INTERNATIONALISATION IN MODERN ELECTRICITY MARKETS

A Quantitative Analysis of the Multinational Enterprise

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Abstract

Since the end of the 20^{th} century, the world's electricity markets have been subject to substantial liberalisation through privatisation and deregulation. The traditional and vertically integrated power systems operated by monopolies, have been dissolved to facilitate more competitive market structures. As electricity markets have been opened for foreign market entry, electricity producing firms have been incentivised to adapt their business models to international competition to retain profits under these new realities. This study explores whether electricity producing firms have reacted to the market changes and penetrated markets outside of their national market during 2006-2015, and whether the pattern is predominantly regional or global. In accordance with theoretical assumptions about Multinational Enterprises, we further investigate the degree to which geographical internationalisation choices are related to superior firm performance.

Our results show that foreign market penetration of electricity producing firms has been driven by Regional Internationalisation and not Global Internationalisation. However, statistical regression analysis showed that Regional Internationalisation strategies have not transformed into superior performance as stipulated by theoretical assumptions. These findings led us to conclude that electricity producing firms have had a preference towards Regional Internationalisation during 2006-2015 even as the strategy has not manifested itself in terms of superior performance of the firm. This paradoxicality leads us to question the causal relationship between Internationalisation and performance within the boundaries of the industry-specific area of research.

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Abbreviations & Nomenclature

API	Application Programming Interface
BOO	Build-Own-Operate
CAPM	Capital Asset Pricing Model
CSA	Country-Specific Advantages
D	Debt
E	Equity
EMV	Excess Market Value
EU	European Union
EV	Enterprise Value
EVA	Economic Value Added
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GICS	Global Industry Classification Standard
GVKEY	Unique Company Identification Number used by Compustat
IB	International Business
IPP	Independent Power Producers
IR	IR-Framework: Integration-Responsiveness Framework, IR: International Relations
LAD	Least Absolute Deviations
MES	Minimum Efficient Scale
MNE	Multinational Enterprise
MW	Mega Watt
NAFTA	North American Free Trade Agreement
NOPAT	Net Operating Profit After Taxes
OCC	Opportunity Cost of Capital
OLI	Ownership, Location, Internationalisation
OLS	Ordinary Least Squares
RBV	Resource Based View
ROE	Return on Equity
ROIC	Return On Invested Capital
ROS	Return On Sales

TCE	Transaction Cost Economics
TWH	Tera Watt Hours
UK	The United Kingdom of Great Britain and Northern Ireland
UN	United Nations
US	United States
USA	United States of America
VIF	Variance Inflation Factor
WACC	Weighted Average Cost of Capital

1 Introduction

The liberalisation of the world's energy markets during the last part of the 20th century has created new opportunities for utilities and private-sector firms to compete in power markets outside of their own home country (International Energy Agency, 2005, p. 27). In the midst of these new realities, we find it crucial to evaluate the strategic geographic location preferences and performance of firms involved with electricity production.

The main objective of this chapter is to introduce the empirical research area and present the concept of the multinational enterprise (MNE). This will be done in a broad fashion using several definitions and understandings that draw on different schools of thought. The introduction is structured as an inverted pyramid approach as we move from a broad to a specific explanation of the research area.

Section 1.1 provides an account of the changes in the world's energy markets and the role of electricity producers. Section 1.2 presents an introduction to the MNE, and section 1.3 will review the literature of the International Business (IB) discipline with a focus on the MNE as a theoretical concept. Section 1.4 will explicitly formulate the research question, followed by a roadmap of the thesis in section 1.5.

Altogether, this section will position the study within the IB literature and explain how it can add further value to the discipline.

1.1 Introducing the Area of Research

The value chain of the electricity sector from generation, transmission, distribution and retail supply has traditionally been developed and operated by centralised and vertically integrated utilities. These were given the right to operate as monopolies in selected areas and were subject to micro-regulation in terms of project authorisation, tariffs for customers, profit-margins and allocation of profits (Wood, Wollenberg, & Sheblé, 2013, p. 37).

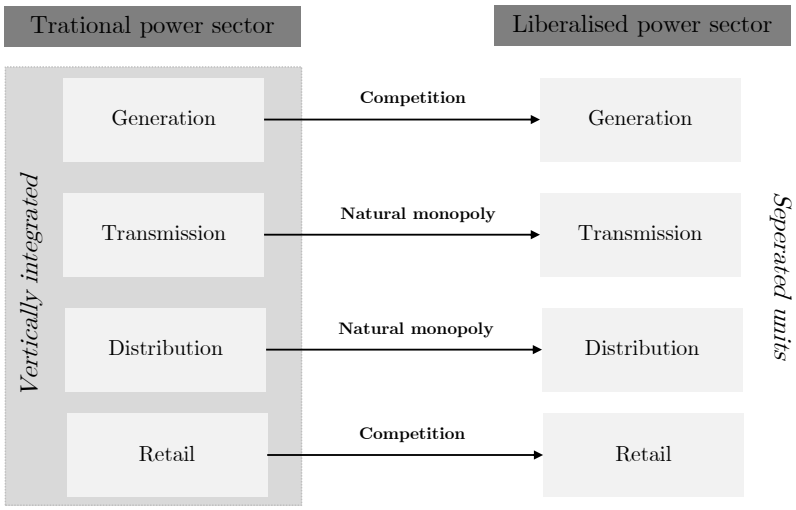
The shortcomings of the traditional system became clear during the 1980s and early 1990s when a trend of overcapacity of power generation took place all whilst electricity demand growth decreased. It showed the inefficiency of the existing framework materialising through high operating expenses, project cost overruns, and ultimately left an additional cost of electricity with the consumer (International Energy Agency, 2005, p. 31).

The call for deregulation in the power sector to satisfy legislators, customers and suppliers has fostered a number of innovations in energy systems. These have mostly included breaking up the traditional utility into smaller and more specialised entities that focus on specific parts in the value chain. Most countries have sought to split it into generation, transmission, distribution and retail supply (Wood et al., 2013, p. 39). Another driver for deregulation has been certain ideological preferences resulting in privatisation of public assets, as for example seen in the UK during the time of Margaret Thatcher (Kopsakangas-Savolainen & Svento, 2012, p. 9).

Western countries have liberalised both generation and retail supply while keeping transmission and distribution deeply regulated and under monopoly governance

(Joskow, 2008, p. 10) (see figure 1 for graphical representation). Developing countries too have experienced a process of liberalisation but have primarily focused on the generation of electricity part of the value chain while keeping all other parts under monopoly (Nepal & Jamasb, 2015, p. 18). The shift from monopoly regulation to liberalisation, usually including privatisation and deregulation, has created new intermediate markets that private companies can operate within. These markets have induced firms to compete without profits restrictions which has created market-based supply and demand mechanisms. The market-based model of competition in energy markets sought to facilitate more efficient production and distribution of electricity at a lower price to the final customer (Wood et al., 2013, p. 40).

Figure 1: Restructuring of Power Markets. Before and After



1.1.1 The Business Models for Electricity Producers

Having just described the full value chain of electricity sector, we will now consider the implications of liberalisation in terms of the development and operation of power plants. In traditional pre-liberalised power markets, power plants were financed and owned by the government, and operated by a government-owned utility. A country's government (or municipality) could hire contractors to build the facility and then hand it over to the utility at the end of a concession period, or have the government-owned utilities built and operate the facility altogether (Gatti, 2013, p. 7). The liberalisation has, however, sparked a process of privatisation of formerly government-owned utilities as well as allowing other private companies to own electricity producing assets in the electricity sector (Joskow, 2008, p. 12).

This has attracted three types of privately owned companies. The first type is the semi or fully privately-owned utility. The second type is a contractor who has extended its business model to not only building, but also owning electricity producing

facilities. The last type consists of funds and institutional investors. These three types of actors usually agree to one of two types of arrangements; (1) build-own-operate (BOO) legal contracts where the government allows a part of the facility to be owned by non-government actors (Gatti, 2013, p. 7); or (2) independent power producers (IPP) arrangement where a group of non-government actors wholly owns the facility and sell electricity without necessarily including government actors at any point of the process[1]. This group of semi or fully privatised utilities and private sector-based IPPs who engage in building, owning and operating electricity producing facilities is the focus of our study throughout this thesis. We will now consider some of the capabilities related to the tasks of these firms.

1.1.2 Building and Owning Electricity Generating Facilities

Some of the challenges in regards to deregulation of electricity markets revolve around the peculiar nature of electricity as a physical product. Electricity differs from other commodities like oil and coal as it cannot easily be stored but is still traded all around the world in various forms of markets (Stoft, 2002, p. 14). It is perhaps the only product in the world that is continuously consumed in almost the same instance as it is produced. Another challenge is related to the question of coverage and synchronisation of the power grid as an energy system must cover a vast area whilst all generators must be synchronised within the AC interconnections. These two characteristics become important determinants of how market arrangements are constructed.

The objective for companies in generation is to build electricity producing facilities and produce electricity. The overall project management capabilities within construction that firms must have involve planning, coordination and control of the project to reach objectives within utility, function, quality, time and cost (Walker, 2015, p. 11).

The electricity generated from the electricity producing assets is then sold in the marketplace . Two types of market interaction exist; bilateral arrangements and mediated arrangement. Bilateral arrangements are agreements between two parties where one part agrees to produce a certain amount of electricity over a specified amount of time, while the other part agrees to off-take the electricity and compensate the producer (Stoft, 2002, p. 87). These arrangements include short-term trading in real time spot markets, where all trades correspond to actual power flows, or forwards which are non-standardised long-term contracts (Stoft, 2002, p. 204). The market for bilateral agreements is less organised and more fragmented as there is no market mechanism to construct prices since buyers and sellers trade directly. These arrangements are much more flexible since the contractual agreement can take various context specific factors into consideration. However, more time is spent on negotiating and the risk increases substantially as one of the firms can run into unforeseen financial challenges.

Mediated markets are exchanges and pools where the supply and demand mechanism and competition play a large role. Exchanges, or auctions, bring together parties who

[1]Besides in relation to regulatory conformity.

possibly do not know each other and enter standardised contractual agreements about delivery and price. Pools are the most competitive market form as producers bid their marginal cost of production into a pool which buyers can shop between (Stoft, 2002, p. 88). These arrangements could include trading in the day-ahead and intra-day market where standardised contracts are in place. For long-term arrangements, standardised futures contracts are available (Stoft, 2002, p. 244). Exchanges and pools are more organised and centralised and offer a higher level of security to both parties.

The main units of analysis throughout this study are utilities and IPPs who engage in building, owning and operating power producing facilities, and sell electricity through bilateral or mediated arrangements.

1.2 Introducing the Multinational Enterprise

The tale of the MNE has been an important area of academic research within IB (Rugman, Verbeke, & Nguyen, 2011, p. 756). MNEs have expanded in terms of scale and scope which have led some to argue that they have transcended as purely economic agents to become political actors that influence political processes and decisions (Hymer, 1960; Raymond, 1971; Buckley & Casson, 1976; Hertz, 2002). MNEs are able to out-compete local businesses to the extent that it might produce more poverty than job creation as revenues of local businesses fall (Van Tulder, 2006).

Others have been less worried about the political influence of MNEs but nonetheless described them as key agents of economic globalisation (Dunning, 1998; Eden & Lenway, 2001; Rugman, 2000, 2005; Dunning & Lundan, 2008). In any of the above cases, it is reasonable to say that MNEs play an extensive role both in business and in society.

On a fundamental level, we understand an MNE as an enterprise that engages in foreign direct investment (FDI) and owns and controls value-added activities in more than one country (Dunning & Lundan, 2008, p. 3). This definition has been broadly recognised by influential international organisations such as the Organisation for Economic Co-operation and Developmen, the United National Conference on Trade and Development's Division on Investment, Technology and Enterprise Development and by most nation states and supranational organisations (UNCTAD, 2017, p. 3). The concept of FDI differs from foreign portfolio investment in two ways. FDI involves a transfer of assets and products including financial capital, management expertise, organisational expertise, technology, cultural values, norms, and physical access to foreign markets. Portfolio investments, on the other hand, only requires financial capital. FDI presumes that the power to control the transferred resources and capabilities stays with the investing enterprise (Dunning & Lundan, 2008, p. 7). The theoretical framework presented in section 2 will elaborate on this introducing definition of the MNE.

1.3 Literature Review

Having now introduced the empirical landscape and the MNE, we will review the current literature to position our analysis herein and determine how to add value in a scientific sense. This literature review is a critical comparison and evaluation of previous works

within the IB discipline. It is structured as an inverted pyramid as it starts with the fundamental theoretical approaches and ultimately closes in on a methodical debate wherein this thesis will add value by making an original contribution to the literature.

1.3.1 Theoretical fundamentals in IB

We will now consider four different theoretical approaches to the MNE and conclusively position our thesis within the theory.

The Economics Approach

Up until the 1960s, academic scholars studied the concept of MNEs using classic portfolio theory. It stipulated that geographical diversification by firms was determined by interest rate differentials between nations (Hymer, 1960). The ground-breaking dissertation by Hymer came about when he considered why investment patterns ran counter to what the interest rate differentials predicted. This led him to ask why firms internationalise at all (Hymer, 1960, p. 29). He hypothesised that MNEs who engage in operations abroad must have some type of competitive capabilities that provides an advantage relative to local firms to outweigh the cost of knowing less about the external environment in that country. He conclusively argued that advantageous competitive capabilities enabled the firm to maximise returns by exploiting market imperfections through monopolistic behaviour in foreign countries (Hymer, 1960).

While Hymer focused on superior returns and monopolistic behaviour, others have argued that MNEs are cost-minimising organisations that increase their geographical scope until the point where the marginal benefit of exploiting market imperfections offsets the marginal cost (Buckley & Casson, 1976, p. 33). Internationalisation enables the firm to maximise profits by decreasing the overall cost of operations. The cost-focused approach is based on transaction cost economic (TCE) principles which assume that the firm internalises market transactions into a hierarchical organisation to avoid the cost of short-term contracts with external actors (Coase, 1937, p. 391). TCE has been the foundation for different variations of the internalisation theory. Scholars have been focusing on how the firm internalises by exerting control of assets and processes via ownership (Rugman, 1981, p. 22), or how to eliminate transaction cost in the market (Williamson, 1992, p. 337), or the cost of arranging allocation of tasks and responsibilities between external parties (Hennart, 2007, p. 428).

The revenue and cost-focused approaches are two sides of the same coin as they are based on a traditional economics ontology focusing on revenues, cost, markets and efficiency. The strength of the economic approach within the IB literature is its close affiliation with the economics discipline which has seen extensive theory and model development and scientific recognition. The close affiliation with economics is, however, also a constraint since economic theory usually assumes perfect markets and information whereas the IB literature bases the motivation of

internationalisation on the exploitation of imperfect markets. The failure to reconcile quantitative economic modelling and contextual market imperfections has left the approach divided in terms of methodical approach. We will later divide the economic approach within IB into further niche research areas on which we focus.

The Resource-Based View

The economic tradition described above is mostly output orientated as it seeks to link financial performance gains with specific capabilities. However, the economic approach refrains from describing where these capabilities originate from and the process of how they come about. The resource-based view (RBV) serves as an alternative and has won many followers since Penrose in 1959 sought to describe the processes by which firms grow (Penrose, 2009). There the literature has dealt with resources in primarily two ways; internal resources and external resources.

The former finds that it is the internal capabilities specific to a firm that are the primary sources of competitive advantage and superior performance, and not factors of the external environment (Andrews, 1986; Grant, 1999). These resources which serve as the basis for profitability include patents, brands, process and product technology and human capital (Grant, 1999, p. 118). The second RBV perspective is concerned with the resource endowments available to the firm, such as labour, capital and land and how these inputs lead to more competitive processes within the firm and ultimately improve financial performance (Wernerfelt, 1984, p. 172). These external factors could either be (1) supply-side related such as availability of labour and capital; or (2) demand-side related factors such as increases in market size which allows for scale and technological advancements (Porter, 1998, p. 98) or changes in market composition and consumer preferences which firms could transfer across borders and outside their home market (Doz & Prahalad, 1987).

The RBV has seen extensive recognition and has been vital for improving the legitimacy of strategic management relative to more traditional disciplines such as economics and organisational theory (Rugman & Verbeke, 2002, p. 769). The main strength of the RBV is the applicability in contextual situations for business strategy development, and not just for academia. To some degree, internalisation theory and the RBV are intertwined to the extent that the internalisation theory considers the exogenous factor inputs and the institutional environment of the home-country of an MNE to be essential for establishing endogenous capabilities which the firm can use to internalise processes across borders (Rugman, 2005, p. 36).

Institutionalism

Institutionalists have also attempted to explain how MNEs are affected by institutional forces. Most of the research is based on the pioneering *bargaining theory*

which looks at the relative power relationships between host governments and foreign corporations. It recognises that corporations are vulnerable from host governments interfering with business operations as they begin operations in host countries. However, the power relationship shifts as the private firms become an integrated part of society, in terms of the business networks and workplaces, which enable the firms to exercise its powers over a sovereign government. (Raymond, 1971, p. 48).

Institutional Theory has provided a basis for risk analysis where unwanted consequences for the firm such as import restrictions, unfair tax laws, currency devaluation (Kobrin, 1979, p. 67) (Zarkada-Fraser & Fraser, 2002, p. 99) or corruption (Mudambi, Navarra, & Delios, 2013, p. 488) are scrutinised. Others have used institutional theory to understand strategic choices of MNEs operating in developed countries or emerging economies (Hoskisson, Eden, Lau, & Wright, 2000). Emerging economies have often shown high entry barriers and weak institutional frameworks and these have been main areas of investigation (Peng, Wang, & Jiang, 2008, p. 921). The study of institutions has been seeking to not only uncover foreign location decisions of the firm but also the appropriateness of regulatory bodies and policies from a nation-state perspective. It is precisely the relation between MNEs and the process of globalisation for institutions and institutional systems which justifies the approach.

The major challenge has been the ability to move from qualitative case studies to quantitative studies with larger samples. The economic approach and the RBV have been successful in linking the firm with the environment to analyse MNEs. The institutional approach has been challenged by poor predictability from quantitative models because of weak linkages to the firm, and difficulties of implementing qualitative research into broader frameworks (Jarvis, 2008, p. 48).

The Learning Approach

The learning approach has been preoccupied with the process of internationalisation by the individual firm where the explanation for patterns of internationalisation rests on a learning process of incremental adjustments to context-specific and non-static conditions of the firm and its environment (Johanson & Vahlne, 1977, p. 26). Successful MNEs are herein not determined by the extent to which they deploy capabilities to exploit market imperfections or internalise operations across borders for efficiency purposes, but through accumulation of foreign experiences to overcome the cultural barriers of entering a foreign country (Barkema, Bell, & Pennings, 1996, p. 151) which makes outcomes highly path-dependent. This behavioural tradition stands in contrast to the economic tradition as the former explains how learning affect outcomes while the process of learning is not dealt with specifically by the latter.

Situating Our Study in the Theory

The IB discipline is in many ways a combination of Economics, Finance, Accounting, Strategy, Institutions and International Relations (Dunning & Lundan, 2008, p. xxiii). This study will use an IB approach rooted in the economic approach as the theoretical basis for understanding the MNE and formulating hypotheses. The approach can establish what constitutes an MNE and the basic motivations behind the process of internationalisation. It assumes that firms are rational actors driven by the desire to maximise profits.

We acknowledge that the specific and more practical theories that we find relevant to use, to further explorer the area of research, is based on an economic ontology but includes components from RBV. The study will, however, not use the RBV to test which specific internal or external factors that seem to generate strong firm capabilities as we delimit ourselves from trying to understand how the firm specific capabilities of firm originate, and instead assume that they exist and generate an advantage relative to other firms.

The theoretical perspectives elaborated above do not try to establish whether MNEs generally have any preferences in terms of locating foreign operations. They merely assume that firms' specific capabilities in principle can be deployed globally and in fact will be deployed wherever the firms can exercise monopolistic behaviour, gain superior revenues or internalise a process to decrease the cost of operations. As the literature review closes in on the research area of the thesis, the next part will focus on how different methodical approaches have created debates as to whether MNEs are more prone to Regional Internationalisation before Global Internationalisation.

1.3.2 Present Debate on Patterns of Internationalisation

As shown above, most of the IB literature throughout the 1970s and 1980s sought to establish a 'grand theory' about the MNE and its behaviour in terms of monopolistic behaviour (Hymer, 1960), cost minimisation (Buckley & Casson, 1976), internal resources (Andrews, 1986), external resources (Wernerfelt, 1984), institutional factors (Raymond, 1971) and learning capabilities (Johanson & Vahlne, 1977). The late 1990s, on the other hand, experienced a new interest in various approaches for analysing geographical diversification of MNEs because of technological innovations and increasing globalisation of economic and political activity such as world trade (Dunning, 1998, p. 47). The traditional theories established why firms internationalised but failed to establish a general and broadly accepted understanding of why MNEs choose specific locations before others. We divide the current academic debate of analytical approaches to the concept of Internationalisation into two groups; Global Internationalisation and Regional Internationalisation.

The main argument of the Global Internationalisation approach is how global

ideological convergence and technological developments have sparked a globalisation process which allowed firms to deploy their competencies all over the world and achieve global economies of scale. The research can be further divided into those who have used qualitative case-studies showing how the firms in question have successfully internationalised globally (Govindarajan & Gupta, 2001; Yip, 2001; Van Agtmael, 2007); and those who have used a quantitative approach to investigate FDI on country or regional level where the increase in FDI suggest increased internationalisation of MNEs (Dunning, 1998; Dunning & Lundan, 2008).

The first group have been criticised for lack of analytical consistency and an unjustified assumption about globalisation being ever-increasing (Rugman, 2005, p.56). However, the critique fails to recognise that the literature mainly describes methods and approaches relevant for managerial purposes and not academia. The second group within the Global Internationalisation approach holds the industry as the unit of analysis and have found that the increase in global inbound and outbound FDI provides evidence to Global Internationalisation (Dunning, 1998, p. 48). The macro-level perspective has been criticised for leaving out the equivalent micro-level growth data for the MNEs responsible for the trade and FDI flows (Rugman & Verbeke, 2004, p. 3).

The main argument of the Regional Internationalisation approach is that the benefits from internationalising globally do not compensate for the additional cost of going beyond the home region (Rugman & Verbeke, 2004; Rugman, 2005; Asmussen, 2009), and that Regional Internationalisation and performance is positively related (Qian, Khoury, Peng, & Qian, 2010; Rugman & Oh, 2010; Oh & Contractor, 2013). A pioneering study analysed global sales data of 380 Fortune 500 companies only to classify nine companies as truly global, whilst the remaining were classified as either home-region oriented, bi-regional or host-region orientated (Rugman & Verbeke, 2004, p. 7).

The study has been criticised for not considering how companies with large home markets have less incentive to internationalise (Dunning, Fujita, & Yakova, 2007, p. 178), for not paying any attention to the sourcing of inputs but solely focusing on output (Dunning & Lundan, 2008, p. 5) and for not theoretically justifying the regional classification system (Osegowitsch & Sammartino, 2008, p. 186). It has nonetheless created an important alternative to the traditional mainstream approach of Global Internationalisation and the perspective has been tested substantially over the last 10 years.

The Regional Internationalisation perspective emphasises that MNEs are less able to utilise their capabilities to exploit market imperfections and decreas transactions costs beyond their home region. It means that their capabilities are regionally constrained due to higher levels of liability of foreignness in markets outside of the home region (Rugman & Verbeke, 2004; Asmussen, 2009; Verbeke & Asmussen, 2016) In practical terms, this means that a French Company would mainly internationalise within Europe since the firm is unable to overcome the

difficulty of operating in increasingly more unfamiliar markets further away from home.

The perspective is in opposition to the Global Internationalisation perspective which stipulates that firms do internationalise in a truly global context because the benefits related to scale far exceeds the cost of operating in unfamiliar markets (Govindarajan & Gupta, 2001; Van Agtmael, 2007; Yip, 2001).

To some extent, the controversy boils down to whether location decisions by MNEs are driven by their individual strategies or by external events in the technological, economic and political sphere. This study does not aim to discuss whether the former or the latter is more influential but assumes that both factors serve as independent variables determining geographical location decisions of firms. What is common for most studies investigating geographical location within the IB literature is of how they study MNEs across industries. Theories of MNEs do establish a set of common features that the average MNE possess and also a set of challenges which they face. However, the composition of each industry is naturally different in terms of competitive environment and regulatory foundation.

Our Contribution

We will test the Regional Internationalisation perspective in an industry specific context. This study will add value to the IB discipline as the industry specific perspective allows for innovative measurement tools in terms of establishing location specific preferences and the performance hereof. It will furthermore add value to understand the geographical scope of energy companies operating in increasingly liberalised markets. The methodical approach and results will provide a basis for others to perform industry specific studies using industry specific indicators to assess the internationalisation patterns of firms in specific industries.

The review of the literature showed how this thesis positions itself in the academic discussion. Section 1.4 will concretise the research area further and formulate a research question which will steer the overall study.

1.4 Formulating a Research Question

We will investigate the internationalisation preferences, operational and financial performance of electricity producing firms during 2006-2015.

The first step is to understand why firms internationalise and how this process is related to firms' endogenous capabilities and external factors of the home market and foreign host market. Having then established the nature of MNEs, how they function and what drives them, we assess the degree to which electricity producing multinationals in fact internationalise in a global or regional context, and how the established internationalisation preferences impact the operational and financial performance of these firms. We will construct new and innovative industry-specific metrics to assess the internationalisation preferences of the firms. These metrics

will thereafter be regressed with comprehensive performance metrics to test the degree to which Regional Internationalisation preferences are related to superior operational and financial performance over the nine-year period between 2006-2015.

1.4.1 Defining the Research Question

> *Have electricity producing firms internationalised regionally or globally during 2006-2015, and to what degree has Regional Internationalisation yielded superior performance of the firm?"*

1.5 Thesis Roadmap

Section 1 introduced the research area, reviewed the current literature and defined the research questions. Section 2 lays out a systematised conceptual definition of the MNE and formulates hypotheses based upon established relationships between dependent and independent variables. Section 3 operationalises the variables into indicators and metrics to create a balance between theory and empirical observations. Section 4 describes the quantitative model used to establish internationalisation preferences, and the statistical models used to analyse the correlation between internationalisation preferences and performance of the firm. Section 5 presents the results and validation of the analysis from the models presented previously. Section 6 expands on the findings from the previous chapter by specifically answering the hypotheses formulated at the beginning of the thesis and provides a normative discussion with respect to the findings. Section 7 answers the research question conclusively and provides future research implications.

2 Theoretical Framework

In this chapter, we create clear definitions of the key concepts that are used throughout the thesis. Section 1 introduced the MNE in a broad sense as a wide constellation of meanings and understandings drawing on different schools of thought. The process of reviewing the IB literature allowed us to determine what theories that are most appropriate to further explore the area of investigation. This theoretical framework will formulate a systematised conceptual definition of the MNE and its motivation and determinants for internationalisation from which we can establish a theoretical rationale for choosing appropriate input and output variables.

Section 2.1 explores why firms internationalise by establishing the motivations behind firms' ambitions to internationalise. Section 2.2 assesses two opposing internationalisation strategies; Global Internationalisation and Regional Internationalisation, to understand *how* firms internationalise. Section 2.3 summarises the chapter in a preliminary conclusion.

2.1 Why do Firms Internationalise?

This section is comprised of three individual theories of the MNE which we use to construct an explicit definition of the MNE and establish the motivations behind its ambition to internationalise. The theories use individual concepts for describing the MNE and its challenges. However, the individual concepts have been categorised as either the firm's endogenous capabilities which it can apply in a foreign market, and exogenous factors specific to the MNE and the environment in which it operates. The OLI paradigm (Dunning, 1980, 1988; Dunning & Lundan, 2008), the internalisation theory (Rugman, 1981, 2000, 2005) and the Integration-Responsiveness framework (Doz & Prahalad, 1987) share a common ontology and the inclusion of three theories enables us to achieve a more comprehensive understanding of the determinants of internationalisation without changing the basic assumptions about what a firm is and how it operates. The theories are thereby not in competition, but complementary. The next subsections will elaborate on the individual concepts of each theory, and ultimately group the concepts into endogenous capabilities and exogenous factors. An ontological discussion will not appear until section 4.1 of this thesis.

2.1.1 The OLI Paradigm

The main impetus for attaining ownership of facilities in foreign locations is to outweigh the cost of servicing an unfamiliar market. The greater the ownership advantages are, the greater the incentive is to internalise operations abroad instead of exporting products (Dunning, 1980, p. 9). The OLI paradigm is based on three factor which can be used to explain the propensity of an enterprise engaging in international operations: ownership, location and internalisation. The first two factors are largely understood as inputs that can be transformed through production. Ownership advantages are the firm specific factors of a firm that enables firms to service markets better than competitors. As the possession of certain ownership advantages decide which firms will service certain foreign markets, the locational factors determine if the firm will service the market through foreign trade (e.g. exports) or FDI and local production (Dunning 1981: 10).

Location advantages are country specific factors such as natural resources, labour force, access to markets, legal and commercial environment and government behaviour affecting the firm and the realities in which it operates. Internalisation is the degree to which a firm choose to internalise or externalise operations in foreign locations. The incentive for a firm to internalise its ownership advantages is to circumvent the disadvantages of not owning production in the foreign country (e.g. tariffs, delivery times etc.), and to capitalise on market imperfections which arise when transaction costs are high (Dunning, 1980, p. 11). These market imperfections can include imperfect information between market actors, lack of capabilities of current actors or infinitely elastic market demand (Dunning, 1988,

p. 2). The OLI model works as a three-legged stool where each leg can be assessed individually while collectively affecting the output, which in this analogy is a firm's propensity to internationalise. The framework seeks to offer a general framework to establish the level of patterns of foreign-owned operations done by national firms, and domestic operations owned, controlled and conducted by foreign firms (Dunning & Lundan, 2008, p. 95).

Ownership and internalisation go hand in hand in the OLI model as ownership is the firm-specific factors that a firm holds that are not geographically confined, which the firm has an incentive to internalise across foreign markets to exploit market imperfections in the final product market (Dunning, 1988, p. 11). Ownership of activities are desirable if they can sufficiently compensate for the costs of establishing and operating a foreign value-adding operation (Dunning 1988: 2). The line between the ownership advantage and internalisation advantage is not always clear cut as ownership is argued to be the input, but ultimately becomes the output when the process of internalisation has occurred.

The framework divides the ownership advantage into two types. The first type is asset ownership advantages existing from proprietary ownership of specific assets relative to competitors. It is the endogenous capabilities that a firm has which enables it to gain market share and exploit market imperfections in foreign markets (Dunning, 1988, p. 2).These ownership advantages are very similar to the Hymer's explanation of capabilities where firms utilise advantages to control foreign activities to remove competition and generate above-normal returns (Hymer, 1960, p. 3). The origin of Hymer's capabilities and how they have come about is however not explicitly explained. The asset ownership advantage in the OLI paradigm shares similar shortcomings as is does not explain how these specific advantages are generated. The second ownership advantage is Transactional ownership advantages. These are the ability of a firm to utilise its hierarchies and long reach to capture transactional benefits which they external market is not able to perform (Dunning, 1988, p. 2).

In that sense, the firm uses the asset ownership advantage via the transactional ownership advantage to decrease transaction costs and become more efficient than the external market, and ultimately exploit the weak market mechanisms and outcompete competitors. This is where the ownership advantage and internalisation advantage become difficult to separate. However, the transactional ownership advantage is the ability (and possibility) of using hierarchies to internalise, and the internalisation-leg of the stool is the extent to which the firm estimates the perceived costs (and inefficiencies) of current market failures relative to the gains of ownership rather than contractual agreements such as licensing (Dunning 1988: 3).

The location advantages in the OLI paradigm include various types of basic factor inputs such as natural resources and labour, and more high-level factors such as political, socio-economic and cultural factors. These factors can affect the

firm as exogenous factors (Dunning, 1980, p. 10). The OLI paradigm focuses on the location advantages in the host country (foreign market) and not the home country of the firm. We will see the opposite in the next theoretical perspective.

The OLI paradigm is concerned with the interactions between ownership, location and internationalisation at the industry level of the country which a firm is considering to enter, and thereby explains why certain geographical areas are more prone to receiving FDI from other countries. The firm is perceived to engage in foreign production if they believe it to be beneficial to combine spatially transferable products produced in the home country, with certain basic input factors or production in another country (Dunning, 1988, p. 4).

2.1.2 The Internalisation Theory

Internalisation theories of the MNE have developed into separate versions as multiple scholars have constructed individual conceptual frameworks. All of these are commonly based on transaction cost economics which sets out fundamental assumptions about the firm in terms of how firms seek to internalise market transactions in a hierarchical organisational structure. It does so to avoid the cost of short-term market-based contracts (Coase, 1937, p. 391) and to eliminate bargaining costs over risk, return (Williamson, 1992, p. 337), tasks and responsibilities (Hennart, 2007, p. 428).

The internalisation theory sets out to explain how firms use internal markets to service foreign markets by exerting control via ownership (Rugman, 1981, p. 22) and suggests that firms are efficiency-orientated when choosing between exports (trade), licensing (a form of outsourcing) and FDI when entering foreign markets (Rugman, 1981, p. 27). The basic premise is that firms can recognise market imperfections which prevent efficient operations of regular trade. These market imperfections (or failures) induce firms to create internal markets as a response and overcome the inefficiencies that the market allows for (Rugman, 1981, p. 40). Two independent variables are established to formalise a conceptual framework; firm-specific advantages and country-specific advantages.

FSAs are factors that characterise the endogenous capabilities that the firm hold and can use to create a competitive advantage to ultimately internalise processes via ownership and exploit the market imperfection of in-efficiency. These have a more precise definition than in the OLI framework as it is solely related, and similar, to the transaction-ownership advantage of the firm. Internalisation is the process of making a market within a firm (Rugman, 1981, p. 28). The firm will respond to market imperfections by using its hierarchy to create markets if transaction costs in the external market place are too excessive, or if supply and demand are not able to meet and set a market price (Rugman, 1981, p. 41). The internalisation process is therefore an endogenous activity performed by the firm and implemented through its strategies as a response to exogenously given market imperfections of intermediate input factors in foreign markets.

CSAs are the political, economic and cultural factors which affect the firm and its strategy. Dunning described how the location factors included factors within the host country that the firm would be able to exploit, such as low-cost labour (Dunning, 1980). The CSA factors in Rugman's version of internalisation theory deals with the exogenous factors in the firm's home country that enables it to create FSAs which the firm later on can take to foreign markets and exploit market imperfections (Rugman, 2005, p. 34). This part is precisely where Rugman's version of the internalisation theory incorporates perspectives from the RBV, as it establishes how the FSAs are created. Managers identify it strengths and weaknesses and formulate strategies based on these FSAs and CSAs to position itself in relation to competitors (Rugman, 2005, p. 36).

The theory places the firm at the center of the analysis as it is concerned with how the firm can maximise its profits by internalising a process. It is to some extent a narrow theory in the sense that it provides efficiency as the only motivation for the MNE to internationalise whereas the OLI framework more broadly lays out multiple reasons for internationalisation such as resource seeking, market seeking, strategic asset seeking and efficiency seeking (Dunning & Lundan, 2008, p. 68).

The theories therefore complement each other with respect to how firms have endogenous capabilities that they can utilise in a host country, and they differ as the OLI framework focuses on the exogenous factors of the host country as the internalisation theory focuses on the exogenous home country factors. To that extent, the internalisation theory offers an explanation to how firms generate these endogenous capabilities while the OLI framework considers these as a constant that some firms have while others do not. Elaborating on the origin of endogenous capabilities is, however, not within the scope of this study as the purpose of our theoretical framework is to establish that firms do have motivations for internationalising, and not to find out how these are generated.

2.1.3 The Integration-Responsiveness Matrix

The Integration-Responsiveness framework focuses on how large, diversified MNEs holds a set of strategic options from which it selects some before others to deal with the twin pressures of central coordination and integration on activities across borders on one hand, and autonomous subsidiary responsiveness to local demands originated from economic, competitive, and market forces on the other hand (Doz & Prahalad, 1987, p. 6). The main argument is that different products may suffer from different degrees of integration or responsiveness pressures since some processes with respect to a product are more suitable to manage centralised and thereby reduce cost, while other processes with respect to a product experience a higher need for local adaptation and responsiveness (Doz & Prahalad, 1987, p. 14). The unit of analysis is like Rugman, as opposed to Dunning, the firm.

The managerial challenge in the IR framework is related to the ability to de-

termine the extent of whether the MNE should integrate geographically dispersed activities to reduce cost and optimise investments, which usually involves the attempt to realise economies of scale and standardisation of products, or to become more local responsive by adapting products to the local environment and its inherent demands (Doz & Prahalad, 1987, p. 15). The more practical managerial task is to balance the two forces, and find an equilibrium point between them.

