged that a firm’s export performance constitutes a multi-faceted and complex construct that cannot find expression in a single metric (Shoham, 1998; Sousa et al., 2008; Carneiro et al., 2011). The literature is in particular in lack of agreement on an appropriate unit of analysis and a conventional measure of export performance (Shoham, 1998; Oliveira et al., 2012).

Two organizational levels tend to dominate the discussion on an appropriate unit of analysis: the export function and the venture level (Oliveira et al., 2012). The studies that investigate the export function focus on the overall export performance of the firm (e.g. Aulakh et al., 2000; Cadogan et al., 2009), while the studies that examine the venture level conceive export performance of a venture such as a single product or product-line in combination with an export market (e.g. Cavusgil and Zou, 1994; Morgan et al., 2004; Katsikeas et al., 2006). The export function appears as the most commonly used unit of analysis – e.g. 3/4 of the articles reviewed in Sousa et al. (2008) draw conclusions from an export function level. It has its theoretical foundation in the theory of internationalization, which states that firms must internalize firm-specific advantages to maximize economic rent (Rugman, 1980). The strength of the export function level is rooted in its width, as it considers all firm-specific advantages, whereas the venture level focuses its attention towards the marketing and development of a specific product. The arguments for undertaking the venture as the unit of analysis seem oppositely related to the depth of analysis. The venture level provides a deeper understanding of key success factors and most often the fluctuations in performance can be traced back to the product-market relationship.
There is no agreement on the appropriate unit of analysis, but researchers tend to have a predilection for the export function level, because respondents are more willing to disclose corporate information at a broader level (Sousa et al., 2008).

Besides the unit of analysis, no consistent measurement of export performance prevails across the literature (Sousa, 2004). The result is a surfeit of disparate economic, non-economic and composite measures of export performance (see e.g. Katsikeas et al., 2000; Sousa, 2004; who identify 42 and 50 performance measures, respectively). The strength of the economic measures (e.g. export intensity, export profitability and export turnover) is their objective nature, but financial figures are not always disclosed and may be subject to national accounting standards, hindering comparability across borders (Sousa, 2004). The perceptual non-economic measures (e.g. perceived export success, export satisfaction and goal achievement) have oppositely been subject to criticism for their subjectivity, but appears appropriate when comparing across borders, as different accounting standards and exchange rate fluctuations disturb the economic measures (Katsikeas et al., 2000; Brouthers et al., 2009).

There is clearly a correlation between the objective and subjective measures, but one cannot replace the other, for which reason export performance studies should investigate both perspectives either in a composite measure or separately (Brouthers et al., 2009; Larimo, 2013).

### 2.1.2 Background Determinants

This subsection discusses the background determinants of export performance in the preliminary theoretical model (fig. 2), which are summarized in figure 3.

**Figure 3: Internal and External Determinants of Export Performance**

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<th>Internal background determinants</th>
<th>External background determinants</th>
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<tr>
<td><strong>Controllable</strong></td>
<td><strong>Uncontrollable</strong></td>
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<td>Management attitudes</td>
<td>Management skills</td>
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<tr>
<td>Export commitment and support</td>
<td>Mgmt’s international experience</td>
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<tr>
<td>International orientation</td>
<td>Mgmt’s education</td>
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<tr>
<td>Export Marketing Strategy</td>
<td>Firm characteristics</td>
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<tr>
<td>Product</td>
<td>Firm’s size</td>
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<td>Price</td>
<td>Firm’s age</td>
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<tr>
<td>Place</td>
<td>Firm’s technology</td>
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<td>Promotion</td>
<td>Firm’s export knowledge</td>
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<td></td>
<td>Industry characteristics</td>
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<td></td>
<td>Industry’s technological intensity</td>
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<td>Industry’s level of instability</td>
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<td>Foreign market characteristics</td>
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<td>Export market attractiveness</td>
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<td>Domestic market characteristics</td>
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<td>Domestic market attractiveness</td>
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<td>Domestic institutional quality</td>
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Source: Author’s own creation with inspiration from Zou and Stan (1998)
In an attempt to classify the determinants within the preliminary theoretical model, an effort was made towards ensuring an appropriate balance between having too many and too few determinants. The discussion of background determinants is separated into (i) internal determinants and (ii) external determinants of export performance.

(i) Internal Determinants of Export Performance

The internal determinants of export performance are divided into controllable and uncontrollable based on a firm’s controllability of the determinant in the short run. The management can, for instance, control the strategy, but not the age of the firm. It is recognized that most internal determinants are controllable in the long run, but not all can be readily changed with immediate impact (Zou and Stan, 1998).

Research has consistently pointed towards the management as a major force behind firms’ export performance (Miesenbock, 1988; Leonidou et al., 1998; Moghaddam et al., 2012). Barney (1991) argues from a resource-based perspective that the management constitutes a rare resource to the firm and emphasizes the necessity of managerial talent in sound strategy formulation and implementation. In the preliminary theoretical model, management characteristics are divided into uncontrollable (skill-based) and controllable (attitudinal) determinants of export performance in line with Zou and Stan (1998). The controllable, attitudinal characteristics of management, in particular, appear as important determinants of export performance across the literature (Leonidou et al., 1998).

Management’s export commitment has, for instance, emerged as a significant determinant of both export intensity and subjective export performance, because a high level of commitment allows for careful export planning, sufficient resource allocation and more effective use of export marketing strategy, which eventually leads to higher export performance (Steven White et al., 1998; Beamish et al., 1999; Dean et al., 2000). Evidence also suggests that the international orientation of management positively influences export performance robust to choice of proxy. This is expected as a management with an international outlook is better prepared to identify potential threats and benefit from new international opportunities (Nazar and Saleem, 2009; Moghaddam et al., 2012).

No clear consensus characterizes the relationship between the uncontrollable and skill-based characteristics of management and export performance. The majority of the studies that investigate the relationship between managements’ international experience and objective measures of export performance (export profits, export sales and export growth) find support of a positive relationship (Zou and Stan, 1998). Brouthers and Nakos (2005) disagree and report a significantly negative association between international experience and perceptual export performance. They argue that more experienced managers are less inclined to pursue new international business opportunities compared to more dynamic and less experienced managers. Das (1994) and Contractor et al. (2005) find no support for managements’ international experience as a determinant of export performance, but this insignificance is rooted in unique industrial and environmental characteristics of the studies, which limit their overall generalizability, as argued by Sousa et al. (2008). The formal level of education is in particular identified across the literature as an indicator of managers’ ability to command foreign languages (Sousa et al., 2008). The findings
on the education-export performance relationship remain, nevertheless, inconclusive across different measures of export performance, including export profits, export sales, export growth, perceptual and composites (Zou and Stan, 1998). Brouthers and Nakos (2005) speculate that the ambiguous findings have root in formal education being less important than accumulated informal education (i.e. alternative education out of school), which is harder to measure.

Firms export marketing strategy is most often integrated into the export performance literature in the form of the 4 Ps: Product, Price, Place and Promotion (Leonidou et al., 2002; Zou and Stan, 1998). This classification enhances the comparability of the marketing strategy-export performance relationship across studies, but in spite of considerable empirical research, only mixed results coexist today (Sousa et al., 2008). Zou et al. (2003) ascribe the inconclusive findings to the inability of the international marketing literature to integrate a profound theoretical foundation. Most of the studies prior to the 2000s had its theoretical roots solely in the industrial organization framework, where external factors constitute the main driver of firms development and implementation of a superior marketing strategy (Cavusgil and Zou, 1994; Zou and Stan, 1998). The framework has been subject to vast criticism in more recent literature, because it solely focuses on the interaction between a firm’s context and strategy on its competitive position, while neglecting the importance of a firm’s internal capabilities. More recent studies (post 2000s) therefore integrate a resource-based view on strategy, because it allows for a broader examination of the firm in the light of its bundle of tangible and intangible resources (Zou et al., 2003; Morgan et al., 2004; Lages et al., 2009; Sousa et al., 2008). Leonidou et al. (2002) argue that firm heterogeneity in fact provides an explanation of the ambiguous findings and find it unrealistically to expect that all firms excel in all strategic disciplines (i.e. all 4 Ps), because a firm most likely lack the requisite capabilities and resources within one or more disciplines. The incorporation of export marketing strategy as a determinant of export performance remains yet widely accepted across the literature (Zou and Stan, 1998; Leonidou et al., 2002; Morgan et al., 2004).

This thesis identifies in line with the existing literature firm size, age, technology and export knowledge as decisive internal uncontrollable determinants of export performance (Zou and Stan, 1998; Moen, 1999; Sousa et al., 2008). Barney (1991) highlights in particular firm size as an indicator of a firm’s level of managerial, organizational and financial resources for different expansion activities (e.g. diversification in products or geographic markets), but in spite of meaningful resource-based arguments of firm size as a determinant of export performance, the findings on the firm size-export performance relationship remains among the most ambiguous (Moen, 1999; Sousa et al., 2008). This ambiguity is investigated further in section 2.2.

Most young firms are small firms and should theoretically be subject to more resource constraints than older and more mature firms (LiPuma et al., 2013). Das (1994) and Baldauf et al. (2000) find on the contrary that firm age, measured as number of years since foundation, negatively influences both export intensity and subjective export performance. This suggests that younger firms achieve higher export performance than older firms, but other studies report a positive relationship, which leaves the conclusion ambiguous (Majocchi et al., 2005; Gwatidzo and Moyo, 2014). The export knowledge of a firm is not alone rooted in the managements’ experience, but also in the entire organization. It
is conventionally measured either as years since initiation of consistent export sales or number of markets served abroad in the past (Brouthers and Nakos, 2005; Contractor et al., 2005). Unlike firm age, the majority of the studies find support of a positive relationship between export knowledge and export performance, measured either objectively (export intensity and export growth) or subjectively (Kirpalani and Macintosh, 1980; Cavusgil and Zou, 1994; Contractor et al., 2005). The more accumulated export market knowledge, the better understanding of customers abroad (Contractor et al., 2005). Brouthers and Nakos (2005) report a negative relationship between years selling abroad and perceptual export performance, but ascribe this finding to the structure of their sample that consists of many small firms with low export intensities. They speculate that the length of export involvement is not as important as the level of commitment of smaller firms to achieve success in the export market.

The term technological resources is most often used interchangeably with innovation and is measured by R&D intensity or R&D employees (Rodríguez and Rodríguez, 2005; D’Angelo, 2010). Firms’ technological capacity constitute a key resource to sustain and develop competitive advantages in the international market. A high level of technological resources facilitates both product innovation and the development of more efficient processes, which remain key elements in successful exporting (Rodríguez and Rodríguez, 2005). This rationale coheres with the empirical findings across the literature that suggest a positive association between technological resources and export performance (D’Angelo, 2010). Hirsch and Bijaoui (1985) and Zhao and Li (1997) find, for example, that R&D intensity is positively associated with export growth, while Özçelik and Taymaz (2004) report the same relationship between R&D intensity and export intensity.

(ii) External Determinants of Export Performance
This thesis classifies the external determinants of export performance into industry characteristics, foreign market characteristics and domestic market characteristics in line with Zou et al. (2003) and Gao et al. (2010). The incorporation of the external environment has its theoretical justification in contingency theory, which holds that export performance should not only be determined based on a firm’s internal resource capabilities, but on the interplay between a firm’s behavior and its external environment (Robertson and Chetty, 2000).

Most firms develop and implement strategies to maneuver their dependence on the external environment and accordingly alter their position in the industry vis-a-vis competitors. Industry characteristics by this means influence the strategic latitude of the firm and determines its export behavior (Gao et al., 2010). Das (1994) and Lim et al. (1996) find a positive relationship between industry instability, when subjectively ranked by the firms, and export intensity. If a firm’s domestic market is stable, the firm has little incentive to exploit new opportunities in the comparatively riskier export markets. This contrasts to an unstable domestic market, which force firms to sustain innovation activities, leading to a more competitive industry that enables domestic firms to compete abroad (Sakakibara and Porter, 2001). Gao et al. (2010) operationalize industry instability more objectively as the sum of variations in market share of each individual firm in an industry, but do not find a significant association to export intensity. Cavusgil and Zou (1994) and Holzmüller and Stöttinger (1996) find evidence in favor of a positive relationship between an industry’s technological
intensity and a composite measure of export performance and export intensity, respectively. The inclusion of technological intensity in the preliminary model is justified from a contingency viewpoint, because maneuvering in a high-tech industry influences a firm’s adaptation of an export marketing strategy (e.g. product innovation) (Cavusgil and Zou, 1994).

The attractiveness of an export market is most often determined based on its competitive intensity and export barriers such as cultural proximity and political intervention (Sousa et al., 2008). Particularly managers’ perception of the political environment appears as a significant determinant of a firm’s export performance across the literature. Cavusgil and Zou (1994) and Baldauf et al. (2000) find that the more a firm’s management perceive its operations as disrupted by political forces, the lower export performance of the firm, when measured either as a composite measure or export intensity. There remains a broad consensus in the literature on a positive relationship between cultural proximity and export performance (Sousa et al., 2008). The main explanation of this association boils down to the reduced risk of failure brought about by a higher cultural proximity between the domestic market and export market (Lado et al., 2004). Baldauf et al. (2000) do not find support for cultural proximity as a determinant of export intensity, but admit that this unexpected finding should rather be ascribed to their unsuccessful efforts of developing a scale for capturing socio-cultural differences in an export context. The competitive intensity of an export market theoretically influences the attractiveness of the export market, and hence export performance, because it impacts the probability of price competition and the firm’s ability to defend and achieve positional advantages through competitive strategy (Morgan et al., 2004). Morgan et al. (2004) find no empirical support for a relationship between competitive intensity and subjective export performance based on a questionnaire in spite of meaningful theoretical arguments. Lages and Montgomery (2005) find contradictory a significantly negative relationship between the same measures of competitive intensity and export performance. The least competitive markets are usually associated with developing countries, where economic instability hampers firms’ export success (Sriram and Manu, 1995).

