UNIVERSITY OF KWAZULU-NATAL

The Impact of Foreign Ownership on Firm Performance: Evidence from South Africa

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DECLARATION

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"If you have infinite patience and perseverance, success is bound to come. No mistake in that."

~Swami Vivekananda

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ABSTRACT

The inflow of Foreign Direct Investment (FDI) is an important source of finance for South Africa. The South African government continuously attempts to attract more FDI to improve economic growth. Several studies have examined the determinants and effects of FDI at a macroeconomic level in South Africa, but very little research has analysed the effects of FDI at a microeconomic level, where the focus is on firm performance. Foreign ownership sourced from FDI can have both direct and spillover (indirect) effects on firm performance. The absence of evidence regarding the effect of foreign ownership on firm performance raises questions about the impact of FDI at the firm-level in South Africa. Hence, this study seeks to determine the direct and horizontal spillover effects of foreign ownership on the financial performance of firms listed on the Johannesburg Stock Exchange (JSE).

This study uses panel data for non-financial firms listed on the JSE, covering the seven-year period from 2012 to 2018. The system Generalized Method of Moments (GMM) approach is employed to estimate the relationship as it accounts for endogeneity, simultaneity and unobserved heterogeneity, thus ensuring unbiased results. Firm performance is measured with Return on Assets (ROA), Return on Equity (ROE) and Tobin's Q. The results for the direct effects vary across performance measures, with a non-linear effect of foreign ownership identified only when ROE is used. The findings show that foreign ownership has a positive effect on ROE at levels of foreign ownership below 40.1% but a negative effect at higher levels of foreign ownership. No evidence of horizontal spillovers are found for any performance measures. The implications of these findings are discussed along with recommendations for future research.

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2SLS:	Two-Stage Least Squares
ASIF:	Annual Survey of Industrial Firms
BoD:	Board of Directors
BSE:	Bombay Stock Exchange
CEO:	Chief Executive Officer
CIT:	Corporate Income Tax
DWH:	Durbin-Wu-Hausman
EU:	European Union
EVA:	Economic Value Added
FDI:	Foreign Direct Investment
FEM:	Fixed Effects Model
FPI:	Foreign Portfolio Investment
GLS:	Generalized Least Squares
GMM:	Generalized Method of Moments
ICB:	Industrial Classification Benchmark
IMF:	International Monetary Fund
ISE:	Istanbul Stock Exchange
IV:	Instrumental Variables
JSE:	Johannesburg Stock Exchange
MNCs:	Multinational Corporations
NSE:	National Stock Exchange
OLS:	Ordinary Least Squares
REM:	Random Effects Model

ROA: Return on Assets

ROE: Return on Equity

ROS: Return on Sales

SARS: South African Revenue Services

SE: South East

SLM: Sasabuchi-Lind-Mehlum

TFP: Total Factor Productivity

UK: United Kingdom

UNCTAD: United Nations Conference on Trade and Development

US: United States

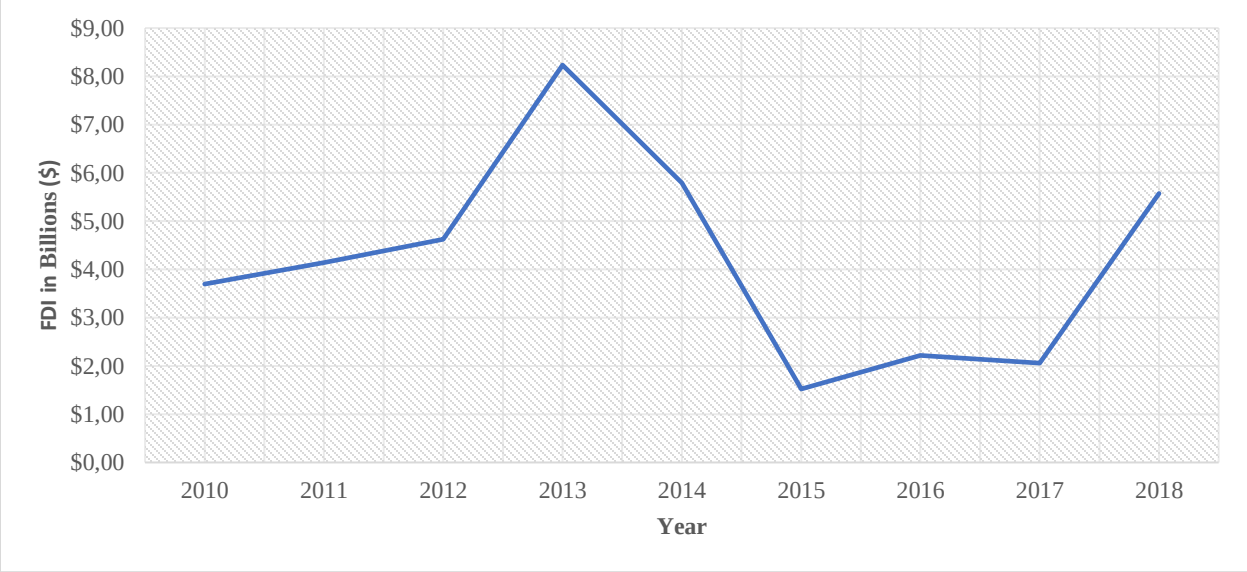
CHAPTER 1: INTRODUCTION

1.1 Background

The rise in Foreign Direct Investment (FDI) and Foreign Portfolio Investment (FPI) have revamped the world economic system. A substantial amount of attention has been directed towards FDI because developing countries consider these inflows as a vital source of finance to facilitate their country's economic growth. According to the United Nations Conference on Trade and Development (UNCTAD) (2018), the largest source of external finance for these developing countries is still FDI, comprising 39% of total incoming finance. As of 2018, FDI inflows to developing economies amounted to $671 billion (UNCTAD, 2018).

For South Africa, a crucial structural limitation faced by the economy is low domestic savings that are inadequate to achieve the levels of productive investment needed to elevate economic growth. Increased economic growth is needed to reduce poverty, increase employment and vastly improve living standards, amongst other factors. Due to the gap between domestic savings and the need for investment, the South African economy needs foreign capital to meet its objectives of job creation and inclusive growth (National Treasury, 2017).

Figure 1-1: Level of FDI in South Africa from 2010-2018



(Source: UNCTAD, 2019)

Figure 1 depicts the increase in FDI from 2010 to 2013, thereafter, a notable decline is witnessed towards the end of Jacob Zuma's presidency. Following the election of Cyril Ramaphosa as president in 2018, attracting more FDI became a central focus of the South African government, as the president stated that his goal was to bring R1.4 trillion in investment to South Africa by 2023 (Villers, 2019). Since then, numerous attempts to attract more international investors have been undertaken. Figure 1 shows that the South African government has been successful with these efforts, as FDI into South Africa grew from $2 billion in 2017 to $5.2 billion in 2018 - an increase of 320%.

In recent years, the importance of Multinational Corporations (MNCs) has grown significantly and outpaced the growth of trade (Ebersberger and Loof, 2005). Dunning and Lundan (2008: 3) defined an MNC as a corporation that "engages in FDI and owns or, in some way, controls value-added holdings in more than one country". By the end of 2015, foreign investors owned 38% of shares on the Johannesburg Stock Exchange (JSE) (see figure A-1 in appendix A). Foreign ownership includes both strategic investors (FDI) and portfolio investors (mainly foreign institutional funds). Strategic investors have the ability to enforce a significant amount of influence over the firm's management in the host economy (National Treasury, 2017). FDI was the largest source of foreign ownership in JSE-listed companies, amounting to R1 970 billion, which was equivalent to 49% of GDP (National Treasury, 2017). The current policy on FDI in South Africa does not place any restrictions on foreign ownership in South African firms (National Treasury, 2011).

1.2 Research Problem

Given the importance of FDI as a source of capital, several studies have been undertaken on FDI to better understand what attracts FDI to a country and the effects on the country, in order to tailor FDI-promotion policies. These studies on the determinants and effects of FDI are typically conducted at a macroeconomic level. For example, a considerable amount of research has been dedicated to the impact of FDI on economic growth and poverty including in South Africa (for example, Kayiya, 2012; Makwembere, 2014; Wakyereza, 2017 among others). Very little research, however, has analysed the effects of FDI at a microeconomic level where the focus is on foreign ownership and firm performance in South Africa.

The existing theories that link foreign ownership and firm performance provide contending arguments as to whether foreign ownership has positive or negative direct and/or indirect effects

on firm performance. With regards to the direct effects of foreign ownership, a positive effect is proposed through decreased agency costs and resource transfer as foreign ownership provides assistance to domestic firms through the introduction of new technology, better managerial practices, production processes and monitoring (Görg and Greenaway, 2004; Douma, George and Kabir, 2006; Swart, 2013). However, a negative effect may arise through an increase in agency costs (Hong and Loan, 2017) and the liability of foreignness (Barbosa and Louri, 2005), among other sources.

In addition, FDI may have indirect, also known as "spillover" effects, on the performance of other domestic firms (Carkovic and Levine, 2002; Girma, Gong, Görg and Lancheros, 2015). These spillovers can occur horizontally (intra-industry) or vertically (inter-industry). Horizontal spillovers are externalities from foreign firms to domestic firms within the same industry (Javorcik, 2004), whereas vertical spillovers (backward and forward) emerge when domestic firms and MNCs connect across different stages of production (Li and Luo, 2019). FDI is argued to have positive horizontal spillovers on the performance of other domestic firms through labour mobility, imitation, increase in competition and export spillovers (Görg and Greenaway, 2004), but may also have negative effects via local workers migrating to MNCs and the crowding out of domestic firms due to decreased market power (Wang and Blomström, 1992). The effects of vertical spillovers may be positive via backward and forward linkages but negative effects could also arise from the crowding out of domestic suppliers (Sasidharan, 2006; Javorcik and Spatareanu, 2008).

Previous studies in individual countries do not provide substantial clarity as to which of the theoretical arguments concerning the direct effect of foreign ownership on firm performance are most accurate. Some studies have observed a positive linear relationship (Douma *et al*., 2006); others a negative linear relationship (Kim and Lyn, 1990); a non-linear U-shaped relationship (Phung and Hoang, 2012); an inverse U-shaped relationship (Gurbuz and Aybars, 2010); and even no relationship (Swart, 2013) between foreign ownership and firm performance. Consequently, the results on the direct effects of foreign ownership appears to be country specific. Therefore, it is not possible to simply translate the findings of other studies to South Africa.

Further complexity is added to the study of the effect of foreign ownership on firm performance in that it is not clear whether the financial performance of firms also influences the amount of foreign ownership in the firm, i.e., whether firm performance shares a reverse relationship with

foreign ownership, as foreign investors often prefer investing in firms that are more productive. This potential reverse relationship raises the issue of endogeneity (Stančík, 2007). Along with endogeneity, Himmelberg, Hubbard and Palia (1999) highlight the possibility of heterogeneity that often appears because the value of firms is usually affected by unobservable characteristics of the contracting environment. Certain studies acknowledge the issues of endogeneity and heterogeneity, but many do not. Roberts and Whited (2013: 6) state that "endogeneity leads to biased and inconsistent parameter estimates that make reliable inference virtually impossible". The reliability of existing studies that failed to account for endogeneity and heterogeneity are therefore questionable.

The unpublished studies of Swart (2013) and Dube (2018) are the only known papers that have examined the relationship between foreign ownership and the financial performance of firms listed on the JSE. Swart (2013) reported no significant relationship between foreign ownership and firm performance, whereas Dube (2018) discovered a positive linear relationship. Nevertheless, both papers contain limitations. Firstly, the sample used by Swart (2013) comprised only of large firms and included financial firms, which most studies on this topic exclude due to their differing asset structures (Yilmaz and Buyuku, 2016). Secondly, Dube (2018) accounted only for the top one, two, three, five and 10 foreign shareholders in his analysis, thus, diminishing the accuracy of the effect of foreign ownership. Lastly, neither of these studies accounted for the issue of endogeneity. These shortcomings call into question the reliability of the results obtained.

Previous evidence on FDI spillovers contains a combination of both vertical and horizontal spillover effects (such as Nicolini and Resmini, 2010; Xu and Sheng, 2012; Choo, 2012); only vertical spillovers (such as Kinda, 2012; Fatima, 2014); and only horizontal spillovers (such as Khalifah and Adam, 2009; Erdogan, 2011). There is a lack of clarity on the effects of FDI spillovers due to mixed findings. Mixed findings have been documented for horizontal spillovers as certain studies observed positive effects (such as Karpaty and Lundberg, 2004; Padibandla and Sanyal, 2005; Thangavelu and Pattnayak, 2006), whereas others observed negative effects (such as Aitken and Harrison, 1999; Mühlen, 2013). The same holds true for vertical spillovers; therefore, there is a lack of clarity on the effects of FDI spillovers. Moreover, while there is abundant literature on the spillover effects of FDI on local enterprises in different countries, little is known in the South African context (exceptions are Mebratie and Bedi, 2011; Magwiro, Josue and Klingelhöfer, 2014).

The existing studies on the direct and indirect effects of FDI have been, for the most part, pursued separately. On the one hand, several authors (such as Griffith, 1999; Harris and Robinson, 2002; Gunduz and Tatoglu, 2003) estimated the direct effects for MNCs that receive FDI and compared their performance to domestic firms, without considering indirect effects (i.e., spillover effects). On the other hand, other authors (such as Padibandla and Sanyal, 2005; Nicolini and Resmini, 2010; Xu and Sheng, 2012) investigated FDI spillover effects, while mainly neglecting the direct effects of FDI.

The absence of definitive evidence on the effect of foreign ownership on firm performance raises questions about the impact of FDI at the firm-level. While South Africa continuously attempts to attract FDI to improve economic growth, it is unclear as to whether these foreign investors improve the performance of firms listed on the JSE or whether a positive effect can only arise if they own less than (or more than) a threshold proportion of the firm. Such knowledge is critical for tailoring FDI-specific policies. To the best of the author's knowledge, there is no study, to date, that has examined the relationship between foreign ownership and the performance of firms listed on the JSE, while taking into consideration the possibility of a non-linear relationship, indirect effects from horizontal spillovers, potential endogeneity and unobserved heterogeneity across the firms in the sample. Thus, to address this research gap, this study intends to fully consider all factors in assessing the relationship between foreign ownership and firm performance in South Africa, thereby ensuring robust and reliable results.

1.3 Research Questions and Research Objectives

1.3.1 Research Questions

The primary research question, which is thus the focus of this study, is as follows:

- What are the direct and indirect horizontal effects of foreign ownership on the performance of firms listed on the JSE?

The primary research question will be answered through the following secondary research questions:

- Does endogeneity exist between foreign ownership and firm performance?
- Is the direct relationship between foreign ownership and firm performance linear or non-linear?

- If the direct relationship is non-linear, what is the optimal level of foreign ownership?
- Are there any horizontal spillover effects from foreign firms to domestic firms?

1.3.2 Research Objectives

To address the secondary research questions, the following objectives are specified:

- To explore if endogeneity exists between foreign ownership and firm performance.
- To establish if the relationship between foreign ownership and firm performance is either linear or non-linear (with the non-linear relationship being either U- or inverse U-shaped).
- If the direct relationship is non-linear, to determine the optimal level of foreign ownership.
- To ascertain if there are any horizontal spillover effects from foreign to domestic firms.