The first half of the IR framework, integration, is similar to the internationalisation (Dunning, 1980) and internalisation (Rugman, 1981) processes that the two previous theories have established. However, the second half of the IR framework, responsiveness, describes how the competitive market characteristics, such as local demand and product substitutes, in the host country affect the MNE which makes the strength of local responsiveness a determining factor that can prevent firms from successfully integrating globally (Doz & Prahalad, 1987, p. 19). It stands in contrast to the OLI framework which establishes that foreign locations can provide advantageous location-specific factor inputs (Dunning, 1980) and internalisation theory assumes that it is the location-specific factor inputs of the home country that allows for firms to generate endogenous capabilities (Rugman, 1981).

2.1.4 Formulating a Definition

The key takeaway is that MNEs have valid motives to internationalise. The arguments are summarised in table 1

Table 1: Motivation and Determinants for Internationalisation

	Level of Analysis	**Key Concepts**		**Why do firms Internationalise?**
Dunning (1980, 1988), **Dunning & Lundan** (2008)	Industry	Endogenous Capabilites	Ownership / Internationalisation	To utilise ownership and internalisation advantages to exploit imperfections in final output markets in least-cost locations to gain revenue and decrease cost
		Exogenous Factors	Location (Host-Country)	
Rugman (1981, 2000, 2005)	The Firm	Endogenous Capabilities	Firm Specific Advantages (Internalisation)	To utilise firm specific advantages developed in home market to exploit imperfections in the intermediate input markets and create internal markets across borders to improve efficiency and decrease transaction cost
		Exogenous Factors	Country Specific Advantages (Home-Country)	
Prahalad & Doz (1987)	The Firm	Endogenous Capabilities	Integration	To integrate geographically dispersed activities to reduce cost and optimise investment, and/or become locally responsiveness across national markets.
		Exogenous Factors	Local Responsiveness (host-country)	

We are now able to formulate a comprehensive definition of MNEs based on a combination of endogenous capabilities internal to the firm and exogenous factors outside of the firm which explains why MNEs internationalise across borders. We define an MNE as an enterprise that engages in foreign direct investment (FDI) and owns and controls value-added activities in more than one country (Bartlett & Ghoshal, 1998). MNEs hold endogenous capabilities related to ownership, internationalisation processes (Dunning, 1980) and internalisation (Rugman, 1981) that they can deploy in least-cost locations (Dunning, 1980) to exploit imperfections in intermediate input markets (Rugman, 1981) or in final output markets (Dunning, 1980). They do so up until the point where the benefits from increased internalisation is exceeded by the cost of doing so (Rugman, 1981) which will ultimately transform into improved financial performance. The utilisation of endogenous capabilities must be conducted with respect to exogenous economic, political, societal, demographic, geographic and market factors which include specific opportunities and risks to the firm (Doz & Prahalad, 1987).

This section has created an explicit systematised definition of the MNE and determined the motivations behind internationalisation. Next, we will explore two different approaches to determining the geographical scope of internationalisation

which will enable us to develop hypotheses that we can test in the analysis.

2.2 How do Firms Internationalise?

This section will describe two internationalisation approaches that we have labelled as "Global Internationalisation" and "Regional Internationalisation". The two approaches differ with regards to the extent that endogenous capabilities are perceived to be either location-bound or non-location bound.

2.2.1 Global Internationalisation

The Global Internationalisation perspective states that firms can utilise their endogenous capabilities in a truly global context as these are in principle able to overcome any potential liability of foreignness. The basic reason for arguing that the value-creation opportunities related to utilising global strategies by far exceeded local strategies, lies within the key assumption that ideological convergence and technological developments have sparked a globalisation process which has allowed firms to utilise their competencies all over the world (Govindarajan & Gupta, 2001; Yip, 2001; Van Agtmael, 2007). Globalisation refers to growing economic interdependence among countries and increased cross-border flow of goods & services, capital and know-how (Govindarajan & Gupta, 2001, p. 4) from a harmonisation of markets through break-down of trade barriers (Yip, 2001, p. 2).

The main argument is that as the world is becoming increasingly globalised, firms must adjust to these changes and acquire global skills and develop global competitive advantage (Govindarajan & Gupta, 2001, p. 20). The source of global competitive advantage is thought to be achieved by finding the equilibrium point between adaptation to local markets and integration across borders to build economies of scale or scope (Gupta, Govindarajan, & Roche, 2001, p. 45) and thereby providing global availability and improved quality of good and services, and cost reductions (Yip, 2001, p. 20). The idea is that the firm should pursue local adaptation to the extent that it will not compromise the cost structure of the firm, and the potential to increase profitability and have a much larger asset base.

This stream of thought is very much based on the building block laid out in section 2.1. Firms have some sort of ownership and internalisation competencies that are specific to the firm (Dunning 1981) which they utilise to decrease transaction cost and become more efficient by creating internal markets across borders (Rugman, 1981) while ultimately customising the offering to a geographical context by being responsive to the local environment (Doz & Prahalad, 1987).

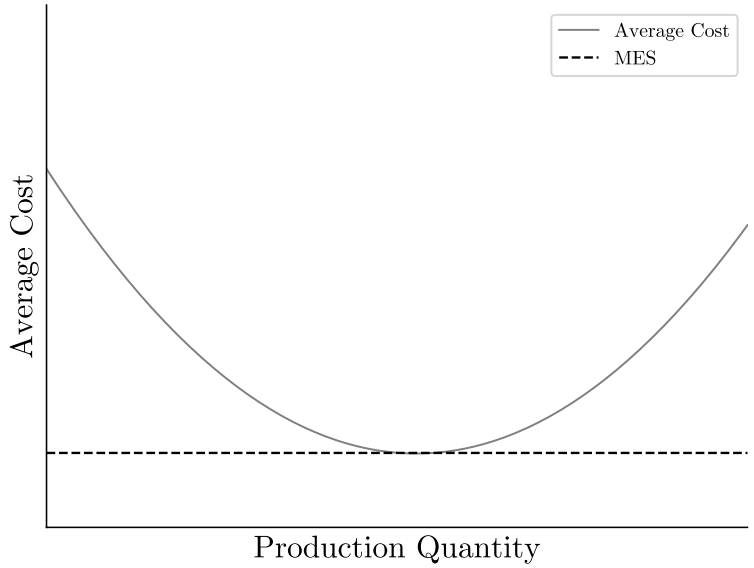
The potential for being cost competitive has been argued to be greatest when significant benefits are gained from utilising a large production volume (Kobrin, 1991, p. 18). If a firm has exhausted the potential for increasing its scale of production in the home market, the natural next step is to seek new, and possibly

foreign, markets to increase the total market potential, which in turn will allow the firm to spread out its cost base, and particularly its fixed cost, across a larger area (Hennart, 2007, p. 431).

The economics rationale requires the assumption that part of the total cost is fixed and a part being variable. The variable cost is tied to the level of output of the firm and hence increases or decreases as a firm changes the output. Fixed costs are, however, not subject to the same level of change with respect to changes in output, and the total average cost of a company must decrease as output increases as long as the average costs exceeds the variable costs (Besanko, Dranove, Schaefer, & Shanley, 2013, p. 61).

The exploitation of economies of scale are therefore not necessarily related to international diversification but requires additional output which can come from either home market or multiple markets from different countries. The optimal level of operation (or output) for any company is when the total average cost stops decreasing as output increases, which is called Minimum Efficient Scale (MES) and functions more as a guiding spot rather than an equilibrium (Besanko et al., 2013, p. 62). It is the point where the benefits from scaling up is exhausted, as additional cost reductions will not be achieved by increasing quantity. An average cost curve captures this relationship between cost and output.

Figure 2: Average Cost Curve. U-Curve



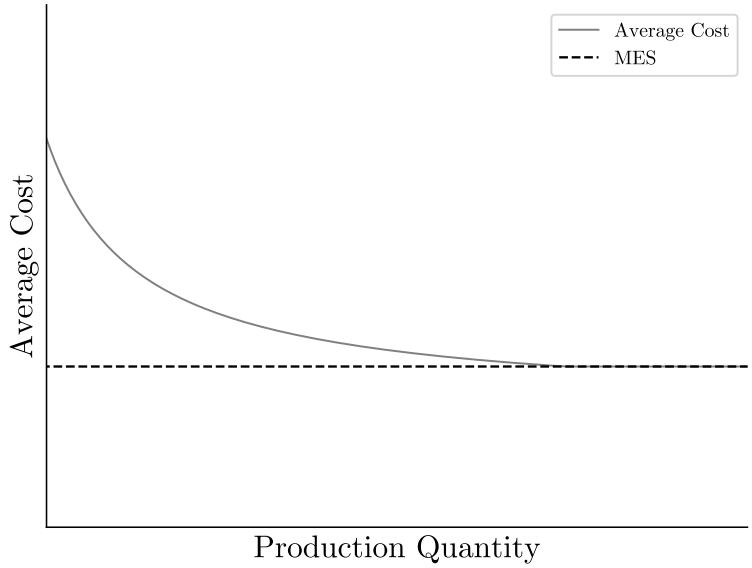
As seen in (Besanko et al., 2013)

The relationship is supposed to be U-shaped so that average cost per unit initially declines as quantity increases as it begins to increase when the quantity exceeds the MES point (see figure 2). The initial decline in average cost is achieved

when the fixed costs are spread out over a larger number of units. An example could be a factory which have a fixed cost in terms of buildings and machinery. When the quantity increases by extending the time that the machines are operated per day, the fixed cost are spread out over more products. However, a given machine can only operate 24 hours a day, and if the output is expected to exceed what can be produced in 24 hours, then another machine must be acquired, or a new production building must be established which altogether will increase the fixed cost and thereby the average cost (Besanko et al., 2013, p. 62).

If we assume the relationship in figure 2 above to be valid, small and large firms would have higher costs than medium-sized firms. However, others have argued that the production cost in a great number of industries is in fact L-shaped and not U-shaped.

Figure 3: Average Cost Curve. L-Shaped



As seen in (Besanko et al., 2013)

If the average cost curve is L-shaped, the average cost declines until the MES is reached and then stays at the same cost-level per unit regardless of whether quantity increases further.

Studies have shown that firms usually have U-shaped average cost curves in the short-term, while firms are more likely to experience L-shaped average cost curves in the long-term as they expand their capacity, for example by building new production sites or buying more machinery, to become as efficient through production as possibly (Besanko et al., 2013, p. 63). The potential for economies of scale are often high in capital intensive industries (such as the power sector) as these are characterised by high levels of fixed cost stemming from investments in

intangible assets such as technology from purchasing patents or extensive R&D expenditures. These firms must sell many products or services (a high output) in order to spread out the large R&D expenditure (Hennart, 2007, p. 433).

To place the concept of economies of scale in the context of the first part of this chapter, we can understand the concept as the process of integrating and coordinating across borders to decrease transaction costs. The idea is that firms will seek to establish a long-term L-shaped average cost curve by expanding on production in foreign countries to increase quantity. It could either be to only produce products in the new location and then send it back to the home market or produce and sell products in the new market. The former is attractive when the foreign market has low-cost factor inputs for production while the latter is attractive if the home-market is saturated and increased output must be reached by capturing new markets.

This subsection has shown the benefits of economies of scale and the spreading of fixed costs that a firm can obtain by becoming geographically diversified. The Global Internationalisation perspectives assume that firms' endogenous capabilities are non-location bound and utilised globally to achieve benefits from economies of scale. Liability of foreignness is dependent on context but independent of geographical distance. Firms can become *truly global*, as long as the business level strategies of entering specific countries or markets are customised to that specific context.

Our first hypothesis is intended to assess and establish whether electricity producing firms have internationalised during 2006-2015 which will show the extent to which the firms of our sample have assessed that establishing electricity producing capacities and production in a foreign country would make their average cost curve decline. Thus, we hypothesise that:

Hypothesis 1: *"Electricity producing firms have internationalised."*

We acknowledge that hypothesis 1 above appears to be deterministic by how it encourages either simple confirmation or falsification, and does not specify any degree. However, the answer to hypothesis 1 is a prerequisite for answering the subsequent hypotheses.

2.2.2 Regional Internationalisation

The Regional Internationalisation perspective states that firms can only utilise their endogenous capabilities in a regional context as these cannot overcome inter-regional liability of foreignness. The perspective gained traction during the mid 2000s and broke with the conventional and mainstream argument of how MNEs were only becoming ever more global with regards to their actual penetration to foreign markets and thereby creating an academic discussion with regards to the empirical findings from analysis (J. Kim & Aguilera, 2015, p. 147).

A ground-breaking paper demonstrated how most of the Fortune 500 companies are in fact not global companies but mainly based in their home region. Looking at sales numbers, the results showed how very few MNEs are in fact able to sell products and services all around the world and reap sufficient benefits from economies of scale and overcome the inter-regional liability of foreignness. The authors concluded that irrespective of their efforts to develop and utilise non-location bound endogenous capabilities, MNEs are simply not able to integrate and internalise processes while simultaneously being locally responsive to the geographical context (Rugman & Verbeke, 2004, p. 6).

Liability of (Regional) Foreignness

The argument explained above largely rests on the theoretical concept of liability of foreignness. Stephen Hymer was the first to touch upon the cost associated with the lack of knowledge regarding the ease of doing business in foreign countries (Hymer, 1960). While not defined conceptually in Hymer's work, it was later labelled as the liability of foreignness (Zaheer, 1995, p. 343). The study identified how the cost a firm operating in a market overseas incurs, that a local firm would not incur, can arise from at least four independent sources: (1) cost directly associated with spatial distance such as travel, transportation and coordination across physical distance and time zones; (2) firm-specific cost associated with companies' unfamiliarity or lack of roots with local environment; (3) cost deriving from discrimination and economic nationalism from the foreign host government; and (4) cost from restrictions of foreign sales imposed on domestic companies from the home government.

The cost of these independent sources reflect the specific context in a foreign market. To overcome the liability of foreignness and compete with local firms, MNEs can either utilise their endogenous capabilities to gain above-average revenues to compensate for the added cost of operating in the foreign context or try to mimic the advantages utilised by the local firms (Zaheer, 1995, p. 344).

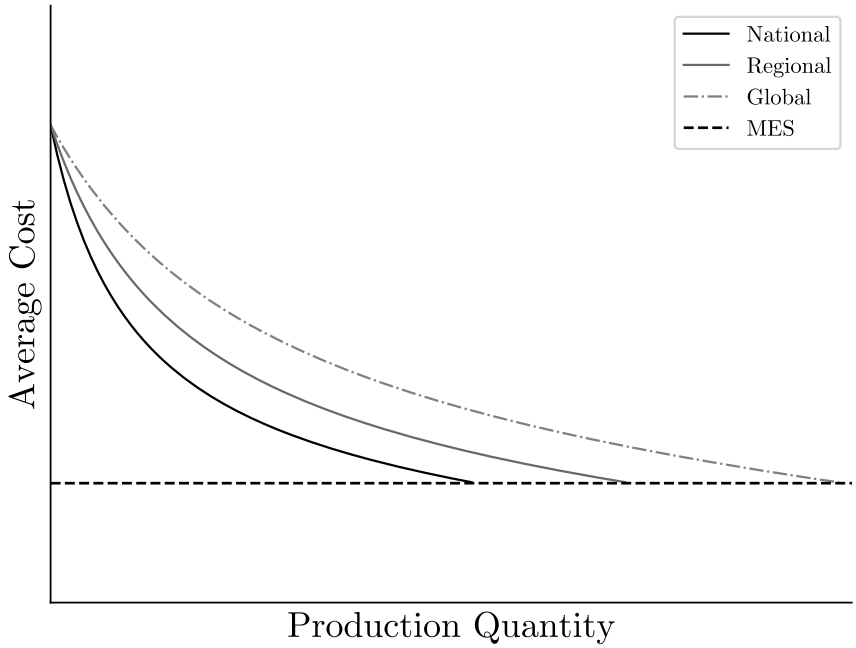
The empirical evidence presented by Rugman and Verbeke led them to argue that widespread geographic diversification possibly has managerial pitfalls and that the economic evaluation of cross border growth strategies should account for costs related to the liability of inter-regional foreignness, which, from an MNE's strategic point of view, means that MNEs do not penetrate markets to become more national responsive and localised, but instead seek to capitalise on similarities across markets, because there is an additional cost related to expanding to other regions (Rugman & Verbeke, 2004, p. 16). This cost causes regional semi-globalisation which then debunks the mainstream idea of ever increasing globalisation led by MNEs. Most firms have been guided by regional preferences as European firms internationalise within Europe and so on.

"The main reason is that the liability of intra-regional expansion appears to be much lower than the liability of interregional expansion" (Rugman & Verbeke, 2007b, p. 201).

This is where the two internationalisation perspectives differ substantially. The Global Internationalisation perspective does accept that liability of foreignness exists but does not recognise that inter-regional liability of foreignness is more extensive than intra-regional liability of foreignness.

As the global strategy perspective highlighted how endogenous capabilities are non-location bound and potentially could be utilised on a global scale, the regional perspective emphasises that MNEs are less able to utilise their endogenous capabilities to exploit market imperfections and decrease transaction costs across regions, hence, some endogenous capabilities are in fact regionally constrained and therefore location-bound. This difference between the two can be illustrated graphically by using the average cost curve and the MES concept. The question is whether the firms can achieve the lowest possible average cost per unit by being national, regional or global.

Figure 4: Average Cost Curves. L-Shaped



As seen in (Verbeke & Asmussen, 2016, p. 1065)

The opportunity to achieve MES has been argued to largely depend on the size of the individual home-market in terms of whether it will be sufficient for the firm to achieve MES herein, or if it has to go abroad to reach MES. However,

firms will not be able to reach MES via truly global production and standardisation because the liability of foreignness is too high in areas outside of the home region and only national and non-integrated economies of scale can be achieved (Verbeke & Asmussen, 2016, p. 1066). The extent to which the firm can achieve MES through global economies of scale then depends on the contextualities of the geographical area with respect to the product or service that the firm sells. It means that the optimal internationalisation level for the individual firm depends on unique factors affecting the individual firm as well as industry specific factors. These factors combined then become the main determinants of a firm's probability of overcoming the liability of foreignness.

Recognition of the Regional Internationalisation perspective:

The new and radical approach for assessing the level of globalisation with respect to MNEs fostered responses in the academic world. A critique about the methodical framework utilised in Rugman and Verbeke has ultimately concluded that internationalisation preferences of MNEs to a much larger extent are driven by exogenous changes than strategic determination of Regional Internationalisation.

MNEs are not deliberately choosing to be less global and more regional, but simply seek to complement their ownership advantages and location strategies wherever it is most suitable. The paper stands in opposition to the Rugman position, who explains how MNE strategies are the independent variable, by arguing that it is in fact the much larger (or macro) economic forces which is the independent variable and thereby as a complement adds to shape strategies of MNEs. These exogenous factors such as regional economic integration (e.g. EU or NAFTA), government policy towards FDI, different degrees of openness of economies and institutional infrastructure, or cultural and ideological values of regions and countries (Dunning et al., 2007, p. 185).

Even as the initial conclusions of an overall exaggeration of globalisation with respect to MNEs met extensive critiques (Dunning et al., 2007; Osegowitsch & Sammartino, 2008), these have mostly targeted the methodological basis of the analytical findings. What then essentially differs between the global and Regional Internationalisation perspectives is of how the former argues that the non-location bound endogenous capabilities can be utilised on a global scale if management are coordinating an organisation optimally, while the latter argues that endogenous capabilities have location-bound components that prevent firms from internationalising as the liability of foreignness exceeds the benefits associated with internationalisation.

A great deal of studies have since tested the Regional Internationalisation argument and found that MNEs do follow home region oriented internationalisation paths (Asmussen, 2009) and that Regional Internationalisation and performance is positively related (Qian et al., 2010; Rugman & Oh, 2010; Oh & Contractor, 2013; Verbeke & Asmussen, 2016).

It is the Regional Internationalisation perspective that we furthermore seek to test. It shows how firms' endogenous capabilities are location-bound and are utilised in the home-region since the benefits from global economies of scale cannot overcome the inter-regional liability of foreignness. We will test the extent to which electricity producing firms have internationalised regionally or globally during 2006-2015. Thus, we propose the following:

Hypothesis 2: *"Have electricity producing firms to a larger extent internationalised regionally than globally?"*

2.2.3 Relationship Between performance of the Firm and Regional Internationalisation

Having just hypothesised that that electricity producing firms pursue Regional Internationalisation strategies before global, we move on to consider the outcome of those established preferences in terms of operational and financial performance. The theoretical perspectives that we have included throughout this thesis all share one common assumption which is that of how firms internationalise to the point where the benefits equal the cost which ultimately transforms into improved financial performance (Dunning, 1980; Rugman, 1981; Doz & Prahalad, 1987).

However, more than 100 empirical studies have examined the relationship between internationalisation and financial performance using different theoretical approaches and thereby yielding diverging results including positive and monotonic, U-shaped and S-shape correlations, as well as negative or insignificant correlations (Hennart, 2007, p. 424).

This study will utilise a research program where we are able to assess both operational and financial performance of the firms of our sample, and correlate with internationalisation preferences. Before explaining the methodical approach further, we will here lay out the hypotheses that will steer the analysis.

Regional Internationalisation & Operational Performance

Studies prior to this have made the distinction between upstream and downstream activity to assess where one of the two was more internationalised than the other. Dunning have found that assets and operations such as R&D, sourcing and manufacturing in a foreign country (upstream activity) have been recognised as more easily internationalised than the following sales and distribution (downstream activities) (Dunning & Lundan, 2008, p. 5).

Rugman also made the distinction but found that the geographic potential for upstream internationalisation often is global and the potential for downstream internationalisation often is regional due to how downstream activities needs to be more locally responsive to local demand (Rugman, 2005, p. 201). This distinction helps to explain why some MNEs have been able to develop global operations

but not been able to fully capitalise on the globally dispersed assets. Or put differently, the MNE might incur a higher liability of foreignness in downstream activities relative to upstream activities.

This study aims to assess the operational performance from established capacities and to actual production of electricity. We thereby categorise the former as upstream and the latter as downstream. We have established that the nature of electricity as a product includes that electricity is consumed almost simultaneously as it is produced, and the sale of electricity happens before it is produced through bilateral or mediated contracts. It practically means that electricity is not produced unless it is sold to an off-taker. Under that assumption, we hypothesise that capacities located regionally will have a higher utilisation rate from capacity to production than globally located capacities due to how the firm will face a lower degree of liability of foreignness regionally than globally. As such, we hypothesise that:

Hypothesis 3: *"Regional Internationalisation yields superior utilisation from capacity to production than Global Internationalisation"*

Regional Internationalisation & Financial Performance

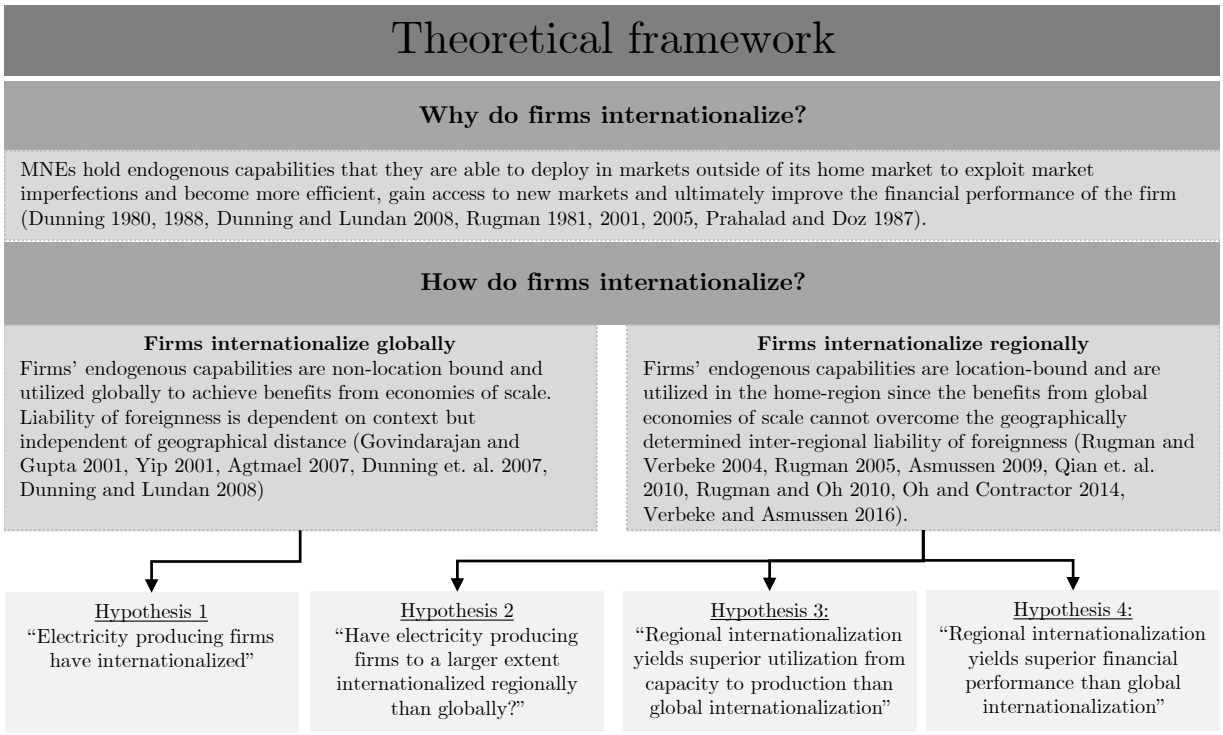
Focusing on operational performance leaves out the perspective of how lower levels of electricity production might be 'the right choice' depending on market prices. As the theory stipulates, Regional Internationalisation ultimately leads to improved financial performance. As such, we hypothesise that

Hypothesis 4: *"Regional Internationalisation yields superior financial performance than Global Internationalisation*

2.3 Chapter Summary

In this chapter, we have formulated a concrete and systematised definition of the MNE, its motivations and determinants for internationalisation. It has led us to further investigate internationalisation preferences of electricity producing firms, to test the relationships between internationalisation and operational performance, and internationalisation and financial performance. Section 3 develops indicators and scoring cases to bridge the theoretical concepts and empirical observations.

Figure 5: Overview of Theoretical Framework



3 Operationalisation

In this chapter, we will create indicators and scoring cases that adequately reflects the MNE to create a balance between theory and empirical observations. Section 3.1 explains the input variables used to establish the firms' electricity producing assets (capacity) and electricity production and measure internationalisation preferences related to hypothesis one and two.

Section 3.2 describes indicators for the dependent and independent variables used to measure the relationship between capacity and production with respect to geographical location which is used to assess operational performance of the firms related to hypothesis 3. Section 3.3 introduces financial metrics to create measurable dependent variables used to assess the relationship between internationalisation and financial performance. Section 3.4 summarises the chapter in a preliminary conclusion.

3.1 Establishing Internationalisation Preferences

This study does not study generic MNEs but firms operating in the electricity sector. We have defined the electricity producing multinationals as semi or fully privatised electric utilities and IPPs who built, own and operate electricity producing assets.

3.1.1 Indicators

To figure out the degree to which the firms have internationalised we need to establish an input metric which captures this phenomenon to place the firms in certain locations. Where others before us have been forced to use sales figures and total assets, we are pleased by the innovative approach and ability to use industry specific metrics. We have chosen two separate indicator variables (1) the firms' electricity producing capacity; and (2) the firms' produced electricity. Capacity is the maximum output of power (watt) to be produced at any time. Produced electricity is the actual amount of power produced over the course of a given amount of time (watt-hours).

It means that we will run two individual tests for each hypothesis using capacity and production separately. This study includes both capacity and production to test whether the two exhibit any variance when determining the level of internationalisation. We assess the capacity and production data of individual firms on a consolidated ownership basis. As an example; if a firm owns 50% of a 100 megawatts power plant, its consolidated share of ownership is 50 megawatts. It means that if a firm has built and owned capacities at a certain point in time, but sold its ownership part off, it will no longer appear as a part of that firm's portfolio of capacities or have any output production.

Converting indicator data into a measurement

To figure out how international a given company is, we need to convert their raw capacity data into a one score that measures internationalisation. To make this (or these) scores comparable so that we can compare between firms, we need to adjust the raw capacity and production data with respect to the market in which they operate. We weight these scores for national, regional and global capacity and production data for each firm to solve the for the problem of sensitivity to the size of the home market, regional market and global market.

3.1.2 Measuring Internationalisation

The degree to which the firms have internationalised, or their level of internationalisation, is captured by the score we will denote 'I' and will be used to test hypothesis 1. We moreover break the I-score down to Regional Internationalisation score (or R-score) and Global Internationalisation score (G-score). The

results generated from running the model and their validity will be thoroughly elaborated in the next chapter.

For this part, we can say that the level of internationalisation is an arbitrary but consistent score which enables us to look at the companies in relation to each other and spot certain trends. After establishing the level of internationalisation, we split this up into Regional Internationalisation and Global Internationalisation levels to establish the extent to which the firms have internationalised regionally or globally. The regional division will also be elaborated in the next chapter. A perfectly internationalised company will have a score where both 'R' and 'G' are equal to 1. On the subset, 'R' = 1 and 'G' = 0 means perfectly intra-regionalised and no rest of world capacity/production and vice versa. Theoretically speaking, scores above in either category should be impossible because a company cannot have a positive liability of foreignness, but in the real world this is empirically observed all the time, simply due random events.

In a more systematic fashion it also happens for small companies because a few distinct investment projects can shift the distribution of the portfolio upside down on its head. When it comes to electricity, due to the size of the investments which cannot be chunked up into infinitely small fractions, the effect of a marginal addition of a project to a portfolio with a low number of assets will change the distribution radically.

The scale for 'I','G' and 'R' is fractionally linear in the sense, that R = 0.5 means the company has achieved half the market penetration in the home region compared to the home country. In a practical example, if a company has 10 percent of the market in the home country and an 'R' of 0.5, it means it has a market penetration in the home region of $10\% \times 0.5 = 5\%$.

3.2 Operational Performance

In order to assess the operational performance of electricity producing firms, we can assess the utilisation of capacity. From simply observing the firms' specific capacity distributions and their generation distribution it becomes apparent that, whilst they are correlated, it is not a perfect match. Working under the theoretical concepts of liability of foreignness and the more tangible notion that it is more difficult, on a practical level, to simply manage assets further away in distance, one can easily imagine a scenario where capacity does not translate to actual electricity production to the same degree.

In order to test whether or not this is the case, we can see how well the R and G scores for capacity are predictors of R and G scores for production. If a firm is equally good at utilising its assets in all regions of the world, these numbers should be an exact 1:1 relationship.

The Regional Internationalisation perspective lays out how firms have the lowest liability of foreignness at home, by the very definition of the term it has zero liability of foreignness at home. A general overarching theme in this paper is the

conjecture that firms prefer to internationalise intra-regionally as opposed to the general rest of world. This is because the liability of foreignness is smaller intra-regionally than globally. We therefore expect to see that regression coefficient for regional capacity on production to be higher than the regression coefficient for global capacity on global production. Mathematically presented in equation 1:

$$1 > \frac{R_{Pro.}}{R_{Cap.}} > \frac{G_{Pro.}}{G_{Cap.}} \tag{1}$$

3.2.1 Dependent Variable

The dependent variable(s) will be production R and G measures established from the output of the work for hypothesis 1 and 2. It is a continuous variable with a lower bound of 0.

3.2.2 Independent Variable

The independent variable(s) will be capacity R and G measures established from the output of the work for hypothesis 1 and 2. It is a continuous variable with a lower bound of 0.

3.3 Financial Performance

As mentioned in the previous chapter, the theoretical perspectives that we have included all share one common feature and that is the assumption of how firms internationalise to the point where the benefits equal the cost which ultimately transforms into improved financial performance (Dunning, 1980; Rugman, 1981; Doz & Prahalad, 1987). Nonetheless, more than 100 empirical studies have examined the relationship between internationalisation and performance using different theoretical approaches and thereby yielding diverging results including positive and monotonic, U-shaped and S-shape correlations, as well as negative or insignificant correlations (Hennart, 2007, p. 424).

This study makes no hypothesis as to the shape of the correlation but solely of the positive relationship between intra-Regional Internationalisation and financial performance. As the previous subsection established the measures needed to assess the level of internationalisation of electricity producing multinationals, this section will establish the measures and scoring schemes related to the concept of performance. For a complete overview of all the variables used, see table 2.

Table 2: Overview of Variables Used in the Multivariate OLS Regression Analysis

Type	Indicator	Data Source	Scoring Case
Dependent variable	ROIC	Calculated from Compustat data	Continuous
Dependent variable	EVA	Calculated from Compustat data	Continuous
Dependent variable	EMV	Calculated from Compustat data	Continuous
Independent variable	Internationalisation score (capacity)	Independently collected and calculated	Continuous with a lower bound of 0
Independent variable	Internationalisation score (Production)	Independently collected and calculated	Continuous with a lower bound of 0
Independent variable	Regional Internationalisation Score (Capacity)	Independently collected and calculated	Continuous with a lower bound of 0
Independent variable	Regional Internationalisation Score (Production)	Independently collected and calculated	Continuous with a lower bound of 0
Independent variable	Global Internationalisation Score (Capacity)	Independently collected and calculated	Continuous with a lower bound of 0
Independent variable	Global Internationalisation Score (Production)	Independently collected and calculated	Continuous with a lower bound of 0
Control Variable	Firm size as Total Assets	Compustat	Continuous with a lower bound of 0
Control Variable	Risk Profile	UN Classification scheme and Compustat	Categorical (Dummy), 1 = developing country

3.3.1 Independent Variables

The previous sub-section established the level of inter-Regional Internationalisation as the dependent variable as we aim to test the degree to which electricity producing multinationals have internationalised. In this performance part of the analysis, the level of regional and Global Internationalisation is the independent variable and serves as the input to the analysis.

3.3.2 Dependent Variables

Return on assets (ROA), return on equity (ROE) and return on sales (ROS) have been widely used in management literature (Grant, 1987, p. 83) (Lu & Beamish, 2001, p. 573)(Qian et al., 2010, p. 1021) while excess market valuation has been more used in finance and economics literature (Errunza & Senbet, 1981, p. 409), and some have sought to use both measures (Thomas & Eden, 2004, p. 98) (Rugman & Oh, 2010, p. 484).

This study will similarly seek to establish a measurement system that includes both the short-term and long-term performance measurements. ROA, ROE and ROS metrics display the immediate performance of the firm in one specific year and can therefore be categorised as short-term metrics. Excess market value reveals the extent that an MNE possess monopolistic market power due to market imperfections (W. S. Kim & Lyn, 1986, p. 122) and also reflects investors beliefs about the future performance of the firm. It can therefore be categorised as a long-term metric. We will not use the upper mentioned short-term performance measurements, as we feel they are overly simplistic because they are heavily influenced by individual firms' finance choices. Instead, we will use: (1) return on invested capital (ROIC) and Economic Value Added (EVA) as a short-term performance metric; and (2) excess market value (EMV) as a long-term performance metric.

Return on Invested Capital

ROIC is Net Operating Profit After Taxes (NOPAT) divided by total assets. Nopat is a performance metric which nullifies the effect of financing decisions of the firm, giving a purer view of the firm's ability to generate value from its assets. This makes comparisons between firms more valid.

Economic Value Added

EVA differs from a pure accounting metric. It is a measure that attempts to rectify the problem with ROIC regarding the fact that earnings are not comparable due to different amounts of risk undertaken to generate these returns. To calculate EVA, we have calculated individual weighted average cost of capital (WACC) for the individual firms based on their financials, calculated betas and a common risk-free rate. EVA is almost the same as ROIC with the only difference being the cost of capital is subtracted. This is important when the risk profiles of the companies you are comparing start to diverge. Were this not the case it would be equivalent to subtracting a constant. Because we have both firms from both developing countries and developed countries, the risk profiles start diverging to an extent, that we cannot just assume equal risk exposure due to being in the same industry. The scoring case for the ROIC and EVA is a ratio/rate which enables us to compare the firms in our sample to each other.

Excess Market Value

EMV is a market value-based measure that assesses the degree to which investors' expectations about the firm drives the market value of that firm to increase, decrease or stagnate (Errunza & Senbet, 1981, p. 403). The reason why firms internationalise, as described in section 2.1, is in this perspective due to how they seek to position themselves in a foreign market where their endogenous capabilities will be able to out-compete the other, and possibly local, market players. It makes EMV a good proxy for measuring long-term value of a firm since the market value is an indicator of how investors regard the future performance of a company. We will use an EMV formulated as the difference between total firm value (consisting of market value of all shares and book value of debt) and total book value of all assets divided by total sales. The scoring case for the EMV is a ratio which enables us to compare the firms in our sample to each other

3.3.3 Control Variables

In order to establish sufficient statistical significance in the regression analysis, we need to add some variables that might be influencing the relationship between our dependent and independent variables. We believe that large firms on average are more likely candidates for internationalisation due to market seeking behaviour. In accordance with scale economies and market imperfection exploitation, larger companies could also be more profitable for that reason alone. Because internationalised companies and the largest companies are more frequently observed in developed countries as well, and because we on average perceive developed countries to be less risky and hence have lower returns, we risk inferring a wrong conclusion on the effect of internationalisation if we do not control for these. Therefore we need to control for both company size and country of origin in terms of being from a developed or developing country.