The attractiveness of the domestic market also plays a part in firms’ export performance (Sousa et al., 2008). It is acknowledged that particularly domestic export-assistance programs provided by governments or non-government organizations contribute positively to firms’ export performance. The programs are designed to facilitate firms’ export efforts as an external resource of knowledge and experience (Alvarez, 2004; Lages and Montgomery, 2005). A more recent branch of the export performance literature has linked domestic institutional quality to domestic market attractiveness (LiPuma et al., 2013). The firms that operate in countries with well-established institutions face less information asymmetries (i.e. lower cost of searching for information for exporting) than firms in countries of lower institutional quality. The inclusion of institutional quality as a determinant of export performance is theoretically justified by contingency theory, because strong domestic institutional environments ensure contract enforcement and transparency, enabling firms’ to develop more long-term export strategies (Lu et al., 2009). Lu et al. (2009) focus on the influence of institutions on both the propensity to export and export intensity, but did not find support for higher export intensities in countries of higher institutional quality. They found instead support of higher propensities to export in countries with
well-established institutional frameworks. The institutional frameworks tend to be less robust in developing countries compared to developed countries, because governmental policy in developing countries lack shareholder and creditor rights (LiPuma et al., 2013).

2.1.3 Conceptual Moderators and Controls

The conceptual moderating effects are illustrated in the preliminary theoretical model in figure 2 as the moderators, which effect directly influences the relationship between the background determinants and export performance (Sousa et al., 2008).

It is recognized that all determinants of export performance to some extent remain intertwined. Each individual determinant can both serve as a determinant of export performance and as a moderator to the relationship between another determinant and export performance (Rose and Shoham, 2002). The use of moderators have historically been sparse across the export performance literature, because most studies have sought for empirical links between different determinants of export performance, rather than investigating alternative explanations hereof. Among the few studies that investigate moderating effects, there is an inclination towards using foreign market characteristics or firm characteristics as moderators (Sousa et al., 2008). Cadogan et al. (2002) and Rose and Shoham (2002) use environmental determinants, such as competitive intensity and export market turbulence, to moderate the relationship between export market-oriented activities and export performance, while Prasad et al. (2001) investigate the moderating impacts of firm characteristics, such as firm size and international experience, on the relationship between market competencies and export performance.

Recall that the integration of the internal determinants (fig. 3) into the preliminary model (fig. 2) is justified in resource-based theory. It is acknowledged in this context that a firm’s combination of capabilities (bundles of skills and knowledge) and assets (accumulated resource endowments) is modified by its path of internationalization. Firms’ internationalization is typically classified into either traditional or born-global based on its prior motivations and capabilities (Chetty and Campbell-Hunt, 2004).

Studies by Knight and Cavusgil (1996; 2004); Aspelund and Moen (2005) and Cavusgil and Knight (2015) jointly indicate that the so-called born-global exporters (hereinafter BGs), who internationalize soon after inception, achieve superior performance in the export markets. BGs are defined as young and small technology firms serving multiple countries from the early days of their establishment (McDougall et al., 1994; Knight and Cavusgil, 1996). Knight and Cavusgil (2004) emphasize that firms’ ability to internationalize soon after inception is a function of its internal organizational capabilities. They explain that BGs superiority is rooted in their organizational flexibility characterizing young firms and unique ability to sustain innovation and generate knowledge. BGs then leverage on this innovative culture, knowledge and resultant organizational capabilities in their export efforts. This compares to the traditional exporters, who are associated with the Uppsala model (Chetty and Campbell-Hunt, 2004; Welch and Paavilainen-Mäntymäki, 2014). The Uppsala model suggests that according to liability of foreignness, firms commence internationalization activi-
ties in neighboring markets characterized by a low psychic distance\(^1\). The firms then gradually select new markets with progressively higher psychic distance in phase with the accumulation of market knowledge. A firm’s internationalization is therefore seen as an incremental process, where it first develop domestically and then spread like rings in the water. Along with the internationalization process, firms gradually increase their commitment decision by moving upwards the establishment chain – first exports, then sales subsidiary and finally production (Johanson and Vahlne, 1977).

The underlying differences between the traditional exporters and BGs clearly moderate the relationship between the internal determinants and export performance. The traditional exporters internationalize incrementally from a strong domestic market due to a lack of experiential knowledge, organizational bureaucracy and a high perceived risk of internationalization. BGs consider oppositely the domestic market as less important and perceive the world as a single market full of opportunities rather than risks and uncertainties (Chetty and Campbell-Hunt, 2004). BGs are young and small firms, which are able to internationalize within three years or less without export knowledge due to low transaction costs of foreign market expansion and a high degree of organizational flexibility (McDougall et al., 1994; Knight and Cavusgil, 2004). Much of BGs international success is driven by the founder, who functions as a change agent strengthening the export efforts (Cavusgil and Knight, 2015). The founder often has an international mindset from a high level of education and international experience from living abroad (Madsen and Servais, 1997). BGs are contrary to the traditional exporters limited by scarce financial and human resources as well as tangible recourses (plants, equipment, etc.). The innovative culture in BGs, however, provides the knowledge capabilities for developing new technologies, which enable the development of unique product offerings. BGs target the products to niches worldwide through a differentiation strategy, which helps the resource-constrained BGs to overcome the competitive advantages held by local firms (Knight and Cavusgil, 2004). This means essentially that the traditional exporters rely on tangible resources in its internationalization, whereas BGs leverage on its intangible knowledge-based resources. The different combinations of capabilities and assets that characterize the two types of firms is therefore a moderator to the relationship between the internal determinants and export performance.

It is also important to consider appropriate conceptual control variables, when evaluating the different determinants of export performance. The most commonly used control variables across the export performance literature is firm size and international experience (Sousa et al., 2008). The conceptual moderators and controls of the firm size-export performance relationship is addressed in section 2.2.2.

\(^1\)Psychic distance is defined by Johanson and Vahlne (2009) as factors hampering the understanding of foreign environments
2.2 Firm Size and Export Performance

With the preliminary theoretical model (fig. 2) as the basis for inquiry, firm size is identified as an internal determinant of export performance, but uncontrollable to the firm in the short run. The relationship between firm size and export performance is subject to moderating effects, while the investigation of the effect of firm size on export performance necessitates appropriate control variables. The relationship between firm size and export performance is illustrated in figure 4.

Figure 4: The Relationship between Firm Size and Export Performance

This section intends to go into details with the conflicting findings on the firm size-export performance relationship and provide possible theoretical explanations hereof. This ensures a sound theoretical foundation for establishing the conceptual model in section 2.3.

2.2.1 Relationship between Firm Size and Export Performance

The majority of the studies that investigate the relationship between firm size and export performance adopts a resource-based view, which cohere with the theoretical arguments underlying the classification of firm size as an internal determinant of export performance in the preliminary theoretical model (see e.g. Bonaccorsi, 1992; Moen, 1999; Brouthers et al., 2009; Williams, 2011a).

The resources that define a firm’s competitive position can be divided into (a) organizational resources, (b) entrepreneurial resources, and (c) technological resources (Majocchi et al., 2005). Most export performance studies use firm size as a proxy of organizational resources, because the size of a firm constitutes a good indicator of its level of organizational capabilities for various expansion activities (e.g. diversification in products or geographic markets) (Barney, 1991). Organizational capabilities is defined as non-imitable and valuable managerial abilities that transmute physical and financial resources into competences. The rationale behind the resource-based view is essentially that the level of firm competences correspond partially to export barriers and by this firm size influence export performance (Wernerfelt, 1984; Majocchi et al., 2005). The fundamental assumption is that larger firms by virtue of a larger resource stock outperform smaller firms in international markets (Bonaccorsi, 1992; Dhanaraj and Beamish, 2003).

Through a resource-based lens, a large firm is contrary to a small firm able to exercise more bargaining power, overcome bureaucratic red-tape, undertake
costly market research, develop more effective export marketing strategies due to a larger talent pool and to a higher degree utilize unused capacity in the export market (Stoian et al., 2011; Williams, 2011b; Adu-Gyamfi and Kornelijussen, 2013). Cavusgil and Naor (1987); Christensen et al. (1987); Calof (1994) and Tu and Hall (2004) all suggest that a large firm size increases a firm’s likelihood of initiating exports. Bloodgood et al. (1996) explain that the relatively larger stock of human capital enables larger firms to initiate exports more efficiently than smaller firms. The more scientific and technical employees available for expansion, the more likely is the firm to innovate and produce products that yield a competitive advantage abroad. Gabbits and Gretton (2003) add that exporting entails sunk costs and risks (e.g. cost of ISO certification, market research and advertising), which may deter smaller firms from exporting. A large firm size evidently facilitates a firm’s export initiation, but when a firm desires to expand its exporting activities, other conditions come into play (Reid, 1983; Bonaccorsi, 1992).

It is recognized that firm size largely captures the economies of scale of production costs (Verwaal and Donkers, 2002). The effect of firm size on export performance therefore depends on a firm’s ability to realize untapped economies of scale in production, because it allows the firm to trade its goods at competitive prices abroad (Williams, 2011a). If economies of scales is present, the average production costs decrease along with output growth, which enable larger firms to have lower per unit costs than smaller firms (Gabbits and Gretton, 2003). This abstains smaller and less competitive firms from exporting, whereas larger firms are able to export a higher share of their revenue (Bonaccorsi, 1992).

This points altogether toward a positive theoretical relationship between firm size and export performance, but the findings on export intensity (defined as export sales of total sales) appear contradictory. Some studies report a positive relationship between export intensity and firm size measured as number of employees (e.g. Schlegelmilch and Crook, 1988; Majocchi et al., 2005; D’Angelo, 2010), some suggest a negative relationship (e.g. Patibandla, 1995; Rodríguez and Nieto, 2010), while others do not report any relationship at all (e.g. Boug Hammoui et al., 2007; Love and Mansury, 2009). Kalafsky (2004) argues that economies of scale is not as critical as the right mix of competitive strategies related to product and innovation. Moen (1999) supports this view and adds that the only way a small firm can overcome the lack of economies of scale in its international operations is through the development of competitive advantages in relation to product uniqueness or technological niche products. Verwaal and Donkers (2002) still believe that small firms can enjoy high export intensities through economies of scale provided that they specialize in exports and develop deep trade partnerships.

Schlegelmilch and Crook (1988) find a significantly positive, but non-linear relationship between number of employees and export intensity. This indicate that firms above a certain size replace exports with foreign direct investment (hereinafter FDI)2. Firms that switch from exporting to FDI avoid different export barriers (e.g. tariffs), which lower the total cost of international involvement (Monteiro et al., 2013). It is evidently harder for small firms to switch to more advanced stages of internationalization, such as FDI, due to

2FDI is defined as the process whereby an enterprise in one country acquire a controlling ownership of assets (e.g. distribution, production, etc.) in another country (Moosa, 2002).
their limited resources for hiring and training personnel and the associated risk of such resource commitment (Calof, 1994). Exporting remains therefore the most viable internationalization strategy for small firms (Adu-Gyamfi and Kørneliussen, 2013). This indicates that larger firms with higher export intensities at some point switch to FDI, while smaller firms struggle in their attempt to move from exports and upwards the establishment chain.

The establishment chain has, however, encountered declining validity due to changes in firm behavior. Some firms tend to leap over stages and the order of foreign market entry is now no longer synonymous with psychic distance, even though most firms perceive exporting a natural starting point of market entry (Johanson and Vahlne, 2009). Johanson and Vahlne (2009) revise the Uppsala model by replacing liability of foreignness with liability of outsidership of business networks. They argue that the business environment no longer should be seen as a neoclassical market of independent customers and suppliers, but instead as a business network, where outsidership constitutes the main cause of uncertainty rather than psychic distance. They posit that business networks form the basis of individual firms internationalization. It is recognized that the likelihood of initiating international operations or international success depends on a firm’s ability to engage and take part in strong business networks irrespective of firm size (Williams, 2011a). This means that smaller firms can manage its limited resources more efficiently by utilizing its network to access information and exchange international experiences (Johanson et al., 1988). The international success or failure of small firms compared to large firms therefore boils down to managers’ ability to engage in partnerships with suppliers, specialists and distributors to both acquire resources and share the risk of internationalization (Chetty and Campbell-Hunt, 2003; Johanson et al., 1988; Zaheer et al., 2000).

Export intensity is among the most widely used objective measures of export performance, but other proxies also subsist across the literature, such as export growth and export sales. In the studies that investigate the relationship between firm size and export growth, defined as growth in exports over the last 12 months, the majority reports insignificant findings regardless of the measure of firm size (number of employees or total sales) (Archarungroj and Hoshino, 1998; Katsikeas et al., 1996; Moen, 1999). Rock and Ahmed (2008) reveal a negative relationship between firm size, a subjective measure of overall capabilities, and export growth in a Chilean context, which indicate that small Chilean firms have been operating more easily abroad than domestically. They ascribe this finding to reduced transportation costs and advances in information and communications technology.

Other studies consider the relationship between subjective measures of export performance and firm size. Brouthers et al. (2009) examine, for example, the relationship between number of employees and the extent to which a firm believes it exceeds domestic sales, while Aulakh et al. (2000) and Lages et al. (2008) use different scales of perceptual measures of export performance. The findings appear ambiguous and the comparability of the findings remains limited due to the different constructions of the subjective measures. The relationship between firm size and subjective measures of export performance originates from managerial attitudes, because the decision-makers in a firm constitutes a key variable in particularly the internationalization of smaller firms (Calof, 1994). The decision-makers in smaller firms associate exporting with more risk than their counterparts in larger firms, because they face a less diversified business
and are exposed to a greater impact of international mistakes (Bonaccorsi, 1992). This explains why smaller firms prove to be more risk-averse and seek to exploit growth strategies domestically before penetrating foreign markets (Brouthers et al., 2009).