1.4 Justification of the Study in a South African Environment

South Africa is a compelling case to analyse the impact of foreign ownership on firm performance due to the South African government's prioritisation in attracting FDI and that FDI is the largest source of foreign ownership in South African companies (in comparison to portfolio investment). This study provides valuable insight to investors, firm owners and managers, on the one side, as they seek to identify an ownership structure that maximises shareholder value and firm performance. In addition, it will also aid the government and other policymakers in achieving their objectives of job creation and inclusive economic growth with the capital attained through FDI.

1.5 The Scope and Method of this Study

1.5.1 The Scope of Study

This study focuses only on the effect of FDI, with respect of foreign ownership, at a firm-level rather than a macroeconomic level, as a substantial amount of research has already been conducted on the impact of FDI on the South African economy. With respect to FDI spillovers, this study reviews literature on horizontal and vertical spillovers, but only horizontal spillovers are estimated due to the discrepancies surrounding the estimation of vertical spillovers. The study covers the seven-year period from 2012 to 2018. The sample excludes firms from the financials industry as their financial statements and asset structures differ substantially from non-financial firms.

Delisted firms are included to eliminate any effects of survivorship bias[1]. Annual data for all listed and delisted companies of financial performance indicators and firm-specific characteristics were obtained from Bloomberg, foreign ownership percentages, while the foreign ownership data was extracted from the shareholder's section of IRESS, due to its unavailability on Bloomberg.

1.5.2 Research Methodology

The first step of the empirical analysis involves a series of tests used to assess the potential issue of endogeneity. These tests include: (i) the test of reverse causality; (ii) the test of strict exogeneity; and (iii) the Durbin-Wu-Hausman (DWH) test, that is adopted as a robustness check. The second step of the empirical analysis uses linear models and a quadratic model estimated using System Generalized Method of Moments (system GMM) to satisfy the remaining three objectives. In order to ensure robustness, the Arellano-Bond autocorrelation test, Hansen test and difference-in-Hansen test are specified within all system GMM estimations. The test of non-linearity between foreign ownership and firm performance is conducted using a quadratic test and Sasabuchi-Lind-Mehlum (SLM) test. The SLM test determines whether the non-linear relationship is U-shaped or inverse U-shaped and estimates the optimal level of foreign ownership in JSE-listed firms. The final component of the empirical analysis extends the robustness tests by assessing the strength of instruments in the system GMM.

1.6 Structure of the Study

The remainder of this study is structured as follows:

Chapter 2 presents the theoretical foundations on the direct and spillover effects of foreign ownership on firm performance. This chapter also includes a comprehensive review of empirical studies on the topic, which is subdivided according to financial performance, firm productivity and spillovers. Chapter 3 explains the data selection, variables utilised in the study and the sample period. A detailed description of the approaches used, is also provided, in conjunction with an outline of the estimation techniques adopted for each model. In Chapter 4 the results from each of the models are presented, together with an analysis of the findings. Chapter 5 provides answers to the research questions and attempts to draw inferences from the findings. The final segment of this

[1] Survivorship bias occurs when the sample being tested consists of only companies which were strong enough to survive the sample period of analysis and excludes the companies which did not survive. This phenomenon distorts the results produced (Pawley, 2006).

chapter details the potential weaknesses of this study, recommendations for future research on the topic and the conclusion of the study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This literature review, comprising of the theoretical framework and review of empirical evidence, centres on two closely related themes: the direct and indirect effects of foreign ownership. In order to form the theoretical framework of this study, it is necessary to adopt a multi-theoretic approach by integrating components of financial and economic theories, as restricting the analysis to only financial theories proves too limiting in fully understanding the relationship between foreign ownership and firm performance. The empirical evidence consists of prior research on this subject and is reviewed through three avenues: financial performance, productivity and FDI spillovers.

2.2 Theoretical Framework

2.2.1 The Direct Effects of Foreign Ownership on Firm Performance

The theories presented in this section aim to provide a more holistic understanding of the direct relationship between foreign ownership and firm performance.

2.2.1.1 Agency Theory

According to Uwuigbe and Olusanmi (2012: 209), one of the most significant traits of contemporary business is "the separation of ownership and control", where shareholders have little or no direct control over the operations of the company (Marks, 1999; Moez, 2018). This separation arises since the ownership of large companies is typically widely dispersed among domestic and foreign institutional, corporate, and retail investors meaning that the owners need to appoint managers to run the business on their behalf. Managers are thus tasked with the responsibility of maximising shareholder wealth. This separation of ownership and control gives rise to the agency theory (Fama and Jensen, 1983).

Agency theory, developed by Jensen and Meckling in 1976, refers to the principal-agent relationship when one person/entity (the principal) hires another (the agent) to act on their behalf. While the principal-agent relationship can be seen in many different environments, it is most common in the case of shareholders (the principal) hiring managers (the agent) to run the firm and act in their best interest.

As a consequence of differing interests and information asymmetry (managers have more information compared to shareholders), managers do not always operate in the best interests of

shareholders (i.e., they do not maximise shareholder value) instead acting in their self-interests (He and Sommer, 2010). This is referred to as the agency problem. In order to reduce this problem, the objectives of managers need to be aligned with those of shareholders. Several mechanisms can be used to achieve this, for example, monitoring, incentives such as share ownership and threats of a takeover (Rediker and Seth, 1995).

The Board of Directors (BoD) has a legal duty to represent shareholders' interests, which includes hiring and firing the Chief Executive Officer (CEO), setting their compensation and monitoring their performance (Adams, Hermalin and Weisbach, 2010). In addition to making decisions concerning the CEO, the BoD may also participate in the setting of strategies and the selection of projects. These duties make the BoD an important element for ensuring that managers' and shareholders' decisions are aligned (Davies, 2000). The monitoring role of the board usually increases once outside members are included as they have incentives to execute duties rather than to conspire with management to expropriate residual claimants as they are driven to obtain reputations as experts in decision control (Fama and Jensen, 1983). Monitoring can also be conducted in the form of auditing (Hall, 1998; Panda and Leepsa, 2017), with owners requiring the books of the company to be audited regularly. This may assist in decreasing the rate of embezzlement in the company (Petrascu and Tieanu, 2014).

Shleifer and Vishny (1997) claimed that shareholders with significant levels of ownership have strong incentives to monitor managers; thereby reducing agency costs. However, large shareholders can also negatively impact firm value as they can cultivate their private interests which contradict with the interests of minority shareholders or those of employees and managers. This is supported by Viet (2013: 299), who states that "ownership by shareholders correlates with gains from monitoring or with losses from expropriations when their ownership exceeds a certain large level".

In the absence of active monitoring of a firm's management by its shareholders, the payment of dividends may provide indirect control benefits (Khan, 2006). The distribution of cash dividends depletes the free cashflows of a company, thus forcing managers to seek external finance. According to Easterbrook (1984), external finance is more effective than internal finance with regard to monitoring and disciplining management. By paying dividends, companies also undergo a market audit which serves to encourage managers to disclose any new information and mitigate

agency problems in order to secure future funds. Hence, the payment of dividends can be viewed as a mechanism that reduces agency costs and information asymmetry between insiders and outsiders (Bhattacharya, 1979; Miller and Rock, 1985).

Another way to reduce the conflict of interest between managers and shareholders is with the aid of performance-based incentives such as share option schemes (Bebchuk and Fried, 2003; Mawanza, 2014). The fundamental idea is that a manager has, as part of their remuneration, the option to buy a prespecified number of shares of the firm, at a fixed price. The manager thus benefits directly from an increase in the share price and, as such, will act and make decisions that are expected to increase the firm's share price (Hall, 1998). Moreover, a significant level of managerial ownership will likely result in the manager committing to value-added activities and refraining from exploiting corporate resources as their main objective is the maximisation of shareholder value, due to their own interests (Jensen and Meckling, 1976).

According to Cohen and Uliana (1990), an active takeover market also aims to align the interests of managers and shareholders. If managerial actions lower the future earnings of shareholders, the price of the share often declines as well. In many cases, this can make the firm a target for takeover (Hall, 1998). If the management of such a firm is replaced, shareholders may benefit. The threat of takeovers can, therefore, act as an outside control mechanism, which guarantees that the actions of managers maximise the wealth of shareholders.

However, these mechanisms have cost consequences, with an associated effect on the wealth of shareholders and should thus only be incurred if the advantages to be gained are greater than the associated cost (Hall, 1998). There are three main types of agency costs: (i) monitoring costs that are induced when principals attempt to monitor the activities of agents, which was discussed above; (ii) bonding costs of restrictive covenants; and (iii) residual losses accumulated from the difference in manager behaviour from the ideal (Coriat and Weinstein, 2012; Zhou, 2014).

Bonding expenditures are a result of the agents assuring the principals that they will not take specific actions (Laiho, 2011; Hong and Loan, 2017). Furthermore, an agent is obligated to contractual obligations that limit the agents' activity. These contractual obligations will also ensure the required performance of agents (Zhou, 2014). Despite monitoring and bonding, it is improbable that the interests of managers and shareholders fully align (McColgan, 2001). Therefore, there are still agency losses arising from conflicts of interest (Hong and Loan, 2017). This is known as

residual loss. In addition to losses induced, firms incur unnecessary management expenditure and residual losses from unrealized investment opportunities due to their management being risk-averse (Kaaro, 2014). These missed opportunities could have increased shareholder wealth.

Agency Theory and Foreign Ownership

Due to the distance between the MNC and the home country of the foreign shareholder, as well as the language barrier and reduced access to information, it is often argued that foreign ownership contributes to greater agency costs than domestic ownership (Swart, 2013; Hong and Loan, 2017). According to Boubakri, Guedhami and Saffar (2016), foreign ownership is expected to be lower in more distant firms since longer distances between the MNC's headquarters and the foreign shareholder potentially amplifies negative incentives and increases the degree of information asymmetry as remotely located companies tend to be neglected by foreign owners due to travel, transportation costs and the difference in time-zones (Malloy, 2005). The lack of available information for foreign shareholders offers managers less incentive to fulfil the interests of external shareholders and more power to seek private benefits (Luo and Chung, 2013). Foreign shareholders are often aware of this and thus implement greater monitoring and transparency of management actions (Guedhami, Pittman and Saffar, 2009), further increasing agency costs.

Differences in languages pose significant problems as numerous non-English-speaking companies are expected to adopt English as their corporate language, compelling them to conduct daily operations in their second language, which may warrant miscommunications (Feely and Harzing, 2008). Some firms introduce language training facilities; however, teaching employees to work effectively in a foreign language may be difficult. As such, companies intending to pursue this route need to do so to sustain the program over many years, which in turn will lead to more agency costs.

The effect of foreign ownership on firm performance in the agency theory, however, may be more complicated, depending upon the type of ownership by the foreigner. Douma *et al*. (2006) and Swart (2013) suggested that foreign shareholders should be separated into two categories, namely foreign financial institutions and foreign industrial corporations, as the governing dynamics of these shareholders are significantly different. Foreign financial institutional shareholders are mainly interested in the short-term returns that a company can provide (Wilkins, 1999). As such, these investors are more concerned in a profitable exit strategy rather than embroiling themselves

with management and, in many instances, do not participate in the transfer of any management or technological skills (Douma *et al*., 2006).

Moreover, foreign financial institutional shareholders hold extremely fragmented stakes as this form of ownership is usually legally constrained. According to Douma *et al*. (2006: 643), these shareholders represent the "dispersed-outside category of shareholders as viewed from an agency perspective". Although equipped with monitoring capabilities, dispersed-outside shareholders only exhibit moderate influence on firm performance and the agency problem, as their capacity to actively monitor is restricted by their weak incentives to monitor and discipline management (Hackethal and Zdantchouk, 2006). Leech and Leahy (1991) argue that if foreign investors are dispersed, they will have only a moderate influence on the performance of the firm since the investor usually owns less than 5%.

Foreign corporate shareholders, in contrast, are potentially more likely to participate in a long-term commitment with MNCs, and thus fill a more operative role to assure the profitability and productivity. Douma *et al*. (2006: 643) characterised these foreign corporate shareholders as "concentrated-outside and strategic-foreign from the agency and resource-based theories, respectively", which is discussed below. Agency theory states that due to foreign corporate ownership stakes being larger and less disintegrated compared to those of foreign financial institutional shareholders, foreign corporate investors may exhibit a favourable influence on firm performance as they can mitigate the possibility of the majority owners taking control at the expense of the minority shareholders, while simultaneously maximising the benefits of monitoring, incentive alignment, and risk-bearing (Allen and Phillips, 2000; Douma *et al*., 2006). Contrarily, increased ownership and control can lead to an entrenchment effect where large foreign shareholders worsen financial performance because they pursue their own interests at the expense of other stakeholders (Morck, Shleifer, and Vishny, 1988; Phung 2015).

It is thus clear that the agency theory does not provide a definitive theoretical argument as to whether foreign ownership positively or negatively affects firm performance. On the one hand, a positive effect may materialise through monitoring and incentives, which will decrease agency costs, but, on the other hand, an adverse effect may also be experienced through an increase in agency costs, caused by distance, the difference in languages and information symmetry. Dispersed foreign investors that usually own less than 5% will have a moderate influence on the

performance, while concentrated foreign investors that own more than 5% will induce a positive impact on firm performance. Nonetheless, Oliver (1997) claimed that the agency theory represents an incomplete outlook of the world. It is therefore suggested that agency theory should be integrated with the resource-based and institutional theories in order to attain a clearer understanding of the effect of foreign ownership on firm performance. As such, these theories are examined in the following two sub-sections.

2.2.1.2 The Resource-based Theory

Firms have a competitive advantage when they are in possession of tangible and intangible resources. In order to maintain their competitive advantage, the company resources need to be scarce, valuable, inimitable and irreplaceable (Barney, 1991). Thus, the performance of firms under the resource-based theory is determined by the resources of the firm.

The impact of foreign ownership on firm performance according to the resource-based theory, like that of the agency theory, depends on the type of ownership. That is, the performance of firms will differ substantially when owners are either foreign financial institutions or foreign industrial corporations (Douma *et al*., 2006). As indicated in the previous section, foreign financial institutional shareholders are equipped with efficient monitoring abilities, but their financial focus and interest in liquidity make them reluctant to commit to a long-term relationship with the company and to participate in the restructuring procedure, in case of inadequate performance (Mukhopadhyay and Chakraborty, 2017). These shareholders favour exit strategies instead of a role to monitor management (Coffee, 1991).

If foreign institutional shareholders are disappointed with the performance of a firm's share price, they hold the easy option of selling their ownership stake rather than investing their time and effort to establish a corporate restructuring process (Douma *et al*., 2006). As mentioned in the agency theory, they do not participate in the transfer of any management or technological skills. Since foreign institutional shareholders are reluctant to enter in a long-term relationship with the company or take part in the restructuring process, they are expected to have only a moderate effect on firm performance (Aguilera and Jackson, 2003).