We choose total firm assets as the control variable for size to isolate the effect of internationalisation on earnings. Total assets is a valid proxy for the firm's size as it includes all its resources. (Dang, Li, & Yang, 2018, p. 161).

Secondly, we also need to control for being a firm based in a developed country directly to isolate this effect. The segregation of countries into developing and developed countries follows the UN methodology published as Standard Country or Area Codes for Statistical Us[2] which assigns countries and areas to specific groupings for statistical convenience.

[2]See file in online-appendix for file or alternatively go to https://unstats.un.org/unsd/methodology/m49/overview/

3.4 Chapter Summary

In this chapter, we have created indicators and scoring cases that adequately reflect the MNE to create a balance between theory and empirical observations.

Micro-level capacity (watts) and production (watt-hours) data of the individual electricity producing firms was chosen to establish internationalisation preferences since it serves as an original alternative to the traditionally used sales data. It furthermore provides a possibility to understand the operational performance of the firms by considering the relationship between the two with respect to geographical location.

ROIC, EVA and EMV similarly offer an alternative financial performance framework different from the traditional accounting measures such as ROA, ROE and ROS, because the combination of short-term and long-term metrics provides as more comprehensive assessment of the financial performance of the firms.

4 Methodology and Research Design

In this chapter, we will lay out the models used to perform the analysis. Throughout this thesis, methodology is related to the philosophical assumptions about ontology and epistemology, while methodical approach and research design is related to the practical styles and methods used for analysis.

Section 4.1 discusses ontological and epistemological perspectives related to business studies to position this thesis herein. Section 4.2 formulates a quantitative model to establish the internationalisation preferences of electricity producing firms and a Wilcoxon signed-rank test to assess statistical significance. Section 4.3 describes the components of a univariate LAD regression analysis used to investigate the relationship between capacity and production with respect to geographical location to assess the operational performance of the firms. Section 4.4 explains the multivariate OLS regression analysis used to examine the relationship between internationalisation and financial performance. Section 4.5 lays out the practical steps for obtaining a relevant sample of electricity producing firms, including data, and discuss strengths and limitations of the approach. 4.6 summarises the chapter in a preliminary conclusion.

4.1 Philosophy of Science and the Firm

The philosophical orientation that is adopted has profound implications to the process of business and management research and the results (Remenyi, Williams, Money, & Swartz, 1998, p. 37). Choosing a methodological stance is often not too difficult, however, continuously utilising it through the methodical framework and analysing the empirical data under the assumptions established prior is the real challenge.

4.1.1 Ontology

We have previously defined MNE as an enterprise that engages in foreign direct investment (FDI) and owns and controls value-added activities in more than one country (Bartlett & Ghoshal, 1998). MNEs can have endogenous capabilities related to ownership, internationalisation processes (Dunning, 1980) and internalisation (Rugman, 1981) that firms choose to deploy in least-cost locations (Dunning, 1980) to exploit imperfections in intermediate input markets (Rugman, 1981) or in final output markets (Dunning, 1980) to the point where the benefits from increased internalisation exceeds the cost of doing so (Rugman, 1981) and thereby become more efficient and gain access to new markets and ultimately improve overall performance. The utilisation of endogenous capabilities must be conducted with respect to exogenous economic, political, societal, demographic, geographic and market factors which includes specific opportunities and risk to the firm (Doz & Prahalad, 1987).

The definition provides an explanation for the motivation and existence of the MNE and its geographical diversification. However, we have not yet critically assessed the ontological foundation of the theoretical framework or stated any clear definition about what the firm is, how it makes decisions and the economic system in which it operates.

Coasian Assumptions About the Firm and the Economy

If the allocation of factors of production between different uses is determined by the price mechanism which is coordinated through a series of exchange transaction on the market, why does the firm, a centralised, bureaucratic and independent controlling authority that must be less allocative efficient that the market, then exist and why is it profitable? Ronald Coase explained how there must be a cost associated with using the price mechanism and being a part of the market – specifically the cost of negotiating and concluding exchange transactions between firms in the marketplace. Firms basically exist and become profitable by functioning as tool for creating long-term contracts when the hassle of short-term contracts induce extensive costs (Coase, 1937, p. 391).

But if that is the case, how come all production is not carried out by one single firm which would be able to eliminate transactions cost in full? Coase finds that at a certain point, the costs of organising an additional transaction within the firm are equal to the costs of performing the transaction in the marketplace. Moreover, as number transactions organised internally by the firm increases, the firm fails to allocate factors of production where the value is highest and the market, or other firms, might become more efficient than the original firm and thereby more profitable (Coase, 1937, p. 395).

We can easily draw links between the 'Coasian' assumptions about the firm and the market and the MNE definition of this study which is supported by the

fact that others have drawn similar associations between these basic philosophical assumptions about the firm and the economy, and modern international business theory (Kirca et al., 2011, p. 48). The Coasian perspective does, in its originality, not concern itself with the concept of internationalisation as it basically is irrelevant. It assumes perfect competitive markets and rational actors which means that it does not matter whether internalisation occurs within or beyond borders. By saying that it does not matter per definition also means that a firm would not hesitate to internationalise transactions if it can outperform the current price mechanism even if it is across borders. In that perspective, it would be against its rational nature if an MNE refrained from internalising transactions (possibly across borders) if it could lower its transaction cost. The Coasian perspective can be labelled as a classical economic and positivist approach to science.

Contingency Theory

The Coasian perspective assumed perfect markets and information, and rational actors. If that is the case, the liability of foreignness would be perfectly calculable, and firms would internationalise to improve performance and in fact experience improved performance. Nonetheless, external factors have the potential to affect the firm negatively or positively in a way that firms cannot fully predict (Doz & Prahalad, 1987; Dunning, 1980). Contingency theory deals with unpredictability in international business strategy by suggesting that no universalistic organisational choices will generate optimal outcomes (Hofer, 1975; Roth & Morrison, 1990).

The notion of perfect information is naïve in practice as decision-making in business are conducted under the assumptions of bounded rationality – characterised by not knowing all the alternatives, uncertainty about relevant external events and incapability to measure consequences (Simon, 1979, p. 500). The theories explained in chapter two can be characterised as being contingency theories as they emphasise how the strategy of the firm must be performed in response to contextual circumstances such as its internal endogenous capabilities and the external risks and opportunities of the home and host countries which may not be similar across borders and geographical space. Firms may encounter a liability of foreignness which they were not aware off beforehand when creating or entering markets in unknown countries.

Reconciling classical economic theory and contingency theory

We noted during the description of the hypotheses that if electricity producing multinationals have internationalised inter-regionally before globally, we can argue that the firm's estimate the benefits associated with inter-Regional Internationalisation to be less than the inter-regional liability of foreignness. The performance analysis which test the extent to which the established internationalisation preferences have generated improved financial performance. We can make a similar

proposition in a methodological perspective to deal with the distinction between perfect and imperfect information by assuming that a positive relationship between the established location preferences of the firms and their performance means that firms have accurate information about the liability of foreignness, and vice versa, that a negative relationship between the variables means that firms have poor information about the liability of foreignness.

The ontology of this study is a reconciliation of classical economics assuming perfect markets, information and actors, and contingency theory assuming imperfect market conditions and bounded rationality of actors. The fact that MNE theory stipulates how firms exploit market imperfections supports that stance. It means that we assume that firms are driven by the imperative of improved performance from internationalisation under market failures and imperfect information about foreign markets conceptualised as liability of foreignness. Our ontological assumptions align with (Devinney, Pedersen, & Tihanyi, 2013, p. 69) who have identified that mainstream business studies stands in contrast to a traditional economic approach by assuming neoclassical market structure of monopolistic competition opposed to perfect competition. The main actors (firms) are considered as rational actors who make decisions under conditions of bounded rationality. We recognise that this study rests on the economics approach as described in the literature review but separates itself from a strict classical approach as we do not require similar assumptions about perfect markets and full information.

4.1.2 Epistemology

Most of what we today understand as philosophy of science in the social sciences aspired from a Germanic movement called logical positivism all of whom met in the so-called Vienna Circle in the 1920s and 1930s. The stream of thought was mostly associated with their attempt to eliminate the ideological and metaphysical elements of science, and dedication to clarity, rigour and attention to detail (Redman, 1993, p. 8). Science was rational and progressive, where verifiability served as a cornerstone by explaining how the existence of entities needed support from absolute laws to exist and avoid being labelled as metaphysical propositions which had no place in science (Redman, 1993, p. 8). The logical positivist approach to science was inductive as verification was based on experience through observation from where entities were ultimately objectified if confirmed (Redman, 1993, p. 9).

The most notable opposition to the logical positivism came from within their own ranks, Karl Popper (1902-1994), who attended several meetings of the Vienna Circle (Redman, 1993, p. 27). As logical positivism used verification to define the line between 'real' objects and metaphysical objects, Popper used testability and falsifiability as criterion of demarcation. He argued that the method of trial and error should replace the inductive methodology by a deductive one (Popper, 2002, p. 88). A deductive process of falsifying hypotheses can refute scientific

theories and thereby add to the progress of science. The process involves moving towards theories which stand the test of trial and error, and thereby remain a valid, and refuting theories which can be falsified. It makes the scientific process a competition between theories similar to a Darwinian struggle for survival of theory (Popper, 2002, p. 88). The methodological process of trial and error, or testability and falsification, begins with problems, as opposed to inductive observations.

> *" . . . all scientific discussions start with a problem P_1, to which we offer some sort of tentative solution — a tentative theory TT; this theory is then criticised, in an attempt at error elimination EE; and as in the case of dialectic, this process renews itself: the theory and its critical revision give rise to new problems P_2 Later, I condensed this into the following schema: $P_1 \rightarrow TT \rightarrow EE \rightarrow P_2$" (Popper, 2002, p. 152).*

The approach is more opportunistic than logical positivism in the sense that it allows for bold conjectures which should then be tested empirically. Knowledge then becomes the aggregation of hypotheses (or theory) which are submitted to critique and discussion, and potentially outcompeted by new and better theories.

Popper's Influence on the Discipline of Economics

Methodological discussions have a long history in the economic discipline ranging all the way back to Adam Smith (1723-1790) who aimed to copy onto the social science what Newton had done in the natural sciences. However, even as his methodology was well accepted by scientists, it was also regarded as misguided and overly optimistic with regards to the accuracy of predictions in economics (Redman, 1993, p. 92). IB research is traditionally heavily reliant on economics which makes it relevant to review how the positivist Popperian view has influenced economics, for then to assess how economics has influences the IB discipline.

Milton Friedman (1912-2006) is by some considered to be the most acknowledged scholar to bring fourth Popperian-like methodologies to the discipline of economics (Redman, 1993, p. 116). He specifically focused on distinguishing between a positive science defined as a body of systematised knowledge concerning what is, and a normative science defined by a body of systematised knowledge discussing criteria of what ought to be. Friedman argues that economics can be a purely objective science similar to physical science, however, the fact that economics deals with interrelations between subjective human being raises challenges in achieving objectivity (Friedman, 1953, p. 2).

Friedman acknowledged the difficulties with regards to achieving full objectivity within the social science due to the interrelations of human beings. He, however, disregards this as a problem in terms of achieving a positive science in economics similar to the natural sciences (Friedman, 1953, p. 25). In other words,

he believed that economic scientists can conclude the same level of validity to not-falsified hypothesis as natural scientists who perform experiments in fully closed environments and in full control of input variables.

Utilising a 'Scientific Research Programme'

We have in so far concluded that this study rests on two ontological assumptions (1) that the firm internalises markets to decrease costs and gain superior profits (Coase, 1937), and (2) that the firm faces bounded rationality due to contextual contingencies (Simon, 1979) which permeates the entire theoretical framework of this thesis. If we used a strict Popperian approach, we would have to test these two hypotheses which would enable us to perform falsification. We find this strategy too strict and even unnecessary to some extent. Instead, we will draw on Imre Lakatos' (1922-1974) who proposed a methodology born out of Popper's deduction whilst relaxing the relationship to falsification of core ontological assumptions.

Lakatos described Popper's approach by boldness in hypotheses on one hand and austerity in refutation on the other hand, but ultimately criticised the falsification principle as naive by arguing that theories cannot be discarded completely if someone falsifies it since other causes might have been operating simultaneously (Lakatos & Musgrave, 1970, p. 95). He shows how the 'all swans are white' hypothesis is irrelevant unless it proposes that being a swan causes the animal to become white or the other way around. Thus, the observation of one black swan would not refute the entire hypothesis since other factors might have affected the colour of that particular swan which ultimately makes the proposition unprovable and thereby not scientifically relevant (Lakatos & Musgrave, 1970, p. 102).

Lakatos sought to replace the concept of one single theory, such as 'all swans are white', with the concept of a series of theories welded into unified research programmes. He differentiates between paths of research to avoid (negative heuristic) and paths of research to pursue (positive heuristic) and divides the research programme into a 'hard core' of fundamental assumptions and into a set of 'auxiliary hypotheses'. Negative heuristic prevents us from investigating the hard core and we must accept these as irrefutable by decision, and instead direct our attention to the auxiliary hypothesis which figuratively form a protective belt around the hard core and can be tested, adjusted or ultimately replaced (Lakatos & Musgrave, 1970, p. 133).

We understand the two ontological assumptions (Coase, 1937; Simon, 1979) and the theoretical foundation (Dunning, 1980; Rugman, 1981; Doz & Prahalad, 1987) as the 'hard core', and our hypotheses as the protective belt around the hard core. This distinction will help to ensure that our methodical approach will be based on the hard core, while the analysis will be steered by the hypotheses. It is the positive heuristic that drives the building of a statistical model and not the available empirical data at hand. To sum it all up, this thesis will utilise a hypothetico-deductive approach to establish the established internationalisation

preferences and financial performance of electricity producing firms. The global and Regional Internationalisation perspective make up the auxiliary hypotheses which can ultimately be falsified.

4.2 Deriving a Model to Establish Internationalisation Preferences

This section will lay out our model which we use to determine the level of firms' internationalisation.

4.2.1 Establishing a Geographical Classification Scheme

We divide the world into 6 regions. They are as follows: North America, South America, Europe, Africa, Asia (including the Middle East) and Oceania. This division seems obvious at first but is in reality a topic that requires a great deal more attention than it is usually given. To elaborate on this point; This study seeks to test the extent to which electricity producing companies have internationalised regionally or globally. It is an industry specific test of the Regional Internationalisation perspective using firm-specific data which was first described in Rugman and Verbeke (2004), who found that most of the largest companies in the world have most of their sales in their home region as opposed to being truly globalised. Their analysis divides the markets across the globe into the 'triad' markets of NAFTA, European Union and Asia.

The triad power concept rests on the work of Ohmae who argued that these three markets are home of most innovations and new products, and they share several characteristics such as low macroeconomics growth, similar development patterns in technological infrastructure, large capital and knowledge intensive firms in all industries, homogenous demand and protectionist pressures (Ohmae, 1985). Ohmae assumes that most MNEs sell engineered commodities, or innovative and differentiated products, which require high investments in capital-intensive and knowledge-intensive product procedures. The development of these products require certainty that the cost of development will be retained from following sales.

The risk for an MNE that does not penetrate all triads is replication of products and the loss of subsequent sales to other companies in the other triad regions which the firm has not penetrated. This 'stealing' of revenue from the 'original' company, which still has the high development cost would result in deteriorated performance. In reality, very few companies have actually managed to convert the success of their home triad into other triad markets defined by equal penetration of markets (Ohmae, 1985, p. 165).

As Rugman's and Verbeke's (2004) integration of the triad power concept into the academic IB literature is greatly appreciated, this study will scrutinise the original classification of the three triads in the light of the research question formulated in the introduction. If we first compare industries producing complex engineered products and the energy industry that produces electricity, we argue

that electricity has a different production process and usage characteristics than, for example, the auto mobile has. The demand for electricity does differ greatly between some regions, but all regions *do* demand electricity regardless of other consumer preferences as electricity is a commodity that cannot undergo any innovative engineered alterations related to the output to be consumed.

The only differentiation that electricity producing companies can offer is the price of electricity which is dependent on endogenous capabilities of building an efficient power plant, and selling the electricity.[3] The original triad regions exclude smaller regions such as South America and Africa as these are not relevant for complex engineered products. However, is makes sense to include these smaller regions in the case of the electricity industry as all have somewhat homogeneous demand[4] apart from the absolute size of the demand. We expect that some firms will seek to internationalise outwards from larger regions and into these smaller regions because there is a demand for electricity that needs supply. The statistical analysis will become more detailed as the number of regions is expanded.

A second reason for including other regions besides North America, Europe and Asia is to include firms that are based in developing countries. The original triad regions do not include Latin America or Africa which according to UN definitions consist of 112 developing countries and no developed. Including firms from these countries will increase the likelihood of getting better data on firms from developing countries. Focusing only on the original core triad regions is very useful in Rugman's paper since he finds that out of 500 of the world's largest MNEs, 430 have their corporate headquarters in the countries of the core triads (Rugman & Verbeke, 2004, p. 4).

Looking at the sample of companies gathered for our study tells a different story as our sample includes a two to one (2:1) ratio of companies from developed versus developing countries, making the frequency of firms in developing countries much higher in this study. Again, this is possibly related to how all countries and regions demand some amount of electricity, where on the other hand it makes intuitive sense to assume that the demand for an engineered product like auto mobiles is very little in some developing countries of Sub-Saharan Africa.

Integrating the Classification Scheme

The original triad classification described first by Ohmae (1985) and integrated

[3]The assumption can be criticised as some electricity users seek only to use electricity generated from renewable resources. This would than add a characteristic that electricity producing firms could differentiate their product relative to competitors. The perspective will, however, not be includes in this study.

[4]Regions with more industry will usually have more extensive electricity demand during the daytime, whereas less industrialised regions will have a more even electricity demand over the course of 24 hours.

into IB literature by Rugman (2004) includes NAFTA, Europe and Asia. We find this classification critical as described in detail above, and furthermore include South America, Africa and Oceania as individual regions in addition to the three others to create a total of six regions (see item 3 in appendix C). With the geographic scope above clarified we are ready to continue with the data collection. For all companies in our sample, we determine the home country - the country of incorporation, and then based on the UN classification methodologies, we establish the appropriate home region. The "rest of world" component becomes self-evident once the other two have been established.

The basic idea is to use a model which measures regional and global penetration metrics. For example, a company which has no regional nor national preference should have equal market penetration in all areas of the world. Simply put, if a company's home country constitutes 17% of the worlds generating capacity, it should also have 17% of its generating capacity in its home country. If the home region of operation constitutes 30% (less the home country) of the worlds capacity, it should have 30% of capacity there and so on. As we will explain more later, we will use 'R' to denote the fraction of intra-renationalised penetration and 'G' to denote the rest of world penetration. If $R = G = 1$ we have an example of a perfectly internationalised company with no regional bias in any way. Anything below 1 denotes "less than perfect" internationalisation, i.e. a home country bias, and the relationship between 'R' and 'G' denotes if it has a preference towards its home region or a truly global strategy.

4.2.2 Constructing the Mathematical Metrics

In order to measure if electricity companies have become more international between 2006-2015, we need a measure to quantify it. When it comes to what proxy to use for our internalisation measure, there are a few options to choose from. In previous literature, because their research designs have been cross-industry, a common measure must be used. They therefore used a strictly accounting measure such as sales by region. As an example of such, see (Rugman & Verbeke, 2004).

There is a minor problem with this metric. In the grand-scheme of things it is not that important, but we have the luxury of avoiding it. Revenues, to a much larger extent, reflect the outcome of the strategy much more than they reflect intent. Regional price differences, operating restrictions etc. can skew revenue numbers to such an extent that they do not really reflect the true nature of the issue. Rather, we propose to use consolidated capacity (watt) by region since this will be a common figure across the whole sample. The capacity reflects investments and therefore intent much better than does revenue which partially reflects the outcome of strategy. To contrast with the capacity, it also makes sense to look at electricity production figures (watt-hours) to see how those figures stack up against the capacity.

Data will be collected from a selected sample of energy companies where their annual reports will be dissected and the capacity and production by region and will be extracted. First the country of incorporation will be established, and this will serve as the home-country. Once the data is collected and dissected, we have the following: "Home Country Capacity", "Home Region Capacity" and "Rest of World Capacity".

To be able to extract any useful meaning from the data, a measure of regional concentration needs to be defined. We need to be able to measure it. Rugman and Verbeke (2004) and Rugman (2005), two of the pioneers in the field have traditionally used sales distributions to measure internationalisation, and have in order to classify what is a multinational enterprise and what is not, used somewhat arbitrary criteria. An example of such a classification of being a "true" MNE could be that a company needs to have at least 20% sale in the region where it has the lowest sale, and not more than 50% in its largest region.

Whilst there is nothing inherently wrong with an approach like that, we feel than in order to measure small changes over time we cannot put the companies into categories and see how many of each type appear in each year as we can easily have a situation where a company is becoming more internationalised but still not enough to cross an arbitrarily defined boundary. We need a metric which objectively measures internationalisation and the score is continuous meaning that any small change will be measurable.

We intuitively categorise firms into three types of strategy: (1) nationals; (2) regionals; and (3) globals. We do not, as Rugman and Verbeke (2004), create any hard definitions of when a firm is one of the three but we accept the notion that it is these types of strategies that exist.

We found a model that satisfies our need in the work of Asmussen (2009) and borrow heavily from the model developed by him. Where we differ is how we use it. His interest lies in the presence of true global MNEs and where they originate. This means he also finds himself in a position where he uses his model output to define what is and what is not an MNE etc. We, at least to begin with, refrain from such exercises and only use the raw-scores as measurements themselves.

Defining 'R' and 'G':

For each company, the ratios e and w are calculated as seen in Asmussen 2009:

$$e = \frac{E}{H+E+W} \quad \& \quad w = \frac{W}{H+E+W} \tag{2}$$

In equation 2, 'H' denotes the home country capacity or production depending on which analysis we are making (We are running the exact same test on these two different sets of numbers). 'E' denotes the capacity or production in the home region with the home country capacity/production subtracted. 'W' denotes the capacity or production in the rest of the world. Think of it like this:

$$E = E^* - H \quad \& \quad W = W^* - E^* \tag{3}$$

The numbers 'e' and 'w' become percentage figures of either capacity or electricity production. 'e' is the percentage share in the home region less the home country share. 'w' is percentage share in the rest of the world outside the home region and country. These numbers in an of themselves do not mean anything in the context of our paper. Sure, a company that has not internationalised will still get a firm score of zero:

$$e = \frac{0}{1+0+0} = 0 \quad \& \quad w = \frac{0}{1+0+0} = 0 \tag{4}$$

Any increase in foreign assets in either the W og E parameter will lead to a score above 0. In that sense, the baseline scores as they are now could tell the story about the internationalisation path of an individual company. The problem is that not all companies have the same size of the home market. Companies with a very large home country can grow very large without having to seek markets elsewhere. In a similar fashion, gauging companies internationalisation based on a simple spread of saying it needs to have $\frac{1}{6}^{\text{th}}$ of its sales across all regions does not take into account that electricity demand is not constant across regions. It would be unfair to conclude that a company having 100 megawatts capacity in France and 'only' 5 megawatts capacity in Nigeria has a country preference for France. Assuming equal market penetration in regions there may not be scope for more capacity in Nigeria.

We therefore need to add a component to the metric which factors this into account. The solution is that we can calculate the exact same numbers for 'e' and 'w' using world bank data on total capacity and generation across all companies (see item 1 and 2 in appendix C), denoted with the subscript '1', such that:

$$e = \frac{E_1}{H_1 + E_1 + W_1} \quad \& \quad w = \frac{W_1}{H_1 + E_1 + W_1} \tag{5}$$

and similarly

$$E_1 = E_1^* - H_1 \quad \& \quad W_1 = W_1^* - E_1^* \tag{6}$$

The numbers e_1 and w_1 can be seen as the ideal fractions of international assets. e_1 and w_1 will be the "optimum" distribution and will be different for every company because of different home countries and by extension different home regions. If we divide these numbers with each other, we get an expression which says percent company assets in region divided by percent all companies assets in region. This is a ratio with the scores for 'R' and 'G' finally defined as follows in equation 7:

$$R = \frac{e}{e_1} \quad \& \quad G = \frac{w}{w_1} \tag{7}$$

The logical interpretation of 'R' and 'G' is that they measure to which extend a company's distribution of assets deviates from the optimal distribution. Very simply put, If a company has a score of 'R' equal to 0.5, it means that it would need to increase the amount of assets in its home region outside its home country by a factor of $1/0.5 = 2$ in order to have the same market penetration in its home region compared to its home country.

With this adjustment in place. We suddenly have numbers which are directly comparable across firms. R and G therefore become true measures of strategy preferences. A company with a high R and a low G can therefore be interpreted as Regional Internationalisation preferences. Low numbers in both categories means that the company has a national bias.

There is always the question of "is this the end-state, or just a developmental path?" For instance, a company with scores $R = G = 0.5$ means that when it comes to internationalising it shows no preference in regards to home region or host foreign regions, it however still has a national over-presence (or international under-presence). Does this mean that the company is home country biased? Or is undertaking a strategy of international expansion that has not finished yet? That we cannot say, but we are aided by the fact that we are looking at not just a single year.

For convenience, a composite metric used to denote degree of internationalisation, not discriminating in terms of which manner can be constructed as a weighted average of the two scores. This is a convenient score when assessing if the companies have internationalised in any way shape or form. Let us denote the composite metric as 'I' and it is calculated as follows in equation 8:

$$1 = R \times \frac{e_1}{e_1 + w_1} + G \times \frac{w_1}{e_1 + w_1} \tag{8}$$

As we can see on the score for 'I', any increase in 'R' or 'G' leads to a strictly increasing score for 'I'. As is observed, the components are weighted meaning that the 'G' component will still be the most influential factor, but the degree to which depends on the company and the size of its home country and home region.

Statistical Test

Once the data is compiled and all the scores are calculated, the scores have to be weighted. A larger firm's score should weight more than a comparatively smaller firm. An overall weighted score representing the mean is obtained for each data year. We need to determine whether these scores differ significantly over time. This calls for a longitudinal study design as opposed to a cross sectional study. In this particular case it is a one subject group, several measurement points" type of analysis.

In terms of hypothesis testing, it will be a simple case of which values differ significantly from each other when talking about the weighted means of the 'R'

and 'G' scores. We will compare all years to the baseline score of 2006 and all the years to each other to map how companies internationalise. This is normally the domain of paired tests like a paired t-test because the data is not independent of each other. Firms' assets and geographic spread of their real assets are not independent between our period years. Because the data is also non-normal, it has a very skewed distribution looking similar to a pareto-distribution, the t-test cannot be utilised as it assumes normality. It therefore makes sense to use the non-parametric equivalent which is the Wilcoxon signed rank test.

In terms of test design, a decision has to be made regarding whether to use a one-tailed or two-tailed test. When running a two-tailed test the null hypothesis is that both sample 1 and sample 2 have the same distribution. The alternative hypothesis is that sample 1 and sample 2 have the same shape, but one distribution is shifted up or down compared to the other (Agresti & Finlay, 2008, p. 205). A one tailed test on the other hand has the same null-hypothesis but the alternative hypothesis has a strict expectation of direction of the deviation.

For most cases, researchers prefer to use a two-tailed test because it opens up for the possibility of the effect going in either direction. We, however, have a strict expectation in our test hypothesis that firms internationalise more over the time period we are looking at. A reversal of internationalisation or no change would from the perspective of this paper be equally violating of our hypothesis. Therefore, it makes sense to use a one-tailed test. In practical terms we will use the scipy.stats.wilcoxon model in python to actually perform the test.

4.3 Deriving a Model to Assess Operational Performance

The 'R' and 'G' scores measure degree of market penetration in relation to the home market penetration. In that sense, it is a relative measure and does not say anything in absolutes. Theoretically speaking, a company with a capacity penetration score on either 'R' or 'G', should have the same score for the production score. In other words, x degree of market penetration in capacity should yield x degree of market penetration in the production. Any deviation from this indicates either less or more efficiency than the other players in the market. This assumption is possible to make since we weight for country, regional and global capacity and production levels.

If we regress the capacity scores for 'R' and 'G' against the production scores, the regression coefficients should tell us to what degree firms that internationalise are able to convert their capacity into electricity production when internationalising.

We use a least absolute deviation model since the data is not normally distributed and has "outliers" in the sense that removing the worst offenders would still be inappropriate for an OLS. We there use such a model instead of an OLS regression because the OLS gives more weight to large "outliers" because of its squared nature. A least absolute deviations regression is more robust as it sets

equal weight to all data points and should give a better fit in this case. It will be a case of univariate analysis because in the absence of liability of foreignness, we would on average expect a 1 to 1 relationship. The hypothetical deviation from the 1:1 relationship regarding, capacity and production is not explained by any measurable variable that can be put into a regression. Liability of foreignness is a concept that is difficult be quantified. Rather, we observe the correlation and infer the cause for the hypothetical deviation from the theoretical framework.

This model should give an indication of how firms "perform" abroad without the distortion of prices and other factors. In and of itself that is also its biggest limitation because financial performance is a lot more indicative of actual state of the firm. This is why we also wanted to include a financial performance section. The contrast between the two should offer valuable insights. The practical implementation will be done in python using the
statsmodels.formula.api.quantreg model. The least absolute deviations regression is just a special case of quantile regression, so we will adjust the quantile regression model by passing the argument that $q = 0.5$. See the official documentation for elaboration[5]

4.4 Deriving a Model to Assess Financial Performance

In the third part of the analysis, we test for correlation between internationalisation and performance. Does following an international, regional or national strategy result in a higher economic performance ceteris paribus. There are many ways this could be done.

First of all, how should we measure performance? Throughout this whole paragraph when talking about performance, we are talking about it from the perspective of an investor. Investors are the equity owners and are therefore the principals who the agents (or management) work for (Brealey, Myers, & Allen, 2013, p. 12). Any objective measure of performance is only objective in the sense that it is what maximises the 'utility' for the investor.

When it comes to actually measuring it we can go several routes. Some are based on accounting measures while others are based on market models or some combinations. In order for us to not limit ourselves we will have three different performance metrics. ROIC, EVA and EMV. This begs the obvious question, why not just use net-income, the bottom line result, what is left after all taxes and expenses? The first issue is that of interest payments. In accounting, interest is considered an expense which can be deducted. Interest is however not an expense in the real sense from the perspective of the owner. An example is how a group of investors have money which needs to be invested in order to generate returns. They consider starting a company for the purpose which needs some capital to

[5]See online appendix for attached copy of the official python documentation

be injected in order to undertake its business. They can either finance it as 100 percent equity, 100 percent debt or any mixture of the two. In a simplified world, the decision to them does not really matter as they are indifferent about receiving the income as interest or dividends. They are receiving returns in any case.

Modigliani-Miller (Modigliani & Miller, 1963) were the first to show that in the absence of taxes and bankruptcy, the value of the firm is independent of the financing mix which, in such a scenario, would mean that investors are indifferent regarding the mix of finance as well. Within finance, this is understood as the debt-irrelevance proposition.

The real world is not that simple however. Because debt has a first claim on assets in a company come bankruptcy, it is generally considered less risky and therefore requires less compensation for risk (Brealey et al., 2013, p. 428). Therefore, the required return on debt is often substantially lower than on equity. The exact relationship also endogenously depends on the ratio of debt to equity since this mix endogenously affects the probability of bankruptcy (Brealey et al., 2013, p. 455).

But there is another factor we have neglected; taxes. Because interest is deductible, any dollar paid out as interest is a dollar that has not been taxed. Simply but, the more debt a company utilises, the more it can pay-out in total to investors because the governments cut of the profits diminishes(Brealey et al., 2013, p. 455). The reason a company then does not use 100% debt is because of bankruptcy costs. The optimal finance mix is often said to the when the value of the tax shield is equal to the expected value of financial distress (Berens & Cuny, 1995, p. 1188).

So when we measure firm performance, we want a purer metric which tells something about a company's ability to generate value on its assets, without accounting, tax details and other caveats distorting the picture.

4.4.1 Short Term Performance Metrics

The first measure of interest we would like to discuss is the measure ROIC which is a derivative measure of the net operating profits after taxes (NOPAT) converted to a rate of return. NOPAT disregards interest payments. This is important because it enables us to measure profitability in a way that neutralises the influence of finance choices regarding the debt and equity mixture

Return On Invested Capital

$$ROIC = \frac{NOPAT}{TotalAssets} \quad | \quad NOPAT = EBIT \times (1 - t_r) \tag{9}$$

ROIC as defined in equation 9 denotes the operating profit as a rate the company

would have had, had it been unlevered [6]. It is also important to note that the tax rate t_r needs to be the effective tax rate calculated from the company's financials as actual tax payments can be influenced by a multitude of factors. This is a strict accounting measure. ROIC is a large improvement compared to net income, but there are still things we can improve on. The reason why it is included despite its issues is because it acts as a sanity check in the sense, that it establishes a baseline of the range the following performance metrics should be around.

The problem with ROIC and by extension NOPAT is that different companies have different risk profiles, and investors demand compensation for systemic risk that cannot be diversified away. Higher risk warrants higher returns. It is simple to see why. Given a choice of two investment opportunities with equal pay, most investors will obviously choose one with less risk. Therefore, ROIC is a poor measure of performance for the firm from the perspective of the owners.

Economic Value Added

EVA circumvents the above challenge by subtracting the opportunity cost of capital which is a good approximation for the required return an investor demands in order to accept this investment (Brealey et al., 2013, p. 306). We define EVA as seen in equation 10:

$$EVA = ROIC - OCC \tag{10}$$

A fundamental notion in finance is that the opportunity cost of capital is what the investor could have received for an investment with a similar risk profile. Usually the broad notion of "the market" is used here. By virtue of its definition, an investor will not agree to an investment proposition if the expected return does not exceed the opportunity cost of capital because the investor can participate in a generic investment instead.

EVA then becomes a direct measure of "excess value generated" it is what is received in excess of what is required. This is called economic profits. Usually EVA is expressed as an absolute number in dollars since NOPAT with Cost of Capital subtracted are absolute numbers and by extension yield an absolute number. To be very clear, EVA here will always be expressed as a rate because we use ROIC and OCC and they are expressed as rates. An EVA of 2000 versus 300 means nothing unless you know how many resources were used to generate it.

To reiterate what is important. We can use EVA because it makes different company's profits directly comparable. The absolute profit numbers mean very little unless you know how much risk the company undertook to generate it.

Obtaining the opportunity cost of capital is a rather laborious exercise. It

[6] If i firm is unlevered it has no debt. Leverage then becomes a ratio that denotes how much debt in relation to equity a company uses.

needs to be calculated individually for each firm because firms have such different risk profiles and operating environments. It is a stepwise procedure where a lot of individual components will be added together to make the final result. Firstly we will introduce the formula for weighted average cost of capital. Then we will break it down into its components. Return on equity and return on debt. Return on equity is fair bit more comprehensive to calculate. In this part beta and the notion of risk will also be introduced. In the following section we will:

- Introduce the formula for WACC
- Introduce return on debt and how it is calculated
- Introduce return on equity and the CAPM model
  - Introduce the concept of Beta β and how it is calculated
  - Introduce the risk free rate and market risk premiums and how it is calculated
- Combine everything

Weighted Average Cost of Capital

We can reasonably calculate the OCC as company weighted average cost of capital (WACC) as seen in equation 11:

$$WACC = r_e \times \frac{E}{EV} + r_d \times \frac{D}{EV} \times (1 - t_r) \quad | \quad EV = E + D \tag{11}$$

where r_e is the required return on equity, r_d is the required return on debt, t_r is the effective tax rate of the company. E is the market value of equity and D is the market value of the company's debt. The market value of equity is simply the share price multiplied by total outstanding shares. The market value of debt is a bit trickier to obtain since a company's debt is often not publicly traded. Book value of debt can be used as a good approximation instead (Brealey et al., 2013, p. 78).

Return on Debt

Return on debt r_d will simply be the effective interest rate paid on liabilities by the company $r_d = \frac{TotalInterestPaid}{TotalDebt}$

Introducing CAPM and Return on Equity

To obtain the required return on equity we will use the capital asset pricing model given by the following formula in equation 12:

$$r_e = r_f + \beta \times r_p \tag{12}$$

Where r_f is the risk-free rate and r_p is the risk premium required as a function of systemic risk denoted by beta (β).

Measuring Risk and Introducing Beta

Now we have spoken about risk before, but it is time to be a bit more specific about what we mean when we talk about risk in finance and in assessing the risk of a firm. The returns of financial assets can often with good approximation be modelled with normal distributions (Brealey et al., 2013, p. 191). Risk is measured as the standard deviation of these returns. Simply put, when looking at stocks, if its standard deviations of returns is higher, it is more risky and therefore needs to offer a higher average rate of return. The higher the deviation, the higher the mean return needs to be. But we need to distinguish between different kinds of risk. There is idiosyncratic risk and there is systemic risk. Idiosyncratic risk, like the name suggests are idiosyncrasies that only affect specific firms. For instance, bad weather will affect farming companies but probably not the pharmaceutical industry.