The number of employees is generally the most widely used proxy of firm size, because firms are reluctant to disclose financial information such as total sales and assets (Brouthers and Nakos, 2005). The studies that use total assets as a proxy of firm size is particularly limited, but represents similarly conflicting findings. Gabbitas and Gretton (2003) is for instance unable to establish a significant relationship between export intensity and total assets, whereas Galdeano-Gómez et al. (2015) disclose mixed findings on the same relationship.

The different definitions of firm size across the export performance literature indeed contribute to the mixed results (Calof, 1994). Samiee and Walters (1990) consider firms employing between 1-99 employees as small, Reid (1984) labels firms with a workforce in-between 100 and 500 employees as small, Wagner (1995) regards groups of 1-50, 51-250, 250+ as small, medium and large, respectively, while Brouthers et al. (2009) and Martín-Tapia et al. (2010) define a small and medium sized enterprise (hereinafter SME) as a firm with a maximum of 250 and 500 employees, respectively. The definition remains as incompatible when total sales is used to proxy firm size. Culpan (1989) regards firms with sales below $5 million as small, while Rabino (1980) defines firms with less than $10 million in sales as small.

The empirical literature appears evidently inconclusive on the relationship between firm size and export performance, even though there remains a strong belief in the resource-based view across the literature, which suggests that a larger firm size theoretically lead to a higher export performance.

2.2.2 Relationship-Specific Moderators and Controls

The empirical inconclusiveness is therefore most likely a result of other factors influencing the relationship between firm size and export performance – the so-called moderators in figure 4. MRA provides fortunately the means to evaluate moderating effects to the relationship beyond investigating the overall population effect. The conceptual moderators and controls that applies to the firm size-export performance relationship are therefore discussed in this section and incorporated in the conceptual model in section 2.3.

This thesis classifies SMEs and large firms into firms with either less or more than 250 employees or EUR 50 millions of sales, respectively, following the European Commission, recommendation 2003/361/EC. The classification is used in this context to conceptually control for the primary studies research focus (e.g. a sample consisting only of SMEs) to eliminate the effect it imparts on the firm size-export performance relationship.

Most MRAs similarly integrate the period of research to account for conceptual path dependencies and potential trends in the literature (see e.g. Doucouliagos and Paldam, 2008). This proves particularly important in this context, because the internationalization literature experiences a shift from the stage theories (e.g. Uppsala model) that are associated with the traditional exporters toward the theories on born-globals and business networks during the 1990s (Welch and Paavilainen-Mäntymäki, 2014). The period of research remains important to conceptually control for path dependencies and trends in the lit-
erature, but cannot be considered a moderator to the relationship between firm size and export performance. Moderators need to be directly traceable to the economic association of interest (Stanley and Doucouliagos, 2012).

This holds instead for the different capabilities and assets differentiating BGs from the traditional exporters, which constitute the main moderator to the relationship between the internal determinants and export performance. Firm size is integrated into the preliminary theoretical model on the grounds that larger firms possess a larger resource stock to achieve higher export performance, but BGs are small resource-constrained firms, which, nevertheless, possess other intangible knowledge-based resources and per se experience high export intensities from inception (McDougall et al., 1994). The extent to which the firms of analysis share the characteristics of either BGs or traditional exporters thus expectedly moderates the relationship between firm size and export performance. Unfortunately, the meta-sample as a product of the research process did not reveal a foundation for including the effect of internationalization path (BGs or traditional exporters) into the conceptual framework. The moderating effect is nevertheless acknowledged and will be addressed as a limitation in the discussion (section 4.2).

Both the institutional quality of the domestic market and a firm’s technological resources is identified as determinants of export performance in the preliminary theoretical model. The firms that are highly innovative and possess a large technological resource stock are classified herein as high-tech firms in line with Rodríguez and Rodríguez (2005) and D’Angelo (2010; 2012). The perception that larger firms outperform smaller firms in innovation has gradually been phased out (D’Angelo, 2012). No doubt that innovation enables all firms irrespective of size to exploit international opportunities, but small firms have generally been observed as more innovative than their larger counterparts (Audretsch, 1991; 1995). Large firms often find themselves locked in by their organizational routines and bureaucracy, which produce inertia of innovation activities. This contrasts to small firms, who are able to adapt and respond to market changes more rapidly thanks to their high level of innovation that is driven by fewer routines and less bureaucracy (Rodríguez and Rodríguez, 2005; D’Angelo, 2010). It is therefore expected that the effect of a firm’s size on export performance is lower for high-tech firms compared to other firms.

It is also acknowledged that formal institutions influence firms’ access to resources, but domestic institutions tend to favor large firms either voluntarily to maintain relationships or involuntarily to wield their market power (Vanhaverbeke, 2001; Johannisson et al., 2002). The absence of formal institutions cause a lack of effective governance and property rights, and force firms to establish internal markets for labor, products and capital. Small firms lack the necessary organizational resources to construct or access these internal markets and have to rely on publicly available markets, leading to above average transaction cost. Particularly a malfunctioning system of property rights proves an obstacle to smaller firms’ export success, because innovation-related patents of products and processes cannot be enforced (LiPuma et al., 2013). Since the institutional quality is less robust in developing countries, the size of the firm is expectedly less important in developed countries with a well-functioning institutional infrastructure, because small firms face similar transaction costs as large firms.

Firm size proxies organizational resources, which differ between service firms and manufacturing firms. A service firm’s resources is rooted in its intangible
capabilities, such as tacit knowledge or skills restricted to certain employees, whereas manufacturers rely on both its intangible capabilities and tangible assets such as equipment, property or patents to sustain and develop competitive advantages (Fahy, 1996; Schroeder et al., 2002). There is an additional dimension related to the location of the capabilities of service firms engaged in international business due to the intangibility of the service offered and simultaneity of consumption and production (Carman and Langeard, 1980; Fahy, 1996). This implies that service firms face less export activity compared to manufacturers, because its activities are location-bound (i.e. knowledge and skills apply to certain location) (Anand and Delios, 1997). Service firms typically initialize its internationalization process by following clients overseas, but rapidly form a joint-venture with a local partner to overcome the location-disadvantage (Anand and Delios, 1997; Steven White et al., 1998). Since the organizational resources are specific to the employees and location-bound in service firms, it is expected that operating in the service industry negatively moderate the effect of firm size on export performance. The firm size simply proves less important for exporting in the service industry, because service sector firms produce products that are not as exportable as manufacturers’ goods (i.e. tangible goods eligible for consumption after production), and therefore rapidly move upwards the establishment chain.

2.3 Towards a Conceptual Model

The development of the preliminary theoretical model provides a basis for evaluating the firm size-export performance relationship. The conceptual model therefore builds on a solid theoretical discussion of firm size as a determinant of export performance and potential moderators hereof. It is presented in figure 5 and forms the basis of the MRA.

Figure 5: A Conceptual Firm Size-Export Performance Model

It is evident from section 2.2.1 that strong resource-based arguments suggest a positive relationship between firm size and export performance. It is expected that a larger firm size leads to a larger stock of inimitable and valuable organizational capabilities, which enables larger firms to generate and sustain a competitive advantage in exports over its smaller counterparts. Hypothesis 1 reflects the first research question (RQ1):
Hypothesis 1 (H1): There is a positive effect of firm size on export performance – the larger the firm, the higher export performance.

It is acknowledged that potential moderators influence the relationship between firm size and export performance. The potential moderating effects are described in hypothesis 2, 3 and 4 with root in section 2.2.2 and reflect the second research question (RQ2).

The first moderating effect relates to firms’ level of technological resources. High-tech firms with a high level of technological capacity is expected to negatively moderate the relationship between firm size and export performance, because small firms are more technological intensive and innovative than large firms.

Hypothesis 2 (H2): The effect of firm size on export performance is lower for high-tech firms with a high level of technological resources (negative moderating effect) compared to other firms.

The second moderating effect relates to the institutional quality of the domestic market. It holds that the institutional quality proves more robust in developed countries compared to developing countries. If a firm is located in a developed country, it is expected to negatively moderate the relationship between firm size and export performance, because a well-functioning institutional infrastructure is more important to small firms than large firms.

Hypothesis 3 (H3): The effect of firm size on export performance is lower for firms located in developed countries characterized by a high institutional quality (negative moderating effect) compared to firms located in developing countries.

The third and last moderating effect relates to the industry in which the firm operates. Service firms per se experience less export activity due to simultaneity and intangibility of service offerings compared to manufacturers. If a firm operates in the service industry, it is expected to negatively moderate the effect of firm size on export performance, because service sector firms rapidly switch to other modes of foreign market entry to overcome the location-disadvantage.

Hypothesis 4 (H4): The effect of firm size on export performance is lower for service sector firms (negative moderating effect) compared to manufacturers.

The research process did unfortunately not allow for an investigation of the moderating effect of internationalization path (BG versus traditional exporter) as illustrated in the conceptual model (fig. 5). The issue of detecting theoretically relevant moderator variables that prove ineligible for investigation due to constraints in the meta-dataset is not uncommon in MRA (see e.g. Doucouliagos and Laroche, 2002). The conceptual model controls for research period and research focus as discussed in section 2.2.2.
3 Methodological Framework

With the conceptual firm size-export performance model (fig. 5) as the basis of empirical inquiry, the methodological framework commences with a brief introduction to MRA in section 3.1. The studies that constitute the meta-dataset are identified, collected and coded in section 3.2, while the MRA is modeled in section 3.3.

3.1 Introduction to Meta-Regression Analysis

MRA is a principled synthesis of empirical findings across a population of studies (Rhodes, 2012; Paldam, 2015). It requires that the identified studies are so analogous that their differences qualifies for coding. This is most often attainable, because meta-analyses disregard theoretical models in the underlying studies and solely consider findings from estimation models (Paldam, 2015).

This MRA follows closely the reported guidelines in economics and business proposed by the meta-analysis of economics research-network (Stanley et al., 2013). The guidelines were developed to codify quality standards of MRA. Besides the reported guidelines, this MRA also incorporates best-practices discussed by Stanley and Doucouliagos (2012) and integrates the most recent meta-analytical trends in the international business literature identified by Kirca and Yaprak (2010). The two-leveled structure of the MRA is outlined in table 1.

<table>
<thead>
<tr>
<th>Table 1: Steps in Meta-Regression Analysis</th>
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<tr>
<td><strong>Level one</strong></td>
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<tr>
<td>Step 1 Effect Size and Dependency Issues</td>
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<td>Step 2 Literature Identification, Compilation and Coding</td>
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<td>Step 3 Summarizing Meta-Data</td>
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<td>Step 4 Funnel-Assymmetry Testing (FAT) and Precision-Effect Testing (PET)</td>
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<td><strong>Level two</strong></td>
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<td>Step 5 Modelling Heterogeneity (Explanatory Meta-Regression Analysis)</td>
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<td>Step 6 Interpretation of Empirical Findings</td>
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</table>

Level one and level two refer to the level of judgement of the meta-analyst, where level one requires the least.

The difference between level one and level two is rooted in the level of judgement made by the meta-analyst. The four steps at level one allows few choices requiring judgement compared to level two, where the purpose is to ask questions to the meta-sample through explanatory MRA. This makes the findings at level one more robust to judgement than the findings at level two, but a successful MRA nevertheless requires consistent findings across both levels (Paldam, 2015; Stanley and Doucouliagos, 2012).

The first step of the MRA is related to the choice of a standardized effect size that allows for a comparison of regression coefficients and to address potential dependency issues. The conceptual model (fig. 5) then provides a basis for identifying, compiling and coding the literature into a meta-dataset suitable for MRA. When the literature has been coded, it can be explored through funnel plots and descriptive statistics to detect potential coding errors and outliers. This exploratory step is important in MRA, because it contributes with insights into the current state of empirical knowledge (Stanley and Doucouliagos, 2012).
The fourth step consists of a Funnel-Asymmetry Test (hereinafter FAT) and a Precision-Effect Test (hereinafter PET). FAT is a test for publication bias, while PET is a test for an empirical effect beyond publication bias. The idiosyncratic choices and preferences of researchers on primary research emerges as systematic biases in meta-data. These biases can be divided into three selection effects: (a) publication selection, (b) methodology selection and (c) research priority selection. The danger of meta-analysts own selection effects relates primarily to sample selection bias, but this is accommodated by a systematic identification and compilation of the literature allowing no judgement to the meta-analyst (Rosenberger and Johnston, 2009). Publication selection bias constitutes the most well-known threat to scientific practice and statistical inference (Stanley and Doucouliagos, 2012). It arises when researchers, reviewers or editors prefer papers that find statistical significant results, which causes an overrepresentation of larger and more significant effects (Stanley, 2005). FAT-PET MRA provides both a simple model to detect publication bias (FAT) and an overall effect corrected for publication bias (PET). The other selection effects and excess heterogeneity is accounted for through advanced econometric methods of MRA and explained at level two through an explanatory MRA that takes into account methodological and conceptual moderating effects (Kirca and Yaprak, 2010; Stanley and Doucouliagos, 2012; Paldam, 2015). The MRA is concluded with an interpretation and comparison of findings at both levels (Paldam, 2015).