Contrarily, foreign corporate shareholders who have strategic interests, as a result of their ownership stakes, are driven by non-financial objectives, such as the attainment of control rights and cultivation of sustainable competitive advantages and capabilities (Aguilera and Jackson,

2003). Strategic-foreign shareholders utilise their stakes of ownership as a way to harvest their strategic interests, which include acquiring entry into new markets, location-specific resources and inexpensive production amenities (Douma *et al*., 2006). Their foreign affiliation also brings local companies in connection with a high-calibre of technical, managerial and financial resources (Chibber and Majumdar, 1999). These shareholders increase profitability through an increase in sales and cost reduction due to additional and/or superior resources such as technology from MNCs, combined with new market access made possible by the affiliated local firms (Anderson and Liao, 2019). Among these groups of shareholders, there exists significant heterogeneity in resources and organisational capabilities, and as such, this impacts on the performance of the firm (Douma *et al*., 2006).

In summary, the resource-based theory stipulates that resources that induce competitive advantage within firms will positively influence a firm's performance and that such resources are most likely to be provided by strategic-foreign shareholders, suggesting a positive relationship between foreign ownership and firm performance.

2.2.1.3 Institutional Theory

Although the agency and resource-based theories provide significant insight in understanding the impact of different types of ownership on firm performance, they experience a limitation in that they fail to analyse the social context within which the company's operations are integrated (Douma *et al*., 2006). Nevertheless, this is captured by the institutional theory. The institutional theory concentrates on the legitimacy required by MNCs in order to operate in a foreign country. The theory emphasises the influence of factors such as socio-cultural norms, beliefs, values, and regulatory and judicial systems on organisational structure and behaviour (Oliver, 1997 and Douma *et al*., 2006). Such factors may constrain the achievement of superior performance by the foreign firm (Alquist, Berman, Mukherjee and Tesar, 2019). The principal rationale of this theory is that organisations must comply with these institutional factors to increase their legitimacy (Karakaş and Yıldız, 2012).

Maintaining legitimacy may prove to be difficult because MNCs try to conform to both internal and external legitimacy expectations and suffer from the liability of foreignness (Crilly, 2011; Campbell, Eden, and Miller, 2012). Internal legitimacy deals with the approval of a subsidiary by the parent firm and stems from the adoption of practices that are institutionalised within the MNC

and embodied by the home country environment of the parent firm. External legitimacy is granted by the institutional environment in which the subsidiary is located and emanates from it following practices institutionalised in that environment (Murage, 2013). Zaahir (1995) defined the concept of the liability of foreignness as the cost incurred from engaging in business abroad because of the competitive advantages that local firms possess. In particular, local firms have superior access to market-relevant information, are more fixed in the national environment and do not face foreign exchange risks (Hymer, 1976). Therefore, the performance of foreign firms may be hindered as they must compensate for the liability of foreignness (Barbosa and Louri, 2005).

There are four major sources of the liability of foreignness. First is the spatial difference between the MNC and its operations. Second, firm-specific costs based on the unfamiliarity of MNCs with the local environment, including governance structures, procedures, business practices and the legal and regulatory frameworks that facilitate and enable business transactions. This may affect their legitimacy, performance and the costs of doing business overseas (Zaheer and Mosakowski, 1997; Cai, 1999; Kostova and Zaheer, 1999; Calhoun, 2002). Third, economic nationalism, where national governments undertake protective measures to reduce imports and investments from other countries or by limiting immigration, may prevent MNCs from having access to required resources and talent from their home countries (Bell, Filatotchev and Rasheed, 2012). Lastly, government policies and restrictions; for example, the restrictions imposed on MNCs from the United States (US) on high-technology sales to certain countries, or laws like the Foreign Corrupt Practices Act[2] (Zaheer, 1995). Some governments also have the power to place restrictions and performance requirements for FDI in all sectors (Singh, 2003).

It is thus evident that major institutional issues that foreign-owned firms face, such as difficulties in maintaining legitimacy and liability of foreignness, may negatively impact firms, thereby indicating a negative relationship between foreign ownership and firm performance.

[2] The Foreign Corrupt Practices Act of 1977, as amended, 15 U.S.C. §§ 78dd-1, et seq. ("FCPA"), was enacted to make it unlawful for certain classes of persons and entities to make payments to foreign government officials to assist in obtaining or retaining business.

2.2.2 The Indirect Effects of Foreign Ownership on the Productivity of Domestic Firms

This section reviews the theories relating to the spillover effects that arise when the presence of foreign firms causes productivity increases in local firms, taking the interactions between firms into consideration.

2.2.2.1 Horizontal Spillovers

Horizontal (intra-industry) spillovers arise when the entrance of foreign subsidiaries increases the productivity levels of other domestic companies within the same industry (Batool, Sadia and Ahmad, 2009; Yanran, 2015; Li and Luo, 2019). Nevertheless, negative spillovers, which decrease productivity levels, may also occur (Mühlen, 2013). There are four main channels through which horizontal spillovers may occur: (i) labour mobility; (ii) imitation; (iii) competition; and (iv) exports (Görg and Greenaway, 2004).

Foreign affiliates are usually more involved than local firms in training and educating their workers (Djankov and Hoekman, 2000), with this training occurring across most levels of employees from manufacturing workers to technologically advanced professionals and top-level managers (Tantratananuwat, 2015). The movement of the MNC-trained workers can conceivably increase productivity via two mechanisms. Firstly, the MNC-trained labourers can take with them the learning of new technology or management systems and therefore become direct agents of the transmission of innovative technology (Fosfuri, Motta and Ronde, 2001; Görg and Greenaway, 2004). Secondly, workers from local firms may enhance their productivity by merely associating themselves with MNC-trained workers. However, it has been widely argued that the most significant mechanism is the relocation of MNC-trained labour within the domestic sector - either by alternating positions of employment or establishing new companies (Fosfuri *et al*., 2001; Doan, Mare and Iyer, 2015). On the contrary, highly skilled domestic labourers may be lured to MNCs as they tend to offer higher wages. As a result, local firms may experience a loss in human capital, thus resulting in productivity losses (Glass and Saggi, 2002).

The sophisticated technologies and new products unveiled by the MNC in the local market pressure the domestic firms to innovate. Innovation usually takes the form of imitation, whereby the local companies imitate the final goods or the production methods of the MNC (Wang and Blomström, 1992; Doan *et al*., 2015). Domestic firms may approach workers who were integral in the production of the physical goods by the MNC, in order to decipher a way to replicate the

production technique of the MNC. This procedure is referred to as reverse engineering (Yanran, 2015). Besides imitating goods and procedures, the local enterprises may also imitate the management systems via reverse engineering (Görg and Greenaway, 2004; Yanran, 2015). However, the success of the strategy of reverse engineering is dependent upon the complexity of the product and process; the more complicated they are, the harder it is to imitate them. Notwithstanding this, any advancement of domestic technology acquired from imitation is a benefit for local firms (Doan *et al*., 2015).

The increase in competition as a result of foreign companies entering the domestic market may drive domestic firms to enhance their productivity, reduce costs and allocate resources more efficiently within the economy (Blomström, 1986; Doan *et al*., 2015; Tantratananuwat, 2015). However, the existence of MNCs might be prominent enough to create a position of market power in the domestic economy, reducing the scale of some local companies that are already in service to the host country market. Eventually, certain domestic companies may even be forced to leave the market as they cannot compete at all (Wang and Blomström, 1992; Glass and Saggi, 2002), thus effectively decreasing local market competition (Davies, 2003). The net effect of the competition relies on the ability of domestic companies to contend with MNCs and the efficacy of foreign firms to strengthen their market share (Kosava, 2010; Tantratananuwat, 2015).

Görg and Greenway (2004: 174) state that "a further indirect source of productivity gain might be through exports". Spillovers through exports occur when MNCs disperse their knowledge of international markets to local companies, thus helping them to grow into more lucrative exporters (Kneller and Pisu, 2007). There are three main channels that facilitate export spillovers. First, if MNCs possess superior access to information on foreign markets, this can "spill over" through their export activities (Görg and Greenway, 2004). Export-related information spillovers result in the decrease of export marketing costs and the increase in the export-to-sales ratios of local companies in the same industry (Chen, Sheng and Findlay, 2013). Second, there are imitation effects whereby local firms can learn the MNCs efficient production or management procedures, which, in turn, allow them to compete more successfully in export markets (Mühlen, 2013). Third, competition between local companies and MNCs in both home and foreign markets can induce domestic firms to improve their export performance (Görg and Greenway, 2004).

Foreign companies have strong incentives to prevent knowledge spillovers to the local firms who are their competitors. This can be accomplished by restricting local employees' access to information; managing core parts/materials information as trade secrets; and exporting production equipment by sealing off know-how in the equipment (Matsubara, 2014). MNCs can also counteract the mobility of labour by paying higher wages or implementing restraints of trade (Batool, Sadia and Ahmad, 2009). The prevention of technology spillovers can occur through formal protection of intellectual property or operating in countries where local companies have restricted imitative abilities (Javorcik and Spatareanu, 2005). Thus, the effect of horizontal spillovers may be restricted by the actions of the MNCs (Li and Luo, 2019).

2.2.2.2 Vertical Spillovers

The spillover effects of foreign ownership on the performance of local firms described above arise for companies in the same industry. However, spillovers may also occur as a result of inter-industry linkages when there is an interaction between the MNC and their local suppliers or customers (Batool *et al*., 2009; Doan *et al*. 2015). These are known as vertical spillovers and may occur through backward/upstream linkages or forward/downstream linkages (Pack and Saggi, 2001). Backward linkages occur when there is an association between the MNC and domestic suppliers, while forward linkages materialise from relationships between the MNC and their domestic customers (Blomström and Kokko, 1998; Talavera, 2001).

Foreign affiliates sign formal contractual agreements with domestic suppliers for the supply of intermediate inputs. In order to decrease the price and elevate the quality of inputs for their production process, the MNC may transfer new technologies or techniques to the suppliers (Görg and Greenaway, 2004; Javorcik and Spatareanu, 2008; Li and Luo, 2019). MNCs are known to contribute technical assistance to facilitate their local suppliers in absorbing and understanding the freshly transmitted knowledge (such as through training management) (Doan *et al*., 2015). In addition, MNCs offer domestic suppliers an opportunity to increase their economies of scale by extending and assuring a market for intermediate inputs (Lim and Fong, 1982). Overall, domestic suppliers benefit from the backward linkages of foreign ownership in the form of an enhancement of the quality of raw materials, increased output and jobs, more efficient production, technological and managerial capabilities (Talavera, 2001; Batool *et al*., 2009).

MNCs adhere to strict quality requirements concerning the inputs supplied by domestic firms (Javorick and Spatareanu, 2005). If MNCs are not satisfied with the quality of inputs from local suppliers, they will be uninterested in building vertical relationships (Reganati and Sica, 2007). This may result in the crowding out of domestic suppliers, as MNCs may acquire their inputs from foreign suppliers; thereby forcing domestic suppliers to exit the market (Görg and Greenaway, 2004; Sasidharan, 2006). As a consequence, a negative vertical spillover can arise in such scenarios.

MNCs acting as suppliers of intermediate inputs to domestic firms may also result in forward linkage spillover effects (Sari, Khalifah and Suyanto, 2016). MNCs take an interest in their customer's revenues and efficiency since that, in turn, translates to higher demand for their supplies. Therefore, the MNC has an incentive to convey knowledge on production procedures, techniques and global market access to the upstream domestic company (Doan *et al*., 2015). Foreign suppliers provide their local customers with the necessary technical support and training when they buy these intermediate inputs. As a result, local firms may increase their productivity through the use of high-quality inputs from foreign suppliers (Liang, 2017).

2.2.2.3 Absorptive Capacity

For spillover benefits from foreign ownership to be realised, sufficient absorptive capacity is required in the host country (Nguyen, Duysters, Patterson and Sander, 2009). Absorptive capacity refers to a local firm's ability to identify, assimilate and exploit the benefits spilled over by FDI (Cohen and Levinthal, 1990; Khordagui and Saleh, 2016). Three main factors increase the absorptive capacity of firms: (i) greater initial technological knowledge; (ii) greater human resource capacity from the labour force; and (iii) a more advanced financial system of the country.

As discussed in sections 2.2.2.1 and 2.2.2.2, the gains from FDI can be transmitted to domestic companies through horizontal or vertical channels. Regardless of the channel, Nguyen *et al*. (2009: 8) asserts that "domestic companies are required to have initial technological level to assimilate or image the advanced technology from FDI". That is, companies require prior related knowledge in order to absorb and utilise new knowledge (Cohen and Levinthal, 1990). Typically, absorptive capacity has been measured by the technology gap between the domestic and foreign firms (Doan *et al*., 2015). Kokko (1996) claims that domestic firms can only reap the benefits of spillovers if the technology gap is not too wide so that they can absorb the knowledge available from the MNCs.

Khordagui and Saleh (2016: 144) notes that "the greater the gap, the lower the ability of the host country to absorb the incoming technology since it lacks the human capital, networks and general infrastructure to make use of such technologies".

The second major element is the labour force, which is defined by human capital and education (Blomström and Kokko, 2003). This factor is deemed crucial as labour is the channel for transferring and receiving the FDI benefits through training, learning by doing and accumulating experience (Nguyen *et al*., 2009). Better educated and skilled labour gives rise to better know-how absorbed, and better performance achieved. Chen (1990) points out that countries with more investment in human capital have the ability to reap greater benefits from foreign ownership. Therefore, to realize the benefits of FDI, the host country requires good quality human capital as only humans have the capacity to learn, assimilate and generate new information.

Finally, the development of the financial system impacts the absorptive capacity of a country (Mabena, 2013). Financial systems are a vital tool used to carry out FDI activities, such as the disbursement of investment capital; the transfer of money from the home country of the MNC to the recipient country; payments for building materials, raw materials and labour costs; collection of money after selling and the transfer of income out of the country, and the other businesses (Nguyen *et al*., 2009). All such activities require a developed financial system. For example, if the investment capital is not disbursed, the project process might be delayed, stagnant or even shut down and the host country will receive nothing from FDI. Hence, the development of financial systems is a crucial component required to accelerate absorptive capacities of recipient country's and to facilitate the FDI operation in the host country (Durham, 2004).

2.3 Empirical Evidence

This section examines previous studies on the direct and indirect relationship between foreign ownership and firm performance through three avenues: financial performance, productivity and FDI spillovers.

2.3.1 Financial Performance

Numerous studies have been conducted on the relationship between foreign ownership and firm financial performance with mixed findings obtained. The results of these studies are analysed based on the findings of the form of the relationship (linear, non-linear and none).

2.3.1.1 Linear Relationship

Gunduz and Tatoglu (2003) compared the impact of various ownership structures on the financial performance of Turkish enterprises, including foreign versus domestic companies, using several stock and accounting performance measures. The dataset compromised of all private sector firms listed on the Istanbul Stock Exchange (ISE), excluding financial companies, with 34 foreign and 168 local companies, as of the end of 1999. The results showed that foreign-owned firms exhibited superior performance, but only in terms of Return on Assets (ROA) and no other performance indicators.

Aydin, Sayim and Yalama (2007) also sought to distinguish if the performance of foreign firms were superior to that of domestic firms in Turkey. To do this, they applied t-tests to determine if there were significant differences in the operating profit margin, ROA and Return on Equity (ROE) between foreign firms and domestic firms listed on the ISE. The dataset included 42 firms with foreign ownership and 259 domestic firms. Consistent with the findings of Gunduz and Tatoglu (2003), this study found that firms with foreign ownership performed more favourably based on ROA than domestic firms. These findings were attributed to enhanced monitoring and control capabilities and the transfer of new technology from foreign firms, resulting in lower operating expenses. This view is consistent with that of the agency theory and resourced-based theory outlined in sections 2.2.1.1 and 2.2.1.2, respectively.