Investor do not like risk and prefer to reduce it as much as possible. Therefore, having a diversified portfolio means that idiosyncrasies will not affect your portfolio too much. You win some, you lose some. Systematic risk is the risk that affects all firms. This is usually encapsulated in the notion of the wider economy. If there is a global recession for instance. Some companies are very exposed to this, for instance the auto mobile industry. Consumer choices regarding new cars are heavily influenced by the economic climate. On the other end of the spectrum you have pharmaceutical companies. Their performance is generally insensitive to the wider economy because medicines represent a much more fundamental need.

It is this systematic risk, the tendency of stocks to all move together at the same time which cannot be diversified away, that investors demand compensation for. We as mentioned previously, use beta as a measurement for this. Beta β is calculated as the covariance between a stock's returns and the market's returns, divided by the variance of the market's returns as seen in equation 13:

$$\beta = \frac{Cov(r_s, r_m)}{var(r_m)} \tag{13}$$

For instance, a company which has a beta of 1.5 should be interpreted as, ignoring idiosyncratic effects, that when the market increases 5% as a whole, this particular stock should increase 7.5% and vice versa.

Risk Free Rates & Calculating Market Risk Premiums:

For risk free rates, we will use US 10-year treasury yields. For market returns we will divide our sample into developed and developing countries. For developing countries, we will use the FTSE emerging markets Index and for developed coun-

tries we will use the FTSE developed markets. The market risk premiums will simply be the compounded annual average growth of the respective indices with the risk-free rate subtracted.

The decision to use US treasuries as the risk-free rate may be 'slightly' controversial so it deserves some attention. The risk free rate is the rate of return on an investment with zero risk of default. This is the compensation the investor receives for foregoing spending opportunities today. The concept of a risk free rate is a slightly theoretical concept because there is no investment out there that is truly risk free.

In theory, the real risk free rate should be universal across the globe because otherwise there would arbitrage opportunities. Borrow in a low interest environment and lend in a high interest environment for a truly risk free profit. The problem is that of exchange rates. Traditionally, highly rated sovereign debt such as US treasuries and German government debt has been considered 'risk free' – at least the closest we are going to get. But from a German investor, holding a US treasury is not risk free because it suddenly exposes the investor to foreign exchange risk. Therefore, the risk free rate is usually slightly different because it is normally denominated in the local currency and needs to take the local rate of inflation into account.

This would in theory mean that every country should have its own risk free rate, but then there is another problem. Some countries, especially in the developing world, simply do not have access to high quality government debt which can act as a proxy for the risk-free rate. Similarly, we are not using all countries individual stock markets as benchmarks as this would be an unnecessary complexity when looking at a whole sample of firms. Rather we are using two international indices. Therefore, we cannot allow for different risk free rates for different countries as that would mean that different companies have different risk premiums (for the same market!). This is conceptually not possible by its very definition. We could have chosen anything but decided to go with the US treasury because it is the classic textbook case.

In summation, ROIC and EVA are both accounting metrics which attempt to give a performance metric that is comparable between different firms. EVA is a slight improvement of the ROIC in the sense that it accounts for risk for the investor.

4.4.2 Long Term Performance Metrics

Both EVA and ROIC have shortcomings. They are a snapshot of one year. Company profits can be boosted in the short run by slashing investments at the expense of profits in the long run. This makes a measure that captures value creation as assessed by the stock market relevant since the stock market would react to such investment slashing exercises. The final performance metric which attempts to fulfil this shortcoming will be the EMV calculated as seen in equation 14:

$$EMV = \frac{TotalAssets_{Market} + TotalLiabilities - TotalAssets_{Book}}{TotalSales} \tag{14}$$

EMV is a market value-based measure that assess the degree to which investor's expectations about the firm drives the market value of that firm to increase, decrease or stagnate (Errunza & Senbet, 1981, p. 403). $TotalAssets_{Market}$ and $TotalLiabilites$ is simply the enterprise value of the company. Subtracting the book value of assets we get the excess market value created over the book value and then normalised by sales as a proxy for size to make different companies comparable. Because we have the enterprise value as it is priced by investors and the price paid for a security is influenced by investors collective beliefs about the future, we get a long term perspective on the matter.

One pitfall of this is that we suspect this metric works best for mature companies. Consider a relatively young and small company in its growth face. It probably has few book assets, few realised sales but a high expectation for the future causes the value of its traded equity to be several times higher than its book values. This means that such a company's score will be of several magnitudes higher than otherwise "normal" firms. This metric is very sensitive to the denominator.

4.4.3 Statistical Test

The regression model used in all three cases (ROIC, EVA, EMV) will be an ordinary least squares OLS linear regression, more specifically the one included in the python library statsmodels.formula.api.ols. of the type seen in equation 15:

$$y = \beta_0 + \beta_1 x_1 + \beta_n x_n ... \tag{15}$$

OLS regression is a statistical tool which fits a linear regression line to a two-dimensional data set consisting of "coordinates". It does so by adjusting the coefficients in order to minimise the sum of the squared error terms. In order for the OLS to be valid a couple of requirements need to be met:

- The linear regression has linear parameters
- The sampling is random
- The conditional mean of error terms should be zero
- There is an absence of multi-collinearity
- There is homoscedasticity and no autocorrelation
  Adopted from (Poole & O'Farrell, 1971, p. 147-179)

It is obvious that our independent variables should be 'R' and 'G'. By implication, I is implicitly included as well. One can easily imagine that larger companies are more likely candidates for international expansion. The other way around could even be true as well. Large companies are large as a result of international expansion. In either case, it would be reasonable to imagine that companies size can be positively correlated with internationalisation. Large company size could according to MNE theory result in higher profitability, so we need to control for this or we could end up wrongfully inferring that companies are more profitable if they internationalise when the effect really stems from being large.

Because we can easily imagine a scenario where international companies are overrepresented in developed countries where the average profit rates in strict accounting measures are lower, we have to control for this effect in order to not infer the wrong conclusion about the financial performance implications of internationalising.

To deal with the requirements for an OLS and in order to make the regression the best it can be, all input variables residuals will be scatter plotted to check for patterns and the need to transform data. Total assets is a strong candidate for this because there are decreasing effects with size and the scale in magnitude between numbers can be significant. This is a likely candidate for log transformations. This is to ensure linearity of the data. All input variables will be checked for covariance in a covariance matrix for covariance and autocorrelation will be assessed using the Durbin-Watson parameter.

4.5 Obtaining a Sample

To make sure data availability on capacity will be available, it makes sense to focus on publicly listed companies as it ensures availability of the data we require. It also makes using ROIC, EVA and EMV as performance metrics feasible as we require stock data in order to calculate opportunity cost of capital and the EMV. EMV is by its very definition only available for public companies. Utilities such as electricity are capital intensive industries, hence finding listed companies in this category will not be an issue [7]. In order to complete our analysis, we will need company capacity as well as actual production figures. We will need company fundamentals, company stock data and comparable stock index data to regress the stocks against.

The academic de-facto standard when it comes to corporate fundamentals is the Compustat Databases. The Compustat North America and Compustat Global contains company stock price information as well as fundamentals for more than 40.000 listed companies. This comprehensive database will be used as a good ap-

[7] Companies requiring this much capital, unless backed by governments have little choice but to go public since private funding of this magnitude is infeasible in the long run

proximation of the "entire population" from which a sample will be constructed. From both databases, accessed through Wharton Research Data Services, all available companies with a GICS industry classification of either 551010, 551030 or 551050 are downloaded (see items 7 and 8 in appendix C). These are industry classification "Electric Utilities", "Multi Utilities" and "Independent Power Producers & Energy Traders" respectively [8]. The two datasets are merged together to one single unified database.

This dataset contains 1207[9] unique companies as identified by their "gvkey". A quick test for duplicates in the data revealed 32 companies appearing in both datasets. There are several reasons why companies may appear twice, but in our case it was primarily due to companies co-listing on two or more stock exchanges. A decision was made to keep the data from the dataset where the company had its headquarters listed. I.e. a Spanish company appearing in both the Global and North America data would be deleted in the North America set.

To satisfy the 'must be public' requirement, companies appearing with a stock exchange code equal to 1 through 4 [10] inclusive were deleted from the dataset. To make sure the sample we obtained was useful, companies without data for 'Total Assets' or 'Currency' were excluded as well.

Because power plants and electricity generation involve investments into large real assets that take many years to complete, companies' portfolios of assets do most likely not vary much from year to year. It therefore makes little sense to do year-on-year comparisons. A time series with larger discrete jumps is more desirable. Starting in 2015 and going back increments of three years for a total of 4 periods yields a dataset containing roughly 450 companies with data for the years 2015, 2012, 2009, 2006. This is approximately 1800 annual reports worth of data.

The choice of time period is pragmatic compromise. 2015 was chosen as the end point because it is the latest year we have access to global electricity capacity and production data. The start of 2006 is chosen because initial trial runs for finding data suggested that most companies do not publish annual reports from much earlier than that. Finding companies' annual reports systematically from a third party is not viable. The interim frequency of every 3 years was chosen as a compromise between including more firms or more data point years for each firm from a feasibility perspective. Because the data is very dependent from year to year (Companies normally do not change everything in their balance sheet from

[8]The difference between an Electric Utility, Multi Utility and an independent producer is subtle. To be classified as a utility, the company must also engage in distribution to the end consumer of the product. Independent producers purely involved in electricity generation.

[9]The database goes back to the 1986, so many of these companies are no longer in existence or have merged into fewer entities later

[10]These are private companies, subsidiaries of other companies, announced leveraged buyouts or a holding company to another listed entity.

year to year) every 3 years was decided as a suitable amount of time to measure real change.

We sorted out 276 companies due insufficient data or failure to meet the requirements to be included in the sample[11]. 145 companies were found to have a strictly national strategy, i.e. at no point did they or do they currently have foreign generating assets in another country than the country of incorporation. This leaves 38 companies that at some point in our analysis period has had foreign generating assets.

4.5.1 Collecting Capacity and Production Data

We collected data regarding firms' capacities and production of electricity by rigorously scrutinising annual reports or sustainability reports from 2006, 2009, 2012 and 2015 for all the companies of the sample. Given that no official standards currently exist in terms of how to publish that information, all companies have done so in different ways, or not at all. It forced us to create method to establish the capacities and production which made the companies comparable and we chose to use consolidated data based on share of ownership. It practically means, that if a firm write that its portfolio consist of 100 megawatts in Spain and 50 megawatts in Russia, and the 50 megawatts in Russia officially is owned by a company which the first company owns 80% off, then the 50 megawatts will only count for $50 \times 0.8 = 40$ megawatts on a consolidated basis. This is also one of the reasons why we have not included subsidiaries in the sample as their capacities are in fact owned by the parent company and is part of their consolidated portfolio.

Collecting the data independently is an advantage for this study since we create an original database which did not exist beforehand. It enables us to perform analysis and communicate results that others have not been able to. On the other hand, it has been a extensive process due to the volume of reports that we have been forced to scrutinise, and in terms of the variations in time used for individual reports as some have been less explicit about their capacity and production data than others.

All reports used to determine capacities and production are found in item 4 in appendix C. It will therefore consist of both international and national firms. Each firm has a folder named by its GVKEY, and four reports inside named by GVKEY_YEAR. In very few cases, PDF or a similar format was not available which complicated download. For an overview of the collected data see item 5 in appendix C.

[11](1) Companies with less than 100 MW of capacity; (2) a subsidiary; (3) less than 50 % revenue in utility business unit or; (5) company report not giving any information about plant capacities and their exact location

4.5.2 Collecting Financial Data

For all companies, stock data from the Compustat databases (items 8 and 9 in apendix C) were downloaded with monthly frequency for the period of 2003-2015. The global database only has daily data, so the whole file was downloaded and then reduced to monthly frequency by retaining the last week day of the month. The FTSE indeces data were also downloaded from here (item 10 in appendix C). To make comparisons of company fundamentals and stock information valid, they must be converted to a common currency. For convenience, Euros were chosen as the common currency, but it could have been any currency. Finding accurate and freely available historical Currency data can be a bit of a challenge. All currencies in the dataset were downloaded from "http://www.fixer.io/" which is an API service for exchange rates sourced from the European Central Bank. Their free subscription does not allow for downloading historical data in one request. A circumvention was made by having a python requests module iterate through all currency pair combinations with Euros for all end of month dates in our time-period for a total of approximately $179 \times 12 \times 9 = 19332$ individual API queries. The data was appended into a single file which was then stacked and structured (see item 11 in appendix C).

All company fundamentals and stock data was converted into Euros based on the exchange rate prevailing on the date of Annual Report publication.

The final dataset is as follows. The sample contains 459 different companies from 61 different countries of incorporation. All 459 companies' annual reports for the years 2006, 2009, 2012 and 2015 were read and analysed to determine the geographical spread of their physical assets to determine capacity in the home country, home region and rest of world. Same procedure was done for total electricity production. These 38 companies combined represent 6.2, 9.2, 10.7 and 11 percent of the total assets of all 459 companies measured on book value of assets for the years 2006, 2009, 2012 and 2015 respectively.

4.5.3 Strength of Sample

When it comes to statistical tests, increasing the size of the sample can often lead to better and more representative results. In our case we limited ourselves to publicly listed and traded companies due to concerns regarding availability of data. Within this sphere of companies, we downloaded ALL companies data listen on more than 80 different stock exchanges around the world. The only other selection criteria was continued reporting in the period of 2006-2015 and available data on key parameters. This only excluded around 70 or so companies. This left us with roughly 450 companies in total we wanted to include in our sample.

This is all there is. In the sense that we could not include more companies in the sample even if we wanted to. Roughly a third of the companies, after we had evaluated all 400+ had sufficient data to establish geographic spread of generating

power assets. This means that our sample represents a significant portion of all companies in the whole population. This is not just a small sub-sample. We have included every company we possibly could. This we feel, makes the conclusions we draw from the results, much more 'robust' than we could otherwise allow ourselves to be in other circumstances.

There may be a small bias in our sample in the sense that the availability of data seems to be best for large companies in the sense that they are more thorough and their annual reports contain a lot more information than for smaller companies. Since there may be an over representation of international companies in the large segment, there may be an over representation of international companies in the final sample we ended up having.

This cannot be verified nor denied with certainty, but it is certainly a possibility. The same is true for firms from developing countries. Developed countries have much more rigorous accounting standards and requirements, so firms from developed countries may be overrepresented in our sample. We strictly do not know, but it is a possibility.

4.5.4 Limitations of Sample

The choice of using capacity and production data for electricity producing firms has the major advantage of allowing us to use original indicators that provides a new perspective on geographical location that has never been used before in the scientific literature. However, the choice involves a few limitations that we need to be aware of. These are related to the collection bias that we have experienced through the process of retrieving the capacity and production data. First, we have categorised some firms as having incomplete data due to how their annual reports appeared in their national language which we could not understand. Secondly, we found that fewer companies appear from developing countries than in developed countries as seen in the table 3 which includes all observations (4 per firm).

Table 3: Frequency Distributions of Observations

Regions	**Complete**	**Incomplete**	**Total**	**Ratio**
Oceania	36	20	56	1.8
South America	72	81	153	0.9
Europa	210	159	369	1.3
Asia	190	335	525	0.6
North America	212	40	252	5.3
Africa	8	4	12	2
Total	728	639	1367	1.14

There were 466 observations from companies that failed the inclusion requirements

That is not to say these the former does not have electricity companies, but more likely a sign of how very few of them are publicly traded (which was a needed requirement for this study to get the necessary financial data from Compustat), and how each region is at a individual level in terms of liberalising their electricity sector. Moreover, the level of completed observations relative to incomplete observation is very different where especially North America scores high while Asia shows the lowest value, as seen in table 3.

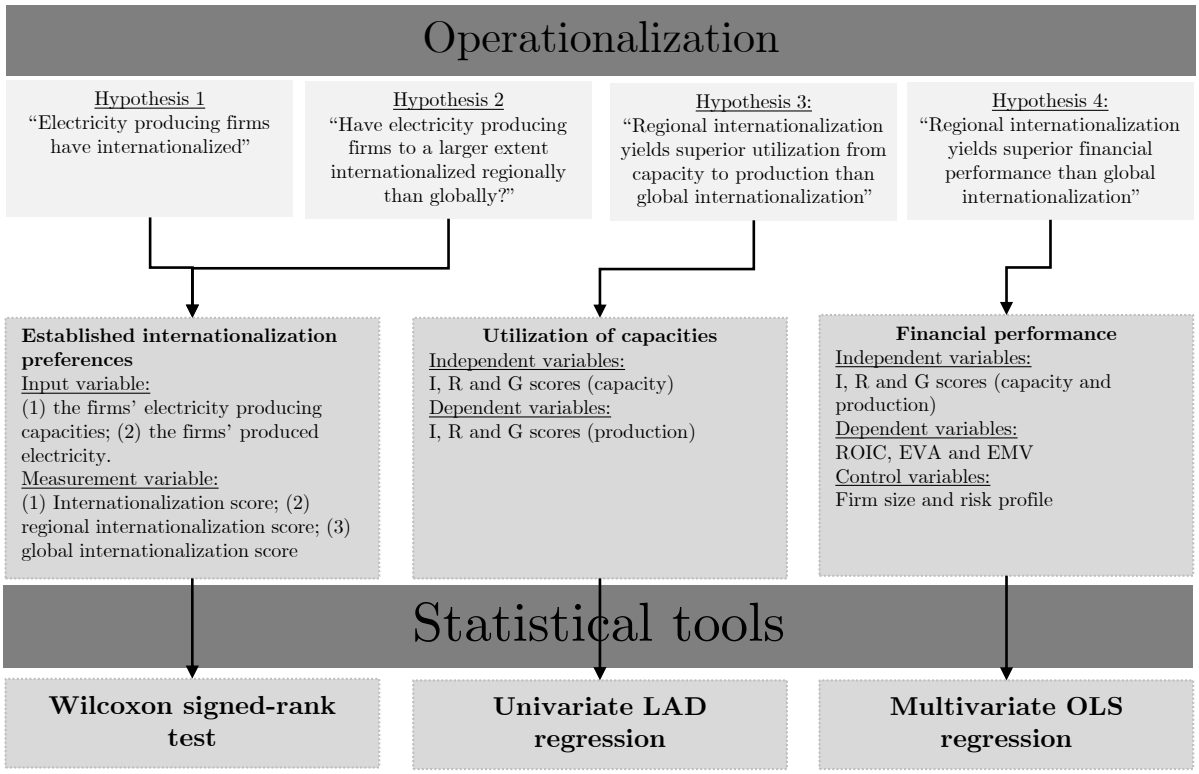
By looking at the data altogether, it we must acknowledge that our sample has a certain level of collection bias as each region is not represented equally which is a limitation of the study. Had each region had sufficient available complete data observations, we would have been able to create a sample with a more evenly represented sample in terms of region.

4.6 Chapter Summary

In this chapter, we will describe and scrutinise the results generated by the three models that we have laid out. Section 5.1 presents the established internationalisation preferences of electricity producing firms as I-score, R-score and G-score for capacity and production, and performs a Wilcoxon signed-rank test to assess statistical significance. Section 5.2 describe the results gained from using the univariate LAD regression analysis to assess the relationship between capacity and production with respect to the I, R and G scores to evaluate operational performance. Section 5.3 examine the results generated from applying the multivariate OLS regression analysis to investigate the relationship between the I, R and G scores and ROIC, EVA and EMV to assess the correlation between the variables. Section 5.4 summarises the results in a preliminary conclusion.

A comprehensive summary is graphically presented in figure 6.

Figure 6: Overview of Theoretical Framework



5 Results

In this chapter, we will describe and scrutinise the results generated by the three models that we have laid out. Section 5.1 presents the established internationalisation preferences of electricity producing firms as the I-score, R-score and G-score for capacity and production, and performs a Wilcoxon signed-rank test to assess statistical significance. Section 5.2 describes the results gained from using the univariate LAD regression analysis to assess the relationship between capacity and production with respect to the I, R and G scores to evaluate operational performance. Section 5.3 examines the results generated from applying the multivariate OLS regression analysis to investigate the relationship between the I, R and G scores and ROIC, EVA and EMV to assess the correlation between the variables. Section 5.4 summarises the results in a preliminary conclusion.

5.1 Established Internationalisation Preferences

We have tested if utilities and IPPs that are engaged in building, ownership and operating electricity producing facilities have endogenous capabilities which they

have utilised to (1) internationalise over the period of 2006-2015; (2) internationalise regionally or globally over the period of 2006-2015. The two questions are related to hypothesis 1 and 2 and are simultaneously answered by this test.

5.1.1 Descriptive Statistics

This sub-section will summarise data related to testing the established internationalisation preferences of our sample. We have calculated I, R and G scores for both capacity data and production data leading to 24 series of data. The companies which are strictly national across all years are not included because they have known values of 0 in all years and including them would dilute the descripted powers of the summary beyond anything meaningful.

We will begin by explaining the unweighed data (or raw data) that we have independently retrieved and sorted to get an immediate picture of the internationalisation level. Afterwards, we use the same data but weight for firm size to normalise the data. Tables 4, 5, 6, 7 show the descriptive results for the years 2006, 2009, 2012 and 2015 respectively.

Table 4: Results 2006

	R Cap	**G Cap**	**I Cap**	**R Pro**	**G Pro**	**I Pro**
N	38	38	38	38	38	38
Mean	0.47	0.32	0.40	0.30	0.68	0.62
Median	0.00	0.04	0.22	0.00	0.51	0.74
Mean (w)	47.64	12.25	21.59	59.19	40.75	12.25
STD. Dev	0.81	0.49	0.42	0.71	0.66	0.50
Min	0.00	0.00	0.00	0.00	0.00	0.00
25 %	0.00	0.00	0.02	0.00	0.00	0.10
50 %	0.00	0.04	0.22	0.00	0.51	0.74
75 %	0.73	0.42	0.85	0.14	1.34	1.02
Max	2.75	1.38	1.29	3.38	1.60	1.29
Skew	1.78	1.26	0.64	2.94	0.11	-0.08
Kurtosis	1.96	-0.08	-1.14	8.67	-1.83	-1.66

Table 5: Results 2009

	R Cap	G Cap	I Cap	R Pro	G Pro	I Pro
N	38	38	38	38	38	38
Mean	0.53	0.36	0.43	0.41	0.66	0.62
Median	0.00	0.17	0.32	0.00	0.42	0.66
Mean (w)	98.85	27.62	44.74	115.87	72.30	27.62
STD. Dev	0.80	0.46	0.38	0.81	0.64	0.47
Min	0.00	0.00	0.00	0.00	0.00	0.00
25 %	0.00	0.00	0.06	0.00	0.00	0.12
50 %	0.00	0.17	0.32	0.00	0.42	0.66
75 %	0.88	0.55	0.70	0.29	1.30	1.02
Max	2.92	1.35	1.27	2.92	1.71	1.26
Skew	1.53	1.17	0.48	1.99	0.28	-0.07
Kurtosis	1.38	-0.01	-1.00	2.68	-1.60	-1.55

Table 6: Results 2012

	R Cap	G Cap	I Cap	R Pro	G Pro	I Pro
N	38	38	38	38	38	38
Mean	1.24	0.29	0.41	0.71	0.61	0.58
Median	0.66	0.16	0.31	0.00	0.41	0.54
Mean (w)	140.7	25.7	50.7	175.0	75.4	25.7
STD. Dev	2.12	0.37	0.33	1.45	0.64	0.44
Min	0.00	0.00	0.00	0.00	0.00	0.00
25 %	0.00	0.01	0.15	0.00	0.01	0.15
50 %	0.66	0.16	0.31	0.00	0.41	0.54
75 %	1.51	0.40	0.67	0.73	1.28	1.00
Max	11.47	1.300	1.23	6.24	1.83	1.23
Skew	3.34	1.52	0.60	2.59	0.52	0.07
Kurtosis	12.77	1.50	-0.58	6.15	-1.24	-1.51

Table 7: Results 2015

	R Cap	G Cap	I Cap	R Pro	G Pro	I Pro
N	38	38	38	38	38	38
Mean	2.14	0.27	0.40	1.03	0.50	0.55
Median	0.46	0.10	0.33	0.11	0.13	0.47
Mean (w)	142.89	23.73	46.66	242.44	61.63	23.73
STD. Dev	6.42	0.37	0.34	1.67	0.61	0.43
Min	0.00	0.00	0.00	0.00	0.00	0.00
25 %	0.00	0.00	0.11	0.00	0.00	0.14
50 %	0.46	0.10	0.33	0.11	0.13	0.47
75 %	1.77	0.38	0.71	1.50	1.14	1.00
Max	39.43	1.27	1.20	6.32	1.95	1.22
Skew	5.35	1.64	0.56	1.80	0.92	0.15
Kurtosis	28.53	1.92	-0.74	2.31	-0.44	-1.39

Centre of Unweighed Data

The mean is the average of the numerical values that represents the observations. It is therefore highly influenced by outliers and a 'long tail' in skewed distribution can pull the mean in a certain direction (Agresti & Finlay, 2008, p. 40). Overall, we can see both high and conflicting numbers of skewness and kurtosis for 'I', 'R' and 'G' scores which supports the observation of non-normal distributions and justifies the use of the Wilcoxon signed rank test to assess significance. If we begin by looking at the I-score at the four points in time: 2006, 2009, 2012 and 2015. We get mean values for the firms' capacities of 0.40, 0.43, 0.41 and 0.40, and 0.62, 0.62, 0.58 and 0.55 for the firms' production data. The means show no discernible trend.

The I-Scores on capacity data would indicate them to be around the same level, the production numbers appear to be stagnated. The R-score have mean values for capacities of 0.47, 0.53, 2.24 and 2.14 and 0.30, 0.41, 0.71 and 1.03 for production. We see an upwards going trend with a steeper increase in capacities than in production. The G-scores have mean values for capacities of 0.32, 0.36, 0.29 and 0.27, and 0.68, 0.66, 0.61 and 0.50 for production. We see no upwards going trend in this data.

The median is another appropriate measure of the center of data that will possibly tell a different story than the mean due to the skewness of the data. The median splits the sample into two parts with an equal numbers of observations and orders these from lowest to highest (Agresti & Finlay, 2008, p. 43). The I-scores for capacities are 0.22, 0.32, 0.31 and 0.33, and 0.74, 0.66, 0.54 and 0.47

for production which shows an increase in capacities and decrease in production. R-scores for capacities are 0.00, 0.00, 0.66 and 0.46, and 0.00, 0.0.00, 0.00 and 0.11 for production both showing an increase in 2015. G-scores for capacities are 0.04, 0.17, 0.16 and 0.10, and 0.51, 0.42, 0.41 and 0.13. Altogether, the median values are closer to zero compared to the mean values which indicate that the majority of firms' capacities and productions are closer to zero with a few firms pulling a lot of weight.

Centre of Weighted Data:

As firms have different sizes and large firms might be more influential than small firms, we normalise the data by weighting for total assets. Still, we look at four points in time: 2006, 2009, 2012 and 2015. The new means have higher absolute values because we have multiplied by 1000 to be more reader friendly.

The weighted mean values for I-score for the firms' capacities are 21.59, 44.74, 50.74 and 46.66, and 12.25, 27.62, 25.73 and 23.73 for production. The data shows an increase in both categories between 2006-215 with a slight decrease between 2012-2015. Nonetheless, the data shows that our sample of electricity producing firms have internationalised at a positive rate during 2006-2015. R-scores for firms' capacities are 47.63, 98.85, 140.70 and 142.89, and 59.19, 115.87, 175.05 and 242.44 for production. It shows an increase in Regional Internationalisation during 2006-2015, and a constant increase from period to period. The G-scores for firms' capacities are 12.25, 27.624, 25.79 and 23.73, and 40.75, 72.30, 75.47 and 61.62 for production. The data displays a general increase over the total time frame of 2006-2015, while the capacities decrease between 2009-2015 and the production decrease between 2012-2015. It means that the firms in our sample have internationalised globally.

We are able to show an alternative indication that shows the extent to which the industry as a whole has internationalised more between 2006-2015. If we take the total assets (financial book-value) of the 38 firms of our sample that has internationalised, as weight for total assets of the entire sample (including purely national firms), we can see that the firms that have internationalised take up a larger proportion of the total electricity generating assets in the world. This is exactly the case in our total sample as the 38 firms who at some point have had or still have international assets comprised 6.2, 9.2, 10.7 and 11 percent of total generating capacity of ALL firms for the years 2006, 2009, 2012 and 2015 respectively.

Assessing the Relative Regional and Global Internationalisation Preferences

If we take a closer look at the weighted means for the R-scores and the G-scores, we recognise that the R-scores increase at a higher rate than the G-scores.

Table 8: Ratio Between R & G

	Capacity				**Production**			
Year	*2006*	*2009*	*2012*	*2015*	*2006*	*2009*	*2012*	*2015*
Unweighed	1.46	1.48	4.25	7.94	0.43	0.62	1.16	2.05
Weighted	3.89	3.58	5.46	6.02	1.45	1.60	2.32	3.93

Table 8 shows how the unweighed ratio between means of regional and Global Internationalisation scores with respect to capacities (R/G) increases from 1.46 in 2006 to 7.94 in 2015 which means that our sample have higher market penetration regionally than globally in terms of capacity. When adjusting for the overall development of capacities, the increase still shows but is more flat as it increases from 3.89 in 2006 to 6.02 in 2015. If we then look at the production figures, we can see a similar trend of how the unweighed relationship between means of regional and Global Internationalisation scores with respect to production (R/G) increases from 0.43 in 2006 to 2.05. The fact that the relationship in 2006 is below one means that the firms at that point in time was more globally internationalised compared to being regional in terms of production. It also evens out when adjusting for the overall development of production, as the difference increases from 1.45 in 2006 to 3.93 in 2015 but still showing a similar trend.

Figure 7: 'G' Divided By 'R' for Capacity

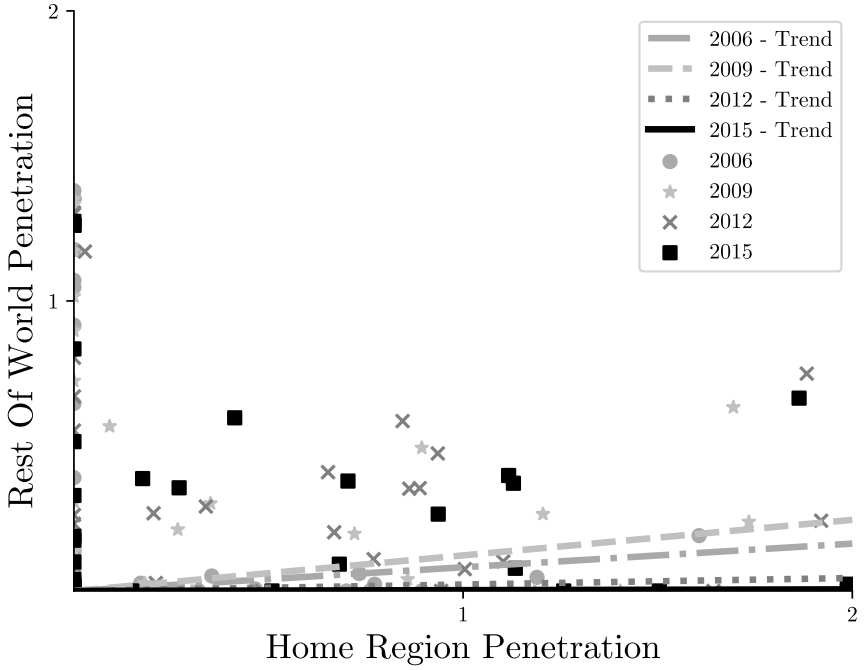
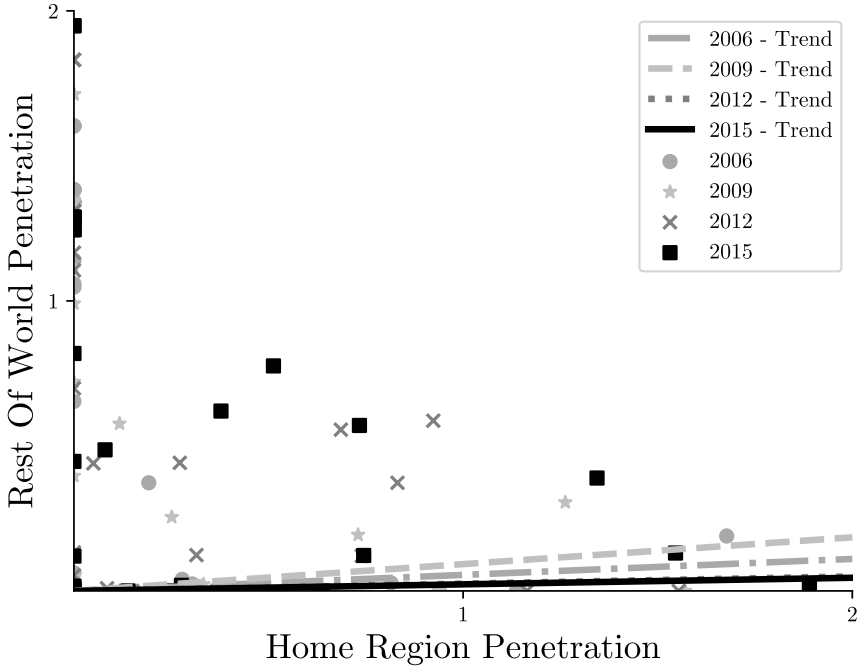


Figure 8: 'G' Divided By 'R' for Production



Figures 7 and 8 depicts the same relationship as table 8. The closer the trend-line is to the x-axis, the higher 'R' is in relation to 'G'. Notice how the trend is increasing over the years. In figure 7 the line for 2015 is so close to the x-axis that it can be difficult to separate the two. Similarly for figure 7, the 2012 trend line is difficult to spot because it is almost hidden by the 2015 line.

Altogether we can see that the electricity producing firms in our sample have internationalised more regionally than globally. To establish the validity of these results, we need to perform a test of significance.

5.1.2 Testing For Significance

We perform a significance test to establish the extent to which the changes that we have just described have changed significantly in a statistical sense. Such a test summarises the statistical evidence about a hypothesis by comparing point estimates of parameters to the values predicted by the hypothesis (Agresti & Finlay, 2008, p. 143). We measure this using a P-value which is the probability of observing a given deviation in a randomly drawn sample from the population, given the null hypothesis is true. Table 9 shows the one-tailed P-values for the Wilcoxon signed rank where all years are measured relative to 2006. Table 10 shows the P-values for the Wilcoxon signed rank where all values show a 1 period delta.

Table 9: Wilcoxon Signed-Rank P-values.

	Capacity			**Production**		
	I	*R*	*G*	*I*	*R*	*G*
2006 - 2009	0.104	0.092	0.044*	0.044*	0.139	0.456
2006 - 2012	0.072	0.017*	0.096	0.096	0.027*	0.185
2006 - 2015	0.014*	0.001*	0.076	0.077	0.002*	0.234

Table 10: Wilcoxon Signed-Rank P-values.

	Capacity			**Production**		
	I	*R*	*G*	*I*	*R*	*G*
2006 - 2009	0.104	0.092	0.044*	0.044*	0.139	0.456
2009 - 2012	0.194	0.054	0.337	0.338	0.089	0.213
2012 - 2015	0.376	0.219	0.409	0.409	0.16302	0.334

The test shows that the change in I and R scores for capacity between 2015 is significant, as well as the R-score for capacity and production for the years 2012 and 2015 relative to 2006. None of the G-values are significant except for 2006-2009, but this disappears when looking at subsequent periods. The significance of the change intra-regionally is more ambiguous as few p-values are significant. Altogether, we can confirm adequate significance within the two changes that we specifically deal with via the hypotheses in term of the overall I-score, and the R-score. When considering that we have statistically significant components in the R-score and almost none in the G-score, firms seem to have a preference for intra-Regional Internationalisation especially in terms of capacity, but less in terms of production.

5.2 LAD Regression: The Relationship Between Electricity Producing Capacity and Electricity Production

We have tested the degree to which electricity producing firms' utilisation of capacities into production differs in terms of their national, regional and global capacities. We will now lay out the model validity and robustness, and elaborate on the results generated.

5.2.1 Model Validity and Robustness

This is a univariate analysis. When looking at the histograms for distribution (see figure 13 to 36 in appendix B) and the skew scores for the data, we can see that in all instances, the data is not normally distributed. This is in and of itself not enough to discard an OLS approach, but it renders the confidence intervals for the test statistics normally associated with OLS regressions slightly suspect. The OLS is also highly sensitive to extreme outliers, and there are a few, but they all cannot be disregarded from our sample because they are in fact valid numbers after double checking. Two observations were disregarded from the R score because their deviation from everything else was so extreme, that they affected the model to an extend that would be hard to defend. With all these caveats in mind, we decided to use a least-absolute-deviations regression.