3.1.1 Effect Size

MRA demands that each effect is comparable across studies, which rule out the direct use of reported regression coefficients unless the measurement or scale is identical (Stanley and Doucouliagos, 2012). This is not the case in the export performance literature, where some studies use the logarithm of firm size. The regression coefficients are instead transformed into partial correlation coefficients (hereinafter PCCs) in line with other meta-analyses (Doucouliagos and Paldam, 2008; Shoham, 2003; Ugur, 2014). The PCC is widely used in business and economics, because it provides a measure of both the strength and direction of a relationship, ceteris paribus. The PCC ($r$) and its standard error is calculated as:

$$r = \frac{t}{\sqrt{(t^2 + df)}}$$  

(1)

and

$$SE_r = \sqrt{\frac{1 - r^2}{df}}$$  

(2)

where $t$ represents the t-statistic from the regression coefficient in the primary study and $df$ denotes the degrees of freedom of the t-statistic.

It is important to notice that the PCC is a unitless statistical effect that is not economically meaningful. The ideal choice of effect size is an elasticity that measures the percentage change in export intensity from a percentage change in firm size. However, elasticities are rarely directly reported (only if double-log form is used) and need to be calculated using sample means of both the
dependent and independent variables. Such sample means are rarely disclosed and therefore the use of elasticities significantly reduces the meta-sample. The PCCs only request standard information and remain sufficient to answer the research questions (Stanley and Doucouliagos, 2012).

There is a few other issues with PCC. Its distribution is not normal, when its values lie close to its extremes (+1 and -1). This issue, together with the issue of PCC not being independent of its standard error, necessitates the use of Fisher’s z-transformation for robustness (Stanley and Doucouliagos, 2012). Fisher’s z-transformation is given by:

\[
z = \frac{1}{2} \ln \left( \frac{1 + r}{1 - r} \right)
\]

(3)

The standard error (\(SE_r\)) represents the variation due to sampling error. The inverse of the standard error (1/\(SE_r\)) is the precision of the PCCs (z-transformed). The smaller standard error, the higher precision of the PCC (Ugur, 2014).

3.1.2 Dependency Issues

MRA is based on the same assumptions as regression analysis, which include the assumption of independent and identically distributed error terms (i.i.d). This assumption is often violated in conventional econometrics (e.g. autocorrelation), but the meta-analysis literature has long recognized the presence of dependency issues, when more than one effect per author or study is reported. This dependency is commonly divided into study dependence and author dependence. When studies report multiple effects, the differences in effects are rooted in different model specifications and cannot be considered within-study independent. If authors publish more than one study within the same field, the reported effects cannot be considered between-study independent due to the authors selection effects related to choice of sample, methodology and subject (Stanley and Doucouliagos, 2012).

In MRA, three different sets of effects are routinely employed: an all-set, a best-set and an average-set (see e.g. Shoham, 2003; Doucouliagos and Paldam, 2008; Ugur, 2014). The all-set consists of all effects reported in each study, the best-set consists of the preferred effects indicated by the authors in each study, while the average-set consists of an average of the effects in each study. The best-set and average-set both eliminates the issue of within-study dependence, but neither set is flawless. The best-set often demands judgement by the meta-analyst, because authors rarely indicate the preferred model in primary research. The average-set does not conform to explanatory MRA at level two, because the differences between models in each study cannot find expression in an average. This MRA follows the conventional practice and use the all-set as the preferred set, but models within-study dependency explicitly with more sophisticated multi-level, unbalanced panel and cluster-robust methods of MRA (Stanley and Doucouliagos, 2012). It is advisable to use at least two different sets, for which reason the average-set is used for robustness at level one (Stanley, 2001). This combination is preferable, because it requires no judgement of the meta-analyst (Stanley and Doucouliagos, 2012). See appendix E for an illustration of the all-set and average-set.
3.2 Literature Identification, Compilation and Coding

This section identifies the meta-sample through a comprehensive literature search that is based on a predetermined set of inclusion criteria. The meta-sample is subsequently coded into a meta-dataset following a detailed coding manual (Stanley, 2005; Kirca and Yaprak, 2010; Stanley and Doucouliagos, 2012).

3.2.1 Criteria for Inclusion

The purpose of the inclusion criteria is to explicitly define the boundaries for the inclusion of the population of studies (both published and unpublished) on the relationship between firm size and export performance (Kirca and Yaprak, 2010). The inclusion criteria thus forms the basis of the literature search in section 3.2.2 by assuring that the identified studies prove so similar that their differences are eligible for coding (Stanley and Doucouliagos, 2012).

It is argued that published studies generally contain estimates of greater quality than unpublished studies (or the so-called grey literature). This is most likely true since published studies undergo a thorough refereeing process, but as an MRA is subject to publication bias, it cannot completely neglect the inclusion of the grey literature. The grey literature is possibly of lower quality, but tend to constitute newer studies consisting of newer data and estimation techniques. The addition of the grey literature therefore contributes with both fresh thinking and more studies to the meta-sample that allows for more comprehensive methods of MRA (Stanley and Doucouliagos, 2012). The inclusion criteria of this MRA is presented in table 2.

Table 2: Inclusion Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Language: English</td>
</tr>
<tr>
<td>(2)</td>
<td>Data type: Primary source</td>
</tr>
<tr>
<td>(3)</td>
<td>Time amplitude: 1960-2015</td>
</tr>
<tr>
<td>(4)</td>
<td>Applied econometric nature: The studies should at a minimum include number of observations, regression coefficients, t-statistics and/or standard errors from continuous variable studies</td>
</tr>
<tr>
<td>(5)</td>
<td>Dependent variable: Export intensity measured as a ratio (export sales divided by total sales)</td>
</tr>
<tr>
<td>(6)</td>
<td>Continuous independent variable: Firm size measured as either (a) total sales, (b) total assets or (c) number of employees</td>
</tr>
<tr>
<td>(7)</td>
<td>Unit of Analysis: Export function level (firm-level)</td>
</tr>
</tbody>
</table>

Successful MRA requires essentially a deep understanding of all studies to mitigate exclusion mistakes and coding errors, which deems simple interpretations of tables insufficient (Stanley and Doucouliagos, 2012). The inclusion of studies are therefore initially restricted to English studies based on the language limitations of the meta-analyst. Stanley and Doucouliagos (2012) recognize the issue of leaving out relevant findings in other languages, but consider this bias of second order, as non-English studies constitute an insignificant share of all studies in business and economics. In line with previous meta-analyses, this MRA only includes data from primary sources and for the sake of completeness consider all studies from 1960 to 2015 (present) (see e.g. Leonidou et al., 2002; Daniel et al., 2004).
It is decisive that the included studies are of an applied econometric nature to allow for econometrical methods of MRA. The studies should at a minimum disclose number of observations, regression coefficients, t-statistics and/or standard errors related to the regression coefficients to provide sufficient information for the calculation of the PCCs (equation 1)\(^3\).

Export performance constitutes a multi-facetted concept that finds expression in both subjective and objective measures. MRA is limited to analyzing the same empirical relationship across all studies, which constrains the analysis of the firm size-export performance relationship to only one proxy of export performance (Hunter and Schmidt, 1990). The composite and subjective measures are based on different assumptions and methodologies that do not translate among studies (Dhanaraj and Beamish, 2003; Brouthers et al., 2009), which leaves the objectives measures as the only comparable measures in an MRA context (Sousa, 2004). Katsikeas et al. (2000) identified 23 different objective measures, where export intensity achieved the highest frequency of use (57%). The high frequency of use can be explained by the fact that firms need to disclose nothing else than a simple ratio (Sousa, 2004). Export intensity as a proxy of export performance is theoretically intertwined with firm size through resource-based theory, where particularly economies of scale enables larger firms to achieve higher export intensities compared to smaller firms (Bonaccorsi, 1992; Verwaal and Donkers, 2002). The use of export intensity appears as the best-possible proxy of export performance due to its theoretical justification and high frequency of use that ensures enough studies for a voluminous meta-sample.

It was clear from section 2.2.1 that the export performance literature disagrees on a conventional proxy of firm size and that different definitions dominate across studies. This MRA therefore considers the three most commonly used measures of firm size identified in section 2.2.1 – (a) total sales, (b) total assets and (c) number of employees – and requires that the measures are used as a continuous variable in the primary studies. The studies that use a dummy variable to indicate small, medium and large firms are excluded to overcome the issue of different firm size definitions.

The empirical literature tends to pose different research questions at different levels of the firm, when evaluating export performance (Oliveira et al., 2012). The export function is generally considered the appropriate unit of analysis, when the objective is to explain heterogeneity in export performance among firms. This makes the export function the appropriate unit of analysis in this MRA, because it embraces the entire organization and thus allows for an assessment of the effect of firm size on overall export performance. The venture level allows oppositely for an evaluation of the variation in firm-specific advantages, which fall outside the scope of this MRA (Oliveira et al., 2012).

3.2.2 Literature Search

The literature search is conducted on the population of studies which boundaries are defined by the inclusion criteria in table 2. The search for meta-literature should be as rigorous and comprehensive as possible to filter out any systematic bias induced by the meta-analysts own preference for certain studies (Stanley, \(^3\)The regression coefficient \(a_1\) together with either the standard error or t-statistic is sufficient, because either statistic can be easily obtained using \(t = a_1/SE_a\) (Stanley and Doucouliagos, 2012).
2005). The literature search is separated into three distinct steps to ensure that the final meta-sample covers the population of studies on the firm size-export performance relationship. This involved an electronic database search (step I) and a bibliographic search (step II) in line with previous meta-analyses (e.g. Shoham, 2003; Leonidou et al., 2002) and a citation search (step III) of the studies from step I and II as suggested by Stanley and Doucouliagos (2012). The entire search process (step I, II and III) is documented in table 3.

Table 3: Process and Documentation of Literature Search

<table>
<thead>
<tr>
<th>Step I</th>
<th>Step II</th>
<th>Step III</th>
<th>Meta-Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total identified</td>
<td>853</td>
<td>51</td>
<td>101</td>
</tr>
<tr>
<td>Criteria (1)</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Criteria (2)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Criteria (3)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Criteria (4)</td>
<td>715</td>
<td>26</td>
<td>67</td>
</tr>
<tr>
<td>Criteria (5)</td>
<td>77</td>
<td>10</td>
<td>24</td>
</tr>
<tr>
<td>Criteria (6)</td>
<td>25</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Criteria (7)</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total remaining</td>
<td>35</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

The criteria (1)-(7) refer to the inclusion criteria established in table 2. The numbers represent excluded studies that do not pass the inclusion criteria in the given sequence. Step I: Database search, Step II: Bibliographic search, Step III: Citation search. Meta-Sample corresponds to the total of Step I, II and III.

The literature search is limited to include only unpublished studies in the database search (step I). Card et al. (2010) acknowledge the issue of covering the entire grey literature, as it requires additional search efforts such as inquiring authors for their unpublished work or knowledge hereof. Such search efforts fall outside the scope of this thesis. Nelson and Kennedy (2009) find this issue common to meta-analysis. They found through a comprehensive review of 140 meta-analyses that most did not include the population of studies and often the grey literature appeared underrepresented in the meta-samples.

The search strategy employed in this MRA is fully disclosed including all databases and combinations of key words in appendix B. Step I involved a search through databases such as EconLit, ABI Inform and Emerald Insight by using a combination of key words such as “export intensity” and “firm size” or “export sales ratio” and “employees”. The database search identified a total of 853 studies after the removal of duplicates among databases. The inclusion criteria 1-3 were specified in the databases prior to the search. After inclusion criteria 4-7 were applied to all studies, 35 qualified for inclusion in the meta-sample. Step II involved a search through relevant references in the 35 studies from step I, where 5 studies out of 51 satisfied all inclusion criteria. The final step III involved a thorough citation search of the 40 studies identified in step I and II on Google Scholar for relevant citations. Out of 101 studies, 6 qualified for inclusion. The final meta-sample therefore consists of 46 studies eligible for coding. All of the 1005 studies that have been subject to a manual review can be found in the enclosed Excel workbook “Meta-Data” along with the criteria for exclusion. The references for the 46 studies are attached in appendix A, while the meta-sample is presented in appendix G.

The literature search revealed eventually that number of employees and total
sales were the most commonly used proxies of firm size by being represented in 36 and 13 studies, respectively (note: do not equal 46 as some studies use both proxies). The use of total assets was limited to two studies (Galdeano-Gómez et al., 2015; Amornkitvikai et al., 2012). These studies were excluded on the grounds that MRA should be based on the same empirical relationship (total assets-export performance) with two studies being insufficient. It was expected that the number of employees would dominate total sales as a proxy of firm size due to firms unwillingness to disclose financial information (Brouthers and Nakos, 2005). The two proxies are considered separately to maintain the analysis to the same empirical relationships.

3.2.3 Coding of the Literature

The meta-sample that is identified through the literature search is coded into a meta-dataset to allow for econometric methods of MRA. The consideration of two different sets of effects (an all-set and an average-set) and two different measures of firms size (number of employees and total sales) necessitates the coding of four subdatasets: (1) employees (all-set), (2) employees (avg.-set), (3) sales (all-set), and (4) sales (avg.-set). The complete coding manual in appendix C presents all coded differences between the collected studies, while the coded variables directly used in the MRA is presented in table 4 along with mean and standard deviation. The coded variables are divided into four categories: (A) main statistics, (B) conceptual moderators and controls, (C) methodological moderators, and (D) control variables.

The main statistics constitute the PCCs with Fisher’s z-transformation and the precision \(1/SE_r\) together with the study-invariant journal impact factor to reflect effect quality and a dummy variable for whether the natural logarithm of the firm size proxy was used. The conceptual moderators and controls are coded with root in the conceptual model (fig. 5), while the methodological moderators comprise estimation methods, data structure and publication status. The selection of methodological moderator variables is based on previous meta-analyses and best-practice (see Doucouliagos and Paldam, 2008; Stanley and Doucouliagos, 2012; Ugur, 2014). The number of variables is therefore deemed sufficient to investigate authors’ selection effects through explanatory MRA at level two. Stanley and Doucouliagos (2012) stress the importance of identifying relevant control variables used in the primary studies. These control variables were identified during the coding process of the meta-sample, where, eventually, the most frequently used variables were coded (see appendix C for descriptions).