Douma *et al*. (2006) explored the differential impact of foreign institutional and foreign corporate ownership on firm performance in India. The data sample of this study comprised of 1005 companies listed on the Bombay Stock Exchange (BSE) from 1999-2000. Following the work of

Thomsen and Pedersen (2000), Douma *et al*. (2006) assumed that the ownership structure was exogenous. The results showed that that the performance of foreign firms were superior to that of domestic firms, with firm performance measured by ROA and Tobin's Q. This superior performance was ascribed to foreign shareholders playing a significant monitoring role, which led to a reduction in agency costs. These results are consistent with those of the agency theory and a study by Boardman, Shapiro and Vining (1997), who also credited foreign ownership for the reduction of agency costs in Canadian companies.

A more recent paper on the impact of foreign ownership on the performance of Indian firms was conducted by Shrivastav and Kalsie (2017). The empirical analysis was conducted on 145 non-financial firms listed on the National Stock Exchange (NSE) from 2008 to 2012. The study utilised Tobin's Q, ROA and ROE as performance indicators. As explained in section 2.2.1.1, the different forms of foreign ownership may exhibit different effects on the firm. Shrivastav and Kalsie (2017) incorporated this into their study by not only examining total foreign ownership but also disaggregating this measure into foreign corporate and foreign institutional ownership. Multiple regression analysis was performed using pooled Ordinary Least Squares (OLS) and the Random Effects Model (REM). Under the pooled OLS model, foreign ownership (as a holistic measure) displayed a positive effect on all measures of firm performance. However, regarding the REM, the effect was insignificant. When total foreign ownership was disaggregated, foreign corporate ownership exhibited a positive influence on firm performance, whereas foreign institutional ownership had an ambiguous effect on firm performance as results varied when different firm performance indicators were used.

Huang and Shiu (2009) studied the effect of foreign ownership on firm performance in Taiwan. In contrast to Douma *et al*. (2006), they treated foreign ownership as an endogenous variable and used Two-Stage Least Squares (2SLS) estimation to account for endogeneity. Despite the difference in assumptions, Huang and Shiu (2009) obtained similar results to Douma *et al*. (2006) as firms with high levels of foreign ownership performed better than firms with low levels. Huang and Shiu (2009) credited the superior performance to the ability of foreign investors to select more profitable investments as they have the resources that allow them to execute fundamental research. The authors further argued that foreign investors also make contributions to technology, finance and expertise, thus increasing firm credibility and reputation compared to domestic investors.

Although most research on the foreign ownership-performance nexus focuses on large companies, Halkos and Tzeremes (2011) analysed 353 foreign-owned Small- and Medium-Sized Enterprises (SMEs) in the Greek manufacturing industry and concluded that foreign ownership had a positive effect on the performance of SMEs.

A Nigerian study by Uwuigbe and Olusanmi (2012) adopted a multivariate regression analysis to determine the relationship between ownership structure and enterprise performance. This study used a data sample consisting of 31 financial firms from 2006 until 2010. The empirical results revealed that foreign ownership had a favourable influence on firm performance. The authors stated that foreign ownership improved managerial efficiency, technical skills and the state of technology.

Marashdeh (2014) investigated the effect of corporate governance on the performance of 115 Jordanian firms during the period 2000 to 2010. Accounting-based measures such as ROA and ROE were used to measure firm performance and the Generalized Least Squares (GLS) and REM were used to estimate the empirical relationship. The results revealed that foreign ownership had a positive relationship with firm performance, but only when measured with ROE. These findings confirmed that foreign investors have the capacity and incentive to intervene (i.e., monitor and control) in corporate governance to improve the existing monitoring strategies of domestic investors (Gillan and Starks, 2003). This is supported by Lee, Rhee and Yoon (2018), who holds the view that a greater incentive for monitoring among foreign shareholders results in superior corporate performance. This evidence is also in agreement with the concepts of the agency theory presented in section 2.2.1.1.

Ting, Kweh, Lean and Ng (2016) explored the impact of ownership structure on firm performance in Malaysia from 2002 until 2011, using 201 non-financial firms. This study employed Tobin's Q and ROA as performance indicators and constituted year and sector dummies to account for year and sector effects. Results from the pooled OLS regressions revealed that foreign ownership positively affected firm performance. Ting *et al*. (2011) attributed the positive impact to superior managerial efficiency, technical skills, and technology that foreign investors brought into the working environment.

A South African study by Dube (2018) investigated the impact of foreign ownership on financial performance of firms. This study utilised an unbalanced panel data set consisting of 205 non-

financial JSE-listed firms from 2004 to 2014. The Fixed Effects Model (FEM) and the GMM were used for estimation purposes. Dube (2018) found positive effects of foreign ownership on corporate performance. As per previous studies, these findings imply that foreign investors take on effective monitoring roles and transfer skills and advanced technology to their investee companies, thus improving firm performance in terms of ROA and ROE. However, the concentration of foreign ownership was only based on the percentage of the top one, two, three, five and 10 foreign shareholders. Dube (2018: 410) notes that "an analysis of the total number of shareholders for each firm would likely give a more accurate picture of ownership and its effects on corporate performance". Hence, the results of the study may be unreliable.

In Indonesia, Nofal (2020) found that foreign ownership enhanced the firm performance of 66 non-financial firms listed on the Indonesia Stock Exchange, from 2014 to 2018. Nofal (2020) states that this outcome is consistent with the view of foreign ownership in Indonesia, where high and stable foreign ownership is beneficial to companies due to active monitoring, facilitation of technology usage, international market development and professional management. The findings of this study do not support the view of the entrenchment effect discussed in section 2.2.1.1 as the author argued that long-term and large-scale investments made by foreign investors do not seem to cause entrenchment, but rather results in monitoring benefits that reduce agency costs.

Not all studies, however, have found that firms with foreign ownership perform better than those without foreign ownership. For example, Kim and Lyn (1990) discovered that foreign firms operating in the US were not as profitable as domestic US firms. The authors argued that although foreign firms spend substantial time engaging in Research and Development (R&D), they do not give sufficient attention to advertising, resulting in lower performance. Furthermore, they contained higher debt levels combined with higher liquidity than domestic firms. Similarly, Munday, Peel and Taylor (2003) found that in terms of profit margin and ROE, foreign subsidiaries in the construction sector in the United Kingdom (UK) were less profitable than domestic firms.

The inferior performance of MNCs in the US and UK compared to the other countries cited may be attributable to their developed status. Traditionally, FDI flows from developed to developing countries, bringing with its superior technology and practices (Chari, Chen and Dominguez, 2011). Chang, Mellahi and Wilkinson (2009: 2) states that "the ways in which MNCs from emerging economies manage their subsidiaries in developed countries are distinctive and different from the

ways in which MNCs from developed countries manage their foreign subsidiaries". MNCs from emerging economies are faced with the double hurdle of liability of foreignness and liability of country of origin (Hymer, 1976). Although the liability of foreignness is inevitable for MNCs in both developed and emerging economies; MNCs from emerging economies are more susceptible to the liability of country of origin and specific disadvantages because of perceived weakness and lack of global dominance of the home country's economy (Chang *et al*., 2009). Furthermore, FDI from developing countries may not provide any competitive advantage to MNCs, as it is unlikely that they contribute any scarce resources that developed countries do not already possess.

2.3.1.2 Non-Linear Relationship

Another common trend in studies of foreign ownership and firm performance is that of a non-linear relationship (Vo and Vo, 2016); that is, the effect of foreign ownership on firm performance varies as the level of foreign ownership varies.

An Indian study by Chibber and Majumdar (1999) analysed 1001 private sector firms listed on the BSE before and after 1991. They discovered that foreign ownership only began to positively influence firm performance after 1991, once foreigners were allowed to obtain a majority shareholding of 51%. Prior to 1991, foreigners were only permitted ownership of a maximum of 40% in their subsidiaries. The study concluded that firms with a majority foreign shareholding achieved better performance compared to domestic and minority-owned foreign firms. Chibber and Majumdar (1999) believed that the reason for the enhanced performance of foreign firms was due to foreign investors having greater strategic control and transferring superior technical, managerial, and financial resources to foreign firms. However, firms will only reap the benefits of foreign investors if their majority shareholding is foreign. These results do not support the findings of Douma *et al.* (2006) and Shrivastav and Kalsie (2017) presented in section 2.3.1.1, where both studies observed linear relationships between foreign ownership and firm performance in India. However, Douma *et al.* (2006) and Shrivastav and Kalsie (2017) did not test for the possibility of a non-linear relationship between these variables, which may account for the conflicting results.

Akimova and Schwodiauer (2004) examined the impact of ownership structure on corporate governance and performance of privatised companies in Ukraine. The data sample consisted of 202 medium and large companies from 1998 to 2000. The results depicted a non-linear relationship between foreign ownership and firm performance, specifically an inverse U-shape with a threshold

value of 39%. This suggested that foreign shareholding below 39% improved firm performance, however, once foreign ownership exceeded the threshold value, firm performance was impaired. Akimova and Schwodiauer (2004) stated that the initial positive effect emerged from foreign investors providing new technology, but the latter negative effect of foreign ownership was due to the institutional environment in Ukraine being averse to foreign majority ownership.

In Vietnam, Phung and Hoang (2012) studied the relationship between firm performance and foreign and state ownership. All firms listed on the Ho Chi Minh and Hanoi stock exchanges from 2007-2012 were included in the study sample. The author used the FEM to estimate the relationship as it controls for unobserved heterogeneity between the variables. Tobin's Q and ROA were employed as performance indicators. The study found that, for both performance measures, state ownership and firm performance shared an inverse U-shaped relationship, whereas the foreign ownership and firm performance shared a U-shaped relationship. Thus, only once foreign ownership becomes concentrated, do the benefits materialise, which the authors attribute to greater monitoring, as discussed in section 2.2.1.1. As such, Phung and Hoang (2012) recommend that for Vietnamese firms to enhance their corporate governance quality; they must increase foreign ownership to a notable level. While the authors do not discuss this possibility, drawing from the resource-based theory presented in section 2.2.1.2, these results may also suggest that the benefits of foreign ownership through technological transfer, capital investment and other resources, only manifest when firms have control, as reflected in a greater stake of foreign ownership.

Viet (2013) conducted a similar study in Vietnam, also adopting ROA and Tobin's Q as performance measures. His sample consisted of 407 listed non-financial firms from 2006 to 2010. This study employed the 2SLS method to account for endogeneity. Unlike Phung and Hoang (2012), Viet (2103) found a significant inverse U-shaped relationship between foreign ownership and firm performance. The author claimed that the inverse U-shape relationship was connected to the entrenchment effect that foreign investors developed when they held a substantial level of shareholding, as explained in section 2.2.1.1. There was also evidence suggesting that foreign investors preferred to invest in companies with sound financial performance (hence the endogeneity problem), large size, low level of debt, in the pharmaceutical industry, and listed on a more liquid stock exchange.

Similar to Viet (2013), Phung (2015) observed an inverse U-shaped relationship between foreign ownership and firm performance in Vietnam, from 2007 to 2012. This study also attributed the U-shape to an entrenchment effect of foreign investors. This study compensated for potential endogeneity by employing the system GMM approach. The results revealed an inflection point of 43% of foreign ownership, maintaining that during the initial increase of foreign ownership, foreign investors are incentivized to monitor the managers and force them to align their objectives with the shareholder's objectives; however when it surpasses 43%, foreign investors display an entrenchment effect. The inverse U-shaped relationship found by Viet (2013) and Phung (2015) is consistent with section 2.2.1.1 on the benefits from monitoring and the losses from expropriations by shareholders when their ownership reaches a certain large level. However, these findings conflict with those of Phung and Hoang (2012). This may be due to the fact that Phung and Hoang (2012) did not account for endogeneity in their analysis.

An inverse U-shape relationship between foreign ownership and firm performance was also reported in Turkey by Gurbuz and Aybars (2010). This paper utilised 205 firms listed on the ISE from 2005 to 2007 and excluded all non-financial firms from the study sample. Firm performance was measured using ROA and the ratio of earnings before interest and tax to total assets (EBITTA). Causality tests proved that foreign ownership should be regarded as an exogenous variable when estimating the relationship between firm performance and foreign ownership. The results revealed that although foreign ownership initially shared a positive relationship with financial performance, the relationship became negative once the foreign shareholders owned more than 50% of the ownership structure. This may be the consequence of Turkey's distinctive methods in carrying out business operations in which they prefer to sustain local relationships and allow local ownership to have a fundamental role. These findings differ from the preceding Turkish studies by Gunduz and Tatoglu (2003) and Aydin *et al.* (2007) that found positive linear relationships. This may be due to the fact that these studies did not test for possibility of non-linear relationships.

2.3.1.3 No Relationship

Barbosa and Louri (2005) studied the difference between the performance of domestic firms and MNCs in Portugal using a sample comprising of 523 manufacturing firms in 1992. A quantile regression technique was used to account for departures from the normality of firms' profitability. The results showed no significant difference in the performance of the domestic firms and MNCs. The inability of MNCs in Portugal to persistently outperform their domestic rivals, despite their technological advantages, may be attributable to the fact that they must provide compensation for their liability of foreignness, as mentioned in section 2.2.1.3.

Mihai (2012) also found no significant relationship between firm performance and foreign ownership across 63 Romanian companies listed on the Bucharest Stock Exchange in 2010. This study argued that the positive effects of foreign ownership were not witnessed, as this study was performed during a year of recession. Furthermore, most firms in the sample belonged to the manufacturing sector, which was severely affected by the crisis, meaning that the decline in demand due to weaker industrial production directly affected the performance indicators, regardless of the presence of foreign ownership.

A South African study by Swart (2013) analysed the relationship between foreign ownership and the performance of JSE-listed firms from 2004 to 2010. This study used a data pairing analysis between foreign- and domestic-owned firms, with ROA, ROE and Economic Value Added (EVA) employed as measures of performance. The study sample included only the largest public companies to ensure that firm size did not influence the results. Conflicting with the results of Dube (2018), Swart (2013) found that foreign ownership was not significantly related to ROA and ROE. However, Swart (2013) observed some evidence of foreign ownership enhancing firm value, as foreign-owned firms had a 4.6% higher EVA return compared to their domestic-owned counterparts, but it was argued that this might be the result of an accounting irregularity instead of true value-added. This is supported by Anderson, Bey and Weaver (2004), who stated that larger firms seem to perform increasingly better when EVA is used as a performance indicator because EVA is biased with respect to firm size. The difference in the findings of Swart (2013) and Dube (2018) can be attributed to the use of different estimation techniques and composition of foreign ownership.

Khan and Nouman (2017) observed an insignificant relationship between foreign ownership and firm performance for 177 non-financial firms listed on the Pakistan Stock Exchange (PSX) from 2004 to 2013. The authors employed several panel regression methods such as pooled OLS, REM and FEM to ensure the robustness of their results. Financial performance was measured using Tobin's Q and ROA. These findings, however, contrast with those of a previous Pakistani study by Javid and Iqbal (2008) as they observed superior firm performance due to foreign ownership. The difference in results may be related to the assumption of endogeneity, as Javid and Iqbal (2008) accounted for endogeneity with the use of the system GMM, whereas Khan and Nouman (2017) ignored the issue of endogeneity.