When looking at the data there also appears to be slight heteroscedastic tendencies in the residual plot for G capacity and production (figure 37 in appendix B). The tendency is persistent even when looking at percentage error terms and not absolute deviations. The plots for R and I do not exactly look textbook either when looking at figure 38 and 39 in appendix B. This may affect the results to some degree, but we ultimately conclude that the effects are within reasonable tolerances. keeping this in mind we will look at the regression results.

5.2.2 Results from Regression

When running simple LAD-regressions on the capacity parameters as predictors of the production parameters, we see the following relationships. Regional capacity penetration regressed against Regional production penetration yields a coefficient of 0.9486, an adjusted R^2 of 0.3550 and a P-value below 0.001. The intercept is more or less zero as would be expected. Global capacity penetration regressed against Global production penetration yields a coefficient of 1.0020, an adjusted R^2 of 0.4113 and a P-value below 0.001. The intercept is again very close to zero as would be expected. A firm cannot have negative production numbers, and positive production in the absence of generating capacity is impossible.

Similarly, the overall Internationalisation score I, which is a composite index of the two, tells a similar story with a coefficient of 1.0132, an adjusted R^2 of 0.4852 and a P-value below 0.001. The results for 'I' 'G' and 'R' can be seen in figures 11, 12 and 13 respectively.

Table 11: LAD Regression, Capacity on Produciton (I)

Dep. Variable:		I Pro.		*Pseudo R^2:*		0.4852
Model:		LAD		*Bandwidth:*		0.1342
Date:		11/05/2018		*N. Observations:*		152
Time:		13:37:16		*Df Residuals:*		150
				Df Model:		1
	Coef.	*Std. Err.*	*t*	*P > | t |*	*[0.025*	*[0.025]*
Intercept:	4.178×10^{-6}	0.017	0.000	1.000	−0.034	0.034
G Cap.:	1.0132	0.032	31.862	0.000*	0.950	1.076

Table 12: LAD Regression, Capacity on Produciton (G)

Dep. Variable:		G Pro.		*Pseudo R^2:*		0.4113
Model:		LAD		*Bandwidth:*		0.2643
Date:		11/05/2018		*N. Observations:*		152
Time:		13:37:17		*Df Residuals:*		150
				Df Model:		1
	Coef.	*Std. Err.*	*t*	*P > | t |*	*[0.025*	*[0.025]*
Intercept:	3.712×10^{-6}	0.026	0.000	1.000	−0.051	0.051
G Cap.:	1.0020	0.050	20.109	0.000*	0.904	1.101

Table 13: LAD Regression, Capacity on Produciton (R)

Dep. Variable:		R Pro.		*Pseudo R^2:*		0.3550
Model:		LAD		*Bandwidth:*		0.04204
Date:		11/05/2018		*N. Observations:*		150
Time:		13:37:17		*Df Residuals:*		148
				Df Model:		1
	Coef.	*Std. Err.*	*t*	*P > | t |*	*[0.025*	*[0.025]*
Intercept:	-7.248×10^{-8}	0.005	1.25×10^{-5}	1.000	−0.011	0.011
R Cap.:	0.9486	0.004	253.020	0.000*	0.941	0.956

To further understand these results. When looking at the confidence intervals for 'R' which is 0.941 to 0.956 and similarly for 'G' which is 0.904 and 1.01, we can see that the confidence intervals are in fact overlapping. So even though it appears that the utilisation rate may be slightly lower for R, we cannot rule out the possibility that they are in fact the same, and there seems to be no difference in utilisation rates between intra-regional and inter-regional assets. Consequently, the results appear to indicate that international expansion, both regionally and globally, delivers the same operational performance as domestic operations.

Just to be clear. Had the coefficients for the regressions been below 1, it would have meant that firms are in fact less able to convert capacity into production for these assets. Similarly, a coefficient above one would have meant that firms exhibit superior performance in these areas.

5.3 Multivariate OLS Regression: Relationship Between Financial Performance and Internationalisation

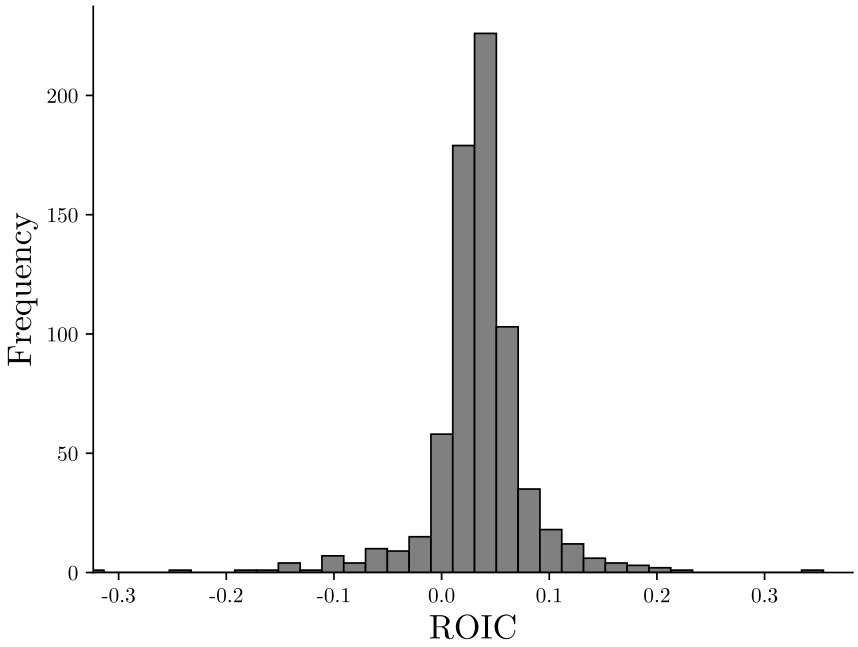
This section is going to test the relationship between firms' internationalisation preferences and their financial performance. We will first describe the features of the dependent variables ROIC, EVA and EVM. This part naturally progresses into model validation and checking for robustness in order to determine if the results are valid. Finally, we will summarise and analyse the results.

5.3.1 Describing the Dependent Variables

Return On Invested Capital

When looking at the distribution for ROIC (see figure 9), the data appears to exhibit something that approaches a normal distribution in nature. The mean appears to be somewhere in the middle between 0.0 and 0.1. This is supported by the calculated mean of 0.0292. This number is in line with our expectations. Having a ROIC above zero means that the sector in general is generating positive returns.

Figure 9: Histogram For ROIC Distribution



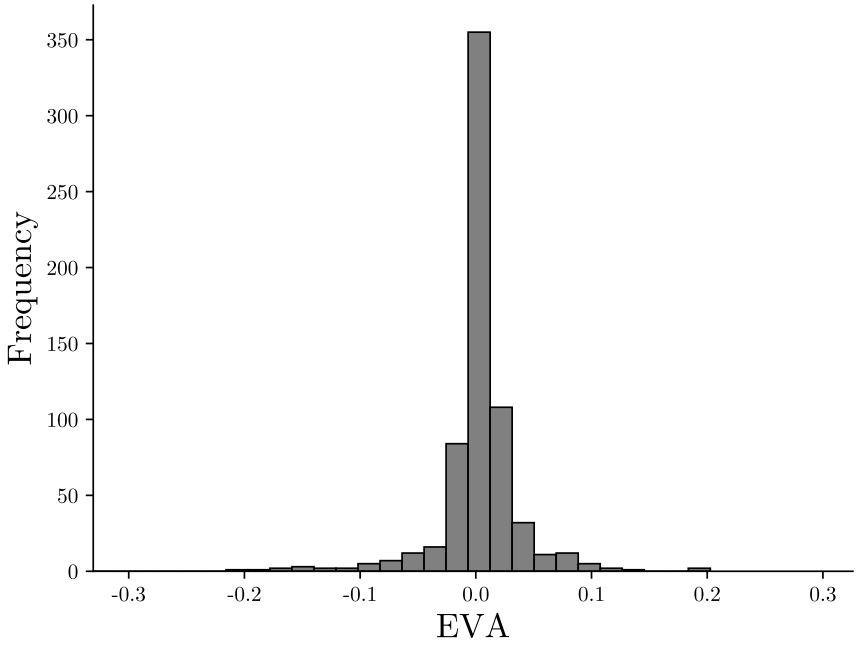
As we can see on the distribution, most of the data appears between -0.2 and 0.2 (1 = 100 %). This is in line with our expectations since we expect most of our data to be within two standard deviations of the mean. This is supported by

the calculated standard deviation which is 0.088. For visual purposes, anything beyond 4 standard deviations was omitted. Only one value was found here.

Economic Value Added

When looking at the plotted histogram for EVA (see figure 10) we see that the data appears to signify a normal distribution. The data appears to centre around a mean value of around 0, supported by the calculated mean of -0.002387 and a standard deviation of 0.0821. Looking at the plot we see that most of the data is within plus minus 0.15 of the mean. This is in line with our expectations. The mean for EVA should theoretically be zero for all companies in the entire world when looking at the aggregate and most of the data should fall within roughly two standard deviations to either side. For visual purposes only, any value outside four standard deviations were omitted, only 1 value was found in this extreme range.

Figure 10: Histogram For EVA Distribution

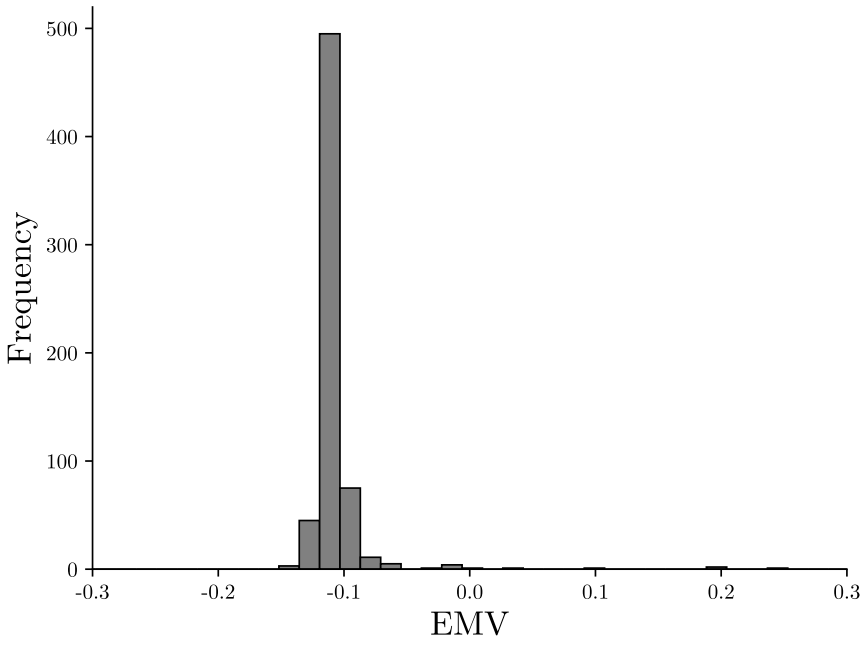


Excess Market Value

The final dependent variable we are going to test is EMV. When looking at the data for EMV (see figure 11) it becomes quite evident that the distribution is approaching normal, but the tails are very long with a heavy right skew. The data was so skewed that in order to visually represent it, the tails had to be cut off. Otherwise the histogram looked like 1 bin. Almost all the observations

are clustered very close to mean compared to the tails. When looking at the histogram, it is a zoomed view. The data for EMV has been normalised. This does not change the distribution in any way. It is only done because the EMV values in absolute terms can be rather large, so it is done to avoid 'large' regression coefficients in the regression for convenience.

Figure 11: Histogram For Normalised EMV Distribution



5.3.2 Robustness Test

Before it even makes sense to talk about the results of the regression we have to verify the validity of the model. We have a set of independent variables; whether a country is developed or developing, 'R' and 'G' for both production and capacity and total assets. The R and G parameters for production and capacity will be run independently due to fears of a large degree of collinearity between them. We also have three dependent variables, but they will not be tested in the same model. This means that there will in fact be $2 \times 3 = 6$ independent regressions. As per the method outlined in the methodology section, we have a range of conditions that we need to adhere to in order to produce valid results. The ordinary OLS model is not robust to violations of its fundamental assumptions, which in brief are:

- The linear regression has linear parameters

- The sampling is random
- The condition mean of error terms should be zero
- There is an absence of multi-collinearity
- There is homoscedasticity and has no autocorrelation
- The dependent variable is normally distributed[12]
  Adopted from (Poole & O'Farrell, 1971, p. 147-179)

The testing for normality regarding the dependent variables has already been established as part of the description of the dependent variables, we will therefore proceed to check the independent variables. ROIC, EVA and EMV will be treated in 3 separate sections because they may not be influenced the same way. After this has been done, collinearity tests will be done as one section because they are common to all three tests.

As part of improving the model and making it robust, we will check all the dependent variables for randomness in the error terms to make sure that the model fit is the best for the data. In order to do that, each independent variable is regressed against the independent variable. Based on the model predictions, the residual is calculated according to: Residual = Observed – Predicted. The residuals are then plotted against the observed values in a scatter plot. We are looking for randomly distributed residuals evenly distributed around the Y axis at 0.0. Anything else indicates a pattern in the residual which means that data in its current form is not the best predictor of the dependent variable as it can be. Data will be transformed to get evenly distributed error terms.

Company data points with incomplete data for the calculations of ROIC, EVA and EMV have been dropped from the regression and therefore results in slightly different numbers of observations for each regression.

Return On Invested Capital

When looking at the residual plot for Assets total (this will be the same for both production and capacity), it does not appear at first glance to be unreasonable (see figure 40 in appendix B). A quick look at the x-axis however reveals that the data points are several magnitudes spread apart, which is congruent with what one would expect to find in this kind of data. Because of the close clustering in the lower range of total assets, it is difficult to see with the naked eye what the distribution really looks like. We transform the data logarithmically. When looking at log(total assets) in figure 41 in appendix B the distribution of residuals looks sufficiently randomly spread around the value 0.0 with no discernible

[12]Is "only" a requirement for the test-statistics. The model fitting works regardless.

pattern in the residuals. We conclude that log transforming the data appears reasonable and continue with this approach. When looking at the residual plots for R and G for both production and capacity (see figures 43, 44, 45 and 46 in appendix B), we treat these together because of the similarity of them, we can see that there is a 'vertical stack' on. 0.0. This is to be expected because this is where all the national firms are. They have a defined score of 0.0 according to the model. When looking at the spread around the y-axis wee see no discernible trend. The plots are in all cases randomly scattered around 0.

The last variable is the developed versus undeveloped status which we use to normalise for risk. We will turn these into dummy variables with binary values of 1 and 0. We then omit the developed status to avoid having co-linearity between two dummy variables. When looking at the dummy variable for 'undeveloped' (see figure 42 in appendix B) we see that that the distributions are symmetrical around the mean zero. What is interesting is that the range the developed countries span x=0 is slightly broader than for developing countries, this could be by virtue of there being more firms in the developed category. All the residual plots appear free for obvious or problematic heteroskedasticity. When looking at the model variables for ROIC they appear to be robust, in the sense that none of the fundamental requirements for the model appear to be violated.

Economic Value Added

Let us continue with the same approach for the EVA residual scatter plots. Let us first look at the data for total assets in figure 47 in appendix B. It is the same story as with the ROIC patterns. This is not unsurprising since EVA is really to be seen as an augmented derivative measure of ROIC. When looking at the EVA residual, there is at first glance nothing particularly wrong with it, but the x axis quickly reveals the magnitude difference in total assets held. We transform the data logarithmically to reduce the magnitude difference between the numbers. When looking the log transformed total assets (see figure 48 in appendix B) we see that the distribution around the y axis value of 0 appears to be uniform and no distinguishable pattern appears in the data. We accept this augmentation and proceed with log transformed total assets.

When looking at the independent variables R and G for production and capacity (see figures 50, 51, 52 and 53 in appendix B) we see a similar story as we did with the ROIC numbers. The numbers appear uniformly and randomly distributed around the y axis with no distinct pattern alluding to a non-linear relationship between the variables. We accept that data as completely valid inputs. The undeveloped dummy in figure 49 in appendix B (we omit the developed dummy) appears to have a good distribution. We again notice how the distribution is slightly wider for developed countries than for undeveloped. This we attribute to there simply being more data-points rather than it being a problem. All the residuals appear free for obvious heteroskedasticity.

When looking at the model variables for EVA they appear to be robust, in the sense that none of the fundamental requirements for the model appear to be violated.

Excess Market Value

Let us turn our attention to the last of the dependent variables EMV. When looking at the residual plot for total assets in figure 54 in appendix B, there appears to be an overweight of data points above the y-axis. Especially approaching the lower values. Log transformed values of total assets somewhat rectify this problem apart from a few outliers in the upper extreme range (figure 55 in appendix B). When looking at the plots for G and R in figures 57, 58, 59 and 60 in appendix B for production the same problem appears. There is an overweight of positive residual for values equal to 0, which are all the national firms. The undeveloped dummy in figure 56 in appendix B also consistently falls off into positive residuals for all values in both categories.

All in all, the residual plots for the EMV model indicate that there is a problem with using this metric as a performance metric in a regression type model since so many variables have residuals that overwhelmingly fall out to the positive side.

5.3.3 Covariance Matrix of Independent Variables

We will now proceed with checking for collinearity of the independent variables, We will run two different regressions for each dependent variable the production numbers and capacity numbers could introduce a large degree of covariance between the independent variables into the regression. On that note, let us check the input variables for covariance. Table 14 and 15 show matrices for capacity and production respectively.

Table 14: Pearson Correlation Coefficients Capacity

	Undeveloped	**R Cap.**	**G Cap.**	**Log Assets**
Undeveloped	1.000	−0.049	−0.147	−0.207
R Cap.	−0.049	1.000	0.020	0.0735
G Cap.	−0.147	0.020	1.000	0.040
Log Assets	−0.207	0.074	0.040	1.000

Table 15: Pearson Correlation Coefficients Production

	Undeveloped	**R Pro.**	**G Pro.**	**Log Assets**
Undeveloped	1.000	−0.085	−0.061	−0.207
R Pro.	−0.085	1.000	−0.015	0.162
G Pro.	−0.061	−0.015	1.000	0.116
Log Assets	−0.207	0.162	0.116	1.000

The numbers in the correlation matrices represents the Pearson coefficient of correlation. The hard limit for what is acceptable is often defined using VIF scores. The specified limit is often indicated as a VIF of 2.5 This is the same as a correlation coefficient of $VIF = 2.5 = \frac{1}{1-R^2} = 0.6$ So any R^2 above 0.6 is a concern. We do not have any pairs exceeding this limit.

5.3.4 Results from Regression

When looking at the performance regressions for the ROIC (see table 17 and 16 for capacity and production respectively), we see as expected that log(total assets) appear to be statistically significant on earnings suggesting that larger companies simply earn more money. We could expect this to be due to some auto-correlation between the two. The Durbin-Watson value at 1.663 suggests this not to be a problem however. Neither 'R' nor 'G' for either case seem to have any influence on earnings. Being based in an undeveloped country appears to have a statistically significant influence on earnings, with the coefficient suggesting that firms based in undeveloped countries on average earn 3.56 percentage points more on the margin with a specified confidence interval of 0.022 to 0.49 when looking at capacity numbers. The findings for the production numbers give slightly different coefficients to the other parameters. The R and G scores are still insignificant in any case.

Table 16: ROIC Regression, Capacity R & G

Dep. Variable:	ROIC	R^2*:*	0.086
Model:	OLS	*Adj.* R^2*:*	0.081
Method:	Least Squares	*F-statistic:*	16.43
Date:	09/05/2018	*Prob. F-statistic:*	7.18×10^{-13}
Time:	13:49:08	*Log-Likelihood:*	740.37
No. Observations:	704	*AIC:*	−1471
Df Residuals:	699	*BIC:*	−1448
Df Model:	4		

	Coef.	*Std. Err.*	*t*	*P* > | *t* |	*[0.025*	*[0.975]*
Intercept:	−0.0609	0.012	−4.8818	0.000*	−0.085	−0.036
Undeveloped:	0.0356	0.007	5.037	0.000*	0.022	0.049
R Cap.:	-7.3×10^{-5}	0.002	−0.038	0.970	−0.004	0.004
G Cap.:	−0.0153	0.014	−1.105	0.269	−0.043	0.012
Log Assets:	0.0102	0.001	7.025	0.000*	0.007	0.013

Omnibus:	1190.054	*Durbin-Watson:*	1.845
Prob(Omnibus):	0.000	*Jarque-Bera:*	1030316.690
Skew:	-10.271	*Prob(JB):*	0.00
Kurtosis:	189.286	*Prob(JB):*	36.6

Table 17: ROIC Regression, Production R & G

Dep. Variable:	ROIC	R^2*:*	0.085
Model:	OLS	*Adj.* R^2*:*	0.080
Method:	Least Squares	*F-statistic:*	16.24
Date:	09/05/2018	*Prob. F-statistic:*	9.98×10^{-13}
Time:	13:49:08	*Log-Likelihood:*	740.03
No. Observations:	704	*AIC:*	−1470
Df Residuals:	699	*BIC:*	−1447
Df Model:	4		

	Coef.	*Std. Err.*	*t*	*P* > | *t* |	*[0.025*	*[0.975]*
Intercept:	−0.0624	0.012	−5.008	0.000*	−0.087	0.038
Undeveloped:	0.0364	0.007	5.196	0.000*	0.023	0.050
R Pro.:	−0.0013	0.005	−0.248	0.804	−0.011	0.009
G Pro.:	−0.0058	0.008	−0.704	0.481	−0.022	0.010
Log Assets:	0.0103	0.001	7.016	0.000*	0.007	0.013

Omnibus:	1188.763	*Durbin-Watson:*	1.845
Prob(Omnibus):	0.000	*Jarque-Bera:*	1019491.566
Skew:	-10.251	*Prob(JB):*	0.00
Kurtosis:	188.297	*Prob(JB):*	33.1

Investors in more risky endeavours, be that an undeveloped country or a country with high corruption will require higher returns to compensate them for their risk. Therefore, it makes sense to look at EVA because it takes this into account. When looking at the EVA regression results (see table 18 and 19 for capacity and production respectively), the significance of being in a developing country diminishes but the effect is still above 0. This could suggest that the amount developing countries' firms earn more offsets the risk premium to some degree, but not all of it. This would indicate that electricity companies in developing countries are earning economic profits.

Table 18: EVA Regression, Capacity R & G

Dep. Variable:	EVA	R^2*:*	0.059
Model:	OLS	*Adj.* R^2*:*	0.054
Method:	Least Squares	*F-statistic:*	10.48
Date:	09/05/2018	*Prob. F-statistic:*	3.08×10^{-8}
Time:	13:49:08	*Log-Likelihood:*	742.77
No. Observations:	668	*AIC:*	−1478
Df Residuals:	663	*BIC:*	−1453
Df Model:	4		

	Coef.	*Std. Err.*	*t*	*P* > | *t* |	*[0.025*	*[0.975]*
Intercept:	−0.07676	0.012	−6.339	0.000*	−0.100	0.053
Undeveloped:	0.0151	0.007	2.229	0.026*	0.002	0.028
R Cap.:	−0.0003	0.002	−0.141	0.888	−0.004	0.003
G Cap.:	−0.0083	0.013	−0.627	0.531	−0.034	0.018
Log Assets:	0.0089	0.001	6.344	0.000*	0.006	0.012

Omnibus:	1285.216	*Durbin-Watson:*	1.814
Prob(Omnibus):	0.000	*Jarque-Bera:*	1881087.133
Skew:	-13.331	*Prob(JB):*	0.00
Kurtosis:	261.598	*Prob(JB):*	36.5

Table 19: EVA Regression, Production R & G

Dep. Variable:	EVA	R^2*:*	0.060
Model:	OLS	*Adj.* R^2*:*	0.055
Method:	Least Squares	*F-statistic:*	10.64
Date:	09/05/2018	*Prob. F-statistic:*	2.34×10^{-8}
Time:	13:49:08	*Log-Likelihood:*	743.06
No. Observations:	668	*AIC:*	−1476
Df Residuals:	663	*BIC:*	−1454
Df Model:	4		

	Coef.	*Std. Err.*	*t*	*P* > | *t* |	*[0.025*	*[0.975]*
Intercept:	−0.07786	0.012	−6.448	0.000*	−0.101	0.054
Undeveloped:	0.0154	0.007	2.287	0.023*	0.002	0.029
R Pro.:	−0.0021	0.005	−0.433	0.665	−0.012	0.007
G Pro.:	−0.0072	0.008	−0.914	0.361	−0.023	0.008
Log Assets:	0.0091	0.001	6.396	0.000*	0.006	0.012

Omnibus:	1284.737	*Durbin-Watson:*	1.816
Prob(Omnibus):	0.000	*Jarque-Bera:*	1876693.675
Skew:	-13.320	*Prob(JB):*	0.00
Kurtosis:	261.295	*Prob(JB):*	33.3

When looking at the EMV regression results (see tables 20 and 21 for capacity and production respectively), we see that the results are in line with the results of the others. However, due to the results of the robustness tests indicating a few problems and the other two models painting more or less the same picture, we concluded that the results presented in the EMV regression may not be too far off, but we refrain from putting any emphasis on them.

Table 20: EMV Regression, Capacity R & G

Dep. Variable:	EMV	R^2*:*	0.023
Model:	OLS	*Adj.* R^2*:*	0.017
Method:	Least Squares	*F-statistic:*	3.901
Date:	09/05/2018	*Prob. F-statistic:*	0.00386
Time:	13:49:08	*Log-Likelihood:*	−931.57
No. Observations:	662	*AIC:*	1873
Df Residuals:	657	*BIC:*	1896
Df Model:	4		

	Coef.	*Std. Err.*	*t*	*P* > | *t* |	*[0.025*	*[0.975]*
Intercept:	−0.1255	0.156	−0.806	0.421	−0.431	0.180
Undeveloped:	0.3157	0.085	3.726	0.000*	0.149	0.482
R Cap.:	−0.0047	0.023	−0.210	0.834	−0.049	0.040
G Cap.:	−0.0946	0.169	−0.561	0.575	−0.426	0.237
Log Assets:	0.0037	0.018	0.204	0.838	−0.032	0.039

Omnibus:	1110.477	*Durbin-Watson:*	1.514
Prob(Omnibus):	0.000	*Jarque-Bera:*	434505.465
Skew:	10.463	*Prob(JB):*	0.00
Kurtosis:	126.752	*Prob(JB):*	37.2

Table 21: EMV Regression, Production R & G

Dep. Variable:	EMV	R^2*:*	0.024
Model:	OLS	*Adj.* R^2*:*	0.018
Method:	Least Squares	*F-statistic:*	4.057
Date:	09/05/2018	*Prob. F-statistic:*	0.00295
Time:	13:49:08	*Log-Likelihood:*	−931.26
No. Observations:	662	*AIC:*	1873
Df Residuals:	657	*BIC:*	1895
Df Model:	4		

	Coef.	*Std. Err.*	*t*	*P* > | *t* |	*[0.025*	*[0.975]*
Intercept:	−0.1382	0.156	−0.888	0.375	−0.444	−0.167
Undeveloped:	0.3188	0.084	3.797	0.000*	0.154	0.484
R Pro.:	−0.0194	0.060	−0.321	0.748	−0.138	0.099
G Pro.:	−0.0938	0.099	−0.945	0.345	−0.289	0.101
Log Assets:	0.0061	0.018	0.335	0.737	−0.030	0.042

Omnibus:	1109.889	*Durbin-Watson:*	1.515
Prob(Omnibus):	0.000	*Jarque-Bera:*	433530.255
Skew:	10.452	*Prob(JB):*	0.00
Kurtosis:	126.613	*Prob(JB):*	34.5

5.4 Preliminary Conclusion

In this chapter, we have described and scrutinised the results generated by the three models that we have laid out. The quantitative model showed significant evidence of increasing Regional Internationalisation during 2006-2015, and no evidence of increasing Global Internationalisation. The univariate LAD regression analysis presented a significant near 1:1 relationship between capacity and production regardless of geographical location. The multivariate OLS regression analysis offered no significant correlated between I, R and G, and ROIC, EVA or EMV in terms of both capacity and production data. Section 6 will answer each hypothesis individually and interpret the results.

6 Discussion

In the chapter, we will combine the assumptions and understanding of electricity markets with the results generated to answer the four hypotheses individually and discuss the implications hereof. Section 6.1 presents answers to each individual

hypothesis. Section 6.2 consists of a discussion of normative implications drawn from the answering of the hypotheses. Section 6.3 deals with the fundamental limitations which have not been assessed yet. Section 6.4 summarises the findings in a preliminary conclusion.

6.1 Hypotheses

The introduction of this paper explained how the electricity sector and especially the electricity generation part of the value chain has been liberalised through privatisation and deregulation (Joskow, 2008) due to shortcomings of traditional electricity systems (International Energy Agency, 2005) and towards a more classic market-based model (Wood et al., 2013). The market-based structure allows for private entities to own and operate power producing facilities and sell electricity which previously were monopolised by government and operated by government-owned utilities.

We will now go over each hypothesis individually.

6.1.1 Hypothesis 1

We have assumed that electricity producing firms hold endogenous capabilities that they have been able to deploy in markets outside of their home country. It means that the firms have perceived the benefits from increased internationalisation to exceed the liability of foreignness associated with going abroad.

The 38 international electricity producing firms of our sample have internationalised at an increasing rate between 2006-2015 in terms of their capacities and production of electricity. Moreover, if we look at the book-value of the assets (not capacities) of the 38 international firms in our sample relative to all assets of the entire population of our sample, including international and national electricity producing firms, we are able to see a trend of increasing asset held by the firms that do internationalise. It means that the total amount of assets of all firms are becoming increasingly international which provides a foundation for concluding that the aggregate industry of electricity producing firms are in total becoming more internationalised. Our theoretical framework is not able to establish an argument of causation as to whether the process of internationalisation has an increasing effect on a firm's assets, or the other way around, but we are able to establish a clear correlation between the two. This will, however, not prevent us from making conjectures about why this might be.

As we explained in the previous chapter where we laid out the results, the assets of the 38 international electricity producing companies held 6.2, 9.2, 10.7 and 11 percent of total generating capacity of ALL firms for the years 2006, 2009, 2012 and 2015 respectively. Looking at those percentages relative to other industries, it is in fact a relatively low share considering that these 38 companies are some of

the largest in the industry. It means that the global electricity generation sector is highly fragmented where firms have low market shares in a global perspective.

The argument corresponds with our previous assumption about how electricity as a commodity differs from other goods due how all regions have somewhat heterogeneous demand patterns since everybody needs electricity. In a future perspective, a fragmented market can mean that: (1) there might be a huge potential for future consolidation via mergers and acquisitions where incumbents will seek to buy out smaller electricity producers to gain more market share. (2) It could mean that the current transaction costs in the markets for electricity are low and that the efficiency level is high. Following the theoretical foundation of this thesis, it would be evidence of how the power markets have few market imperfections that firms with strong endogenous capacities can internalise (possibly through internationalisation) because the market already is as efficient as it can be; or (3) following a Coasian logic where organisations grow until they become too large to internalise contracts more efficiently than the market, it could mean that the electricity producing firms estimate that they will become less efficient than the market if they increase in size.

The results of the analysis are significant in such a way that we can reject the null-hypothesis and thus conclude that firms have become more internationalised in the period of 2006-2015. We have shown this trend in terms of weighted and un-weights capacity and production data for 38 firms and established that the aggregate level of book-value assets of the entire population of national and international firms has become more internationalised between 2006-2015.

6.1.2 Hypothesis 2

The Regional Internationalisation perspective attempts to show how the endogenous capabilities of firms are location-bound to its home-region instead of being non-location bound and practically deployable globally (Rugman & Verbeke, 2004; Rugman, 2005; Asmussen, 2009). We can conclude that the firms to a larger extent have internationalised regionally as opposed to globally. It can be related to how MNEs have perceived the inter-regional liability of foreignness, associated with going into markets outside of the home region, to be higher than the intra-regional liability of foreignness associated with going into markets inside of the home region.

Our results show that this is also the case for electricity producing firms as they to a much larger extent have owned capacity and produced electricity regionally compared to globally. It is outside of the scope of this study to analyse each individual endogenous capability in detail. However, we have established that these broadly consist of building, owning and operating power producing facilities.

The output from processing these endogenous capabilities is electricity, and as electricity is a commodity which is practically only differentiated by price (as previously established), we can reasonably argue on the basis of the shift towards

Regional Internationalisation that the electricity producing firms of our sample are able to make better use of their endogenous capabilities in their home-region to ultimately produce electricity at a lower price relative to competitors. On a more practical level these endogenous capabilities could be within contract negotiations of power delivery agreements if for example a firm is very experienced in executing mediate arrangements but are forced to engage in bilateral arrange in new markets.

The results generated from the analysis of this study breaks with the assumption from the Global Internationalisation perspective that firms have no predetermined geographical preferences and, on the average, are internationalising globally and not regionally (Govindarajan & Gupta, 2001; Yip, 2001; Van Agtmael, 2007; Dunning et al., 2007; Dunning & Lundan, 2008). In the case of electricity producing firms, the internationalisation patterns support the theoretical rationale of a geographically predetermined liability of foreignness which is higher in regions outside of firms' home-regions (Rugman & Verbeke, 2004; Rugman, 2005; Asmussen, 2009).

It means that the endogenous capabilities the firms can use to internationalise are location-bound for electricity producing firms as it cannot exceed the inter-regional liability of foreignness. The findings contradict the proposition of how it is mainly exogenous factors (e.g. economic and political forces and events) that determine MNE strategy (Dunning et al., 2007, p. 185) since such events per definition occur independently of geographical borders.

The results of the analysis are significant in such a way that we reject the null-hypothesis and this are able to conclude that electricity producing firms have become more regionally internationalised between 2006-2015. We have shown this trend in terms of weighted and unweighed capacity and production data for 38 firms and established that their endogenous capabilities are location-bound instead of non-location bound.

6.1.3 Hypothesis 3

The inclusion of both capacity and production data yields important insights into to the relationship between the strategic choice of where to produce electricity and electricity produced. If we use the Regional Internationalisation perspective, we can assume that electricity producing firms will be better at utilising their capacities in a regional context compared to a global context. We have operationalised the utilisation as a proxy for the operational performance of the firm.

The univariate LAD regression analysis found that firms internationalise evenly with respect to upstream and downstream activity since the relationship between capacity (assets) and production (sales) are 1:1. It means that the firms who have pursued Regional Internationalisation strategies have not experienced superior operational performance than those who have pursued Global Internationalisation strategies during 2006-2015.

The results to hypothesis two confirmed that the firms have internationalised

regionally and not globally which supported the Regional Internationalisation perspective and stood in opposition to the Global Internationalisation perspective. However, the Regional Internationalisation perspective is based on an economic ontology of rational actors which means that firms make location decisions based on what improves performance. The findings of this study therefore contradict the Regional Internationalisation perspective as we have been able to show that the linkage between strategy and performance cannot be found in terms of operational performance for electricity producing firms between 2006-2015.

As described earlier, electricity producing firms can sell electricity through bilateral and mediated arrangements, where mediated arrangements, such as exchanges or pools where supply and demand mechanisms prevail, are the most used approach to buy and sell electricity in developed countries (Menanteau, Finon, & Lamy, 2003, p. 802). The competitive nature of exchanges and pools creates a natural equilibrium price and quantity sold. Suppliers can then either accept the current market price or face the prospect of not selling anything at all. It is simply a marketplace for a commodity which in this case is electricity. If we take that fact into consideration, our analysis has established that electricity producing firms have internationalised by building, owning and operating power producing facilities in a given area, and furthermore been able to convert these capacities into production of electricity regardless of whether it has been located nationally, home-regionally, or globally.

Finally, we have not been able to reject the null hypothesis as the operational performance is unaffected by internationalisation strategy. It breaks with the Regional Internationalisation perspective as regional strategies have not transformed into superior operational performance. However, operational performance is only one side of the full assessment of performance of the firm. It does not consider monetary aspects in the same way that financial performance analysis does.

6.1.4 Hypothesis 4

The relationship between internationalisation and performance has, in the literature, yielded diverging results including strictly monotonic positive and negative relationships, as well as U-shaped and S-shaped or insignificant correlations (Hennart, 2007, p. 424). This thesis has found no statistically significant relationship between Regional Internationalisation and superior financial performance.

The reason for the inconclusive results can be due to several reasons which we will go over here. It could be that no correlation exists and we must accept the null-hypothesis. However, other reasons can have affected the inconclusive results. First of all, the dataset that we have complied consists of 38 electricity producing multinationals that have electricity producing capacities and electricity production in markets outside of their own national markets, and 145 that only are situated in their national market. This may no be enough data to establish a strong relationship. The potential insufficiency of data could not be overcome,

and the only solution would be to either collect more data, which was not possible unless companies provided it directly, or generate a more accurate measurement system which leads us to the next explanation.