It is recognized that there subsists a danger of including too many variables, because it reduces the degrees of freedom. Most of the strategies that accommodate this issue involves a reduction of the number of variables, but this often leads to omitted variable bias in the context of MRA. This means that anything thought to affect the sampling distribution should be incorporated regardless of sample size. The literature remains too immature for MRA, when this is statistically impossible (Stanley and Doucouliagos, 2012). The coding of the literature in this MRA therefore attempts to balance integrating only meaningful variables for explaining heterogeneity, but still not including too few for answering the research questions.
Table 4: Coded Variables based on the Meta-Sample

<table>
<thead>
<tr>
<th>No.</th>
<th>Variable</th>
<th>Description*</th>
<th>Employees</th>
<th>Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean  SD</td>
<td>Mean  SD</td>
<td></td>
</tr>
<tr>
<td>(A)</td>
<td>Main Statistics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>z</td>
<td>Partial correlation coefficient with Fisher’s z transformation</td>
<td>0.131</td>
<td>0.164</td>
</tr>
<tr>
<td>2</td>
<td>Precision</td>
<td>Inverse of the standard error of the partial correlation coefficient</td>
<td>43.20</td>
<td>56.57</td>
</tr>
<tr>
<td>3</td>
<td>Impfactor</td>
<td>Journal impact factor b</td>
<td>3.238</td>
<td>3.091</td>
</tr>
<tr>
<td>4</td>
<td>Logspec</td>
<td>BD for using the logarithm of firm size</td>
<td>0.485</td>
<td>0.501</td>
</tr>
<tr>
<td>(B)</td>
<td>Conceptual Moderators and Controls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>DC</td>
<td>BD for sample relating to a developed country c</td>
<td>0.653</td>
<td>0.478</td>
</tr>
<tr>
<td>6</td>
<td>Y80</td>
<td>BD for sample relating to 1980s</td>
<td>0.054</td>
<td>0.226</td>
</tr>
<tr>
<td>7</td>
<td>Y90</td>
<td>BD for sample relating to 1990s</td>
<td>0.174</td>
<td>0.380</td>
</tr>
<tr>
<td>8</td>
<td>Y00</td>
<td>BD for sample relating to 2000s</td>
<td>0.743</td>
<td>0.439</td>
</tr>
<tr>
<td>9</td>
<td>Y10</td>
<td>BD for sample relating to 2010s</td>
<td>0.030</td>
<td>0.171</td>
</tr>
<tr>
<td>10</td>
<td>Manu</td>
<td>BD for manufacturing industry</td>
<td>0.838</td>
<td>0.569</td>
</tr>
<tr>
<td>11</td>
<td>Serv</td>
<td>BD for service industry</td>
<td>0.078</td>
<td>0.269</td>
</tr>
<tr>
<td>12</td>
<td>Hightech</td>
<td>BD for high-technology firms (&lt;250 employees)</td>
<td>0.102</td>
<td>0.303</td>
</tr>
<tr>
<td>13</td>
<td>SME</td>
<td>BD for investigating SMEs (&lt;250 employees)</td>
<td>0.323</td>
<td>0.469</td>
</tr>
<tr>
<td>14</td>
<td>Large</td>
<td>BD for investigating large firms (&gt;250 employees)</td>
<td>0.054</td>
<td>0.226</td>
</tr>
<tr>
<td>(C)</td>
<td>Methodological Moderators</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>OLS</td>
<td>BD for using ordinary least squares (OLS)</td>
<td>0.329</td>
<td>0.471</td>
</tr>
<tr>
<td>16</td>
<td>Censreg</td>
<td>BD for using a censored regression</td>
<td>0.305</td>
<td>0.462</td>
</tr>
<tr>
<td>17</td>
<td>Fraclogit</td>
<td>BD for using fractional logit regression</td>
<td>0.341</td>
<td>0.476</td>
</tr>
<tr>
<td>18</td>
<td>Trunreg</td>
<td>BD for using a truncated regression</td>
<td>0.024</td>
<td>0.153</td>
</tr>
<tr>
<td>19</td>
<td>Panel</td>
<td>BD for using a panel data structure</td>
<td>0.545</td>
<td>0.499</td>
</tr>
<tr>
<td>20</td>
<td>Randefects</td>
<td>BD for using random effects</td>
<td>0.066</td>
<td>0.249</td>
</tr>
<tr>
<td>21</td>
<td>Fixefects</td>
<td>BD for using fixed effects</td>
<td>0.275</td>
<td>0.448</td>
</tr>
<tr>
<td>22</td>
<td>Pooled</td>
<td>BD for using a pooled sample</td>
<td>0.036</td>
<td>0.187</td>
</tr>
<tr>
<td>23</td>
<td>PubStatus</td>
<td>BD for published in a journal</td>
<td>0.898</td>
<td>0.303</td>
</tr>
<tr>
<td>(D)</td>
<td>Control Variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Rdint</td>
<td>BD for controlling for R&amp;D intensity</td>
<td>0.257</td>
<td>0.439</td>
</tr>
<tr>
<td>25</td>
<td>Age</td>
<td>BD for controlling for firm age</td>
<td>0.461</td>
<td>0.500</td>
</tr>
<tr>
<td>26</td>
<td>FO</td>
<td>BD for controlling for foreign ownership</td>
<td>0.114</td>
<td>0.318</td>
</tr>
<tr>
<td>27</td>
<td>SizeSq</td>
<td>BD for controlling for firm size^2</td>
<td>0.246</td>
<td>0.432</td>
</tr>
<tr>
<td>28</td>
<td>IndEff</td>
<td>BD for controlling for industry specific effects</td>
<td>0.144</td>
<td>0.352</td>
</tr>
<tr>
<td>29</td>
<td>Capint</td>
<td>BD for controlling for capital intensity</td>
<td>0.120</td>
<td>0.326</td>
</tr>
</tbody>
</table>

* BD refers to a binary dummy that is equal to 1 if condition is true, 0 otherwise.

b IDEAS/RePEc Simple Impact Factors for Journals provided by the CitEc project. If an impact factor is not provided, the journal is assigned a weight corresponding to 50% of the lowest sample impact factor. Unpublished studies are assigned a weight of 25%.
c Developed countries are defined based on UNCTAD Statistics Database and comprises all EU member states, incl. Iceland, Norway and Switzerland, Australia, Canada, Japan, New Zealand and the United States.
It was noticed during the coding process that some authors recurred in multiple studies with the same dataset. These authors were coded with a unique author identification number to be able to treat the studies in one group to mitigate between-study dependency. The unique author identification number were also assigned to the studies with the exact same authors, because the authors idiosyncratic selection effects create between-study dependency even though different datasets were used (Wagner, 1995; 2001; D’Angelo, 2010; 2012; Kuivalainen et al., 2013; Rodríguez and Nieto, 2010; 2012).

3.3 Modeling the Meta-Regression Analysis
This section commences with an exploratory insight into the current state of empirical knowledge to detect potential publication bias, outliers, coding errors or overly influential studies. When the meta-data is fully understood, the MRA can be meaningfully modeled both at level one and level two (Stanley and Doucouliagos, 2012).

3.3.1 Summarizing Meta-Data
The meta-dataset consists of 221 observations (i.e. effects) from a total of 46 studies, which separate into the employees all-set (167 effects) and the sales all-set (54 effects). The study that report most effects reports 24, while the average effect per study is 4.8. The published studies are overrepresented in the sample with 40 studies, leaving only 6 studies unpublished. The heterogeneity among effects are summarized in table 4 in section 3.2.3 (see mean values). Most effects in the employees all-set relates to the 2000s (74%), while the 1980s dominate (40%) in the sales all-set. No effects passed the inclusion criteria from the 1960s and 1970s. It is evident from both the employees and sales all-sets that the manufacturing industry is the most common industry of analysis (84% and 82%, respectively). In the employees all-set half of the sample countries are developed, while developing countries dominate (89%) in the sales dataset.

A simple vote-count in table 5 confirms the conflicting findings on the firm size-export performance relationship of previous literature reviews (Sousa et al., 2008; Zou and Stan, 1998). The majority of the total studies (65%), however, report a positive and statistically significant effect. The vote-count should be considered exploratory, because it suffers from a severe loss of information (Stanley and Doucouliagos, 2012). It solely counts the effects while disregarding sources of variation, sampling error and publication bias (Hunter and Schmidt, 2004).

Table 5: Vote-Count (Descriptive Statistics)

<table>
<thead>
<tr>
<th></th>
<th>Employees</th>
<th>Sales</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive, statistically significant</td>
<td>110 (65%)</td>
<td>33 (61%)</td>
<td>143 (65%)</td>
</tr>
<tr>
<td>Positive, statistically insignificant</td>
<td>25 (15%)</td>
<td>10 (19%)</td>
<td>35 (16%)</td>
</tr>
<tr>
<td>Negative, statistically significant</td>
<td>16 (10%)</td>
<td>4 (7%)</td>
<td>20 (9%)</td>
</tr>
<tr>
<td>Negative, statistically insignificant</td>
<td>16 (10%)</td>
<td>7 (13%)</td>
<td>23 (10%)</td>
</tr>
<tr>
<td>Observations (effects)</td>
<td>167 (100%)</td>
<td>54 (100%)</td>
<td>221 (100%)</td>
</tr>
<tr>
<td>Studies(^a)</td>
<td>36</td>
<td>13</td>
<td>46</td>
</tr>
<tr>
<td>Published</td>
<td>32</td>
<td>11</td>
<td>40</td>
</tr>
<tr>
<td>Unpublished</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
</tbody>
</table>

Vote-count on the employees and sales all-sets, i.e. includes all effects from all studies.
\(^a\) Studies do not add up to 46 as some studies report both Sales and Employees effects.
Funnel plots are commonly used in meta-analysis to identify key features and characteristics of an empirical literature. A funnel plot is a scatter plot of all empirical effects ($z$) (x-axis) against these effects’ precisions (y-axis), which is the inverse of the effects standard errors ($1/SE_r$) (Stanley and Doucouliagos, 2010). MRA is especially vulnerable to publication bias, because it distorts statistical inference when findings from multiple studies are synthesized. The simplest method to detect publication bias is through an informal analysis of funnel plots. It is important to notice that such analysis is regarded exploratory. Publication bias still needs to be tested formally using FAT (Stanley, 2005).

If the literature can boast of being free from publication bias, the funnel plot should appear symmetric. The more precise effects should be compactly distributed at the top of the plot, leaving the more imprecise effects widespread at the bottom. This occurs because the effects’ precisions are the inverse of its standard errors. The smaller samples, the larger standard errors and the more imprecise effects. In a scenario with publication bias, the primary studies that base its findings on smaller samples will search thoroughly for larger effects to compensate for its larger standard errors. This search involves the modification of functional forms, manipulation of samples, estimation techniques and specifications, resulting in nothing else than low precision and widespread effects. (Doucouliagos and Paldam, 2008). The studies that, on the contrary, base its findings on larger samples do not need to search so hard to find statistical significance and are satisfied with less widespread (smaller) effects (Stanley and Doucouliagos, 2012).

Figure 6: Funnel Plot (all-sets)

It appears from the funnel plot in figure 6 that the literature using total sales as a proxy of firm size is asymmetrically skewed towards a positive relationship between total sales and export intensity (i.e. positive publication bias).
effects are compactly distributed on the right hand side, but with very low precisions. When employees are used as a proxy of firm size, the funnel plot also appears asymmetrically skewed towards positive publication bias. The extent to which publication bias exists remain questionable due to a few high precision negative effects.

The funnel plot was also used to correct coding errors, which were typically related to typos (e.g. the failure of adding a zero to a standard error). The slightly negative high precision effects distributed at the top of the funnel plot is not outliers, but rather influential points. The effects in question were checked for coding errors, but the high precision is purely a result of a very large sample of more than 100,000 observations (see Egger and Kesina, 2014). The large imprecise effects distributed at the bottom of the funnel plot can technically be regarded as outliers. However, outliers pose no real threat to the central findings of MRA, because it uses precision as analytical weights (discussed in section 3.3.2). This means essentially that the low precision effects exert little influence on the findings and are retained in the meta-dataset to avoid systematic bias of the meta-analyst (Stanley and Doucouliagos, 2012). The funnel plots of the average-sets are presented in appendix D for the interest of the reader.

3.3.2 Funnel-Asymmetry and Precision-Effect Testing

The problem of publication bias is not its existence, but rather the bias it imparts on any summary of empirical estimates, if uncorrected. The Funnel-Asymmetry and Precision-Effect MRA (FAT-PET) is both a test for publication bias (FAT) and a test for a genuine underlying empirical effect beyond publication bias (PET) (Stanley and Doucouliagos, 2012). FAT-PET generally outperforms other methods of MRA and is regarded the preferred method across the more mature and recent meta-analysis literature in economics and business (Doucouliagos and Stanley, 2009; Efendic et al., 2011; Ugur, 2014).

This MRA considers multiple effects in the all-sets, which causes a multilevel data structure (see fig. E.1. in appendix E). Such data structure suffers per se from within-study dependency from authors selection of method and data and other unobservable factors such as study quality, author’s ideology or funding source (Stanley and Doucouliagos, 2012).