In conclusion, it is therefore evident that most of the research based on the relationship between foreign ownership and firm performance has been conducted in developing countries, with mixed results having been obtained. The two studies that were conducted in developed countries (the US and UK) both found that the performance of domestic firms was superior to that of foreign-owned firms. This implies that foreign ownership may not have any financial benefits for firms in developed markets.

2.3.2 Firm Productivity

According to Greenaway, Guariglia and Yu (2014), when the share of foreign ownership in firms increases, foreign owners tend to be more productive, thus increasing the total profit of firms. Contrarily, since the increase in foreign ownership translates to a decrease in the total profits that will be dispersed to domestic owners, their incentives to contribute to production decreases, leading to a lower level of total productivity, which in turn reduces total profit. The overall effect depends on the level of foreign ownership. Hence, the impact of foreign ownership on firm productivity can be interpreted as another avenue for firm performance as productivity and profitability are closely related and should produce similar trends (Foster, Haltiwanger and Syverson, 2008). Firm productivity is analysed in the succeeding literature where the principal focus is on whether the relationship between foreign ownership and firm productivity is either positive or negative. Therefore, unlike the preceding empirical evidence, less emphasis is given to the shape of the relationship (i.e., linear versus non-linear). In addition, in contrast to the literature on firm performance, studies centred on productivity have focused on developed and developing countries.

Globerman, Ries and Vertinsky (1994) tested for differences in productivity and wages between Canadian-owned, US-owned, Japanese-owned, and European-owned firms in Canada. This study used industry dummy variables to capture the influence of the industry. The results showed that labour productivity was substantially higher for foreign-owned firms, but that this difference disappeared once size and capital intensity were controlled for. Furthermore, it was found that foreign-owned companies tended to pay higher wages to production workers. These findings suggested that FDI improved productivity and income levels in Canada.

Griffith (1999) used data collected from the Annual Census of Production to determine whether foreign-owned firms in the UK car industry were more productive than domestic-owned firms over the period 1980 to 1992. The production functions were estimated using panel data analysis, with the results demonstrating that German and US subsidiaries had a significant Total Factor Productivity (TFP) advantage over domestic UK firms.

In another study of the UK, Harris and Robinson (2002) aimed to determine whether foreign-owned plants from the US, European Union (EU) and South East (SE) Asia exhibited superior productivity compared to domestic plants for all manufacturing firms, from 1974 until 1995. The system GMM approach was used to estimate the models and. Similar to the findings of Griffith (1999), in general, US-owned firms outperformed the UK-owned firms. There was little evidence of a significant productivity differential between UK-owned plants and EU-owned plants. For SE Asian-owned firms, the results were mixed as they performed better in some industries but worse in others.

Fons-Rosen, Kalemli-Ozcan, Sørensen, Villegas-Sanchez and Volosovych (2015) used a unique firm-level panel data set from advanced European countries (Belgium, Germany, Spain, Finland, France, Italy, Norway, Portugal and Sweden) over the period 1999 until 2008, to investigate the effect of foreign ownership on firm-level productivity. Fons-Rosen *et al*. (2015) confirmed that foreign ownership was endogenous as it was a function of current and expected future productivity and firm-level variables. This implied that foreign investors endogenously selected high productivity firms. Hence, this study utilised the instrumental variables (IV) approach to control for endogeneity. Results revealed that firms that received FDI displayed small increases in TFP; however, these increases in productivity only materialised after several years.

Driffield, Sun and Temouri (2018) used Hansen's (2000) threshold estimation technique to examine the relationship between foreign ownership and productivity across four countries (UK, Germany, Italy and Poland) from period 2001 to 2010. With the use of a split sample, Hansen's (2000) threshold estimation method enabled the authors to investigate the possibility of a non-linear relationship between firm productivity and foreign ownership by endogenously identifying and estimating the value of foreign ownership at which the impact of foreign ownership either switched in signs or magnitude. In Germany, foreign firms were found to have a higher productivity than local firms. This coincides with a previous study by Temouri, Driffield and Higón (2008) who also discovered that foreign firms were more productive than all local firms in Germany. As a matter of fact, Driffield *et al.* (2018) found that German MNCs had the highest level of TFP, followed by the UK, Italy and Poland across the entire distribution for the manufacturing sector. With regard to the services sector, Italian MNCs were the second most productive after German MNCs, followed by the UK and Polish MNCs. Hansen's (2000) threshold method yielded an increasing but non-linear relationship between foreign ownership and productivity.

Turning to evidence from developing countries, Takii (2004) conducted a study to investigate whether foreign affiliates used more advanced technology or skills compared to domestic companies in the Indonesian manufacturing sector in 1995. The results suggested that foreign companies were more productive than domestic companies and, in addition, companies with 100% of foreign ownership were more productive than companies with less foreign ownership. This finding differs from a previous Indonesian study by Blomström and Sjoholm (1999), who claimed that the productivity of foreign-owned plants did not depend on the level of foreign ownership.

Using the GMM estimation technique to account for endogeneity, Li, Lu and Ng (2009) compared the productivity of foreign firms and domestic firms in China. The empirical analysis used data from the Survey of Chinese Enterprises. The results found that a 10% increase in foreign ownership led to an approximately 10% increase in labour productivity. However, the identity of the foreign ownership mattered, as only foreign ownership from foreign firms had a positive impact on productivity but not ownership from foreign banks, institutional investors or individuals. Li *et al.* (2009) suggested that the productivity improvement from foreign ownership might have arisen from the transfer of technology, managerial skills and products and the bridging with overseas markets, as per the resource-based theory in section 2.2.1.2.

Greenaway *et al.* (2014) used both accounting (such as return on sales (ROS) and ROA) and productivity measures (such as labour productivity and TFP) in their study of the relationship between foreign ownership and firm performance in China. Their sample comprised of 21 582 unlisted Chinese firms over the period 2000 to 2005. Given possible endogeneity of the regressors, this study used the first difference GMM approach to estimate all specifications and found that an inverse U-shape characterised the foreign ownership-performance relationship among Chinese firms. Specifically, the turning points were found to be 52.31%, 64.24%, 55.65%, and 46.79% of foreign ownership for ROA, ROS, labour productivity and TFP, respectively. This indicates that a substantial level of domestic ownership is still essential to guarantee optimal firm performance.

A positive effect of foreign ownership on productivity is confirmed by most studies. Unlike the firm financial performance in developed countries, foreign ownership increased firm productivity in developed countries (such as Canada, UK and Germany).

2.3.3 FDI Spillovers

Whilst the preceding sections reviewed studies only on the direct effects of foreign ownership, this section extends the empirical evidence to the indirect effects of foreign ownership, specifically in terms of FDI spillovers.

Padibandla and Sanyal (2005) used panel data of firms in India in the post-reform period from 1989 to 1999 to examine the productivity effects at the firm-level from FDI. Data was sourced from the Confederation of Indian Industry and the Centre for Monitoring the Indian Economy. The results revealed strong evidence of horizontal spillovers as domestic firms benefited from the presence of foreign-owned firms in their industries. In addition, the benefits were found to be greater for larger firms and those that did more business domestically. This could be attributed to larger firms having better absorptive capabilities compared to smaller firms and domestically orientated firms benefiting by imitating the practices of MNCs, as stated in section 2.2.2.3.

Thangavelu and Pattnayak (2006) also examined spillovers from FDI in the Indian market through both backward and horizontal linkages but focused exclusively on the pharmaceutical industry. The data sample consisted of nearly 200 companies from 1989 to 2000. To account for endogeneity, this study adopted a semi-parametric estimation method proposed by Olley and Pakes (1996) and Levinsohn and Petrin (2003). Consistent with the results of Padibandla and Sanyal (2005), Thangavelu and Pattnayak (2006) found positive horizontal spillovers. However, evidence

of negative spillovers from the backward linkages were also detected, suggesting potential technology and efficiency gaps between domestic companies and MNCs in the Indian pharmaceutical industry.

A more recent study in India by Mondal and Pant (2018) used a panel data sample comprising of manufacturing firms from 1994 to 2010 to explore productivity spillovers through horizontal and vertical linkages. Interestingly, the results revealed that only local companies with initial technological knowledge, a narrow technology gap with the foreign firms, and high complementary capabilities, achieved productivity gains from FDI spillover channels. This discovery may, to some extent, explain the reasons for some of the findings of Padibandla and Sanyal (2005) and Thangavelu and Pattnayak (2006).

From the perspective of a developed country, Karpaty and Lundberg (2004) studied whether the productivity of local manufacturing companies in Sweden were higher in the presence of foreign companies over the period 1990 to 2000. The data was extracted from Statistics Sweden and included all manufacturing firms. Using the FEM approach, their findings showed strong evidence of positive horizontal spillover effects from FDI as the presence of foreign ownership in the same industry and region increased the TFP of local companies. Karpaty and Lundberg (2004) also found that the magnitude of the spillover effects was contingent on both the absorptive capacity of the local firm and the nationality of the foreign firm. US-owned companies had a more substantial positive impact on productivity in local companies compared to foreign ownership from the rest of the world. The authors attributed this to a larger stock of firm-specific knowledge that could be dispersed to domestic companies.

Zhang *et al*. (2010) adopted a slightly different approach to the seminal research on spillover effects by investigating the impact of the diversity of FDI country origins on the productivity of local companies in China. The authors suggest that the diversity of FDI country origins may increase FDI spillovers by enhancing the range of technology and managerial methods introduced by foreign companies, to which local companies are subjected and which they could adopt. The study used panel data on Chinese manufacturing firms obtained from the Annual Industrial Survey Database of the Chinese National Bureau of Statistics over the period 1998 to 2003. The results revealed that the diversity of FDI country roots within an industry had a favourable effect on the productivity of local companies in the industry, indicating a positive horizontal spillover. The

study further stated that the positive effects of the spillovers were greater when local companies were larger and when the technology gap between FDI and the local firms were intermediate.

Xu and Sheng (2012) also studied the effect of FDI spillovers on Chinese companies in the country's manufacturing industry between 2000-2003. Using the Levinsohn and Petrin (2003) method, the study accounted for endogeneity, simultaneity bias and clustering errors. Xu and Sheng's (2012) findings showed a positive productivity gain in local companies due to vertical spillovers through forward linkages. There was also evidence of positive horizontal spillovers; however, after controlling for the firm's market share, negative effects of horizontal spillovers emerged. Thus, the initial result of a positive horizontal spillover effect was a function of market power.

In a more recent Chinese study, Lu, Tao and Zhu (2017) focussed only on horizontal spillovers, with data from the Annual Survey of Industrial Firms (ASIF) for the period of 1998-2007. After accounting for endogeneity, the findings revealed that FDI had a negative and significant effect on the productivity of domestic firms in the same industry; thereby signalling negative horizontal spillovers.

Nicolini and Resmini (2010) utilised an unbalanced panel of firm-level data from Bulgaria, Poland and Romania between the period 1998 to 2003 to explore the effect of foreign ownership on the productivity of local companies. The authors used a panel FEM to account for unobservable heterogeneity at the firm, industry and regional levels as well as over time. The results showed evidence of both technological horizontal and vertical spillovers but that the advantages of spillovers depended on the size of the local company. In Bulgaria, foreign firms benefited medium-sized firms operating in complementary low-tech manufacturing sectors regardless of their level of absorptive capacity. There was no evidence of spillovers in Poland. Finally, both horizontal and vertical spillovers were present in Romania, although only small firms benefited from both kinds of spillovers, while large firms reaped horizontal spillovers, but only from low-tech foreign firms.

Jude (2012) estimated the direction and magnitude of FDI technological spillovers using a plant-level dataset of Romanian enterprises from 1999 to 2007. Although the results confirmed the previous findings of Nicolini and Resmini (2010), of both vertical and horizontal spillovers in Romania, Jude (2012) discovered that vertical spillovers were more prominent than horizontal spillovers. Furthermore, using different absorptive capacity measures like human capital or R&D

did not alter the results. Among all the horizontal spillover channels mentioned in section 2.2.2.1, labour mobility was found to be the only significant one in this study.

In a study of horizontal spillovers from foreign ownership in Turkey, Erdogan (2011) analysed 215 firms that were among the top 500 industrial enterprises in Turkey over the period 2004 to 2008. The findings suggested that domestic firms benefited from productivity spillovers from foreign-owned firms, but that absorptive capacity did not matter for horizontal spillovers. Fatima (2014) also examined FDI spillovers in Turkey but extended the study of Erdogan (2011) by also considering vertical spillovers. Firm-level data for manufacturing firms for the period 2003 to 2010 was used, as this period coincided with substantial inflows of FDI into both the manufacturing and service sectors in Turkey. In contrast to Erdogan's (2011) findings, Fatima (2014) found no significant effects of horizontal spillovers from foreign firms on the productivity of domestic Turkish firms. The difference in results may be explained by the different time periods examined and variations in the firms in the sample. With respect to vertical spillovers, Fatima (2014) found evidence of a positive and significant effect on local productivity levels. Fatima (2014) suggested that Turkish policymakers should focus their attention on the strengthening of supplier-buyer relationships between local firms and MNCs to maximise the benefits from FDI. This study also acknowledged the heterogeneity of local (foreign) firms and their differential capacity to absorb (exude) the FDI-induced externalities.

In a study of five developing countries (Brazil, Morocco, Pakistan, South Africa and Vietnam), Kinda (2012) adopted a one-step stochastic frontier model to explore the importance of vertical spillovers from 2000 to 2005. The author used an alternative approach to estimate vertical spillovers by measuring the share of a firm's sales to MNCs within the country to capture backward linkages. The results of the study pointed to the existence of vertical spillovers from foreign to domestic companies, through backward linkages. Smaller domestic firms that did business with MNCs, were observed to be more productive.

Mühlen (2013) employed comparable firm-level panel data from 10 Latin American countries (Argentina, Bolivia, Chile, Colombia, Ecuador, Guatemala, Panama, Paraguay, Peru and Uruguay) to estimate the spillover effects from FDI on firm productivity levels. The impact was evaluated as an average effect for the entire set of countries as well as individually for each economy. The

results revealed a small negative horizontal spillover effect from the foreign presence within sectors across Latin American countries, caused by wholly-owned foreign firms.

FDI spillovers in the Malaysian manufacturing sector studied by Khalifah and Adam (2009), Choo (2012) and Dogan, Wong and Yap (2017) demonstrated mixed results. Khalifah and Adam (2009) undertook the study during the period 2000 to 2004 and focused exclusively on horizontal spillovers. Using pooled-OLS and the FEM to account for the heterogeneity of the firms, Khalifah and Adam (2009) found evidence of positive horizontal productivity spillovers in industries when MNCs competed with local companies. Choo (2012) explored horizontal and backward vertical spillovers from foreign ownership in Malaysia. The data sample consisted of 940 firms, covering 12 industries for the period 2004 to 2007. Consistent with the results of Khalifah and Adam (2009), Choo (2012) found evidence of positive horizontal spillover effects, and in addition, significant backward vertical spillovers at sub-sectoral levels. Dogan *et al.* (2017) used firm-level data from the Census of Manufacturing for the years 2000 to 2005 and the Annual Survey of Manufacturing Industries for the years 2001 to 2004. This study used the Levinsohn and Petrin (2003) method to compute TFP and included lagged spillover variables to address the potential endogeneity problem that could arise because foreign firms might choose to enter more productive industries. In contrast to the two previous studies, Dogan *et al.* (2017) observed weak evidence of horizontal spillovers and the vertical spillovers were found to be negative. The variations in methodologies, underlying assumptions, and the firms included in the samples can possibly account for the different results observed in the studies.