Taken into consideration that the multi- and electricity utilities that make up the sample of firms is huge organisations with multiple business lines in multiple industries.It practically means that electricity generation might only make up a specific percentage of the total revenues and costs of the firm, which ultimately makes the holistic financial assessment of firms' entire financials too un-specific. It could be that the power business unit in a company is performing extremely well, whilst its retailing business line is losing money. That critical divergence would not show in our analysis which creates inaccuracies and potential pitfalls. A natural solution would be to not include the financials of the entire company, but only the power business line performance. However, such an approach would remove the possibility of automating the quantitative exercise of using the comprehensive and very accurate database from Compustat leaving us to acquire the financial figures ourselves; (4) Another reason for the inconclusive results can be poor balance between the theory and measurement tools. Other have identified weak theoretical frameworks because of overemphasis on practical methodical measurement tools as the main reason to contradictory findings (Verbeke, Li, & Goerzen, 2009, p. 150).

We have identified two factors which may complicate the connection between theory and measurement tools for assessing financial performance: (a) the body of the theoretical framework of this paper understands endogenous capabilities of the firm to be a fixed constant the firms can hold and utilise. Put differently, it does not evolve over time or become more of less useful to the firm. The Learning approach, as explained in the literature review, looks at how the utilisation of a firm's endogenous capabilities rests on a learning process of incremental adjustments to context-specific and non-static conditions of the firm and its environment(Johanson & Vahlne, 1977, p. 26).

Successful MNEs are herein not determined by the extent to which they deploy capabilities to exploit market imperfections or internalise operations across borders for efficiency purposes, but through accumulation of foreign experiences to overcome the cultural barriers of entering a foreign country (Barkema et al., 1996, p. 151). The measurement tools for financial performance in this paper do not consider that the process of internationalisation might be a learning process which spans over a significant amount of time; (b) and from a more practical point of view, many of the investments that these companies make can quite easily be categorised as long-term investments as a power plant can produce power in a great deal of years all the way from 10 to 50 years depending on technology and ambition to upgrade technology. Given the fact that the liberalisation process in power markets is fairly new, and that the investments are long-term, the nine-year time frame that this study uses might not be long enough to truly capture the full financial gains that these firms generate over such a long period of time.

If we again assume that our results of no correlation between Regional Internationalisation and financial performance hold true and look at the results in the perspective of the results generated from hypothesis three, which showed no correlation between Regional Internationalisation in capacities and final production of electricity. We can then propose that the theoretical rationale of Regional Internationalisation leading to improved performance might not be the case for electricity producing firms both in terms of operational performance and financial performance.

To put it differently, the firms might have Regional Internationalisation preferences due to their perceptions about future benefits from internationalisation and the liability of foreignness, but these strategic preferences have not yet materialised into superior performance in any way according to the analysis performed in this study. The findings open the question of the relevance of the theoretical rationale regarding how internationalisation automatically leads to improved performance for the firm. We will discuss this further in section 6.2.2 which includes a critical evaluation of the positive-normative dichotomy in IB in the perspective of these findings. Ultimately, we have not been able to reject the null hypothesis as we have found no relationship between Regional Internationalisation and superior financial performance for electricity producing firms during 2006-2015.

6.2 Normative Discussion

Having just analysed the data and answered our hypotheses via a strict methodical approach, we will broaden out the discussion to include more general concepts and discuss normative implications which our results enable us to consider; (1) Internationalisation; (2) internationalisation-performance relationship; (3) globalisation; and (4) Policy implication.

6.2.1 Internationalisation

The previous chapter confirmed that electricity producing multinational have internationalised during the period of 2006-2015. We furthermore showed that these firms have internationalised regionally before globally leading to a confirmation of the second hypothesis.

Does 'perfect internationalisation' exist? The models that we have used to analyse the data has produced great results in terms of determining these patterns of geographical diversification. However, it does not shed light on whether the there is a perfect level of internationalisation or if there is an 'end-stage' that firms can strive towards. The theoretical apparatus in this paper lays out how MNEs pursue regional strategies because the inter-regional liability of foreignness is too high, or put differently, the benefits of Global Internationalisation does not seem to overcome the inter-regional liability of foreignness. The assumption is based on empirical analysis where especially (Rugman & Verbeke, 2004) argue

that the internationalisation patterns must mean that the benefits does not exceed the cost of being global.

What is not considered is if there even is a perfect level of internationalisation. It we consider the model used in this study, we adjust the 'R' and 'G' scores to home-country, home-region and global capacity and production data. Hence, the perfect level of internationalisation is in fact individual to each firm and not generalizable. The only thing that we can argue based on this study is how the average patterns of internationalisation are changing while acknowledging that an individual firm could not use the average as a guide to whether it should pursue a regional or global strategy. An intuitive example is of how firms in saturated home-country and home-region markets would be more inclined to pursue a global strategy to gain access to new streams of revenue or decrease their cost-base, whereas firms in markets that experience electricity demand growth will be less inclined to seek new markets because they are already preoccupied with satisfying their home market and are therefore not that concerned about decreasing cost.

The only type of firm that could have a perfect level of internationalisation would be a firm without any home-country. Such as firm would (in theory) face a perfectly even amount of liability of foreignness across all markets as it is neutral towards political, economic, legal and market differences across the globe. That firm would be perfectly situated globally under the assumption that it would be able to disperse itself immediately. Contrary, we would suspect that such as firm would internationalise globally incrementally and automatically be affected by its environment and thereby be subject to increased amount of liability of foreignness in other markets. Moreover, such as firm would not have any endogenous capabilities as we assume that these are developed in the home-country of the firm. Ultimately, we must assume that there is no average perfect level of internationalisation for the industry as a whole and thereby neither any end-stage in terms of the future.

6.2.2 Internationalisation-Performance Relationship

An essential part of this study is to make the connection between assessing the regional and Global Internationalisation scores of the firms in our sample, and correlate with their operational and financial performance. We theorise that there is a correlation between Regional Internationalisation and superior performance in so far as the firm has the endogenous capacities to overcome the liability of foreignness. However, this study has failed to show statistical significant results hereto. The performance analysis did not show any significant result of the R-score and G-score as predictors of performance, which ultimately led us to concluded that we cannot reject the null hypothesis. This discussion will assume that the lack of correlation in fact reflects reality and discuss implications hereof.

What we first need to consider is the extent to which the assumption about the relationship between internationalisation and performance are appropriate. If we

look at the hard core of this study, we established a reconciliation between TCE theory stipulating that firms internalise markets to decrease cost and gain superior profits (Coase, 1937), and organisational theory that recognises that firms face bounded rationality due to contextual contingencies (Simon, 1979) to ultimately assume an ontology of neo-classical market structure of monopolistic competition and market imperfection, and rational actors operating under imperfect information (Devinney et al., 2013).

The causality of internationalisation leading to improved performance therefore lies on the market logic of rational choice found in the TCE theory even as we have altered the assumption about market structure. TCE theory has, however, been criticised for in fact being a normative theory and not a positive one. Ghoshal and Moran have argued that all positive theories of social science (including TCE theory) is also normative theories as the assumption about opportunistic behaviour through internalisation and hierarchy-building rests on imperfect information about the benefits of such behaviour (Ghoshal & Moran, 1996, p. 15). It means that the opportunistic behaviour of seeking to internalise and thereby decrease transaction cost only result in larger internal hierarchies and not necessarily a decrease in cost.

Geyskens et. al. has similarly argued that TCE have normative features as managers make strategic decisions to align the organisation to with TCE principles which should turn into improved performance compared to those who do not (Geyskens, Steenkamp, & Kumar, 2006, p. 523). It is particularly the distinction between what is and what ought to be that we find interesting.

The findings from this study does not support the economics rationale of internalisation leading to superior performance (Coase, 1938) or that Regional Internationalisation should yield superior performance compared to Global Internationalisation due to higher inter-regional than intra-regional liability of foreignness (Rugman & Verbeke, 2004; Asmussen, 2009; Verbeke & Asmussen, 2016). It places this thesis in opposition to the Regional Internationalisation perspective. These studies do not specifically investigate performance. However, the entire perspective rest on an ontological assumption about how rational actors (the firms) based their decisions of internationalisation on how to maximise profits which ultimately mean that since they advocate Regional Internationalisation, they implicitly argue that it leads to improved performance. Even as this thesis finds significant evidence of Regional Internationalisation, it finds not evidence of how such as strategies will lead to improved performance.

We argue that a reason for this finding (or lack of finding) means that the deduction between the internationalisation and performance is in fact normative instead of strictly positive in a methodological sense. If we follow that assumption for now and to understand how that might be the case, we can look at the decision-making in a firm in terms of both fact-based and value-based decisions. Simon (Simon, 1979) argues that all decisions are comprised of fasts and values.

The value-based decisions then only have imperative value to whom which it is derived from and has ethical significance. And as facts cannot be derived from ethical statements we might argue that the missing correlation between internationalisation and performance is due to how the correlation is value-based (or normative) and concern what 'ought to be' and not fact-based (or positive) and concern 'what is'.

We do, however, acknowledge that the findings from our study cannot completely falsify the hard core of theoretical assumption that characterise the field of economics and IB. As Lakatos noted in his critique of Popper, other factors might have been influential. Nonetheless, we can falsify that the link between Regional Internationalisation and improved operational and financial performance does not appear to exist.

Following this logic would mean that the scope of this study in reduced to how electricity producing firms have not been able to utilise their endogenous capabilities to the extent that they have overcome the liability of foreignness, or that managers choosing internationalisation strategies have not been able to adequate estimate the benefits and cost associated with internationalisation.

Recognising that managers makes value-based decisions opens for many reasons for why firms would internationalise and not achieve improved performance. Corporate finance as an academic discipline has theorised extensively as to the agency problems related to management of a firm. Top management are officially employed to maximise shareholders value but tend to practice management styles that ultimately maximise the managers value (Jensen & Meckling, 1976, p. 338).

Managers might choose to build and own a power plant in a region outside of its home-region because the potential payoff is much higher than in the home-region even if the risk of building the facility is much higher than the reward. Another example is how manager tend to prefer to manage large and international businesses instead of small and local. A decision to internationalise would then not be fact-based in terms of the benefits and cost associated with the decision but be value-based to the manager alone.

The evaluation of the non-existing correlation between internationalisation and performance of electricity producing companies can possibly be due to how the theoretical assumptions rely on normative assumptions which is difficult to generalise beyond the sample that we have analysed.

6.2.3 Towards an MNE-Driven (Semi) Globalisation

This study does not in any way provide empirical evidence of the influence that electricity producing MNEs may or may not have on global institutions, national-State or society in general. However, we have empirically shown the internationalisation patterns of these MNEs in terms of their geographical presence and we are therefore able to consider how our results can add value to that area of research.

Academia has theorised a great deal on the relationship between for example

nation-States and MNE. Some have argued that as MNEs grow and expand their scale and scope, they can become political actors of their own and influence political processes and decisions (Hymer, 1960; Raymond, 1971; Buckley & Casson, 1976; Hertz, 2002). This perspective defines the State-MNE relationship as equal in practice where each part seeks to exercise its influence in political, economic and societal aspects. Others have limited the power of MNE to an economic spectrum and described them as key agents of economic globalisation (Dunning, 1988; Eden & Lenway, 2001; Rugman, 2000, 2005; Dunning & Lundan, 2008).

These assess the relationship between a nation-State and an MNE is a principal-agent relationship where States are the actors of the political order while firms are agents within the world economy. Dunning considers globalisation from a macro perspective as he describes it as a process towards the deepening of economic interdependence between institutions and countries (John, 2000, p. 21). Rugman is more firm-focused as he understands globalisation as the activities of MNEs engaged in FDI and the development of business networks to create value across borders (Rugman, 2000, p. 4).

Having now established a working definition of globalisation, we can consider it in the context of the results this thesis has produced. Three points are relevant hereto: (1) Internationalisation of electricity producing firms increases. We are then able to confirm that these firms increase the geographical presence in new and foreign locations and add to the deepening of economic interdependence through international business networks; and (2) internationalisation of electricity producing firms to a larger extent is regional than global. This final point aligns with the proposition of Rugman who basically argues that globalisation is a myth as almost all MNEs internationalise regionally and not globally (Rugman, 2005).

We have here been able to show how the results of this thesis have added value to the debate regarding role of MNEs in the context of globalisation, of how these actors drive globalisation. We have argued that electricity producing firms internationalise regionally, and hence adds to regional economic interdependence through business networks (or semi-globalisation). Future research could investigate the relationship between electricity producing multinationals and sovereign nation-State to establish insights to the relationship between the two, and how it affects the institutional framework in a particular country or region.

6.2.4 Policy Implications

The analysis in the former chapter established that electricity producing firms based in developing countries have internationalised less than firms based in developed countries. We were able to confirm our hypothesis as theoretical framework depicted that firms generate endogenous capabilities in their home-market, and as firms based in developing countries have less sophisticated home markets, they will have less opportunity to develop strong endogenous capabilities to overcome the liability of foreignness associated with going abroad. Moreover, only six elec-

tricity producing multinationals of our sample were from developing countries n as opposed to 32 electricity producing multinationals from developed countries. A more intuitive approach to explain this phenomenon is that the liberalisation process in developing countries is not as far along it is in developed country. Taking this into account would possibly explain the why we see so few and why the ones we do see to be less internationalised than their peers from developed countries.

What is interesting to consider is whether a policy objective of increasing liberalisation in energy markets in developing countries would be advantageous or not. We first need to establish that since we have done no analysis in terms of the different stages of liberalisation in the countries in question, we have little basis to make contextual propositions as to which policies they should pursue individually. However, if we assume that liberalisation of energy markets lays a foundation for internationalisation of electricity producing firms, and that developed countries are further along the liberalisation process than developing countries are, we can consider the timing of liberalisation for developing countries.

From the perspective of the electricity producing firms in developing countries, we can see that the top-ten largest companies of our sample measured by total assets consist of seven Europeans, two Americans and one Chinese. Or put differently, nine companies based in developed countries and one company based in a developing country. It is possible that the large power producers have become so large because they were able to grow while being monopolies, and then more easily internationalised when markets opened because of their size advantage developed in their home-market.

An alternative proposition reveals itself if we remove the assumption about how endogenous capabilities are made in the home-market. The learning approach stipulates how the process of internationalisation is based on a learning process of incremental adjustments to its environment over time (Johanson & Vahlne, 1977, p. 26). Under that assumption, a firm originally based in a developing country would benefit greatly from being able to internationalise because it could develop its endogenous capabilities where ever it goes.

From a state point of view, the question is then whether developing countries in general should seek to liberalise and allow for international competition or keep a traditional government-owned monopoly structure. Two opposing views exist on such as problem: (1) the mercantillistic view; and (2) the liberalist view. To a mercantilist, nascent markets need to be protected from foreign competition until it is able to compete with firms from more developed markets (O'Brien & Williams, 2013, p. 10). Such protectionist measures ensure that the institutional framework that facilitates the development and growth of industries progress naturally and is not disrupted by foreigners (Chang 2002: 5). To a liberalist, opening of markets for international competition serves a universal good as all states and industries will have a comparative advantage (O'Brien & Williams, 2013, p. 13). It is impossible to say whether the electricity producing companies would benefit from competition

in their home-market and thereby develop stronger endogenous capabilities, or they would be outcompeted by foreign firms with strong endogenous capabilities. To assess this, we would need to analyse the maturity of the energy markets of the individual developing countries to evaluate whether they would be ready for competition.

6.3 Limitations of Study

As we have described and discussed the results of the study, we find it relevant to discuss limitations. Each individual section throughout this thesis has, in its own, dealt with specific limitations that have been relevant to explain in that specific context. This section will instead focus on the fundamental limitations of the study which we have not touched upon yet.

6.3.1 Assuming Liberalisation

One of the fundamental assumption of this study is with respect to the understanding of liberalisation of energy markets. The introduction explains how it is the liberalisation process consisting of privatisation and deregulation that has enabled firms to own electricity producing assets and expand their operations into markets outside of their home. However, this assumption is not integrated into the methodical research program in the sense that we distinguish quantitatively between the varying levels of progress in the liberalisation process between the regions or countries. The assumption of increasing liberalisation is based on a qualitative assessment which we deem adequate as a basis for studying the internationalisation patterns of electricity producing firms. We have elaborated and shown tangible cases of increased liberalisation in electricity markets (see appendix A).

The model that we use to establish internationalisation preferences does in fact assume that all regions are equally easy (or difficult) to penetrate. If a firm does enter a market, we assume that it based on estimates of benefits from internationalisation and liability of foreignness. Ideally, we would have used a quantitative indicator of liberalisation in the electricity sector, in terms of privatisation of utilities, IPP business models, and general openness for foreign firms, to measure levels of each country to control for the potential of penetration in each region. Such an indicator has unfortunately not available and we simply regarded the tasks too extensive to do ourselves and potentially a master thesis subject of its own.

As a matter in fact, we have never encountered a study in the IB literature that has controlled for the ease of market penetration across geographical areas with respect to legislative frameworks. It means that even if the assumption might not fully reflect reality, it is generally not taken into consideration when performing

these types of geographical diversification studies. On the other hand, most other sectors are completely open for foreign firms compared to the electricity sector.

6.3.2 Assuming Endogenous Capabilities and Exogenous Factors

Section 2.1 explains rigorously how endogenous capabilities and exogenous factors are two types of variables that determine whether an MNE should internationalise or not. We use the theoretical rationale throughout the thesis to justify why firms internationalise and as we describe the market specific but general market conditions in electricity market in the introduction, we use these concepts when answering the hypotheses to make inference about what our results mean in the industry context. Specifically, we refer to the difference between building and owning, and the difference between bilateral and mediated arrangements. However, as this study is quantitative of nature and does not analyse each individual firm to figure what the specific endogenous capacities are, we must acknowledge that we do not know. This becomes a limitation since the business models that electricity producing firms can use can vary depending on the deal. For example, we state that the endogenous capabilities lie within building and owning power producing facilities, but we only measure the capacities owned on a consolidated basis. More practically, a firm could potentially buy already built capacities to operate the facility and produce electricity and we would not know the difference.

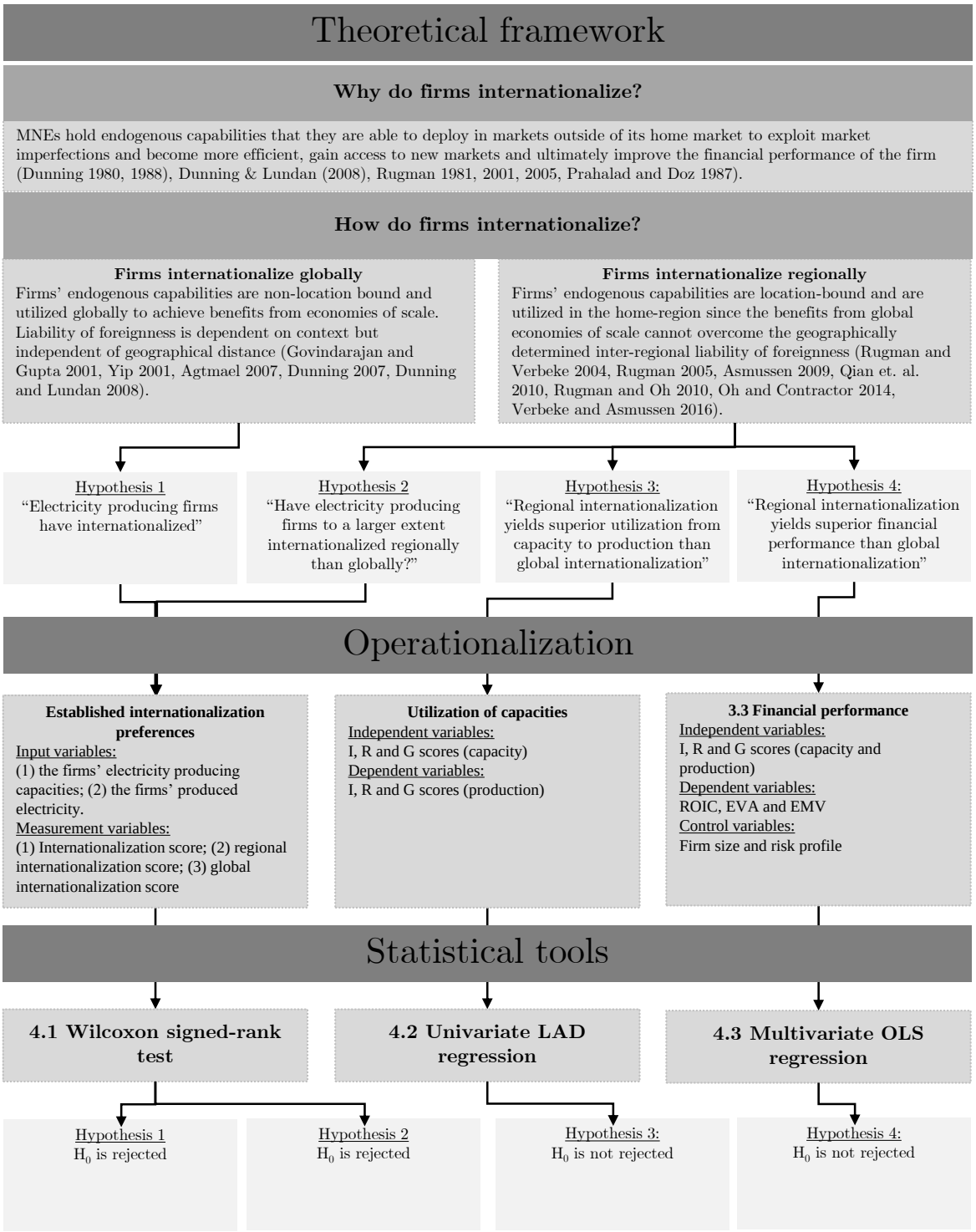
In that perspective, we cannot make suggestions as to whether the endogenous capabilities that firms take across borders are within building or operating power facilities. It also means that this study cannot make arguments in terms of what the 'right' endogenous capacities are, or which exogenous factors affect firms in certain ways. We are only able to describe how the firms altogether looks like. That is not to say that the industry is the unit of analysis oppose to the firm since we do use firm-data on a micro level to analyse the firms, and not industry-based FDI data.

6.4 Preliminary Conclusion

In the chapter, we have combined the assumptions and understanding of electricity markets with the results generated to answer the four hypotheses individually and discuss the implications hereof. We have been able to reject the null hypotheses in hypothesis one and two, as electricity producing firms have internationalised regionally and not globally during 2006-2015. However, we have not been able to find a correlation between Regional Internationalisation and improved operational or financial performance as otherwise described in the literature. It let us to discuss whether perfect internationalisation even exist, and if the causal relationship between internationalisation and performance is a normative assumption considering what ought to be instead of a positive assumption of what is.

For a full overview of the thesis including results consult figure 12.

Figure 12: Thesis Structure & Result



7 Conclusion

This chapter brings together all the essential findings of this study to draw final conclusions. Section 7.1 presents the final answer to the defined research question based on the results and discussions. Section 7.2 offers a final reflection on the implications of the study of how it has added value altogether.

7.1 Answering the Research Question

The liberalisation of power markets has allowed electricity producing firms to pursue internationalisation strategies based on penetrating foreign markets outside of their national market in the pursuit of improved operational and financial performance. This thesis began by asking:

> *"Have electricity producing firms internationalised regionally or globally during 2006-2015, and to what degree has Regional Internationalisation yielded superior performance of the firm?"*

Quantitative analysis of internationalisation has enabled us to establish that electricity producing firms have increased their regional electricity producing assets (or capacity) and electricity production related to building, owning and operating electricity producing facilities during 2006-2015. The same relationship was not significant in a global perspective. These findings let us to conclude that firms have internationalised increasingly during 2006-2015 and have widely done so regionally as opposed to globally globally.

The findings support the Regional Internationalisation perspective which stipulates that firms internationalise regionally instead of globally due to more extensive inter-regional liability of foreignness than intra-regional liability of foreignness (Rugman & Verbeke, 2004; Asmussen, 2009; Verbeke & Asmussen, 2016).

The statistically significant relationship has enabled us to answer the first part of the research question by concluding that electricity producing firms have internationalised regionally during 2006-2015.

To assess the relationship between operational performance and Regional Internationalisation, a univariate least absolute deviation regression analysis was used to model the firm's electricity producing capacity as a predictor of electricity produced. We found a statistically significant near 1:1 relationship between capacity and electricity produced regardless of geographical location. It led us to conclude that regionally located capacity has not yielded superior operational performance compared to globally located capacity for electricity producing firms during 2006-2015.

Regarding a relationship between financial performance and Regional Internationalisation, a multivariate OLS regression analysis tested the relationship between internationalisation preferences and financial performance. We found no

statistical significant correlation between the two as the financial performance metrics was unaffected by internationalisation preferences. It led to the conclusion that regionally located capacity has not yielded superior financial performance compared to globally located capacity for electricity producing firms during 2006-2015.

As we have established that electricity producing firms have internationalised regionally while simultaneously concluded that no relationship between internationalisation and performance exists, we can reject the causal relationship between Regional Internationalisation and superior performance in the case of electricity producing firms during 2006-2015.

The paradoxical finding led us to discuss the internationalisation-performance relationship to conclude that the causal correlation between Regional Internationalisation and improved performance possibly is based on a normative reasoning in terms of 'what ought to be' instead of a positive understanding of 'what is'.

7.2 Future Research Implications

This thesis performs an industry-specific analysis of the electricity sector. The focus paved the way for using customised indicators to measure the theoretically established relationships between variables. Specifically, we used the capacities and electricity production of the firms to establish their internationalisation preferences instead of using a generic measure of foreign sales (Rugman & Verbeke, 2004). Moreover, we have found other areas where this study can possibly spur new research.

7.2.1 Introducing Renewables Into the Energy Mix

This study does not distinguish in any way between traditional and sustainable electricity generation. Producing electricity via traditional power plants includes burning fossil fuels such as oil, coal or natural gas, whereas sustainable electricity production is based on renewable energy sources such as the sun or wind. Nonetheless, energy is one of the most discussed subjects by global institutions, nation-states and citisens. The former UN General Secretary, Ban Ki-moon were in 2012 were clear in the importance of energy and its future role:

> *"Energy is the golden thread that connects economic growth, social equity, and environmental sustainability (...) We must find a way to end energy poverty. And with climate change as a growing menace to all, we must also rethink conventional energy solutions. We can no longer burn our way to prosperity" (Ban Ki-moon, 2012).*

It has moreover been specifically framed as one of the 17 Sustainable Development Goals (Goal 7: Affordable and Clean Energy) set by the UN through the

2030 Sustainable Agenda which seek to establish a collaborative approach of partnerships where tasks and responsibilities is allocated between nation-States, global institutions and non-State actors (General Assembly, Resolution 70/1, para. 39, 2015). The fall of the Soviet Union and Communism in Eastern Europe, and advance and recognition of neo-liberalism as the dominant ideology, has launched a period of less state intervention, deregulation and privatisation (Martens, 2007, p. 11) where profit-seeking private-sector actors has been invited to take an active role as an instrumental driving force of implementation to reach the Sustainable Development Goals (SDG).

This study does not in any why contribute to increasing the understanding of what private-sector actors in global policy implementation is all about. However, understanding how political trends shape the 'rules of the game' for business and how firms deal with external changes is not so far from our area of research. Future research should seek to methodically distinguish between sustainable and traditional capacities and production for electricity producing firms. Retrieving such distinction in the data would enable researchers to study the extent to which electricity producing firms internationalise by offering traditional power plants or sustainable energy solutions based on renewable input. As technology used for traditional power plants are very mature and price differentials are small, competitors will have a very hard time distinguishing themselves from each other in terms of what they offer to the market. With in sustainable power generation, the technological advances in for example photovoltaic solar cells or wind turbines are radically changing the possibilities in terms of energy solutions and price of electricity. We inductively and cautiously hypothesise that firms to a much larger extent internationalise by offering sustainable energy solutions to foreign markets than traditional power plants.

As we have mentioned, we have established the capacity and production data of individual firms on a consolidated ownership basis. It means that if a firm owns 50% of a 100 MW power plant, its consolidated share of ownership is 50 MW. Future research could investigate whether electricity producing firms internationalise via full ownership or part-ownership. It could contribute by establishing the business models that these firms aim to utilise in a global context.

Moreover, distinguishing between traditional and sustainable capacity and production of the firms, and comparing with their usage of full ownership and part ownership, would enable future research to establish which of the two business models are used with respect to the input for electricity production. We inductively and cautiously hypothesise that firms use part ownership business models abroad in sustainable energy solutions due to increased risk from technological application and liability of foreignness.

The methodical approach of including data on sustainable electricity capacity and production would add to the research area in terms of the business models used by electricity producing firms, and for policy makers who seek information

about how the private sector assist in the global implementation of more energy production based on renewable sources.

7.2.2 Industry-Specific Studies about MNE's and Internationalisation

This study has distanced itself from using generic indicators such as total sales (Rugman & Verbeke, 2004) to measure internationalisation and GDP to normalise firms' sales distributions (Asmussen, 2009) in cross-sectional studies. This thesis investigates a specific industry which allows for new and innovative measurement tools. We have chosen to use firms' electricity producing capacities (MW) and producing electricity (MWh), and furthermore weight for national, regional and global capacity and production data to normalise the sensitivity to the size of the different markets.

We recommend future research to develop industry-specific metrics to analyse internationalisation and performance of MNEs in an industry context. Another new approach could be to use CO2 emissions as an dependent variable to assess the internationalisation of companies in a foreign market in terms of how much emission they put out. It would shed light on the presence of MNEs and how they strategically deal with emissions. Based on the theoretical framework of this study, we would suspect MNEs to location themselves in least-cost locations in terms of emissions. Without studying the data, we could intuitively imagine that large MNEs would place their emissions producing assets (e.g. factories) in developing countries where the legislation in terms of emissions is less strict than in developed countries.

Appendices

A Liberalisation of Electricity Markets

This appendix serves as an elaboration of the liberalisation process of electricity markets, and as a justification of the assumption that we make related to opportunities that electricity producing firms have in terms of internationalisation. We argue qualitatively that the process of increased liberalisation has made our study relevant since we need to investigate the internationalisation patterns of the MNEs to understand how these organisations behave in more competitive market structures. Moreover, the methodical approach utilised in this study does not in any way control for the potential constraint that some regions may face relative to others. The distribution of the internationalisation preferences of the firms in our sample does show that all regions have capacities owned by firms based in another region which must mean that it is possibly to internationalise into all regions if some firms found it desirable to do so. However, we imagine that some countries

in regions where the ratio of developing countries is high still have non-liberalised markets which eradicated the potential for firms to internationalise into those markets.

We have learned that a comprehensive analysis showing which countries have liberalised, and which have not, is a very difficult task since no electricity systems are completely comparable and all have individual compositions and attributes (Bacon & Besant-Jones, 2001, p. 2) (Zhang, Parker, & Kirkpatrick, 2008, p. 161). Nonetheless, we will herein seek to descriptively and objectively show representative cases of liberalisation of various electricity markets to showcase that our assumption is acceptable in practice even as it might be questionable scientifically.

Liberalisation - How & Why

As we have mentioned persistently, all processes for liberalisation of power markets has varied greatly to reflect the local circumstances. However, the reform programmes adopted has tended to feature three elements: (1) unbundling of incumbent monopoly utilities to introduce competition by separating generation, transmission, distribution and retail into individual units; (2) privatisation of the separating and individual units through sales of state assets; (3) implementation of new regulatory framework to remove direct regulation by government to regulation by independent (or quasi-independent) bodies. Most modern power systems have largely been built around these three characteristics (Zhang et al., 2008, p. 161). The grounds for deregulation primarily rests on in-efficient power production and political preferences (Kopsakangas-Savolainen & Svento, 2012, p. 9).

Very few studies have sought to construct a cross-country overview of which countries have liberalised and the extent to which these have. Bacon and Besant-Jones (2001) investigated the progress of privatisation and liberalisation of global power sectors. The results are shown in table 22.

Table 22: Countries Achieving Substantial Liberalisation by 1998

Region	**Substantial Liberalisation**	**Liberalisation planned/under way**	**No Liberalisation**
Western Europe	5	12	2
Central & Eastern Europe	4	8	15
Africa/Middle East	0	17	46
Asia/Oceania	2	12	13
South America	4	3	5
North America	0	3	0
Total	15	55	81

As seen in (Bacon & Besant-Jones, 2001, p. 9)

The results show how relatively few have undergone substantial reform while many are currently on their way towards more liberalised markets. As such, these results shed relatively little light on the privatisation or opening of markets for foreign companies. However, it provides evidence that as far back as in 1998, many countries were working towards more liberalisation.

Another cross-country study has estimated the level of liberalisation in electricity markets. Erdogdu (Erdogdu, 2013) explored why some countries are better at implementing energy reform than others and found that institutions are a very important factor. He used a dataset consisting of 53 countries [13] and found that the countries altogether averaged 5.48 reforms dedicated to electricity market liberalisation from a range between 1 and 8 reforms with a Std. Dev. Of 2.24 (Erdogdu, 2013, p. 243). The study includes few countries that we would consider developing according to UN methodology, and many developed. Nonetheless, it provides a snapshot of how many countries had implemented liberalising electricity market reforms by 2013. The next section will show qualitative liberalisation cases.

Liberalisation in European Electricity Markets

Until the beginning of the 1990s, many European countries did not find liberali-

[13] Albania, Argentina, Armenia, Australia, Austria, Bangladesh, Belgium, Bosnia and Herzegovina, Brazil, Bulgaria, Cambodia, Canada, China, Colombia, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, India, Ireland, Italy, Jamaica, Kenya, Latvia, Lithuania, Luxembourg, Macedonia, Malaysia, Mexico, Netherlands, New Zealand, Nigeria, Norway, Pakistan, Philippines, Poland, Portugal, Romania, Russia, Serbia, Singapore, South Africa, Spain, Thailand, Turkey, Uganda, United Kingdom and United States of America.

sation in electricity markets to be an appropriate solution (Heddenhausen, 2007, p. 5). It was not until during the time of Margaret Thacther's first government, considerable emphasis was placed on how the deeply monopolised energy industries was in need of market forces (Robinson 1992: 113). Privatisation was a major driver for liberalisation in the UK, and the first political ambition to privatise the electricity industry was announced at a Conservative Party's election fest in May 1987 and included a privatisation plan for England and Wales (Robinson, 1992, p. 118).

The Electricity Generating Board was split up and divided into one transmission company (National Grid Company) and three power generators (National Power, PowerGen and Nuclear Electric (International Energy Agency, 2005, p. 171). The first 60% of National Power and PowerGen was sold off in 1991, and the reminders in 1995 when also IPPs could enter the generation part of the electricity sector (International Energy Agency, 2005, p. 172). In 2010, electricity generation in the UK is spread out among many producers (more than 15) including the national SSE and RWE but also the German E-ON and the French EDF (International Energy Agency, 2012, p. 123).

In 1993, the Norwegian-based Nordic power exchange was established as an independent company which sought to establish price quotations on the world's first exchange that traded electricity (International Energy Agency, 2005, p. 171). It later became known as Nord Pool and included Norway, Sweden and Finland. Denmark entered the Nord Pool in 2002 as a co-owner, and Estonia entered in 2010. Nord Pool was a fully voluntary exchange as bilateral agreements outside of the exchange is allowed as well (Kopsakangas-Savolainen & Svento, 2012, p. 11). The German electricity sector saw extensive divestitures of public utilities during the mid-1990s. The liberalisation in the generation part of the value chain has spurred mergers which have concentrated the market for generation and also France announced in 2002 that it would undergo a privatisation of EDF (Heddenhausen, 2007, p. 18).

Besides the national objectives to liberalise, the European Union has seen it in its interest to liberalisation gas and electricity markets as part of creating EU's internal market. The first electricity directive was introduced in 1996 and sought to introducing tendering processes and IPPs (Chapter 3, Directive 6/92/EC of the European Parliament and the Council). A send directive in 2003 and a third in 2009 continued the liberalisation trend as they sought to establish guidelines for market opening and third party access in electricity generation for all member states (Štreimikienė, 2013).

Liberalisation in North American Electricity Markets

It is difficult to say anything fully covering when it comes to the US, as each state can independently determine how to structure their electricity sector. Some pursue a great deal of liberalisation, and some do not. What is common for all

US states is how they have opened the wholesale market completely to incentivise private investment and are by most regarded as the investor of the inventor of the investor-owned utility model where the power producing utilities are privatised (Bacon & Besant-Jones, 2001, p. 5). Besides generation, most states have kept transmission and distribution deeply regulated and most have liberalise retail as well (Erdogdu, 2013, p. 249).