The issue of within-study dependency is routinely accommodated in MRA by using multilevel unbalanced panel methods (Rosenberger and Loomis, 2000; Bateman and Jones, 2003). The need to control for within-study dependency in this MRA is confirmed by a Breusch-Pagan Lagrange multiplier (LM) test, which serves as a test for heterogeneity among study-level effects (Stanley and Doucouliagos, 2012). The LM test follows a chi-squared distribution and equals 570 and 530 for the employees and sales all-set ($H_0$ : constant variance), respectively, which is significant at all levels (reject $H_0$). This confirms the need to control for within-study dependency, but the meta-dataset also suffers from between-study dependency related to authors selection of data and methods (recall section 3.2.3). This MRA therefore controls for author-level fixed-effects in line with Doucouliagos and Paldam (2008). See appendix F for an illustration.
The author fixed-effect multilevel (hereinafter FEML) FAT-PET panel model is given by:

\[ z_{is} = \beta_0 + \beta_1 SEr_{is} + D_a + \epsilon_{is} \]  

(4)

where \( z_{is} \) is the PCC with Fisher’s z-transformation, \( SEr_{is} \) is its standard error, \( D_a \) represents a matrix of author dummy variables, and \( \epsilon_{is} \) constitutes the residuals (Stanley and Doucouliagos, 2012). FEML only allows for correlation among author-level effects and the explanatory variables. This means fundamentally that FEML rules out any variation between authors, which induces no bias on the estimates by unobserved differences between authors. FEML is estimated by a least-squares dummy variable approach, where author dummy variables \( (D_a) \) control for all variation between authors (Wooldridge, 2010).

A simple t-test on \( \beta_1 SEr_{is} \) is a test for funnel asymmetry or publication bias (FAT, \( H_0 : \beta_1 = 0 \)) and estimates of \( \beta_0 \) constitute the meta-averages corrected for publication bias (PET, \( H_0 : \beta_0 = 0 \)) (Stanley and Doucouliagos, 2012).

The FEML panel model is preferred to a random-effect multilevel (hereinafter REML) panel model in economic applications of MRA. REML assumes that excess heterogeneity is random and independent of the explanatory variable \( (SEr_{is}) \). It adds practically an unobserved study-effect that allows for between-effect or between-study random variation. Recall that researchers experiment systematically with techniques and model specifications to compel certain findings for their statistical significance. Such efforts are correlated with the explanatory variable \( (SEr_{is}) \), as larger standard errors demand larger effects to obtain significance. This assumption is therefore routinely violated in REML, which invalidates its applicability in this context (Stanley and Doucouliagos, 2012). FEML panel models are oppositely criticized for calculating smaller standard errors, which exaggerates the significance of the MRA coefficients. This is a matter of efficiency rather than bias and even though it is of second order, not appropriately accommodating the error structure can cause incorrect calculations of the t-statistics and standard errors in the MRA, which lead to inflated t-values and false appearance of significance. This is remedied by using cluster-robust standard errors within FEML for conservativeness, which treats each study as a cluster and allows for dependency among study-level effects (Doucouliagos and Paldam, 2008; Stanley and Doucouliagos, 2012).

The FEML panel model is estimated by weighted least squares (hereinafter WLS) with precision-squared \( (1/SEr^2) \) as weights. Equation 4 should not be estimated by ordinary least squares (hereinafter OLS) due to obvious heteroscedasticity (i.e. unequal variance of \( z_{is} \) and \( \epsilon_{is} \) across effects). Recall that MRA is based on the same assumptions as conventional econometrics (Stanley and Doucouliagos, 2012). This implies fundamentally that this MRA adheres to the conventional Gauss-Markov assumptions that applies to linear regression models. The classical assumptions include: (1) linearity \( (Y = X\beta + \mu) \), (2) strict exogeneity \( (E(\mu) = 0) \), (3) no multicollinearity \( (\rho(X) = K) \), and (4) no heteroscedasticity \( (V(\mu) = \sigma^2 I_n) \) (Wooldridge, 2012). WLS both corrects for heteroscedasticity and limits the impact of the widespread and yet implausible effects found at the very bottom of the funnel plot (fig. 6) by assigning weights based on precision-squared, which serve as a measure of effect quality. Simulations have indicated that weighting by precision-squared is more
efficient compared to alternative weights such as degrees of freedom (Stanley and Doucouliagos, 2012).

It is important in MRA to provide sufficient robustness checks to verify the findings across model specification and sets of effects. The FEML FAT-PET panel model remains the preferred model, but it suffers from a loss of degrees of freedom from the insertion of author dummy variables ($D_a$) (Stanley and Doucouliagos, 2012). This also expectedly leads to high $R^2$ values, because the author dummies explain much of the variation in the data (Wooldridge, 2012). Equation 4 is consequently estimated by cluster-robust WLS without author fixed-effects ($D_a$) on the all-sets for robustness. The robustness check extends in MRA to sets of effects, because cluster-robust standard errors may suffer from few-cluster bias (i.e. too few clusters can bias the estimates) (Cameron et al., 2008). No consensus has nevertheless been reached on the minimum number or structure of clusters needed for consistency (Pfaff, 2013). Cameron et al. (2008) find no issues of few-cluster bias when the numbers of clusters exceed 40, whereas Rogers (1994) suggests that no cluster should include more than 5% of the data. This would equate to eight and three effects in each study in the employees and sales all-set, respectively, which is violated two times in the sales all-set and five times in the employees all-set. Equation 4 is therefore estimated by WLS with robust-standard errors on the average set for robustness to abolish any doubt. The econometrics underlying FAT-PET MRA is explained in more detail in appendix H for the curiosity of the reader.

3.3.3 Explanatory Meta-Regression Analysis

The simple FAT-PET MRA presented in section 3.3.2 has its limitations. FAT possesses low power, while PET typically suffers from inflated type I errors and detects a genuine underlying empirical effect too often (Stanley, 2008a). These inflated type I errors originate from excess unexplained heterogeneity. This means that the observed variation is much greater than expected from random sampling error alone. This excess variation begs explanation for which reason MRA should not solely rely on simple FAT-PET MRA, but also consider an explanatory FAT-PET MRA to explain the systematic heterogeneity among authors (Stanley and Doucouliagos, 2012).

If a relevant explanatory variable that is correlated with an incorporated explanatory variable is omitted from the MRA, the regression coefficients will suffer from omitted-variable bias. To address excess heterogeneity all research dimensions thought to influence the effects are modeled as binary dummy variables (hereinafter BDs) in Table 4 in section 3.2.3. When the BDs together with the study-invariant impact factor are added to the simple MRA, it forms the explanatory MRA. The explanatory MRA makes it possible to investigate the extent to which differences in the moderating variables account for variations in the reported effects. Recall that an MRA is deemed successful, if the FAT-PET results are robust across level one (simple MRA) and level two (explanatory MRA). The advantage of research heterogeneity is related to it being rooted in statistical theory that requires no further assumptions of the meta-analyst, because the researchers on primary research have taken the necessary precautions already (Stanley and Doucouliagos, 2012; Ugur, 2014).
The simple FEML FAT-PET panel model is expanded to the explanatory FEML FAT-PET panel model in equation 5 following Stanley (2008b); Efendic et al. (2011); Stanley and Doucouliagos (2012) and Ugur (2014):

\[ z_{is} = \beta_0 + \beta_1 SE_{ris} + D_a + \sum \beta_k Z_{ki} + \epsilon_{is} \] (5)

where \( z_{is} \) is the PCC with Fisher’s z-transformation, \( SE_{ris} \) is its standard error, \( D_a \) represents a matrix of author dummy variables, \( Z_{ki} \) is a vector of BDs and the impact factor that account for variation in the evidence base, and \( \epsilon_{is} \) constitutes the residuals.

Equation 5 is estimated using cluster-robust WLS with precision-squared \((1/SE^2)\) as weight both with and without author fixed-effects \((D_a)\) similar to the simple FAT-PET MRA for robustness. Notice that only the all-sets have the appropriate multilevel data structure for explanatory MRA. This renders a robustness check on the average-set impossible. This thesis therefore follows the general advice of Angrist and Pischke (2008) and report findings from both cluster-robust and heteroskedastic-robust standard errors in line with Mekasha and Tarp (2013).

The explanatory MRA models are derived through a general-to-specific (hereinafter G-t-S) procedure. This involves the exclusion of insignificant variables starting with the largest p-value and then the MRA is otherwise reduced one at a time until all remaining variables turn out significant (Ugur, 2014). The G-t-S procedure is preferable, but not necessarily ideal. G-t-S proceeds from a general model into a structured and statistically valid model, which avoids too much data mining. It ensures congruency and reduces model complexity at the same time (Ugur, 2014). If the explanatory MRA includes all coded variables (table 4), it would suffer from low statistical power and high multicollinearity (Stanley and Doucouliagos, 2012) and Ugur (2014).

The explanatory MRA is generally limited by the relatively small number of observations in the employees and sales all-set (n= 167 and n=54, respectively). It is recognized that using FEML along with conceptual, methodological and control variables adds additional pressure on the degrees of freedom. This deems at least an explanatory MRA infeasible on the sales all-set (n=54) and makes the robustness check without author fixed-effects particularly important in the employees all-set. It is worth noting that the small samples seem to indicate that the export performance literature is not sufficiently mature for MRA, but no consensus exists on a threshold for number of observations to explanatory variables (Stanley and Doucouliagos, 2012).
4 Empirical Findings

The conceptual firm size-export performance model (fig. 5) as a product of
the preliminary theoretical model (fig. 2) provided the foundation for identi-
fying, compiling and coding the meta-sample into a meta-dataset suitable for
MRA in section 3.2. The correct model specifications of the MRA and appro-
riate robustness checks were then derived from the structure and dimensions
of the meta-data in section 3.3. This section presents the empirical findings and
thoroughly answers the research questions and accompanying hypotheses.

4.1 Meta-Regression Results

The simple FAT-PET MRA is presented in table 6 and provides the level one
findings for the four meta-subdatasets. The existence of publication bias is
reflected in the coefficient of the intercept (FAT), while the genuine effect of firm
size on export performance is reflected in the coefficient of precision (PET).

<table>
<thead>
<tr>
<th>Table 6: Simple Funnel-Asymmetry and Precision-Effect MRA Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level one</td>
</tr>
<tr>
<td>WLS (All-set)</td>
</tr>
<tr>
<td>WLS (Avg.-set)</td>
</tr>
<tr>
<td>WLS (All-set)</td>
</tr>
<tr>
<td>WLS (Avg.-set)</td>
</tr>
<tr>
<td>Intercept</td>
</tr>
<tr>
<td>Precision</td>
</tr>
<tr>
<td>R²</td>
</tr>
<tr>
<td>n</td>
</tr>
</tbody>
</table>

Dependent variable: Partial Correlation Coefficient with Fisher’s z-transformation.
FEML is calculated with author fixed-effects with precision² as weight. WLS is calculated
similar to FEML but without author fixed-effects.
Brackets report t-statistics from cluster-robust standard errors in the all-sets and
heteroskedastic-robust standard errors in the average-sets. Significance at a 10%, 5%
and 1% level is represented by *, ** and ***, respectively.

The dependent variable (PCC with Fisher’s z-transformation) constitutes a sta-
tistical effect that is not economically meaningful. It is restricted to the direc-
tion and strength of the relationship between firm size and export performance.
Doucouliagos (2011) suggests four thresholds for interpreting PCCs in the eco-

nomic literature: (1) if the PCC is less than ±0.02 the effect is practically
useless and can be dismissed even if significant, (2) if the PCC is less than
±0.07 the effect is small, (3) if the PCC is in-between ±0.07 and ±0.30 the
effect is moderate, and (4) if the PCC is more than ±0.30 the effect is large.

The simple FAT-PET MRA finds evidence of a large and positive genuine
effect of the number of employees as a proxy of firm size on export intensity in the
preferred model 1.2 (PET: 0.366, t=6.72, reject H₀). This result is not robust to
model selection or set of effects, but remain sufficient for further exploration at
level two through explanatory MRA. The genuine effect disappear when total
sales is used to proxy firm size. The explanation of this result is most likely
related to either the relatively smaller sample (n=54 or n=13), which augment
the threshold for significance, or the rationale of using total sales to proxy firm size. Total sales is not theoretically as directly tied to a firm’s organizational resources as the number of employees and may be subject to different accounting standards across borders. This questions both the applicability of total sales to proxy firm size and its comparability. Since the simple MRA does not provide evidence of a genuine empirical effect of total sales on export intensity, it must be accepted that no such relationship exists (PET – accept \( H_0 \)). This deems an exploration at level two superfluous (Stanley and Doucouliagos, 2012).

The explanatory FAT-PET MRA is presented in table 7 and provides the level two findings for the employees all-set.