Li and Luo (2019) examined the effects of spillovers from FDI on firm-level productivity growth in the West Midlands of England for 2198 firms operating in 75 industries over the period 2004 to 2011. FEM panel data IV regression was adopted to accommodate reverse causality. In terms of vertical spillovers, the empirical results suggested strong forward spillovers from foreign affiliates to their local consumers in downstream sectors. However, there was weak positive spillover effects through backward and horizontal linkages.

Orlic, Hashi and Hisarciklilar (2018) explored the relationship between FDI spillovers and the productivity of manufacturing firms in five European transition countries (the Czech Republic, Estonia, Hungary, Slovakia and Slovenia). This study relied on firm-level data extracted from the Amadeus database. The findings revealed that domestic manufacturing companies benefited from

the presence of foreign firms in upstream services, particularly in the knowledge-intensive services, and in the downstream manufacturing sector. The imitation effect was observed to negatively affect the productivity of domestic companies. At the same time, labour mobility and increased competition appeared to be the primary channels of horizontal knowledge diffusion, consistent with the theory discussed in section 2.1.2.1. The study concluded that the direction and intensity of both vertical and horizontal spillovers depended on the absorptive capacity of domestic firms.

For the most part, the evidence on spillovers is mixed. This can be attributed to different estimation techniques used in studies and the different levels of absorptive capacities in countries.

2.3.4 Firm Productivity and FDI Spillovers

As presented above, the literature on the performance effects of foreign ownership can be broadly classified into those that evaluate the direct impact of foreign ownership on the recipient firms and those that evaluate FDI spillovers from those firms to competitors, suppliers and customers. This section examines empirical evidence that is based on a combination of both, i.e., direct and indirect effects of foreign ownership on productivity.

With the use of a panel containing more than 4000 Venezuelan firms between 1976 and 1989, Aitken and Harrison (1999) identified two effects of FDI on firms: (i) increases in foreign ownership were correlated with increases in productivity for recipient firms with less than 50 employees, implying that these firms gain from the productivity advantages of foreign investors; and (ii) that increases in foreign ownership impairs the productivity of domestic firms in the same industry; thereby suggesting a negative horizontal spillover effect. The net effect of foreign ownership was relatively small and the gains from FDI appeared to be mainly achieved through joint ventures.

Konings (2000) examined the influence of FDI on the productivity performance of firms in Bulgaria, Romania and Poland, using the FEM. This study also considered the possibility of spillovers, and endogeneity of ownership among other factors. There was no evidence of an impact of foreign ownership on the productivity of firms in Bulgaria and Romania. However, in Poland, foreign-owned firms were found to be more productive than local firms. This may be due to the time lag required by firms to restructure and affect performance productivity as Poland is more advanced in the transition process compared to Bulgaria and Romania. In addition, negative

spillovers were observed from foreign firms to domestic firms in Bulgaria and Romania whereas no spillovers were detected in Poland. Konings (2000) attributes this finding to a larger technological gap in less advanced countries like Bulgaria and Romania.

Schoors and Tol (2002) analysed the effects of foreign ownership on labour productivity of Hungarian firms. Data for Hungarian firms was collected from the Amadeus database of Bureau van Dijk. This study utilised an unbalanced panel of 1084 firms in 1997 and 1998. In order to control for a potential selectivity bias, a treatment effects model was estimated for the foreign ownership dummy variable and firm-specific effects were used as right-hand side variables in the treatment equation. Foreign ownership was found to have a positive impact on labour productivity; therefore, the performance of foreign businesses was superior to that of local businesses. Furthermore, horizontal spillovers were apparent as the presence of foreign ownership increased the labour productivity of local firms in the same sector. The absorptive capacity of the local firms that was measured by the technology gap discussed in section 2.2.2.3, did not affect the magnitude of spillovers.

Yudaeva, Kozlov, Melentieva and Ponomareva (2003) compared the productivity of Russian firms that had foreign ownership with the productivity of wholly domestic-owned firms from 1993 to 1997. This study also considered spillover effects from foreign ownership. The results showed that foreign-owned firms were more productive than local Russian-owned firms, but the productivity of the former was negatively affected by the lagging development of reforms in the regions where they operated. They also discovered evidence of positive horizontal spillovers and negative vertical spillovers.

Kee (2005) investigated the relationship between foreign ownership and firm productivity in Bangladesh's garment sector during the period 2004 to 2005. This study was based on data collected from the Bangladesh Garment Manufacturers and Exporters Association Members' Directory. To address the endogeneity bias, firm productivity was measured by a three step non-linear estimation methodology developed by Olley and Pakes (1996). The findings showed that foreign-owned firms were, on average, 20% more productive than domestic firms in the same sub-industry and location. Furthermore, there was significant evidence that domestic firms benefited from productivity spillovers from the foreign-owned firm; for every 10% increase in the productivity of foreign-owned firms, the productivity of domestic firms improved by 1.4%.

Olabisi (2011) analysed the causal relationship between foreign ownership and the productivity performance of Chinese manufacturing companies from 2003 until 2007. An unbalanced panel data set of 413 firms. The results show that foreign-owned firms had higher average productivities but, after controlling for endogenous selection into foreign ownership and unobserved confounding factors, the foreign-owned firms appeared to lag their Chinese-owned counterparts. These results suggest that local firms appear to be catching up with their foreign-owned counterparts in terms of productivity. The process of "catching up" may be motivated in part by observable characteristics of the firms, referred to as imitation in section 2.2.2.1.

As noted in chapter 1, studies investigating the effect of foreign firms operating in Africa on local firms are limited. To the authors knowledge, Mebratie and Bedi (2011) and Magwiro *et al*. (2016) are the only existing studies that studied the effect of FDI on domestic firms in the South African context. Mebratie and Bedi (2011) investigated the impact of FDI on the labour productivity of foreign- and domestic-owned manufacturing firms using a two period (2003 and 2007) panel data model. With the implementation of stratified sampling, firms were selected from a list of all registered companies in Johannesburg, Cape Town, Port Elizabeth and Durban. Based on results produced by OLS, foreign-owned firms displayed superior productivity to their local counterparts. However, panel data-based estimates supported the notion that FDI is attracted to more productive companies, and after controlling for firm fixed-effects, there was no longer any foreign-owned productivity effect. This highlights the possibility of endogeneity in the South African environment. Consistent with the lack of a foreign ownership productivity effect, no evidence of spillover effects were observed.

This view is supported by Magwiro *et al*. (2014), who sought to determine whether there were any productivity differences between MNCs and local manufacturing firms while also assessing the possibility of horizontal and vertical spillover effects. Drawing on cross-sectional data from the World Bank enterprise survey in 2007, Magwiro *et al.* (2014) also found that MNCs were not significantly more productive than local manufacturing firms, nor were there any significant horizontal or vertical spillover effects. The absence of spillovers contradict the findings of the Zambian studies by Waldkirch and Ofosu (2010) and Bwalya (2006), who found negative spillover effects which was attributed to negative competition effects.

2.4 Conclusion

A review of the literature on the relationship between foreign ownership and firm performance shows that this relationship depends on many factors operating within a firm. The empirical evidence on the foreign ownership-financial performance relationship generates mixed findings with some studies claiming that performance is dependent on the level of foreign ownership. This differs from the relationship between foreign ownership and firm productivity, where in most cases, foreign ownership is positively linked to firm productivity. This difference is unexpected given that productivity usually translates into better financial performance. However, these differences may be attributable to the fact that the studies that focused on financial performance are typically of listed companies, whereas those that focused on productivity usually involve private companies that may be smaller. With respect to FDI spillovers, the evidence is also mixed, which could be a consequence of different absorptive capacity in countries and the use of different methodologies in studies (including potential endogeneity). The empirical evidence has also given insight into various methodologies employed to carry out the different studies, which has guided the study's methodology described in the next section.

CHAPTER 3: DATA AND METHODOLOGY

3.1 Introduction

This chapter outlines the data and methodology that were utilised to fully answer the research questions presented in chapter 1. Firstly, the dataset that was formulated for the empirical analysis is described. Thereafter, the variables and empirical models used to measure the direct effects of foreign ownership are presented, followed by the additional variables and model/s required for the estimation of the horizontal spillover effects of foreign ownership. Finally, the methods that were used to estimate the models are discussed.

3.2 Data

The data sample used in this study consists of non-financial firms listed and previously delisted on the JSE during the period 2012-2018. The list of firms contained within the sample is presented in table B-1 in the appendix. Annual firm-level data was obtained from financial statements through the Bloomberg database. Similar to previous South African studies (such as Swart, 2013; Dube, 2018), the percentage of foreign ownership was obtained from IRESS. All data was obtained in local currency, and market capitalisation was measured at 31 December for all firms in each year. The final data set comprised of an unbalanced panel of 1320 annual observations in respect of 247 firms, spanning the seven-year period from 2012 to 2018 inclusive. This data set accounts for mergers, acquisitions and unbundling's. The structure of the unbalanced panel is presented in table B-2 in the appendix.

Consistent with many previous studies on this subject (such as Gurbuz and Aybars, 2010; Ting *et al*., 2016; Shrivastav and Kalsie, 2017; Dube, 2018), financial firms are excluded from this study because their financial statements, asset structures and regulatory requirements differ substantially from firms in other industries; therefore, analysing financial firms with non-financial firms may produce biased results. Delisted firms were included, as failing to account for them when performing historical research may result in a survivorship bias (Kouwenberg, Salomons and Thontirawong, 2014).

The industry classification of firms was based on the Industrial Classification Benchmark (ICB) that is used by the JSE. Firms in the data set belong to eight industries, namely, Basic Materials; Consumer Goods; Consumer Services; Health Care; Industrials; Oil and Gas; Technology; and Telecommunications. The ninth industry, Utilities, did not consist of any firms within the study

period; therefore, eight categories were used. Industrial classifications are considered relatively broad and may combine firms whose operations appear to differ, although they are grouped in the same industry. Sectoral classifications, which are a level lower of industrial classifications, may prevent this issue (Dube, 2018). However, from the eight industries, there exist 33 sectors, thus making the use of dummy variables extremely cumbersome. Hence, following previous studies (such as Fosu, 2013; Nguyen, Locke and Reddy, 2015; Akbar *et al*., 2016; Dube, 2018), the ICB industry classification was deemed as most suitable for this study. The industry that each company belongs to and the distribution of firms among these industries are documented in table B-1 and table B-3 of the appendix, respectively.

3.3 Testing the Direct Effect of Foreign Ownership on Firm Performance

The empirical models presented in this section were utilised to test the first research objective (i.e., to establish if the relationship between foreign ownership and firm performance is either linear or non-linear). The empirical evidence presented in section 2.3 suggests that the direct effects of foreign ownership on firm performance can be estimated through financial and productivity measures. However, the estimation of productivity at the firm-level is problematic in South Africa due to the unavailability of the required data. Bhorat and Lundall (2004) and Behar (2010) claim that the scarcity of South African firm-level studies has been primarily driven by a lack of data. As such, most studies examining productivity in South Africa are undertaken at an aggregate- or sectoral-level (such as Fedderke, 2000; Tsebe and Biniza, 2015).

To the author's knowledge, the only study that attempted to estimate productivity at the firm-level in South Africa is that of Kreuser and Newman (2018), who estimated TFP for the South African manufacturing sector. Their primary data source was South African Corporate Income Tax (CIT), and South African Revenue Services (SARS). Still, this study experienced difficulties in accessing certain firm-level data and thus substituted the missing data with industry-level data; thereby creating drawbacks and limitations to their study.

Productivity can also be reflected through financial measures that are employed to measure firm performance. Miller (1987) examined the relationship between profitability and productivity and found that the increases in operating income can be attributed to productivity and price changes. Tatje and Lovell (1999) confirmed that productivity gains have the potential to contribute to an increase in business profits. Garrigosa and Tatje (1999) analysed the variation in profits based on

TFP, using the framework of the neoclassical theory of production, and introduced the concept of "duality" among TFP measures. They showed that several decompositions of profit variations are, in fact, "dual" to each other and therefore, largely measure the same concept.

Bosch-Badia (2010) discovered a "functional relationship" between ROA and the leading productivity indicators at firm-level, namely TFP and labour productivity. Both productivity indicators, together with a price change in outputs and inputs, were the drivers that determine the value of ROA. This relationship can be deemed as an extension of the DuPont method that expresses ROA as the product of operating margin per asset turnover.

Taking all the above factors into consideration, firm productivity was not directly estimated in this study. Instead, financial and market measures were utilised to determine the effect of foreign ownership on financial firm performance.

3.3.1 The Variables

3.3.1.1 The Dependent Variables

As was evident from the review in section 2.3, accounting-based measures such as ROA and ROE are most commonly used to measure financial performance in the prior research focused on the relationship between foreign ownership and firm performance (such as Aydin *et al*., 2007; Gurbaz and Aybars, 2010; Swart, 2013; Marashdeh, 2014). Ongore (2011) confirms the widespread usage of these two ratios. As such, ROA and ROE were selected for this purpose in this study. ROA was calculated as the ratio of pre-tax profit to total assets, while ROE was calculated as the ratio of net income to the average common stockholder's equity.

In conjunction with these accounting-based measures, market-based measures of performance have also been employed in studies of ownership and performance, with Tobin's Q used extensively (such as Douma *et al*., 2006; Ting *et al*., 2016; Shrivastav and Kalsie, 2017; Dube, 2018). Tobin's Q uses a forward-looking approach to measure corporate performance by reflecting what management will achieve in the future whereas ROA and ROE use a backward-looking approach to reflect what management has already achieved (Demsetz and Villalonga, 2001; Hu and Izumida, 2008). Chinaemerem and Anthony (2012) claim that the use of market-based performance measures, such as Tobin's Q, along with accounting-based performance measures, make studies more robust.

Kyereboah-Coleman (2008) also points out that only using one measure of performance contributes to the inconsistencies in identifying a clear relationship between firm performance and the variables of interest. Likewise, Tian and Zeitun (2007) stated that investors might favour either accounting- or market-based measures of performance and thus, only considering one category hinders the reliability of the results obtained. As such, in conjunction with ROA and ROE, Tobin's Q was employed to measure firm performance in this study. Tobin's Q is the ratio of the market value to the replacement value of assets (Kyereboah-Coleman, 2008; Hu and Izumida, 2008; Hong and Loan, 2017). Due to the lack of data on the replacement costs of assets, many studies use the book value of assets instead of the replacement value of assets, which is followed in this study (Kyereboah-Coleman, 2008; Shrivastav and Kalsie, 2017; Hong and Loan, 2017).

3.3.1.2 The Explanatory Variables

The explanatory variable in this section, foreign ownership, was measured as the percentage of shares owned by foreigners in the firm (Miguel, Pindado and Torre, 2004; Douma *et al*., 2006; Hong and Loan, 2017). Based on theory and previous evidence, the *a priori* expectation of the relationship between foreign ownership and firm performance was unclear.