Liberalisation in Developing Countries

The liberalisation process in South America is not as structured as seen in the European Union. However, Chile was in fact the first country to liberalise its electricity sector. The liberalisation process in Chile has been a part of a comprehensive scheme since its beginning in 1974. The programme includes privatisation and wholesale competition in the electricity sector but within vertical or horizontal unbundling (Gutierrez, Serra, Fischer, et al., 2003) Today, generation, transmission and distribution are 100% private where the spot market is based on marginal cost(Yepez-Garcia & Ji, 2017, p. 22). Argentina, Columbia and Peru are too privatised in electricity industry including a restructuring of the entire value chain where a monopoly coordinates and plans the exchanges, while transactions and price clearing in create by supply and demand mechanisms (Rudnick & Zolezzi, 2001, p. 182).

Asian, Central American and Caribbean countries have during the 1990s largely been able to implement arrangement where IPPs are able to sell power to a state-owner utility (Bacon & Besant-Jones, 2001, p. 8). Specific Asian countries such as Pakistan, Philippines and India as too implanted reforms to liberalise their power sector to some extent. India has unbundled the monopolies through a reform in 2003 and later on privatised its large Orissa power utility (Singh, 2006, p. 2480). Even China has been looking towards market-based reforms in electricity to meet the demand requirements in terms of investment. The change began in 1985 and has gradually opened the power market to foreign investors and technology providers (Xu & Chen, 2006, p. 2458).

Sub-Saharan Africa has historically lagged behind others in terms of implementing reform(Bacon & Besant-Jones, 2001, p. 8). However, the continent is experiencing severe shortage of power as population grows and demand increases. Most countries have seen private sector investments through IPPs to be solve the problem and bring power to the continent (Eberhard, Gratwick, Morella, & Antmann, 2017, p. 390).. It means that the generation part of the value chain is very open to foreign power producers who are interested in building and especially owning power producing facilities. Cöte d'Ivoire was the first to see an IPP driven project in 1994 followed by Kenya in 1996 and Mauritius in 1997. Today, numerous projects are spread out over 18 countries in Sub-Saharan Africa (Eberhard et al., 2017, p. 392).

To conclude, we believe that this piece does not make up for our inability

to control for propensity to penetrate the individual regions. However, it shows that a great deal of countries has in fact liberalised to the extent that it would not inhibit foreign power producers with endogenous capabilities that are able to compete with the local firms.