Table 7: Explanatory Funnel-Asymmetry and Precision-Effect MRA Results

<table>
<thead>
<tr>
<th>Level two</th>
<th>WLS (G-t-S)</th>
<th>WLS (G-t-S)</th>
<th>FEML (G-t-S)</th>
<th>FEML (G-t-S)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cluster-S.E.</td>
<td>Robust-S.E.</td>
<td>Cluster-S.E.</td>
<td>Robust-S.E.</td>
</tr>
<tr>
<td></td>
<td>(2.1)</td>
<td>(2.2)</td>
<td>(2.3)</td>
<td>(2.4)</td>
</tr>
<tr>
<td>Intercept</td>
<td>1.023 (1.59)</td>
<td>0.852 (2.71)***</td>
<td>-0.571 (-1.17)</td>
<td>-0.658 (-2.03)**</td>
</tr>
<tr>
<td>Precision</td>
<td>0.161 (4.33)***</td>
<td>0.209 (7.53)***</td>
<td>0.322 (10.79)***</td>
<td>0.264 (3.06)***</td>
</tr>
<tr>
<td>Impactor</td>
<td>n.s.</td>
<td>0.007 (2.28)**</td>
<td>0.050 (6.96)***</td>
<td>0.049 (7.50)***</td>
</tr>
<tr>
<td>Logspec</td>
<td>-0.106 (-5.46)***</td>
<td>-0.143 (-5.04)***</td>
<td>-0.087 (-3.91)***</td>
<td>n.s.</td>
</tr>
<tr>
<td>DC</td>
<td>n.s.</td>
<td>n.s.</td>
<td>-0.086 (-2.62)**</td>
<td>n.s.</td>
</tr>
<tr>
<td>Y80</td>
<td>n.s.</td>
<td>-0.089 (-2.16)**</td>
<td>0.143 (4.36)***</td>
<td>n.s.</td>
</tr>
<tr>
<td>Y90</td>
<td>-0.060 (-3.29)***</td>
<td>-0.145 (-3.56)***</td>
<td>0.015 (1.74)</td>
<td>n.s.</td>
</tr>
<tr>
<td>Y10</td>
<td>n.s.</td>
<td>n.s.</td>
<td>0.563 (23.44)***</td>
<td>0.503 (6.31)***</td>
</tr>
<tr>
<td>Manu</td>
<td>n.s.</td>
<td>n.s.</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>Serv</td>
<td>n.s.</td>
<td>n.s.</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>Hightech</td>
<td>-0.173 (-3.89)***</td>
<td>-0.191 (-5.68)***</td>
<td>-0.065 (-2.96)***</td>
<td>0.021 (1.79)*</td>
</tr>
<tr>
<td>SME</td>
<td>0.070 (3.15)***</td>
<td>0.041 (2.47)**</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>Large</td>
<td>0.049 (5.77)***</td>
<td>n.s.</td>
<td>0.039 (4.82)***</td>
<td>0.041 (1.69)*</td>
</tr>
<tr>
<td>Censreg</td>
<td>0.088 (4.06)***</td>
<td>0.103 (4.29)***</td>
<td>0.014 (10.22)***</td>
<td>0.016 (3.41)***</td>
</tr>
<tr>
<td>Fraclogit</td>
<td>-0.064 (-4.41)***</td>
<td>-0.076 (-5.53)***</td>
<td>0.013 (18.64)***</td>
<td>n.s.</td>
</tr>
<tr>
<td>Trunreg</td>
<td>-0.271 (-3.07)***</td>
<td>-0.363 (-4.60)***</td>
<td>-0.336 (-7.19)***</td>
<td>-0.427 (-6.96)***</td>
</tr>
<tr>
<td>Panel</td>
<td>-0.042 (-2.04)**</td>
<td>-0.115 (-3.45)***</td>
<td>-0.192 (-5.89)***</td>
<td>n.s.</td>
</tr>
<tr>
<td>Randefects</td>
<td>-0.138 (-6.38)***</td>
<td>-0.089 (-3.37)***</td>
<td>-0.406 (-3.96)***</td>
<td>-0.267 (2.99)***</td>
</tr>
<tr>
<td>Fixeffects</td>
<td>n.s.</td>
<td>n.s.</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>Pooled</td>
<td>0.039 (4.13)***</td>
<td>0.064 (1.67)*</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>PubStatus</td>
<td>n.s.</td>
<td>n.s.</td>
<td>-0.126 (-3.64)***</td>
<td>n.s.</td>
</tr>
<tr>
<td>Rdint</td>
<td>n.s.</td>
<td>-0.387 (-2.21)**</td>
<td>n.s.</td>
<td>n.s.</td>
</tr>
<tr>
<td>Age</td>
<td>n.s.</td>
<td>0.036 (2.08)***</td>
<td>-0.007 (-9.52)***</td>
<td>n.s.</td>
</tr>
<tr>
<td>FO</td>
<td>n.s.</td>
<td>-0.018 (-2.15)**</td>
<td>-0.003 (-5.09)***</td>
<td>n.s.</td>
</tr>
<tr>
<td>SizeSq</td>
<td>n.s.</td>
<td>0.035 (1.76)*</td>
<td>0.005 (2.81)***</td>
<td>0.005 (3.73)***</td>
</tr>
<tr>
<td>IndEff</td>
<td>0.110 (4.77)***</td>
<td>0.089 (3.46)***</td>
<td>0.003 (9.27)***</td>
<td>n.s.</td>
</tr>
<tr>
<td>Capint</td>
<td>-0.036 (-3.71)***</td>
<td>-0.058 (-3.35)***</td>
<td>0.111 (9.05)***</td>
<td>n.s.</td>
</tr>
</tbody>
</table>

Dependent variable: Partial Correlation Coefficient with Fisher’s z-transformation.
Meta-dataset: Employees (All-set). FEML is calculated with author fixed-effects with precision as weight. WLS is calculated similar to FEML but without author fixed-effects.
Brackets report t-statistics from either cluster-robust standard errors or heteroskedastic-robust standard errors as indicated. Significance at a 10%, 5% and 1% level is represented by *, ** and *** respectively, while n.s. indicate insignificance. Censreg, FracLogit and Trunreg with OLS as base. Y80, Y90, Y10 with Y00 as base.

R² = 0.82
k = 36
n = 167
The exclusion of the total sales dataset limits the level two explanation of moderating effects to the employees all-set. A Breusch-Pagan (LM) test on the employees all-set confirms again the need to control for heterogeneity ($X^2 = 2065$, reject $H_0$), which makes the cluster-robust FEML model 2.3 the preferred regression.

The findings of publication bias appear contradictory across level one and level two, which is inconsistent with the exploratory analysis of the funnel plot in figure 6. The funnel plot indicated that at least the sales all-set could suffer from positive publication bias, but this could not be confirmed in either model 1.4 or 1.5. The existence of a positive publication bias is nevertheless found in model 1.6 on the average-set (FAT: 2.889, $t$=2.83, reject $H_0$). The funnel plot also indicated a positive publication bias in the employees all-set, but the findings appear inconclusive across both level one and level two. The FEML panel models at level one (model 1.2) and at level two (model 2.3) find no evidence of publication bias (FAT: accept $H_0$), but this is not robust across model specification. Other models find both a significantly positive and negative publication bias. This inconclusiveness is most likely associated with the few high-precision negative effects in the employees all-set that blur the net effect.

The level one and level two FAT-PET findings in table 6 and 7 is fortunately cleansed for publication bias and provides a basis for answering the research questions and relevant hypotheses derived from the conceptual model (fig. 5).

(H1): This MRA finds strong support for hypothesis 1, which is reflected in the coefficient of precision. The size of a firm is significantly and positively associated with a higher export performance when controlling for all moderating and control variables, if firm size and export performance is operationalized as the number of employees and export intensity, respectively. This conclusion is robust to all model specifications at level two and partly robust to level one. The effect of number of employees on export intensity is significantly large in model 2.3 (PET: 0.322, $t$=10.79, reject $H_0$), while the robustness checks reveal evidence of significantly moderate effects of number of employees on export intensity, in-between the threshold of $\pm0.07$ and $\pm0.30$, among the other models (model 2.1: 0.161, model 2.2: 0.209, model 2.4: 0.264).

(H2): This MRA finds support for hypothesis 2, which is reflected in the coefficient of high-tech firms. If a firm shares the characteristics of a high-tech firm, the relationship between the number of employees and export intensity is negatively moderated by -0.065 to 0.257 (0.322 - 0.065) in model 2.3, ceteris paribus. This changes the effect of number of employees on export intensity from large to moderate. This conclusion is partly robust to model specification: model 2.1 and 2.2 both finds that sharing the characteristics of a high-tech firm negatively alters the effect of number of employees on export intensity from a moderate level to a dismissal level (below $\pm0.02$) (model 2.1: -0.012 = 0.161 - 0.173 and model 2.2: 0.018 = 0.209 - 0.191). The conclusion remains partly robust, because model 2.4 indicates a positive moderating effect.

(H3): There is also support for hypothesis 3, which is reflected in the coefficient of DC. If a firm is headquartered in a developed country with a high institutional quality, the effect of number of employees on export intensity changes from large to moderate 0.236 (0.322 - 0.082), ceteris paribus. If a firm is oppositely located in a developing country, the effect of number of employees on export intensity is large (0.322). This finding is only significant at a 5% significance level in model 2.3 and not robust to model selection.
This MRA did not find support for hypothesis 4, which is reflected in the coefficient of serv and manu. Model 2.3 finds a very small statistically significant negative moderating effect of being a service sector firm on the effect of number of employees on export intensity, but the effect is below 0.02, which is too small to meaningfully alter the magnitude of the effect (0.312 = 0.322 - 0.010), ceteris paribus. No model finds a significantly positive moderating effect of operating in the manufacturing industry on the effect of number of employees on export intensity. This indicates altogether that industry does not alter the effect of firm size on export intensity. The conclusion proves robust to model specification.

It is concluded that this MRA finds support for hypothesis 1, 2 and 3, but it is noteworthy that the moderating effects in hypothesis 2 and 3 only moderates the strength of the effect of number of employees on export intensity. The direction remains positive, which indicate that a larger firm size leads to a higher export performance regardless of moderators (positive correlation). The moderating effects only suggest that the correlation between firm size and export performance is less strong or more meaningfully that firm size is less important for export performance, when a firm either possesses a high level of technological resources or is located in a developed country.

4.2 Discussion and Limitations

The findings are summarized in table 8, which forms the basis for a thorough discussion of possible theoretical explanations and limitations in this section.

<table>
<thead>
<tr>
<th>Hypothesized Relationship</th>
<th>Expected Sign</th>
<th>Hypothesis Supported?</th>
<th>Robust?</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 Larger firm size → Higher export performance</td>
<td>(+)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>H2 High-tech firm → Negative moderating effect</td>
<td>(-)</td>
<td>Yes</td>
<td>Partly</td>
</tr>
<tr>
<td>H3 Firm located in developed country → Negative moderating effect</td>
<td>(-)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>H4 Service sector firm → Negative moderating effect</td>
<td>(-)</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

It is acknowledged that research on the determinants of export performance is of particular interest to both public-policy makers and managers (Sousa et al., 2008). The findings therefore both contribute to consensus-building in the export performance literature and form a basis for guiding the two interest groups with meaningful recommendations.

4.2.1 Empirical Firm Size-Export Performance Relationship

The large effect of number of employees on export intensity suggests that a larger firm size enables firms to achieve a higher export performance. This finding is in line with the resource-based arguments in section 2.2.1, which posit that larger

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(H4): There are two separate variables, because some studies in the meta-sample investigate all industries – not either manufacturing or service industry (dummy variable).
firms by virtue of a larger stock of non-imitable and valuable organizational capabilities outperform smaller firms in the export market. This holds solely for number of employees and not total sales as a proxy of firm size, which indicate that the workforce is an accurate proxy of a firm’s organizational resources.

This finding is interesting, because it confirms that hiring more employees constitute an important step towards higher export performance. It is accordingly recommended that public-policy makers should enforce the right policies to supply qualified labor and ensure the right framework conditions on the job market to enable managers to increase its workforce over time. This causal relationship is important, because increasing firms’ export performance augment national prosperity by reducing unemployment (Czinkota, 1994).

This conclusion of course hinges on the generalizability of export intensity to export performance. It is recognized that export performance constitutes a multi-faceted construct that cannot find expression in one metric, but MRA is methodologically limited to one economic relationship. This constrains the analysis of the firm size-export performance relationship to one objective measure of export performance, because subjective measures prove incomparable between studies. The use of specifically export intensity as a proxy of export performance is also problematic, because both the numerator (export sales) and denominator (total sales) are endogenous. Many internal and external factors concurrently influence export sales and domestic sales, which in turn influences both the numerator and denominator and makes the net effect ambiguous (Salomon and Shaver, 2005). Export intensity remains nevertheless a good objective proxy of export performance, because it accurately indicates a firm’s ability to increase its share of export sales of total sales. This ratio-format makes the proxy comparable irrespective of firm size in contrast to other proxies such as export sales, which proves both methodologically and theoretically inapplicable, because larger firms per se have higher export sales (Singh, 2009).

Some studies also theorize and test for a non-linear relationship between firm size and export performance as illustrated in figure 7.

Figure 7: Illustration of Non-Linearity

![Figure 7: Illustration of Non-Linearity](source: Author's own creation)
MRA requires a meta-dataset of marginal effects to investigate potential non-linearity (Stanley and Doucouliagos, 2012), but this meta-sample neither provides the marginal effects nor provides sufficient information for manual calculations. This MRA is accordingly limited to assuming a linear relationship between firm size and export performance, as illustrated by (a) in figure 7.

Many studies have theorized an inverted U-shape, suggesting that firms enjoy high export intensities to a certain point and then switch to other and more advanced modes of entry such as FDI. The firm size-export performance relationship could, however, also be U-shaped, indicating that firms need to reach a certain size before it can accelerate its export performance. The inability of integrating non-linearity to investigate either an (b) inverted U-shape or (c) U-shape, as illustrated in figure 7, remain a great limitation to the central findings of this MRA.

The primary studies that acknowledge a non-linear relationship between firm size and export performance either uses a quadratic form by adding firm size-squared to the regression or use a logarithmic transformation of firm size. The quadratic form directly models the curvature of the relationship (either inverted U-shape or U-shape if any), while the logarithm constitutes a monotone transformation, which makes the effective relationship non-linear, but preserves a linear model (Benoit, 2011). The use of the logarithm of firm size negatively moderates the effect of number of employees on export intensity by -0.087 in model 2.3. This alters the effect of number of employees on export intensity from large to moderate (0.235 = 0.322 - 0.087) in model 2.3 and to small in model 2.1 and 2.2. This indicates that using the logarithm of firm size to preserve a linear model or adjust for non-linearity significantly lowers the effect of firm size on export performance, but the effect does not abolish.

This suggests that firm size (number of employees) significantly and positively affect export performance (export intensity) irrespective of logarithmic transformation. This conclusion is statistically robust and answers the first research question (RQ1) and supports the first hypothesis (H1), but remains subject to important limitations.

4.2.2 Conceptual Moderators

It is documented across the meta-analysis literature that an MRA is limited by the scope and nature of the meta-sample of primary studies on which it is based (Henard and Szymanski, 2001).