3.3.1.3 The Control Variables

Following the analysis of previous empirical work, several firm-specific variables were included in the empirical models as control variables. The inclusion of firm-specific variables removes the potential influence that other factors may have on financial performance to more accurately identify the relationship between foreign ownership and firm performance (Chinaemerem and Anthony, 2012). The control variables that were used are listed and described in table 3-1 below.

Table 3-1: Explanation of Control Variables

Variable	Explanation
Firm Size	The natural log of net assets.
Firm Age	The natural log of the number of years since the establishment of the firm to the observation date.
Leverage Ratio	The ratio of long- and short-term debt to total assets.
Dividend Payout Ratio	The ratio of dividends per share (DPS) to earnings per share (EPS).
Asset Turnover Ratio	The ratio of net sales to total assets.

1. Firm size (LNSIZE) - Firm size controls for any systematic effect of a firm's size with regards to the relationship between assets and a firm's performance since the performance of large firms compared to small firms may differ (Lee, 2010). Larger firms frequently outperform smaller firms due to their operational efficiency and competitive power (Gurbuz and Aybars, 2010). Nonetheless, De Miguel, Pindado and Torre (2004) argued that larger firms often experience information asymmetry, leading to an impairment in firm performance. Consequently, the expectation of the relationship between firm performance and size was ambiguous.

2. Age of a firm (LNAGE) - Firm performance may also be affected by the firm's age. According to Thornhill and Amit (2003), older firms are exposed to experience-based economies and can steer clear of the liabilities of newness. Hence, a positive relationship was expected between firm performance and the age of firm.

3. Leverage ratio (LEV) - The leverage ratio was included as firms require loans to invest and expand over and above the money supplied by shareholders and thus, this should influence performance (Yilmaz and Buyuklu, 2016). Companies also find debt attractive as they are always cheaper than funds raised on external equity markets (Shuetrim, Lowe and Morling, 1993). Furthermore, Lins (2003) claimed that the leverage ratio should be controlled due to the chance of creditors minimising managerial agency costs and, in the process, impacting ownership concentration. Although financial and economic theory suggests a positive relationship between leverage and profitability (Kale, 2014), the increase in debt raises the costs associated with its fulfilment, which could result in a potential decline in the profitability of firms (Gurbuz and Aybars, 2010). Consequently, the expected relationship between firm performance and the leverage ratio was unclear.

4. Dividend Payout (DIVPAY) - When the distribution of a firm's earnings occurs in the form of the payment of dividends, investors' expectations of firms generating more profit in the future is amplified (Gurbaz and Aybars, 2010). Thus, the relationship between the dividend payout ratio and firm performance was expected to be positive.

5. Asset Turnover ratio (ASTO) - The managerial efficiency of a firm may be measured by the way management utilises the firm's assets to yield positive returns (Kim and Lyn, 1990; Chinaemerem and Anthony, 2012); therefore, the inclusion of the asset turnover ratio as a control

variable in the model. A positive relationship was expected between the asset turnover ratio and firm performance.

3.3.1.4 Dummy Variables

Along with the firm-specific control variables, a group of industry and year dummies were also included to control for differences in industry and time effects (Sasidharan, 2006). Industry dummy variables control for industry-specific characteristics and shocks (Hu and Izumida, 2008). The industry dummies are presented below in table 3-2.

Table 3-2: Industry Dummy Variables

Variable	Explanation
$\mathbf{Ind_1}$	A dummy variable equal to unity if a firm is in the Basic Materials industry and otherwise equal to zero.
$\mathbf{Ind_2}$	A dummy variable equal to unity if a firm is in the Consumer Goods industry and otherwise equal to zero.
$\mathbf{Ind_3}$	A dummy variable equal to unity if a firm is in the Consumer Services industry and otherwise equal to zero.
$\mathbf{Ind_4}$	A dummy variable equal to unity if a firm is in the Health Care industry and otherwise equal to zero.
$\mathbf{Ind_5}$	A dummy variable equal to unity if a firm is in the Industrials industry and otherwise equal to zero.
$\mathbf{Ind_6}$	A dummy variable equal to unity if a firm is in the Oil and Gas industry and otherwise equal to zero.
$\mathbf{Ind_7}$	A dummy variable equal to unity if a firm is in the Technology industry and otherwise equal to zero.
$\mathbf{Ind_8}$	A dummy variable equal to unity if a firm is in the Telecommunications industry and otherwise equal to zero.

Numerous studies that focus on the ownership-performance nexus and/or FDI spillover effects include year dummies in their estimation models to account for contemporaneous correlations in the errors across firms (such as Arellano and Bond, 1991; Wintoki *et al*., 2012; Schultz, Tan and Walsh, 2010; Sato and Söderbom, 2017; Shrivastav and Kalsie, 2017). For this reason, year dummy variables are incorporated into the models of this study. The time classification was based on the period of this study (2012-2018), as shown below in table 3-3.

Table 3-3: Year Dummy Variables

Variable	Explanation
$\mathbf{Year_{2012}}$	A dummy variable equal to unity if the year is 2012 and otherwise equal to zero.
$\mathbf{Year_{2013}}$	A dummy variable equal to unity if the year is 2013 and otherwise equal to zero.
$\mathbf{Year_{2014}}$	A dummy variable equal to unity if the year is 2014 and otherwise equal to zero.
$\mathbf{Year_{2015}}$	A dummy variable equal to unity if the year is 2015 and otherwise equal to zero.
$\mathbf{Year_{2016}}$	A dummy variable equal to unity if the year is 2016 and otherwise equal to zero.
$\mathbf{Year_{2017}}$	A dummy variable equal to unity if the year is 2017 and otherwise equal to zero.
$\mathbf{Year_{2018}}$	A dummy variable equal to unity if the year is 2018 and otherwise equal to zero.

3.3.2 Empirical Model

3.3.2.1 The Base Model

As a starting point for the analysis, equation (1) was estimated to determine whether foreign ownership impacts firm performance. The relationship was estimated for each of the performance measures and serves as a baseline against which the results from the non-linear models were compared (Gurbuz and Aybars, 2010; Viet, 2013). This model is presented as follows:

$$\boldsymbol{Y_{it} = a_0 + a_1 FO_{it} + \eta z_{it} + d_{it} + e_{it}} \qquad (1)$$

where i = 1…N and t = 1…7; Y_{it} is either ROA, ROE or Tobin's Q; FO_{it} is the percentage of foreign ownership; z_{it} is the set of control variables (firm size, firm age, leverage ratio, dividend payout ratio and asset turnover ratio); d_{it} are the industry and time dummies and e_{it} constitutes the random error term.

3.3.2.2 A Non-Linear Relationship

As noted by Gurbuz and Aybars (2010), it is necessary to consider the possibility that foreign ownership of different quantities may have different effects on firm performance; hence, only testing for a linear relationship, as described above, is inadequate as it may fail to deliver an accurate assessment of the effect of foreign ownership on firm performance. This is evident from previous studies that observed non-linear relationships between foreign ownership and firm

performance, as presented in section 2.3.1.2. For this reason, to fully answer the research objectives, this study conducted tests for non-linearity (U-shaped and inverse U-shaped). If a non-linear relationship was found, the optimal level of foreign ownership was then determined, as it is the turning point where the positive effect of foreign ownership turns negative (inverse U-shaped) or vice versa (U-shaped).

Traditionally, non-linear relationships have been measured by a standard regression model that consists of a quadratic term (Lind and Mehlum, 2010) as follows:

$$\boldsymbol{Y_{it}} = \boldsymbol{a_0} + \boldsymbol{\beta FO_{it}} + \boldsymbol{\lambda (FO_{it})^2} + \boldsymbol{\eta z_{it}} + \boldsymbol{d_{it}} + \boldsymbol{e_{it}} \qquad (2)$$

A significant coefficient on the quadratic term (λ), with an extremum point within the data range, indicates a non-linear relationship. In addition, the sign conveys the direction of curvature, with a negative value reflecting that the relationship is characterised by an initial rise, followed by a decline, inferring an inverse-U shape (Hans, Pieters and He, 2016). If λ is positive, the curve declines initially before increasing and is thus U-shaped (Simonsohn, 2018).

It has been argued, however, that this approach alone is inadequate for the testing of a non-linear relationship (Lind and Mehlum, 2010; Megersa, 2014; Megersa and Cassimon, 2015). Lind and Mehlum (2010) notes that the inclusion of a quadratic term does not guarantee the existence of a non-linear relationship because if the actual relationship is convex but still linear over relevant data values, this method inaccurately yields an extreme point and hence a U-shape. Thus, in order to ensure of the presence of a non-linear relationship, Lind and Mehlum (2010) developed and modified Sasabuchi's (1980) likelihood ratio test, which is now referred to as the Sasabuchi-Lind-Mehlum (SLM, as defined in chapter 1) test. Given the estimates of a regression model, the SLM method allows for tests of non-linearity at a certain level of significance. This approach also enables the U-shape (or inverse U-shape) to be examined to determine the extreme point of the relationship (Megersa, 2014).

Although this method has not been adopted in prior research of the foreign ownership-performance nexus, it was previously employed by Asali, Cristobal-Campoamorb and Shaked (2016) to uncover the optimal level of FDI required in MNCs for human capital formation and has also been widely used in a variety of other studies (such as Rafindadi and Yusof, 2013; Megersa, 2014; Megersa and Cassimon, 2015; Begum, Sohag, Abdullah and Jaafar, 2015; Dary and James, 2019). Thus, taking into account the reliability and validity of SLM, this study implemented it in conjunction

with the quadratic equation shown in equation (2). The SLM test was favoured over Hansen's (2000) endogenous threshold approach that was used by Driffield *et al.* (2018) to find the optimal level of foreign ownership in firms, as the approach of Hansen (2000) requires the splitting of sample which may induce inaccurate results since they are sensitive to the manner in which the data is split, that is, different splits generate different outcomes (Gupta, 2013).

To implement the SLM test, it was assumed that the relationship between foreign ownership and firm performance was either U-shaped, inverse U-shaped, or linear; thus, if it was non-linear, it has at most one extreme point (Lind and Mehlum, 2010). The choice of the interval was the observed data range [*min(FO), max(FO)*], with a minimum holding of foreign ownership set at 10% for *min(FO)*. The 10% border was applied as it is in accordance with the International Monetary Fund's (IMF) definition of foreign ownership where foreign-owned firms are defined as an enterprise in which foreign shareholding is at least 10% of the total shareholding and FDI is defined as purchase of at least 10% of equity in a firm (Patterson, Montanjees, Motala and Cardillo, 2004). This definition of foreign ownership has been applied in several other studies (such as Gurbuz and Aybars, 2010; Mondal and Pant, 2010; Orlic *et al.* 2018).

As previously mentioned, a U-shaped curve is characterised by a negative slope at low values and a positive slope at high values (Lind and Mehlum, 2010; Simonsohn, 2018). This is captured by the following condition:

$$\boldsymbol{\beta + \lambda(FO_{min}) < 0 < \beta + \lambda(FO_{max})} \qquad (3)$$

If there is a violation of either of these inequalities, the curve is not U-shaped but inverse U-shaped or linear (Lind and Mehlum, 2010). In order to test if these inequalities were satisfied by the sample, the following composite null (inverse U-shaped relationship) and alternative hypotheses (U-shaped relationship) were tested:

$$\boldsymbol{H_0: \beta + 2\lambda(FO_{min}) \geq 0} \text{ and/ or } \boldsymbol{\beta + 2\lambda(FO_{max}) \leq 0} \qquad (4)$$

$$\boldsymbol{H_1: \beta + 2\lambda\,(FO_{min}) < 0} \text{ and } \boldsymbol{\beta + 2\lambda(FO_{max}) > 0} \qquad (5)$$

Due to the linearity of equation (2) with respect to β and λ, the test of equation (4) vs. equation (5) was simply a test of linear restrictions on β and λ. The output from the test includes the Fieller confidence interval, whose boundaries produce the cut-off points for the acceptance or rejection of the null hypothesis (Megersa, 2014).

3.4 Testing the Indirect Effect of Foreign Ownership on Firm Performance (Horizontal Spillovers)

In this section, the empirical model that was employed to test the final research objective is described. The review of the literature in sections 2.3.3 and 2.3.4 presented two categories of spillovers, i.e., horizontal spillovers and vertical spillovers. Several studies considered both horizontal and vertical spillovers (such as Nicolini and Resmini, 2010; Erdogan, 2011; Xu and Sheng, 2012; Jude, 2012). However, some studies have shown that vertical spillover effects actually measure intentional productivity transfers rather than unintentional externalities or spillovers (such as Pack and Saggi, 2001; Javorcik and Spatareanu, 2005; Lin and Saggi, 2005; Smeets, 2008; Blalock and Gertler, 2008). The analysis of vertical spillovers also requires complex estimations as they are computed at the sector level (Havranek and Irsova, 2010) and further bifurcated into downstream (backward: from FDI to local suppliers) and upstream (forward: from FDI to local buyers).

Taking the above arguments into consideration and following the work of Aitken and Harrison (1999), Mühlen (2013) and Lu *et al*. (2017), this study chose to concentrate specifically on horizontal (intra-industry) spillovers, attempting to establish a link between the share of foreign ownership in an industry and the financial performance of domestic firms within the same industry. Hence, this study does not perform any estimations of vertical spillovers and focuses only on horizontal spillovers in the subsequent sections.

3.4.1 Variables

3.4.1.1 The Dependent Variables

Since horizontal spillovers are expected to affect the productivity of a domestic firm, it is common for studies to estimate the presence of spillovers with TFP as the dependent variable. However, this was not possible for this study due to data limitations. Moreover, as explained in section 3.3, financial performance and productivity are considered to be closely related. Therefore, the dependent variables used to estimate the presence of horizontal spillovers were the financial performance measures of ROA, ROE and Tobin's Q, that are outlined in section 3.3.1.1.

3.4.1.2 The Explanatory Variables

The first explanatory variable was the percentage of foreign ownership of firms, as defined in section 3.3.1.2. The second explanatory variable was the horizontal spillover measure that captured the effect that foreign-owned firms had on the performance of domestic firms, in the same industry. Based on the work of Sinani and Meyer (2004), Mondal and Pant (2010) and Lu *et al*. (2017), a proxy for the horizontal spillover variable was formulated as the ratio of the total share of foreign firm sales to the total sales of the industry, for a particular period. This is presented as follows:

$$\boldsymbol{HS_{jt} = \frac{\sum_i (FO_{ijt} \times Sales_{ijt})}{\sum_i Sales_{ijt}} \times 100} \qquad (6)$$

where HS_{jt} measures the extent of horizontal spillovers in industry j in year t; FO_{ijt} represents the foreign ownership percentage of firm i in industry j in year t and $Sales_{ijt}$ measures sales of firm i in industry j in year t. As stated in section 3.3.2.2, a firm is considered as foreign-owned if it contains at least 10% of foreign shareholding; therefore, the foreign ownership percentage of firm i in industry j is equal to 10% or more ($FO_{ijt} \geq 10\%$ in equation (6)).