B Graphs & Figures

Figure 13: Histogram Capacity 'G' 2006

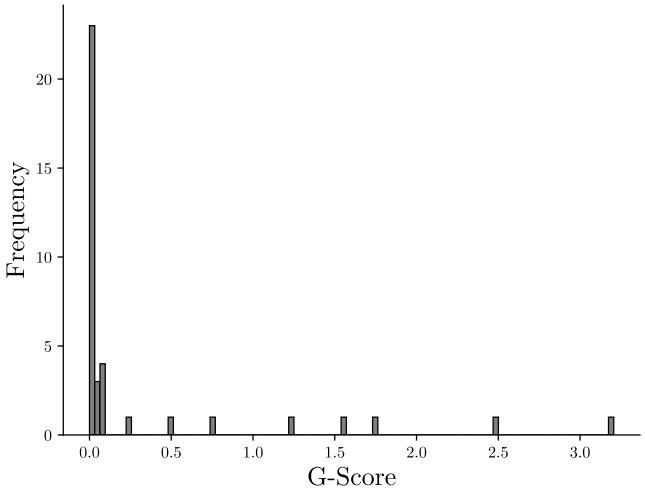


Figure 14: Histogram Capacity 'G' 2009

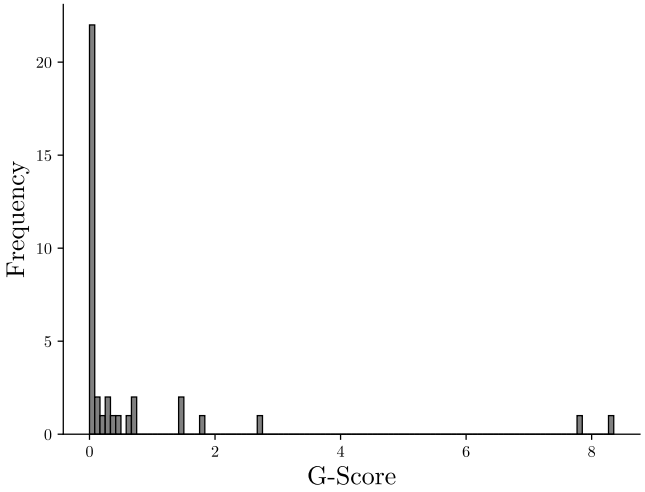


Figure 15: Histogram Capacity 'G' 2012

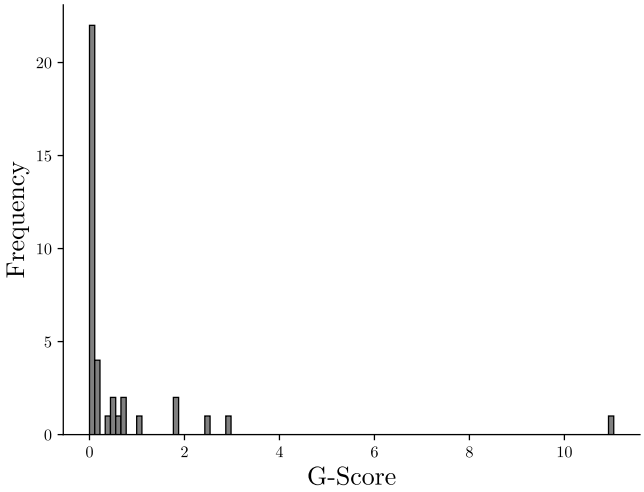


Figure 16: Histogram Capacity 'G' 2015

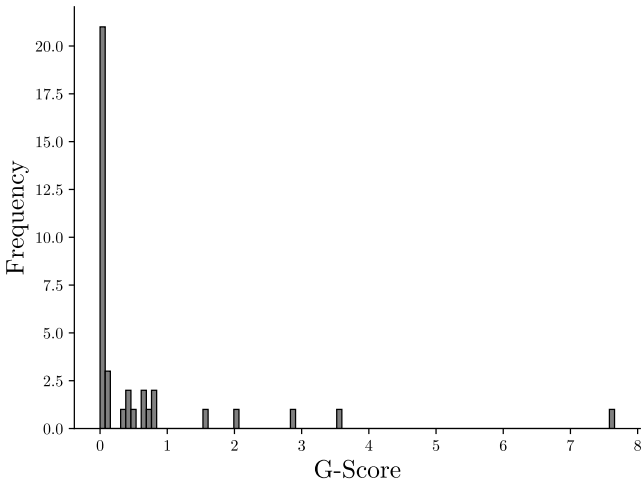


Figure 17: Histogram Production 'G' 2006

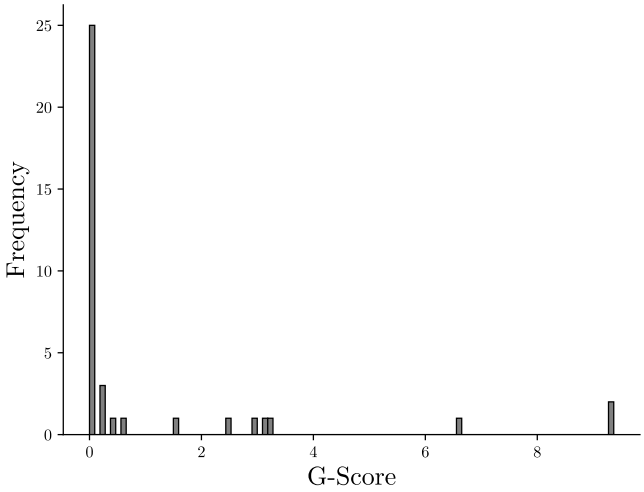


Figure 18: Histogram Production 'G' 2009

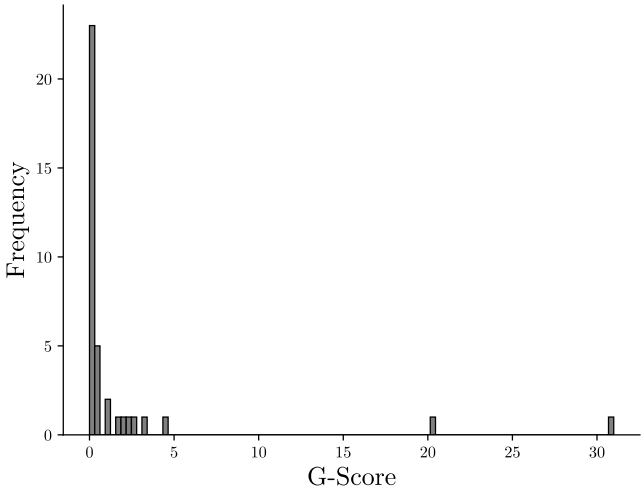


Figure 19: Histogram Production 'G' 2012

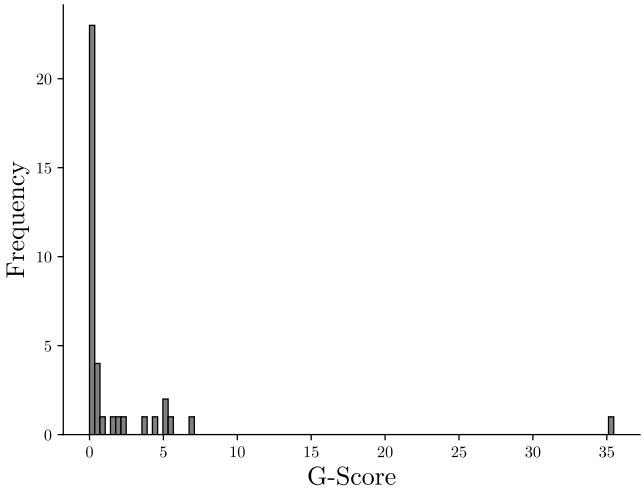


Figure 20: Histogram Production 'G' 2015

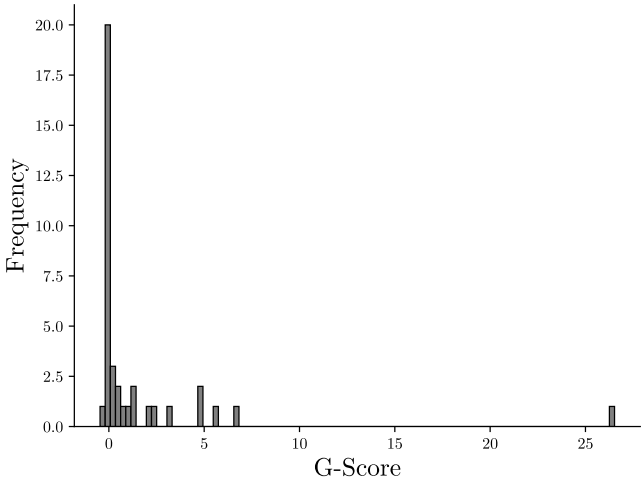


Figure 21: Histogram Capacity 'R' 2006

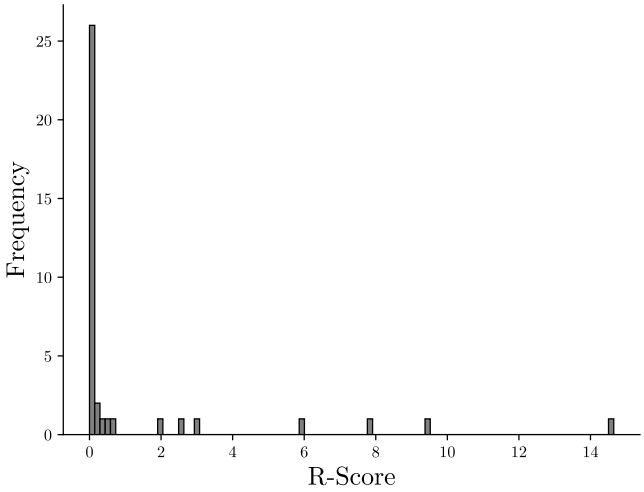


Figure 22: Histogram Capacity 'R' 2009

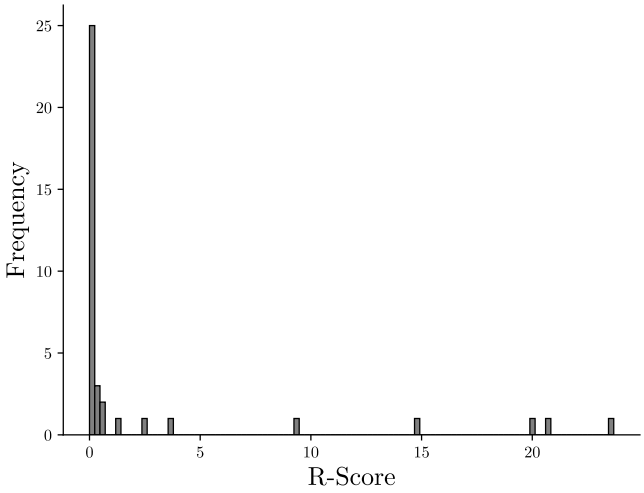


Figure 23: Histogram Capacity 'R' 2012

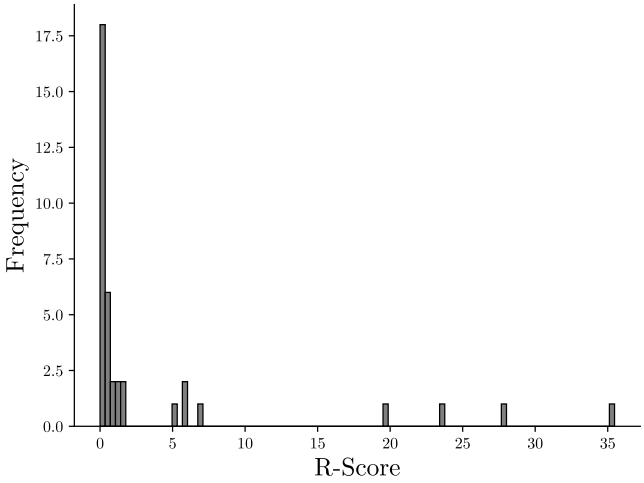


Figure 24: Histogram Capacity 'R' 2015

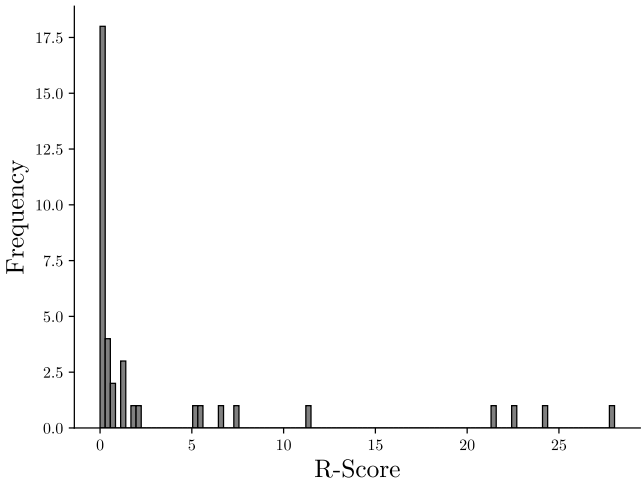


Figure 25: Histogram Production 'R' 2006

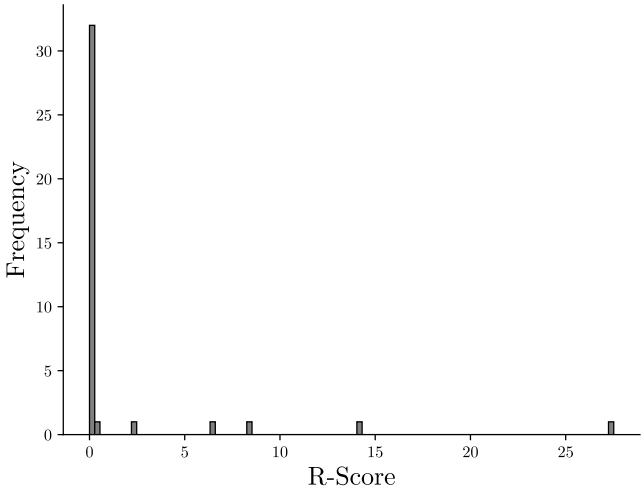


Figure 26: Histogram Production 'R' 2009

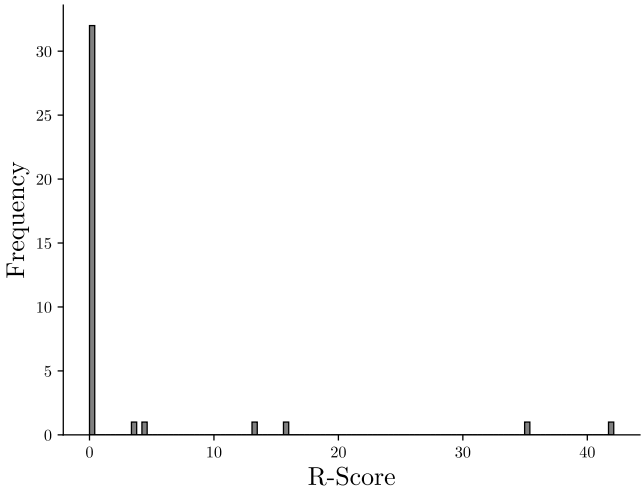


Figure 27: Histogram Production 'R' 2012

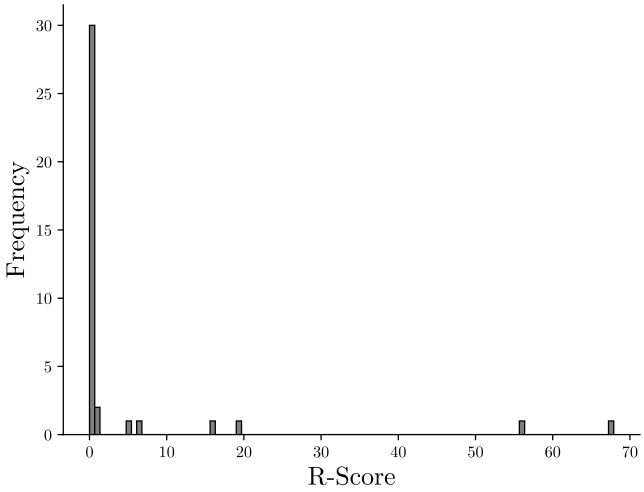


Figure 28: Histogram Production 'R' 2015

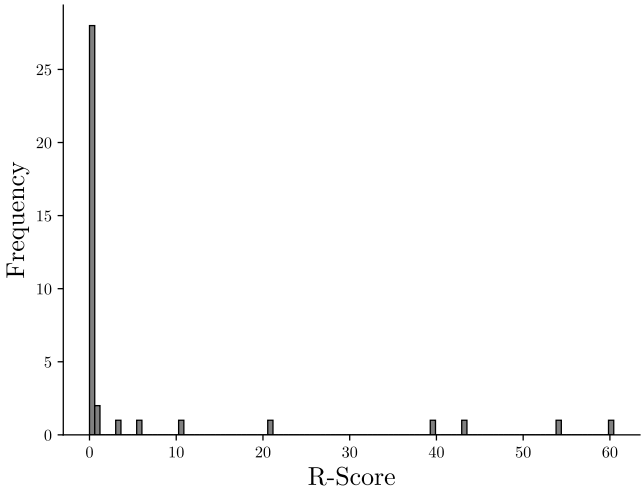


Figure 29: Histogram Capacity 'I' 2006

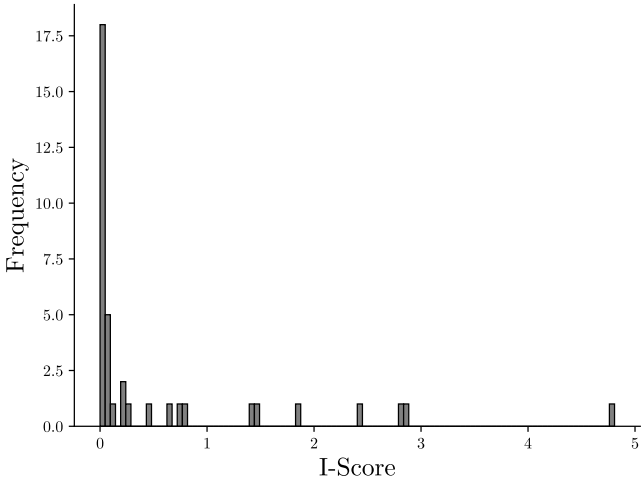


Figure 30: Histogram Capacity 'I' 2009

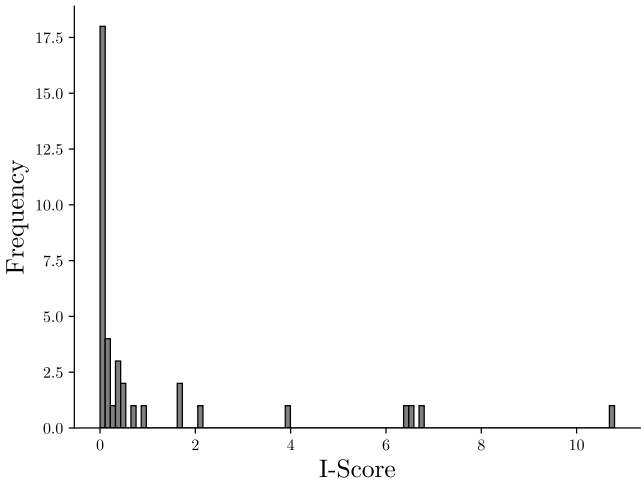


Figure 31: Histogram Capacity 'I' 2012

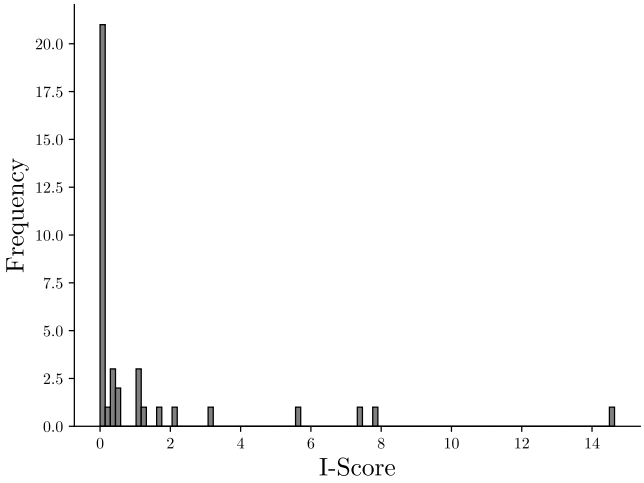


Figure 32: Histogram Capacity 'I' 2015

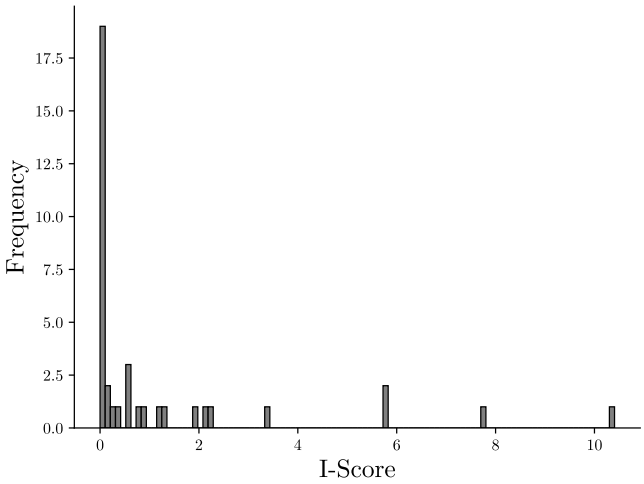


Figure 33: Histogram Production 'I' 2006

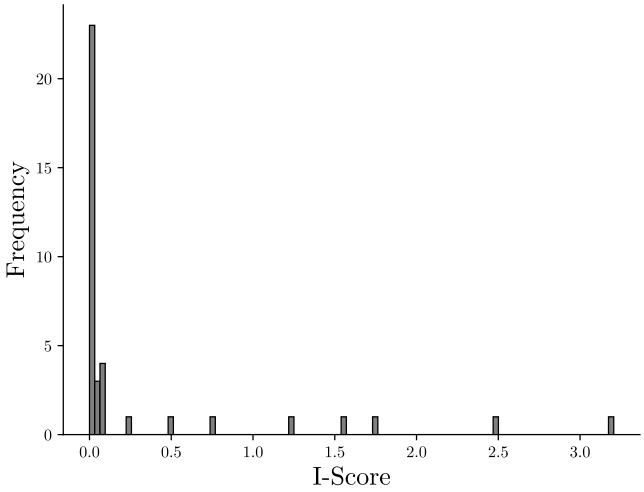


Figure 34: Histogram Production 'I' 2009

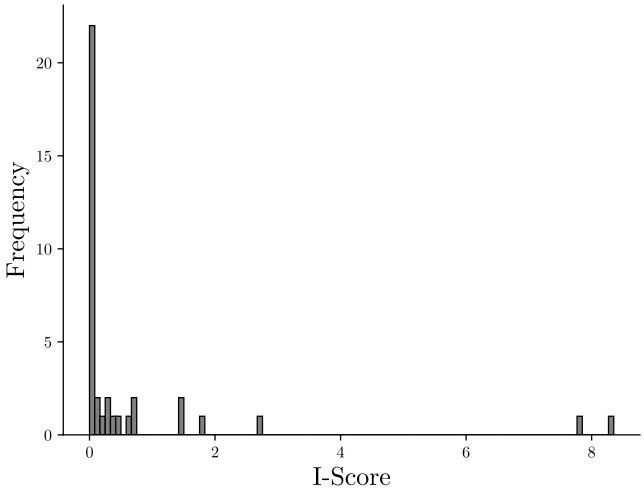


Figure 35: Histogram Production 'I' 2012

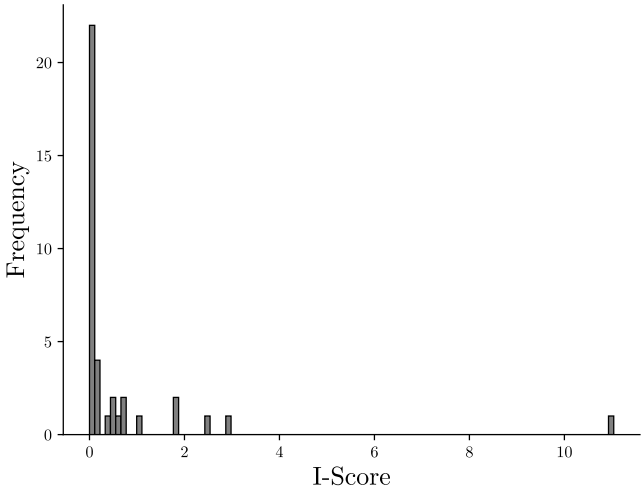


Figure 36: Histogram Production 'I' 2015

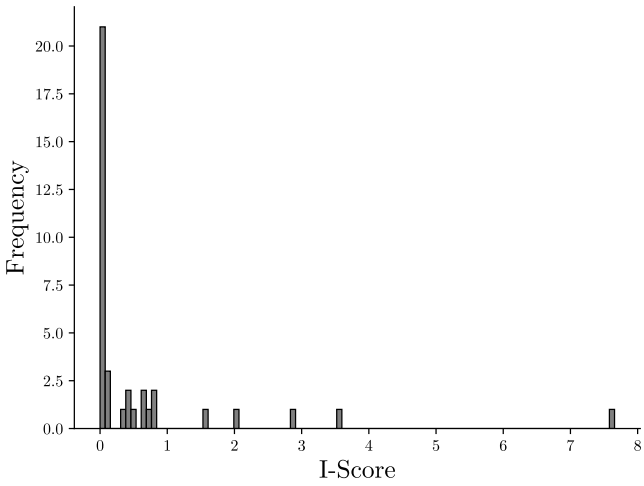


Figure 37: Residual Plot. Capacity Predicting Production G

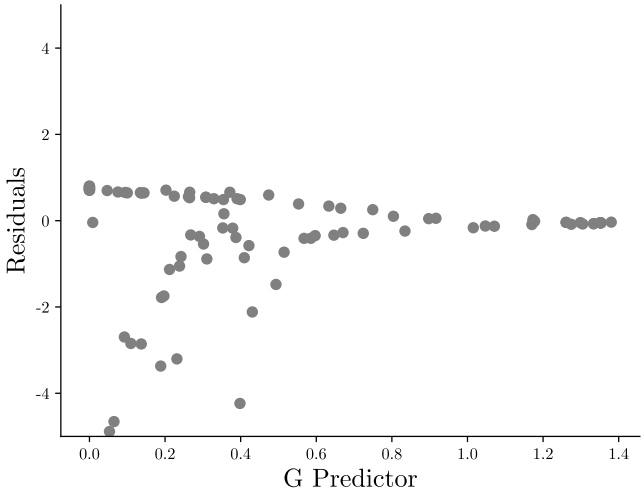


Figure 38: Residual Plot. Capacity Predicting Production R

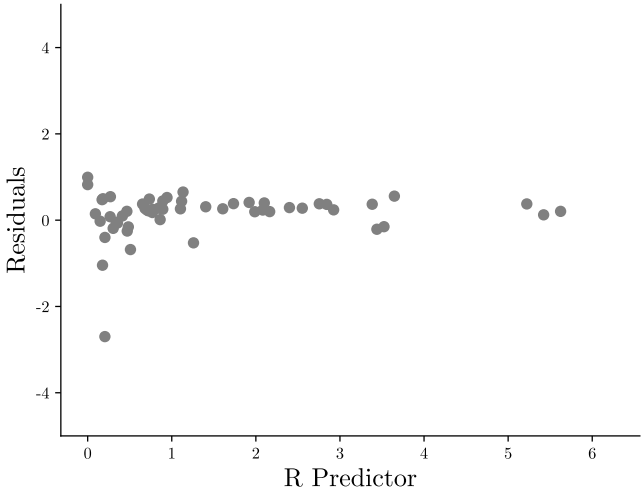


Figure 39: Residual Plot. Capacity Predicting Production I

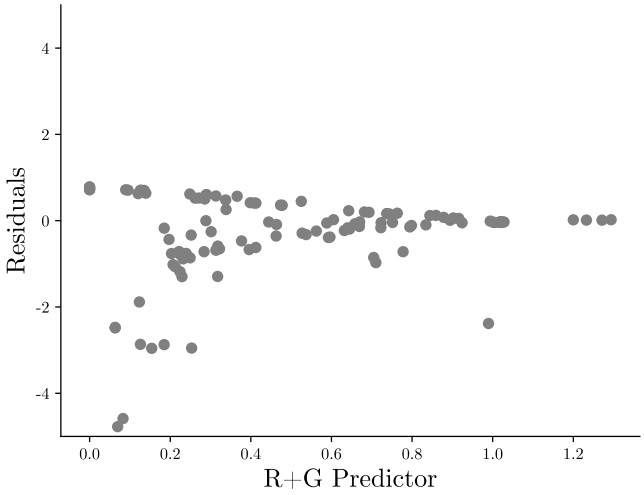


Figure 40: ROIC Residual Plot. Total Assets

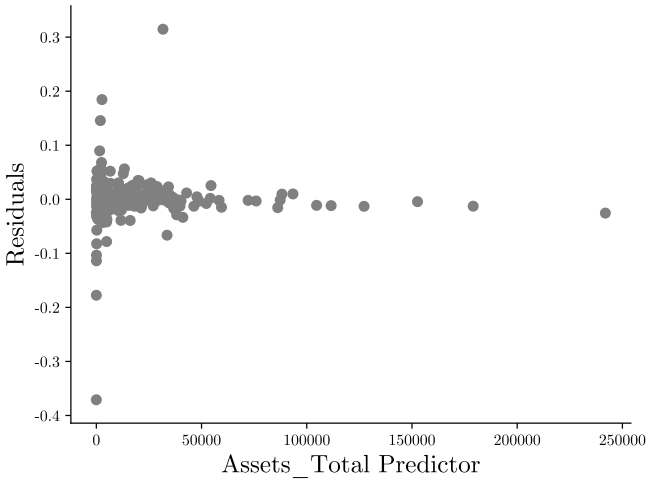


Figure 41: ROIC Residual Plot. Log Total Assets

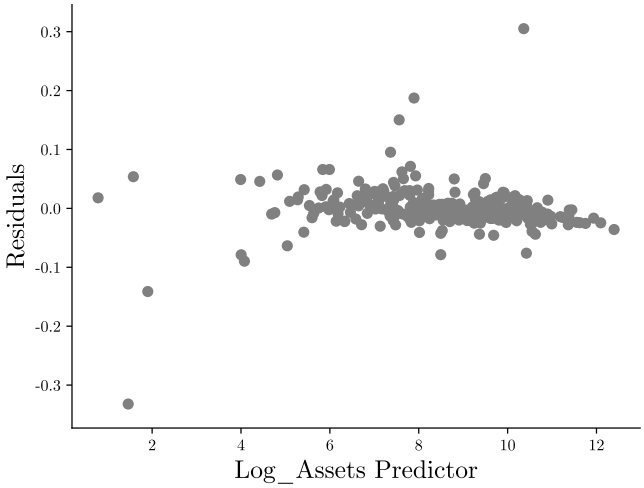


Figure 42: ROIC Residual Plot. Undeveloped Dummy

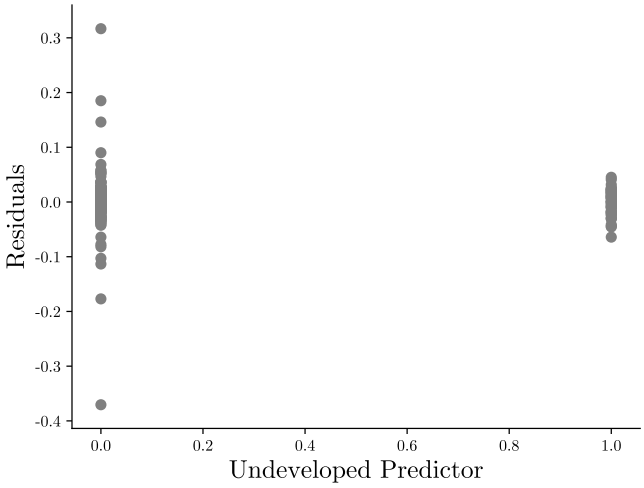


Figure 43: ROIC Residual Plot. Capacity R

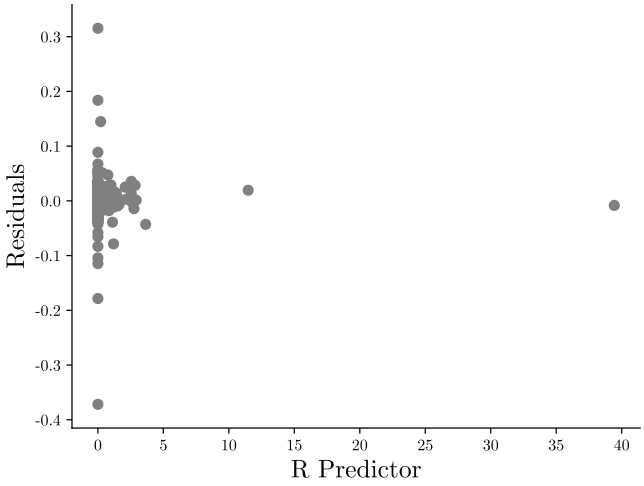


Figure 44: ROIC Residual Plot. Production R

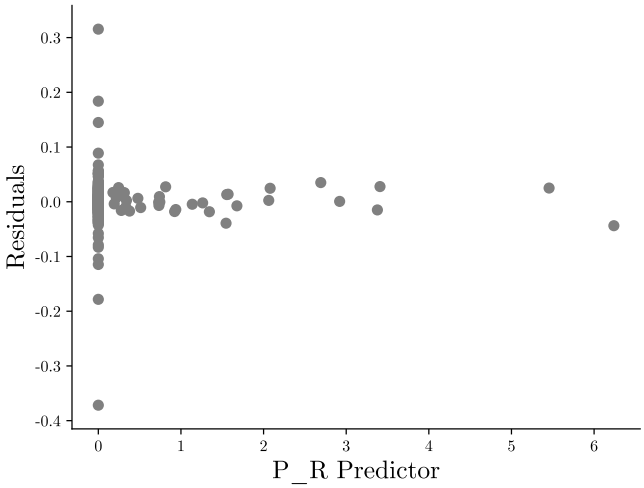


Figure 45: ROIC Residual Plot. Capacity G

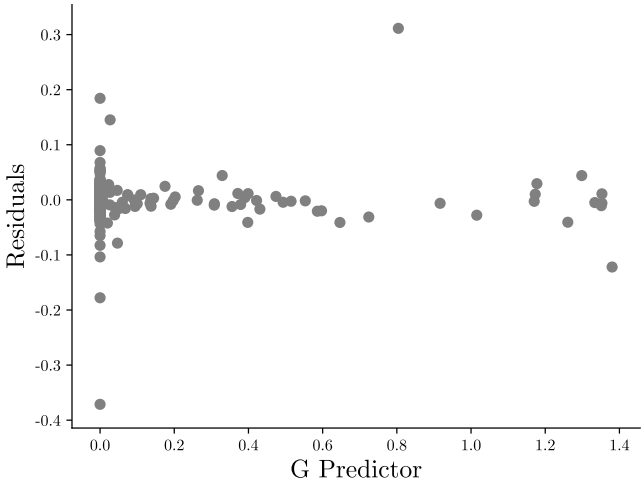


Figure 46: ROIC Residual Plot. Production G

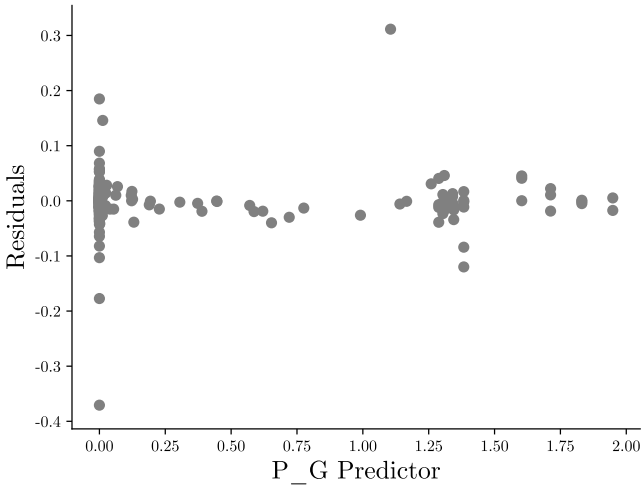


Figure 47: EVA Residual Plot. Total Assets

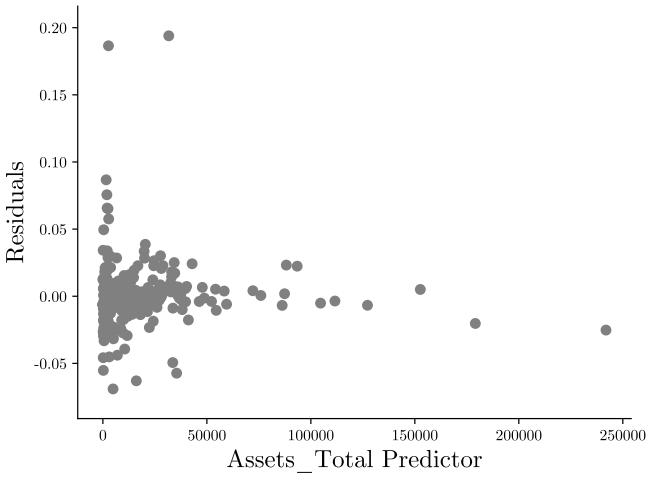


Figure 48: EVA Residual Plot. Log Total Assets

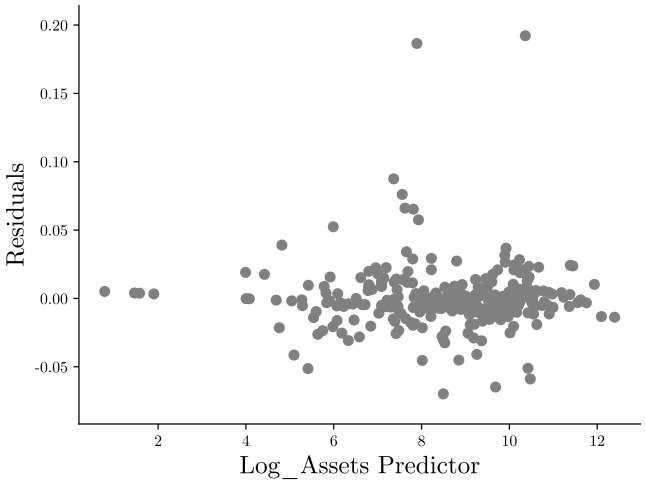


Figure 49: EVA Residual Plot. Undeveloped Dummy

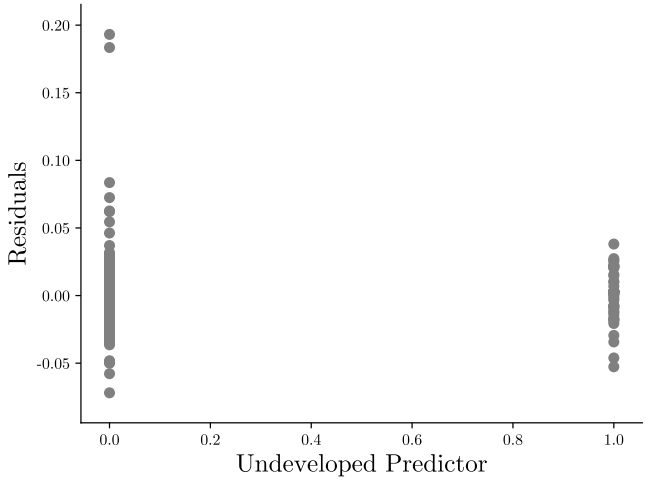


Figure 50: EVA Residual Plot. Capacity R

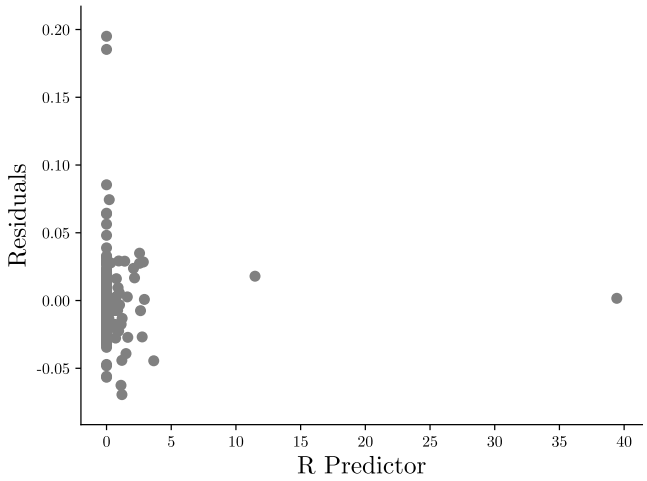


Figure 51: EVA Residual Plot. Production R

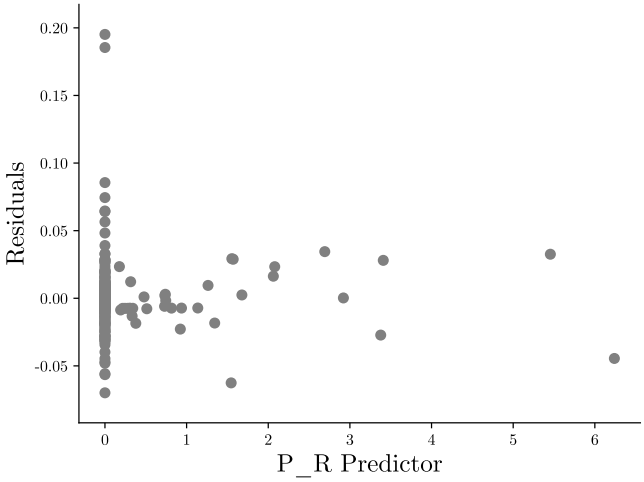


Figure 52: EVA Residual Plot. Capacity G

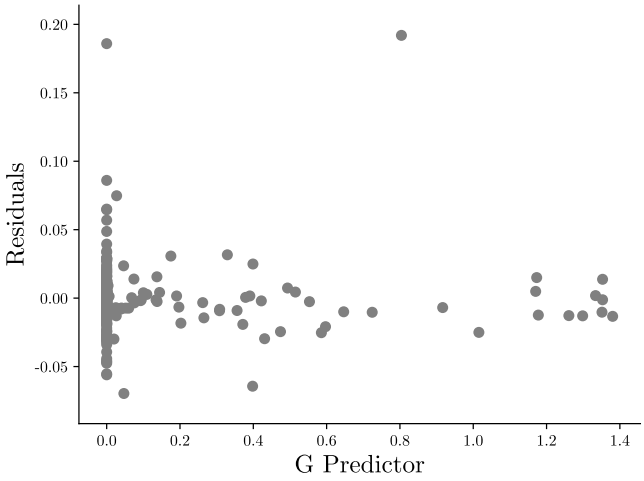


Figure 53: EVA Residual Plot. Production G

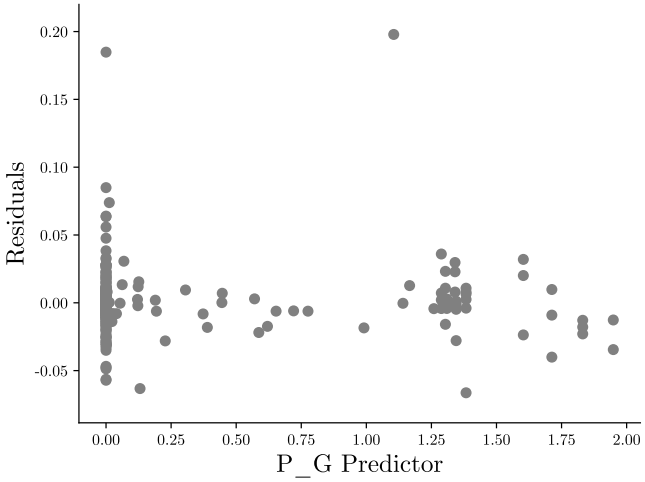


Figure 54: Normalised EMV Residual Plot. Total Assets

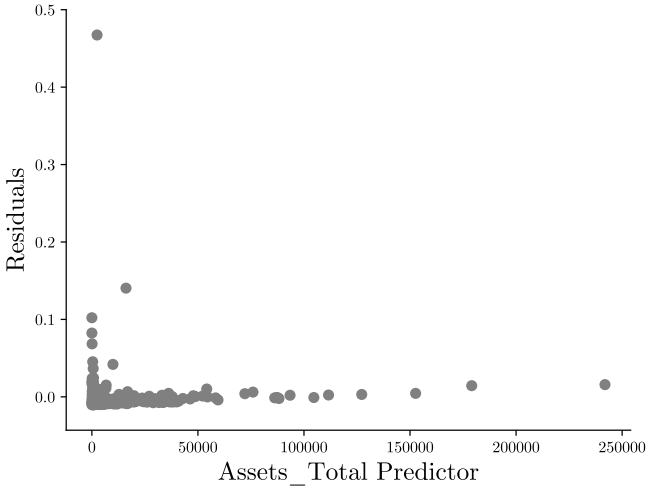


Figure 55: Normalised EMV Residual Plot. Log Total Assets

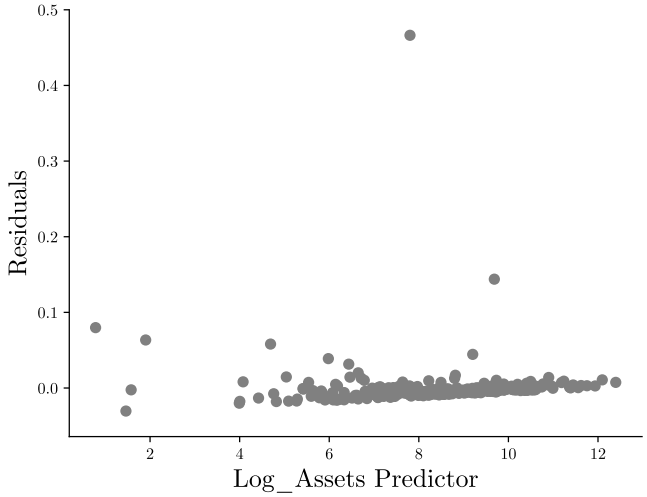


Figure 56: Normalised EMV Residual Plot. Undeveloped Dummy

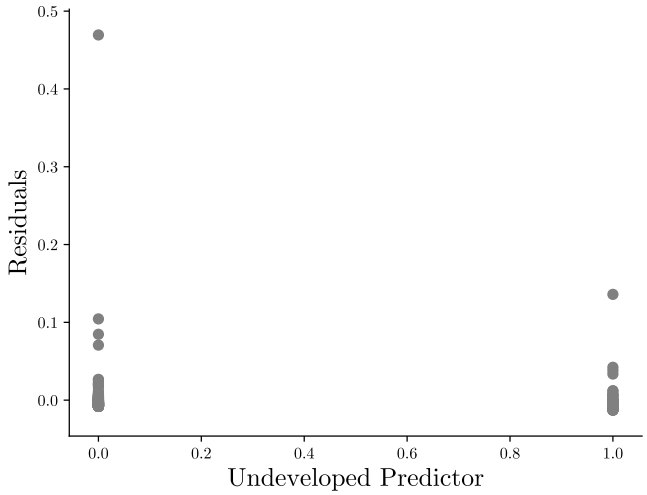


Figure 57: Normalised EMV Residual Plot. Capacity R

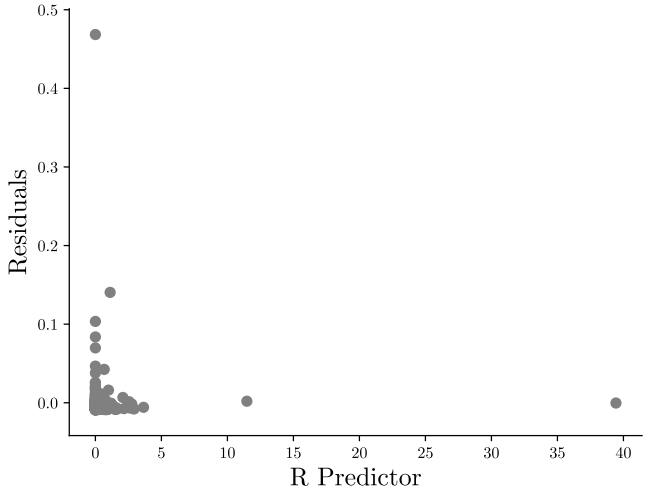


Figure 58: Normalised EMV Residual Plot. Production R

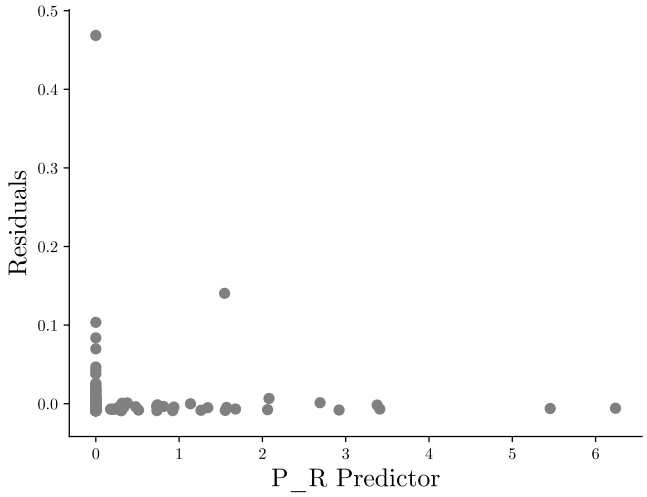


Figure 59: Normalised EMV Residual Plot. Capacity G

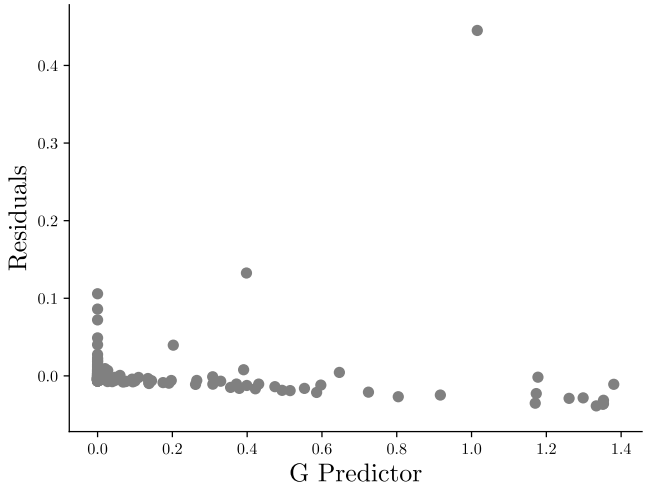
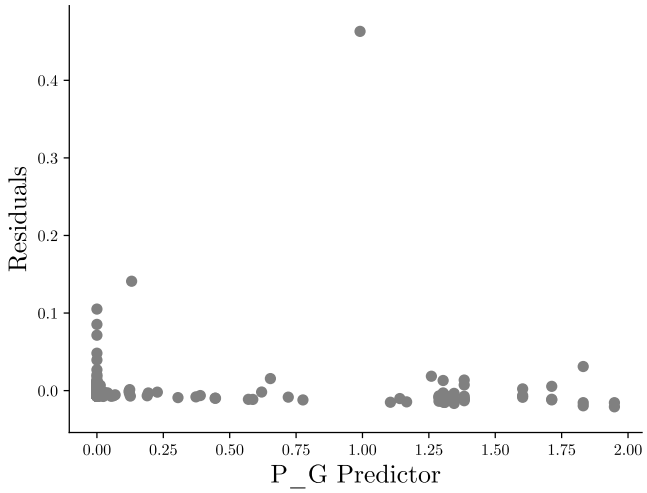


Figure 60: Normalised EMV Residual Plot. Production G



C Digital Appendix

The contents of this appendix are computer files and can naturally not be attached in this document. Please consult the contents of attached USB drive or alternatively find them uploaded online with the submission. Some of these items are prohibitively large for uploading to the internet and will only be included on the physical USB drive.

1 Energy statistics yearbook 2009 (.pdf).

2 Energy statistics yearbook 2015 (.pdf).

3 UN Regional Classification Scheme (.xlsx).

4 Company Annual reports(.pdf)

5 Raw Firm Data File (.csv)

6 Compustat North America Daily Company Fundamentals Annual dump (.csv)

7 Compustat North America Daily Security Monthly dump (.csv)

8 Compustat Global Daily Company Fundamentals Annual dump (.csv)

9 Compustat Global Daily Security Monthly dump (.csv)

10 Compustat Global Daily Index Prices dump (.csv)

11 Sample file of exchange rates (.csv)

12 Roadmap of raw data transformation into final test file (.pdf).

13 Structured input file for all tests(.csv)

14 Folder with Python file environment for test replication[14] (.py)

References

Agresti, A., & Finlay, B. (2008). *Statistical methods for the social sciences (4th edition).* Prentice Hall.

Andrews, K. R. (1986). *Concept of corporate strategy.* Richard d Irwin.

Asmussen, C. G. (2009). Local, regional, or global? quantifying mne geographic scope. *Journal of International Business Studies*, *40*(7), 1192–1205.

Bacon, R. W., & Besant-Jones, B. (2001). Global electric power reform, privatization, and liberalization of the electric power industry in developing countries. *Annual Review of Energy and the Environment*, *26*(1), 331-359. Retrieved from `https://doi.org/10.1146/annurev.energy.26.1.331` doi: 10.1146/annurev.energy.26.1.331

Ban Ki-moon. (2012). *Secretary-general to global development center: 'energy is the golden thread' connecting economic growth, social equity, environmental sustainability.* Retrieved 2018-05-13, from `https://www.un.org/press/en/2012/sgsm14242.doc.htm`

[14]Requires a fully functioning python 3.6 environment with all necessary libraries. The Anaconda Suite is a good starting point

Barkema, H. G., Bell, J. H. J., & Pennings, J. M. (1996). Foreign entry, cultural barriers, and learning. *Strategic Management Journal*, *17*(2), 151–166. Retrieved from http://www.jstor.org/stable/2486854

Bartlett, C. A., & Ghoshal, S. (1998). *Managing across borders (random house business books)*. Random House Business Books.

Berens, J. L., & Cuny, C. J. (1995). The capital structure puzzle revisited. *The Review of Financial Studies*, *8*(4), 1185-1208. Retrieved from http://dx.doi.org/10.1093/rfs/8.4.1185 doi: 10.1093/rfs/8.4.1185

Besanko, D., Dranove, D., Schaefer, S., & Shanley, M. (2013). *Economics of strategy 6th edition*. Wiley.

Brealey, R. A., Myers, S. C., & Allen, F. (2013). *Principles of corporate finance (the mcgraw-hill/irwin series in finance, insurance, and real estate) (the mcgraw-hill/irwin series in finance, insureance, and real estate)*. McGraw-Hill Education.

Buckley, P., & Casson, M. (1976). *The future of the multinational corporation.* London: Macmillan.

Coase, R. H. (1937). The nature of the firm. *economica*, *4*(16), 386–405.

Dang, C., Li, Z. F., & Yang, C. (2018). Measuring firm size in empirical corporate finance. *Journal of Banking & Finance*, *86*, 159–176.

Devinney, T. M., Pedersen, T., & Tihanyi, L. (2013). *Introduction to part ii: Do we do science? philosophy and knowledge in international business and management.* doi: 10.1108/S1571-5027(2013)0000026009

Doz, Y. L., & Prahalad, C. (1987). The multinational mission. *Balancing Local Demands and Global Vision, New York/London*.

Dunning, J. H. (1980). Toward an eclectic theory of international production: Some empirical tests. *Journal of international business studies*, *11*(1), 9–31.

Dunning, J. H. (1988). The eclectic paradigm of international production: A restatement and some possible extensions. *Journal of international business studies*, 1–31.

Dunning, J. H. (1998). Location and the multinational enterprise: a neglected factor? *Journal of international business studies*, *29*(1), 45–66.

Dunning, J. H., Fujita, M., & Yakova, N. (2007, Jan 01). Some macro-data on the regionalisation/globalisation debate: a comment on the rugman/verbeke analysis. *Journal of International Business Studies*, *38*(1), 177–199. Retrieved from https://doi.org/10.1057/palgrave.jibs.8400241 doi: 10.1057/palgrave.jibs.8400241

Dunning, J. H., & Lundan, S. M. (2008). *Multinational enterprises and the global economy*. Edward Elgar Publishing.

Eberhard, A., Gratwick, K., Morella, E., & Antmann, P. (2017). Independent power projects in sub-saharan africa: Investment trends and policy lessons. *Energy Policy*, *108*, 390 - 424. Retrieved from http://www.sciencedirect.com/science/article/pii/S0301421517303087 doi: https://doi.org/10.1016/j.enpol.2017.05.023

Eden, L., & Lenway, S. (2001). Introduction to the symposium multinationals: The janus face of globalization. *Journal of International Business Studies*, *32*(3), 383–

400.

Erdogdu, E. (2013). A cross-country analysis of electricity market reforms: Potential contribution of new institutional economics. *Energy Economics*, *39*, 239 - 251. Retrieved from http://www.sciencedirect.com/science/article/pii/S014098831300100X doi: https://doi.org/10.1016/j.eneco.2013.05.012

Errunza, V. R., & Senbet, L. W. (1981). The effects of international operations on the market value of the firm: Theory and evidence. *The Journal of Finance*, *36*(2), 401–417. Retrieved from http://www.jstor.org/stable/2327024

Friedman, M. (1953). The methodology of positive economics.

Gatti, S. (2013). Chapter 1 - introduction to the theory and practice of project finance. In S. Gatti (Ed.), *Project finance in theory and practice (second edition)* (Second Edition ed., p. 1 - 25). San Diego: Academic Press. Retrieved from https://www.sciencedirect.com/science/article/pii/B9780123919465000013 doi: https://doi.org/10.1016/B978-0-12-391946-5.00001-3

Geyskens, I., Steenkamp, J.-B. E. M., & Kumar, N. (2006). Make, buy, or ally: A transaction cost theory meta-analysis. *The Academy of Management Journal*, *49*(3), 519–543. Retrieved from http://www.jstor.org/stable/20159779

Ghoshal, S., & Moran, P. (1996). Bad for practice: A critique of the transaction cost theory. *The Academy of Management Review*, *21*(1), 13–47. Retrieved from http://www.jstor.org/stable/258627

Govindarajan, V., & Gupta, A. K. (2001). *The quest for global dominance. san francisco: Josey-bass.* Wiley.

Grant, R. M. (1987). Multinationality and performance among british manufacturing companies. *Journal of International Business Studies*, *18*(3), 79–89. Retrieved from http://www.jstor.org/stable/155111

Grant, R. M. (1999). The resource-based theory of competitive advantage: implications for strategy formulation. In *Knowledge and strategy* (pp. 3–23). Elsevier.

Gupta, A. K., Govindarajan, V., & Roche, P. (2001). Converting global presence into global competitive advantage [and executive commentary]. *The Academy of Management Executive (1993-2005)*, *15*(2), 45–58. Retrieved from http://www.jstor.org/stable/4165734

Gutierrez, R., Serra, P., Fischer, R., et al. (2003). *The effects of privatization on firms and on social welfare: The chilean case* (Tech. Rep.). Inter-American Development Bank, Research Department.

Heddenhausen, M. (2007). Privatisations in europe's liberalized electricity markets–the cases of the united kingdom, sweden, germany and france. *Research Unit EU Integration, https://www. swp-berlin. org/fileadmin/contents/products/projekt_papiere/Electricity_paper_KS_IIformatiert. pdf (accessed March 10, 2017)*.

Hennart, J.-F. (2007). The theoretical rationale for a multinationality-performance relationship. *Management International Review*, *47*(3), 423–452.

Hertz, N. (2002). *The silent takeover: Global capitalism and the death of democracy.* ARROW BOOKS LTD.

Hofer, C. W. (1975). Toward a contingency theory of business strategy. *The Academy of Management Journal*, *18*(4), 784–810. Retrieved from http://www.jstor.org/stable/255379

Hoskisson, R. E., Eden, L., Lau, C. M., & Wright, M. (2000). Strategy in emerging economies. *Academy of management journal*, *43*(3), 249–267.

Hymer, S. H. (1960). The international operations of national firms, a study of direct foreign investment. *Massachussets Institute of Technology*.

International Energy Agency. (2005). Lessons from liberalised electricity markets. Retrieved from http://dx.doi.org/10.1787/19901615

International Energy Agency. (2012). Energy policies of iea countries, the united kingdom 2012 review.

Jarvis, D. (2008). Conceptualizing, analyzing and measuring political risk: The evolution of theory and method.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305 - 360. Retrieved from http://www.sciencedirect.com/science/article/pii/0304405X7690026X doi: https://doi.org/10.1016/0304-405X(76)90026-X

Johanson, J., & Vahlne, J.-E. (1977). The internationalization process of the firm-a model of knowledge development and increasing foreign market commitments. *Journal of International Business Studies*, *8*(1), 23–32. Retrieved from http://www.jstor.org/stable/254397

John, D. (2000). The political economy of globalization. In N. Woods (Ed.), (chap. 2). Springer.

Joskow, P. L. (2008). Lessons learned from the electricity market liberalization.

Kim, J., & Aguilera, R. (2015). Foreign location choice: Review and extensions. *International Journal of Management Reviews*, *18*(2), 133-159. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1111/ijmr.12064 doi: 10.1111/ijmr.12064

Kim, W. S., & Lyn, E. O. (1986). Excess market value, the multinational corporation, and tobin's q-ratio. *Journal of International Business Studies*, *17*(1), 119–125. Retrieved from http://www.jstor.org/stable/154753

Kirca, A. H., Hult, G. T. M., Roth, K., Cavusgil, S. T., Perryy, M. Z., Akdeniz, M. B., ... others (2011). Firm-specific assets, multinationality, and financial performance: A meta-analytic review and theoretical integration. *Academy of management journal*, *54*(1), 47–72.

Kobrin, S. J. (1979). Political risk: A review and reconsideration. *Journal of international business studies*, *10*(1), 67–80.

Kobrin, S. J. (1991). An empirical analysis of the determinants of global integration. *Strategic Management Journal*, *12*, 17–31. Retrieved from http://www.jstor.org/stable/2486639

Kopsakangas-Savolainen, M., & Svento, R. (2012). *Modern energy markets: real-time pricing, renewable resources and efficient distribution*. Springer Science & Business Media.

Lakatos, I., & Musgrave, A. (1970). *Criticism and the growth of knowledge: Proceedings of the international colloquium in the philosophy of science, london, 1965* (Vol. 4). Cambridge University Press. doi: 10.1017/CBO9781139171434

Lu, J. W., & Beamish, P. W. (2001). The internationalization and performance of smes. *Strategic Management Journal*, *22*(6/7), 565–586. Retrieved from http://www.jstor.org/stable/3094321

Martens, J. (2007). *Multistakeholder partnerships-future models of multilateralism?* (Vol. 29). Citeseer.

Menanteau, P., Finon, D., & Lamy, M.-L. (2003). Prices versus quantities: choosing policies for promoting the development of renewable energy. *Energy Policy*, *31*(8), 799 - 812. Retrieved from http://www.sciencedirect.com/science/article/pii/S0301421502001337 doi: https://doi.org/10.1016/S0301-4215(02)00133-7

Modigliani, F., & Miller, M. H. (1963). Corporate income taxes and the cost of capital: a correction. *The American economic review*, *53*(3), 433–443.

Mudambi, R., Navarra, P., & Delios, A. (2013). Government regulation, corruption, and fdi. *Asia Pacific Journal of Management*, *30*(2), 487–511.

Nepal, R., & Jamasb, T. (2015). Caught between theory and practice: Government, market, and regulatory failure in electricity sector reforms. *Economic Analysis and Policy*, *46*, 16–24.

O'Brien, R., & Williams, M. (2013). *Global political economy: Evolution and dynamics*. Palgrave Macmillan.

Oh, C.-H., & Contractor, F. (2013). A regional perspective on multinational expansion strategies: Reconsidering the three-stage paradigm. *British Journal of Management*, *25*(S1), S42-S59. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1111/1467-8551.12019 doi: 10.1111/1467-8551.12019

Ohmae, K. (1985). *Triad power*. Free Press.

Osegowitsch, T., & Sammartino, A. (2008, Mar 01). Reassessing (home-)regionalisation. *Journal of International Business Studies*, *39*(2), 184–196. Retrieved from https://doi.org/10.1057/palgrave.jibs.8400345 doi: 10.1057/palgrave.jibs.8400345

Peng, M. W., Wang, D. Y., & Jiang, Y. (2008). An institution-based view of international business strategy: A focus on emerging economies. *Journal of international business studies*, *39*(5), 920–936.

Penrose, E. T. (2009). *The theory of the growth of the firm*. Oxford university press.

Poole, M. A., & O'Farrell, P. N. (1971). The assumptions of the linear regression model. *Transactions of the Institute of British Geographers*(52), 145–158. Retrieved from http://www.jstor.org/stable/621706

Popper, K. R. (2002). *An unended quest*. Psychology Press.

Porter, M. E. (1998). *The competitive advantage of nations (macmillan business)*. Palgrave Macmillan.

Qian, G., Khoury, T. A., Peng, M. W., & Qian, Z. (2010). The performance implications of intra-and inter-regional geographic diversification. *Strategic management*

journal, *31*(9), 1018–1030.

Raymond, V. (1971). Sovereignty at bay: The multinational spread of u. s. enterprises. *The International Executive*, *13*(4), 1-3. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1002/tie.5060130401 doi: 10.1002/tie.5060130401

Redman, D. A. (1993). *Economics and the philosophy of science*. Oxford University Press.

Remenyi, D., Williams, B., Money, A., & Swartz, E. (1998). *Doing research in business and management: an introduction to process and method*. Sage.

Robinson, C. (1992). Privatising the british energy industries: The lessons to be learned. *Metroeconomica*, *43*(1-2), 103–129.

Roth, K., & Morrison, A. J. (1990). An empirical analysis of the integration-responsiveness framework in global industries. *Journal of International Business Studies*, *21*(4), 541–564. Retrieved from http://www.jstor.org/stable/155059

Rudnick, H., & Zolezzi, J. (2001). Electric sector deregulation and restructuring in latin america: lessons to be learnt and possible ways forward. *IEE Proceedings-Generation, Transmission and Distribution*, *148*(2), 180–184.

Rugman, A. M. (1981). *Inside the multinationals*. Croom Helm Ltd.

Rugman, A. M. (2000). *The end of globalization: What it means for business*. Random House Business Books.

Rugman, A. M. (2005). *The regional multinationals: Mnes and'global'strategic management*. Cambridge University Press.

Rugman, A. M., & Oh, C. H. (2010). Does the regional nature of multinationals affect the multinationality and performance relationship? *International Business Review*, *19*(5), 479 - 488. Retrieved from http://www.sciencedirect.com/science/article/pii/S096959310900033X (Integrating Contemporary Finance and International Business Research) doi: https://doi.org/10.1016/j.ibusrev.2009.02.012

Rugman, A. M., & Verbeke, A. (2002). Edith penrose's contribution to the resource-based view of strategic management. *Strategic Management Journal*, *23*(8), 769–780. Retrieved from http://www.jstor.org/stable/3094292

Rugman, A. M., & Verbeke, A. (2004). A perspective on regional and global strategies of multinational enterprises. *Journal of international business studies*, *35*(1), 3–18.

Rugman, A. M., & Verbeke, A. (2007a). Liabilities of regional foreignness and the use of firm-level versus country-level data: A response to dunning et al.(2007). *Journal of International Business Studies*, *38*(1), 200–205.

Rugman, A. M., & Verbeke, A. (2007b, Jan 01). Liabilities of regional foreignness and the use of firm-level versus country-level data: a response to dunning et al. (2007). *Journal of International Business Studies*, *38*(1), 200–205. Retrieved from https://doi.org/10.1057/palgrave.jibs.8400242 doi: 10.1057/palgrave.jibs.8400242

Rugman, A. M., Verbeke, A., & Nguyen, Q. T. (2011). Fifty years of international business theory and beyond. *Management International Review*, *51*(6), 755–786.

Simon, H. A. (1979). Rational decision making in business organizations. *The American Economic Review*, *69*(4), 493–513. Retrieved from http://www.jstor.org/stable/1808698

Singh, A. (2006). Power sector reform in india: current issues and prospects. *Energy Policy*, *34*(16), 2480 - 2490. Retrieved from http://www.sciencedirect.com/science/article/pii/S030142150400254X (Power market reform in Asian countries) doi: https://doi.org/10.1016/j.enpol.2004.08.013

Stoft, S. (2002). Power system economics. *Journal of Energy Literature*, *8*, 94–99.

Thomas, D. E., & Eden, L. (2004). What is the shape of the multinationality-performance relationship? *Multinational Business Review*, *12*(1), 89-110. Retrieved from https://doi.org/10.1108/1525383X200400005 doi: 10.1108/1525383X200400005

Štreimikienė, D. (2013). Assessment of energy technologies in electricity and transport sectors based on carbon intensity and costs. *Technological and Economic Development of Economy*, *19*(4), 606-620. doi: 10.3846/20294913.2013.837113

UNCTAD. (2017). Methodologial note, world investment report 2017. *United Nations Conference on Trade and Development*.

Van Agtmael, A. (2007). *The emerging markets century: How a new breed of world-class companies is overtaking the world*. Simon and Schuster.

Van Tulder, R. (2006). *Van der zwart.(2006). an international business-society management: linking corporate responsibility and globalisation.* London: Routledge.

Verbeke, A., & Asmussen, C. G. (2016). Global, local, or regional? the locus of mne strategies. *Journal of Management Studies*, *53*(6), 1051-1075. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1111/joms.12190 doi: 10.1111/joms.12190

Verbeke, A., Li, L., & Goerzen, A. (2009). Toward more effective research on the multinationality-performance relationship. *MIR: Management International Review*, *49*(2), 149–161. Retrieved from http://www.jstor.org/stable/40658307

Walker, A. (2015). *Project management in construction*. John Wiley & Sons.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, *5*(2), 171–180. Retrieved from http://www.jstor.org/stable/2486175

Williamson, O. E. (1992). Markets, hierarchies, and the modern corporation: An unfolding perspective. *Journal of Economic Behavior & Organization*, *17*(3), 335 – 352. Retrieved from http://www.sciencedirect.com/science/article/pii/S0167268195900128 doi: https://doi.org/10.1016/S0167-2681(95)90012-8

Wood, A. J., Wollenberg, B., & Sheblé, G. B. (2013). *Power generation, operation, and control, 3rd edition*. Wiley.

Xu, S., & Chen, W. (2006). The reform of electricity power sector in the pr of china. *Energy Policy*, *34*(16), 2455 - 2465. Retrieved from http://www.sciencedirect.com/science/article/pii/S0301421504002654 (Power market reform in Asian countries) doi:

https://doi.org/10.1016/j.enpol.2004.08.040

Yepez-Garcia, A., & Ji, Y. (2017). *Market power in electricity generation sector: A review of methods and applications* (Tech. Rep.). IDB. doi: http://dx.doi.org/10.18235/0000894

Yip, G. S. (2001). *Total global strategy.* Prentice Hall PTR.

Zaheer, S. (1995). Overcoming the liability of foreignness. *The Academy of Management Journal*, *38*(2), 341–363. Retrieved from `http://www.jstor.org/stable/256683`

Zarkada-Fraser, A., & Fraser, C. (2002). Risk perception by uk firms towards the russian market. *International Journal of Project Management*, *20*(2), 99–105.

Zhang, Y.-F., Parker, D., & Kirkpatrick, C. (2008). Electricity sector reform in developing countries: an econometric assessment of the effects of privatization, competition and regulation. *Journal of Regulatory Economics*, *33*(2), 159–178.