This MRA is limited from assessing the moderating effect of a firm’s internationalization path on the relationship between firm size and export performance. None of the primary studies in the meta-sample are based on a sample of firms sharing the characteristics of either BGs or traditional exporters, which renders the coding of a moderator variable impossible. The meta-sample fortunately allows for an analysis of the moderating effects of (i) high-tech firms, (ii) institutional quality, and (iii) industry on export performance, which provides the answer to research question two (RQ2).

The $R^2$ is high in all models at level two (+0.80). This indicates that the models largely capture the main sources of heterogeneity in the literature. The $R^2$ is higher in the FEML models, but this was expected, because much of the heterogeneity is explained by the author fixed-effects. The high $R^2$ could also reflect the limitation of the relatively small number of observations (n=167) to
many explanatory variables. This indicates that many variables fit a relatively small number of observations (Harrell, 2013).

(i) High-tech firms
The effect of firm size on export performance evidently diminish from large to moderate if a firm share the characteristics of a high-tech firm (i.e. high R&D intensity). This finding supports hypothesis 2 and confirms that the firm size-export performance relationship is subject to moderating effects (RQ2).

The correlation between firm size and export performance remains moderately positive ($0.257 = 0.322 - 0.065$) in model 2.3, which indicates that high-tech firms still rely on more employees to achieve higher export intensities, but that the effect of number of employees on export intensity is significantly lower than in other firms that depends largely on firm size. This supports the view that larger firms produce inertia of innovation activities through bureaucracy and organizational routines, which reduce the effect of number of employees on export intensity. The effect of firm size on export intensity abolish utterly in model 2.1 and 2.2 for which reason the three models solely agree on a negative moderating effect and not to which level of moderation.

This finding is interesting in a wider perspective for managers in high-tech firms, because it should direct their attention towards maintaining a high degree of organizational flexibility and resultant innovative culture, rather than alone focusing on increasing the workforce in the long run.

Numerous studies focus on the empirical relationship between firms level of technological resources and export performance (see e.g. Sterlacchini, 2001; Barrios et al., 2003), but none of the studies that investigate export performance on a sample of high-tech firms analyze the moderating effect of firm size, other than consider it a control variable. Most studies focus instead on potential endogeneity issues, which suggests that exporting can either serve as a determinant of R&D intensity or R&D intensity can serve as a determinant of exporting (Bravo-Ortega et al., 2014). The conclusion that high-tech firms negatively moderate the strength of the relationship between firm size and export performance therefore opens a new corridor of possible research. Such research could advantageously focus on the effect of firm size in high-tech firms in different industrial settings (e.g. pharmaceuticals in contrast to information technology), where the importance of a sales force or organizational flexibility may differ.

(ii) Institutional Quality
This MRA finds support for hypothesis 3, which suggests that the effect of firm size on export performance diminishes, if a firm is located in a developed country with a high institutional quality contrary to a developing country with a low institutional quality.

It is widely acknowledged that domestic institutions are one of the means by which firms gain access to necessary resources such as well-educated employees or capital and that such access leads to a higher likelihood of international growth and survival (see e.g. Johannisson et al., 2002; Belso-Martínez, 2006). Both small and large firms have to create their own internal markets for resources in the absence of well-functioning institutions, which is relatively more difficult for smaller and more resource-constrained firms.

The support for hypothesis 3 indicates that firms located in developed countries have easier access to critical resources and depends less on its size to create
internal markets for products, labor and capital. This is evident from the large
effect of number of employees on export intensity (0.322) for firms located in
developing countries, which diminishes to moderate (0.236 = 0.322 - 0.086) for
firms situated in developed countries.

This conclusion forms the basis for recommending public-policy makers in
charge of certain institutions to not unduly favor large firms at the expense
of small firms. This means essentially that public-policy makers should resist
the temptation of enforcing policies that give larger firms preferential treatment
to resources from domestic institutions. This recommendation is in line with
Johansson (2004), who recommends a firm size neutralization of the formal
institutions in Sweden to increase firm performance in the domestic information
technology industry.

It should be borne in mind that the conclusion is limited to the assumption
that all developed countries are characterized by a well-functioning institutional
infrastructure in contrast to all developing countries. This superficial view on
institutional quality neglects important quality differences among institutions at
a country and industry-level. The support of a significantly negative moderating
effect of institutional quality therefore rather serves as a sound inspiration for
more empirical research on the effect of institutions on export performance
for small and large firms in different country and industrial contexts. The
conclusion lacks robustness across model specification, but, nevertheless, reveals
an important area of improvement in the export performance literature.

(iii) Industry
This MRA does not find evidence of a moderating effect of industry (service
or manufacturing) on the effect of firm size on export performance (H4). This
insignificance is possibly rooted in the characteristics of the employees all-set,
where the majority of the firms operate in the manufacturing industry compared
to the service industry (see table 4). The MRA does therefore not find being a
manufacturer significantly different from the central findings on the relationship
between number of employees and export intensity.

The insignificance or significantly, but dismissible, moderating effect in model
2.3 of service sector firms on the effect of firm size on export intensity possibly
relates to the inability of the MRA model to catch a potential non-linear relation-
ship. The majority of the primary studies in the meta-sample that investigate
export intensity in the service industry focus on knowledge-intensive-business-
services such as legal advice and consulting (see e.g. Love and Mansury, 2009;
Rodríguez and Nieto, 2010). Such product offerings suffer from intangibility and
simultaneity of consumption and production, which puts service sector firms at a
location-disadvantage compared to manufacturers. Service sector firms initiate
exports by client-following, but rapidly attempt to form a joint-venture to bring
in local knowledge. This suggests that number of employees does not or only
marginally increase in the beginning with higher export intensities, but at some
point export intensity drops due to the formalization of a joint-venture. This
suggests theoretically an inverted U-shape as illustrated in figure 7, because the
number of employees continue on a rise in the new joint-venture.

It is widely recognized that the literature on export performance in ser-
vice industries indicate differences from the manufacturing literature (Love and
Mansury, 2009). The literature remains, nevertheless, underdeveloped and
leaves room for improvement particularly on possible non-linearity.
4.2.3 Publication Bias

The strength of FAT-PET MRA is rooted in its ability to both detect publication bias (FAT) and provide a genuine empirical effect corrected for potential publication bias (PET) (Stanley and Doucouliagos, 2012).

This MRA is limited of an underrepresentation of the grey literature, but this is not uncommon in meta-analysis (Nelson and Kennedy, 2009). It is evident that published studies (reflected in PubStatus in table 7) report a lower effect of number of employees on export intensity (0.196 = 0.322 - 0.126) in contrast to unpublished studies that report a larger effect (0.322 = 0.196 + 0.126), ceteris paribus. This finding is not robust across models, but indicates that publishers not necessarily select studies for their statistical significance.

This conflicts with the findings on the study-invariant impact factor (reflected in Impfactor in table 7), which is included to control for quality differences among studies. The Impfactor suggests that studies of a higher perceived quality (i.e. higher impact factor) positively moderate the effect of firm size on export performance, ceteris paribus. This situation, where higher quality studies publish larger effects, confirms the presence of a “winner’s curse” in the employees all-set. The “winner’s curse” hypothesis builds on the argument that fierce competition among researchers on primary research for the limited space in top academic journals allows reviewers and editors to demand more spectacular and extreme results (Costa-Font et al., 2013).

FAT does, nevertheless, not reveal any robust indication of publication bias (reflected in the intercept), although both the impact factor and publication status turn out significant to the relationship between firm size and export performance. Doucouliagos and Stanley (2009; 2013) argue that publication bias can be considered substantial if the absolute value of the intercept is ≥ 1 and severe if the absolute value of the intercept is ≥ 2. The level two FAT-PET MRA on the employees all-set finds contradicting evidence of the direction of publication bias in model 2.2 and 2.4, but in both instances the bias can be considered unsubstantial (less than 1). The level one FAT-PET MRA finds evidence of a severe publication bias in model 1.1 in the employees all-set, but this finding is not robust to set of effects or across level one and level two. This indicates jointly the absence of at least substantial or severe publication bias in the employees all-set. The sales average-set suffers from severe publication bias, but, again, this finding lack robustness across set of effects.

4.2.4 Methodological Moderators

The reported effects in the meta-sample may reflect patterns of misspecification bias and model selection beyond potential publication bias. Recall the selection effects regarding methodology and research priority discussed in section 3.1. It is therefore common in MRA to account for choices of data structure, model specification and estimation technique (Stanley, 2005).

The dependent variable in primary research, export intensity, is characterized by many limited observations, because firms are either exporting or not exporting in a random sample. The empirical model therefore has to deal with a dependent variable with many zeros (non-exporters) bound in-between 0 and 100%, including both limits (Singh, 2009). The solution is not as simple as a log-transformation, because it alters the distribution of export intensity arbi-
trarily, but rather to choose the correct estimation technique (Wagner, 2001). The studies in this meta-sample use either OLS, fractional logit, censored or truncated regression techniques to estimate the relationship between number of employees and export intensity. Wagner (2001) argues that a one-step approach such as OLS most likely proves inappropriate compared to a two-step approach that deal with sample selection. The estimates from censored and truncated regressions originate from two-step approaches, while fractional logit is a one-step approach that specifically takes account of the bounded nature of export intensity (see e.g. Conti et al., 2010; D’Angelo, 2010). The pros and cons of each estimation technique in different empirical settings in primary research goes beyond the scope of this thesis, but Wagner (2001) provides a well-written section on how to model the export/sales ratio for the interested reader. It is evident from the level two explanatory MRA that choice of estimation technique (Censreg, Fraclogit or Trunreg with OLS as base) significantly moderate the effect of number of employees on export intensity. This is robust to model selection, but the magnitude of the moderating effect varies greatly across models.

It is also evident that a panel data structure negatively moderate the effect of firm size on export intensity in contrast to a cross-sectional data structure. The findings on the moderating effect of a pooled sample is not robust, but model 2.1 and 2.2 indicates a positive effect. The use of random effects and fixed-effects appears to moderate the effect of number of employees on export intensity negatively and positively, respectively.

These findings altogether indicate that selection of methodology significantly influences the effect of number of employees on export intensity.

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5In a two-step estimation, the first step is devoted to an empirical model of the decision to export or not using the total sample, while another empirical model in step two concentrates on the data for firms with positive exports, leaving non-exporters out of the sample (Wagner, 2001).
5 Directions for Future Research

This thesis quantitatively synthesizes the existing knowledge (1960-2015) on the effect of firm size on export performance to facilitate theory development in the field. The entire research process ensures that the empirical findings from the MRA is integrated into the existing body of knowledge in the preliminary theoretical model (fig. 2). This unique approach should serve as an inspiration for other scholars to similarly investigate the remaining determinants of export performance. Hopefully, over time, the preliminary theoretical model will be further questioned for the export performance literature to mature.

This thesis also reveals new corridors of possible research on the moderators to the relationship between firm size and export performance. Such research extends to (i) the role of firm size in high-tech firms’ export performance, (ii) the importance of institutional quality to small and large firms, and (iii) possible non-linearity in the service industry between firm size and export performance.

The methodological moderating effects also suggest that choices of estimation technique, model specification and data structure significantly influence the findings on the relationship between firm size and export performance. It is therefore important that researchers on primary research give a thorough account of choice of methodology in the future.
6 Conclusion

The literature on export performance suffers from ambiguous findings on the determinants of export performance. This thesis brings clarity to the field through an updated preliminary theoretical model that reflects the current state of the literature and forms the basis for a conceptual firm size-export performance model. It is evident from the preliminary theoretical model that firm size constitutes an internal, but uncontrollable determinant of export performance to the firm in the short-run and that the inclusion of firm size is theoretically rooted in resource-based theory. The conceptual model delineates the effect of firm size on export performance and hypothesizes a positive relationship (H1) that is subject to particularly three negative conceptual moderating effects. The moderating effects comprise high-tech firms (H2), institutional quality (H3) and industry (H4).

The conceptual model provides a basis for identifying, compiling and coding the existing literature on the firm size-export performance relationship. The literature search is based on seven inclusion criteria, which define the boundaries of the population of studies to primary studies in English (1960-2015) of an applied econometric nature, considering only one proxy of export performance (export intensity) and three proxies of firm size (total sales, total assets and number of employees) at one unit of analysis (export function). The three-step literature search reveals eventually 1005 candidates for a manual review, but after all inclusion criteria has been applied, only 46 studies remain with number of employees and total sales as the only feasible proxies of firm size. The meta-sample is coded into four meta-datasets (employees avg.-set and all-set and sales avg.-set and all-set) eligible for econometric methods of MRA. The meta-data is initially summarized through an exploratory vote-count that confirms the ambiguous findings on the firm size-export performance relationship. The meta-data is also subject to an exploratory analysis of funnel plots, which indicate possible publication bias in the literature. The MRA is then econometrically modeled suitable for investigating the four hypotheses.

The empirical findings across level one and level two suggest a large effect of number of employees on export intensity (support H1), but this effect disappears when total sales proxy firm size at level one. The MRA remains, however, limited from testing potential non-linearity of the relationship. The MRA also finds evidence of a negative moderating effect of sharing the characteristics of a high-tech firm (support H2) and being situated in a developed country with high institutional quality (support H3). No support of a negative moderating effect of sharing the characteristics of a service sector firm is found (H4). This answers altogether the research questions that firm size positively influences export performance (RQ1) and that the relationship is subject to conceptual moderating effects (RQ2).

This MRA does not reveal substantial or severe evidence of publication bias in the literature, but find that authors choice of estimation technique, data structure and model specification significantly influence the central findings.

The findings of this thesis fits into the existing body of knowledge and brings clarity to public-policy makers and managers. It also opens new corridors of potential research on the moderating effects and provides a new research approach for other scholars to investigate the remaining determinants of export performance.
References