Mondal and Pant (2010) referred to this proxy as a measure of competition spillover as it results from the presence of foreign ownership and its effect on production in the domestic market. This is supported by Glass and Saggi (2002), who stated that competition between local firms and MNCs is motivation for local firms to increase their productivity levels, as explained in section 2.2.2.1. For example, Sinani and Meyer (2004) found that greater competition between foreign and domestic firms had a positive impact on the growth of sales of local firms in Estonia. Although there are other channels through which spillovers can be proxied (such as imitation, skill, employment, etc.), this specific measure was adopted as sales accounts for output (Reyes, 2017), which is linked to productivity.

If the benefits of foreign ownership are "spilled over" to domestic firms, then the coefficient on HS_{jt} should be significantly positive as per the theory reviewed in section 2.2.2.1. However, based on previous empirical evidence, the effect was unclear and thus there was no *a priori* expectation with regards to the sign.

3.4.1.3 Control Variables

All firm-specific control variables and dummy variables used to test the direct effects of foreign ownership, as outlined in section 3.3.1.3 and 3.3.1.4, were also implemented in this model.

3.4.2 Empirical Model

Following the benchmark model used by Aitken and Harrison (1999) and Lu *et al*. (2017) to investigate the spillover effects of foreign ownership on firm performance, the empirical model used in this study was as follows:

$$\boldsymbol{Y_{it} = a_0 + a_1 FO_{it} + a_2 HS_{jt} + \eta z_{it} + d_{it} + e_{it}} \qquad (7)$$

where $I = 1 \ldots N$ and $t = 1 \ldots 7$; Y_{it}, FO_{it}, HS_{jt}, d_{it}, z_{it} and e_{it} are defined as per the previous usage.

3.5 Estimation Technique

When determining the most appropriate method to estimate the empirical models using panel data, it is crucial to consider the issue of potential endogeneity (Schultz *et al*., 2010). This issue is discussed further in the sub-section below. All regressions were performed on STATA.

3.5.1 Testing for Endogeneity

The most common and pervasive issue confronting studies that focus on performance-ownership relationships is that of endogeneity. Roberts and Whited (2013: 6) broadly define endogeneity as "a correlation between the explanatory variables and the error term in a regression". This concept leads to a violation of the basic OLS assumption that all explanatory variables are strictly orthogonal to the error terms (Brooks, 2014). The presence of at least one source of endogeneity will lead to biased estimates and invalid results (Schultz *et al*., 2010).

There are three sources of endogeneity that can arise in the relationship between foreign ownership and firm performance: (i) dynamic endogeneity; (ii) simultaneity; and (iii) unobserved heterogeneity (Wintoki *et al*., 2012). Dynamic endogeneity occurs when the firm's past performance determines the current level of foreign ownership and/or the control characteristics of the firm. Simultaneity occurs when there is a reverse relationship between variables. For example, a higher percentage of foreign ownership leads to better firm performance, or alternatively, better firm performance leads to a higher percentage of foreign ownership. Unobserved heterogeneity refers to firm-specific characteristics (also known as firm fixed-effects)

that may affect a firm's level of foreign ownership, control characteristics and/or performance, but may be unobservable to the researcher and therefore difficult to quantify (Schultz *et al*., 2010).

Panel data estimation techniques such as the FEM may ameliorate the bias stemming from unobserved heterogeneity and produce consistent parameter estimates (Petersen, 2009). However, this is done at the expense of violating an exogeneity assumption; one that researchers frequently fail to notice. That is, the model assumes that current observations of the explanatory variables are entirely independent of past values of the dependent variable (Schultz *et al*., 2010) and that the explanatory and dependent variables do not simultaneously affect each other (Rasmussen, 2013); an assumption that Wintoki *et al*. (2012) argues is unrealistic.

Dynamic endogeneity is highly probable as previous unsatisfactory firm performance can potentially decrease the number of foreign shareholders willing to invest in the firm, which can, in turn, affect the firm's current level of foreign ownership, some control characteristics and performance. This is supported by Bishop, Filatotchev and Mickiewicz (2002: 21) who stated that "foreign investors are attracted to the companies characterised by previous positive results in terms of performance". With regard to simultaneity, if firms aim to attract a specific level of foreign ownership in any period that is based on achieving a particular level of performance in that period, then, while performance may be influenced by foreign ownership, the reverse is also true- the level of foreign ownership is determined by the performance target. Under this circumstance, foreign ownership and firm performance are simultaneously determined; thereby indicating a reverse relationship (Gurbuz and Aybars, 2010; Antonakis, Bendahan, Jacquart and Lalive, 2014). Given the strict exogeneity assumption and the subsequent inability to account for dynamic endogeneity and simultaneity, the FEM is regarded as inefficient to control for all sources of endogeneity (Schultz *et al*., 2010).

The dynamic GMM approach developed by Holtz-Eakin, Newey and Rosen (1988), Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998) can overcome the estimation problems imposed by unobservable heterogeneity, simultaneity, and dynamic endogeneity and produce consistent parameter estimates (Roodman, 2009; Phung, 2015). However, in the case that the assumption of strict exogeneity is valid (i.e., there is no dynamic endogeneity or simultaneity), then the FEM specifications will produce parameter estimates that are more efficient than their dynamic GMM counterparts (Schultz *et al*., 2010). Therefore, before

selecting the most appropriate estimation technique for this study, a series of tests for endogeneity between the firm performance and foreign ownership relationship were conducted (Schultz *et al*., 2010; Saidi and Al-Shammari, 2014). These tests are outlined in the subsequent sections. Following the work of Wintoki *et al*. (2012) and Akbar *et al*. (2016), firm age and the industry and time dummy variables are treated as exogenous.

3.5.1.1 Test of Dynamic Completeness

Before testing for dynamic endogeneity, it is imperative to identify the number of performance lags required to incorporate all information from the past. Glen, Lee and Singh (2001) and Gschwandtner (2005) suggested that two lags are adequate for capturing the influence of past performance on current data. To determine the suitability of this assertion, Wintoki *et al.* (2012) estimated two OLS regressions for each performance indicator. In the first regression, the performance indicator was regressed against the control variables and four lags of past performance; Wintoki *et al.* (2012) discovered that only the first and second lags were significant. The second regression was estimated with the control variables and only the third and fourth lags of past performance, which were observed to be significant. Together, these results showed that, although the earlier lags contain relevant information, that information is absorbed by the more recent lags. Thus, their results confirmed the suggestions of Glen e*t al*. (2001) and Gschwandtner (2005).

For the purposes of this study, the testing approach of Wintoki *et al.* (2012) was followed to assess the suitability of the assertion that two lags of past performance (ROA, ROE and Tobin's Q) were sufficient to attain dynamic completeness. The models for the first and second OLS regressions were estimated as follows:

$$\boldsymbol{Y_{it}} = \boldsymbol{a_0} + \sum_{\boldsymbol{p=1}}^{\boldsymbol{p=4}} \boldsymbol{k_p Y_{i,t-p}} + \boldsymbol{\eta z_{it}} + \boldsymbol{d_{it}} + \boldsymbol{e_{it}} \qquad (8)$$

$$\boldsymbol{Y_{it}} = \boldsymbol{a_0} + \sum_{\boldsymbol{p=3}}^{\boldsymbol{p=4}} \boldsymbol{k_p Y_{i,t-p}} + \boldsymbol{\eta z_{it}} + \boldsymbol{d_{it}} + \boldsymbol{e_{it}} \qquad (9)$$

where $i = 1 \ldots N$ and $t = 1 \ldots 7$; Y_{it}, z_{it}, d_{it} and e_{it} are defined as per the previous usage. The first regression in equation (8) runs from the first lag to the fourth lag, while the second regression in equation (9) runs from the third lag to the fourth lag.

3.5.1.2 Test of Reverse Causality

The first endogeneity test was conducted as per the procedure of Wintoki *et al.* (2012) and Akbar *et al.* (2016) with the purpose of establishing whether past performance had an impact on current variables. This test involved estimating the following OLS regression for each of the variables:

$$\boldsymbol{Current\ Variables_{it} = a_0 + a_1 Y_{i,t-1} + \sum_{i=1}^{n} \eta z_{i,t-1} + d_{it} + e_{it}} \qquad (10)$$

where $i = 1 \ldots N$ and $t = 1 \ldots 7$; $Current\ Variables_{it}$ is either the percentage of foreign ownership, horizontal spillovers, firm size, leverage ratio, dividend payout ratio or asset turnover ratio. d_{it} and e_{it} are defined as per the previous usage. Y_{it-1} is the performance (with respect to ROE, ROA or Tobin's Q) of firm i in period $t-1$; $z_{i,t-1}$ are the control values of firm i in period $t-1$. If past performance was significant for any current variable (i.e., the current percentage of foreign ownership, horizontal spillovers or any control variables) in equation (10), there exists reverse causality in which performance determines these variables and not vice versa.

3.5.1.3 Test of Strict Exogeneity

Still in accordance with Wintoki *et al.* (2012) and Akbar *et al.* (2016), a second test of endogeneity was performed to ensure the robustness of the results drawn from the reverse causality test above. The strict test of exogeneity, outlined by Wooldridge (2010), differs from the first test of endogeneity as the estimation involves future values (leads) instead of past values (lags). This was conducted by using a FEM to examine whether future realisations of the explanatory and control variables were associated with current performance (Grieser and Hadlock, 2019). The FEM was estimated as follows:

$$\boldsymbol{Y_{it} = a_0 + a_1 FO_{it} + a_2 HS_{jt} + \Omega W_{i,t+1} + \eta z_{it} + d_{it} + e_{it}} \qquad (11)$$

where $i = 1 \ldots N$ and $t = 1 \ldots 7$; $W_{i,t+1}$ is a subset of future values of foreign ownership, horizontal spillovers and the control variables. Y_{it}, FO_{it}, HS_{jt}, z_{it}, d_{it} and e_{it} are defined as per the previous usage.

The null hypothesis of strict exogeneity assumes that the future realisations of foreign ownership, horizontal spillovers and the control variables are not linked to current firm performance. If the future values were found to be significant in equation (11), the null hypothesis was rejected, suggesting endogeneity of the explanatory and control variables due to a dynamic relationship,

i.e., future realisations of foreign ownership, horizontal spillovers and the control variables adjust in response to firm performance.

3.5.1.4 The Durbin-Wu-Hausman (DWH) Test

When testing for endogeneity, El-Faitouri (2014) and Akbar *et al.* (2016) discovered a difference in results between the test of reverse causality and the strict test of exogeneity. Therefore, the DWH test was adopted in this study as an additional robustness check for endogeneity in the case of such discrepancies. The DWH test (Durbin, 1954; Wu, 1973; Hausman, 1978) was used to test for endogeneity in the studies of Schultz *et al.* (2010), Saidi and Al-Shammari (2014) and Rathnayake, Kassi, Louembe, Sun and Ning (2019).

This test aims to ascertain whether the explanatory variables are strictly exogenous. If the null hypothesis is rejected, foreign ownership, horizontal spillovers or the control variables are endogeneous. If the null hypothesis cannot be rejected, all variables are considered exogenous.

3.5.2 Panel Estimation with an Exogenous Explanatory Variable

As highlighted above, if endogeneity was not detected in any of the above tests, then panel data equation methods should be employed. The first approach to estimating panel data simply entails pooling the time-series and cross-sectional observations and estimating a single equation using OLS. However, the cross-sectional units in the panel data set, often firms or countries (the former being the case in this study), are typically heterogeneous (Nwakuya and Ijomah, 2017). In the presence of this unobservable heterogeneity, using OLS to estimate the empirical models yields biased results (Moulton, 1986). The FEM[3] is thus typically used (Kyereboah-Coleman, 2008; Chinaemerem and Anthony, 2012; Yilmaz and Buyuklu, 2016).

The FEM controls for all time-invariant differences between the cross-sectional units, therefore, this model is not biased due to the omission of time-invariant characteristics (Nwakuya and Ijomah, 2017). The FEM infers that these time-invariant traits are distinctive to the individual and must not display any correlation with other individual traits. There is variation among every entity, thus the entity's error term and the constant should not be correlated with the others. If there is a

[3] The Random Effects Model (REM) was not used as it allows for correlation between the error term and explanatory variables which is why endogeneity occurs so regularly (Bell and Jones, 2015). The discovery of endogeneity has often led to the abandonment of the REM.

correlation between the error terms, the FEM is not appropriate (Torres-Reyna, 2007; Nwakuya and Ijomah, 2017).

To understand how the FEM operates, the error term (e_{it}) from either equation (1), (2) or (7) are decomposed into a time-invariant effect (μ_i) and the remainder (v_{it}) that varies over time and entities (Brooks, 2014). The decomposition is displayed below:

$$\boldsymbol{e_{it} = \mu_i + v_{it}} \qquad (12)$$

where μ_{it} encapsulates all the variables that affect Y_{it} cross-sectionally but do not change over time (Brooks, 2014).

3.5.3 Panel Estimation with an Endogenous Explanatory Variable

If endogeneity was observed in any of the tests, panel data techniques (such as OLS or FEM) result in biased estimates of the coefficient (Akbar *et al*., 2016). The IV estimation approach used by Fons-Rosen *et al*. (2015) could alleviate the endogeneity problem. However, it is difficult to identify variables that fulfil the requirements of a valid IV (Nakano and Nguyen, 2012; Guo, Kand, Cai and Small 2018), including no correlation with the error term and no correlation with the endogenous variable (Baser, 2009).

To avoid an endogeneity problem, numerous studies (such as Abbas and Christensen, 2010; Roodman, 2009; Wintoki *et al*., 2012; Phung, 2015; Akbar *et al*., 2016) utilised a more robust estimation methodology known as the dynamic GMM. As mentioned in section 3.5.1, GMM can control for all endogeneity sources and "produce unbiased and consistent estimates by employing valid internal instruments during estimation" (Schultz *et al*., 2010: 146). These internal instruments take the form of selected lags of the regressors (Roodman, 2009). The intricacies of this model are explained further below.

3.5.3.1 Dynamic Model

Equation (13) assumes that two lags of the dependent variable are appropriate to capture the influence of past performance on current performance, nevertheless, as explained in section 3.5.1.1, this was determined empirically. The dynamic empirical model was thus specified as follows:

$$\boldsymbol{Y_{it} = a_0 + k_1 Y_{i,t-1} + k_2 Y_{i,t-2} + a_1 FO_{it} + \eta z_{it} + d_{it} + e_{it}} \qquad (13)$$

where Y_{it-1} is the performance (with respect to ROE, ROA or Tobin's Q) of firm i in period $t-1$; $Y_{i,t-2}$ is the performance (with respect to ROE, ROA or Tobin's Q) of firm i in period $t-2$; Y_{it}, , FO_{it}, z_{it}, d_{it} and e_{it} are defined as per the previous usage.

3.5.3.2 First Difference GMM

Arellano and Bond (1991) developed the first difference GMM specification for dynamic panel datasets that produces consistent parameter estimates in the presence of endogeneity. In this approach, the model is defined as a system of equations and uses lagged values of endogenous and exogenous variables as IV (Wintoki *et al*., 2012). The dynamic model of equation (13) was specified in the first differenced form as follows:

$$\triangle \boldsymbol{Y_{it}} = \boldsymbol{\beta_0} + \boldsymbol{\lambda_1} \triangle \boldsymbol{Y_{i,t-1}} + \boldsymbol{\lambda_2} \triangle \boldsymbol{Y_{i,t-2}} + \boldsymbol{\beta_1} \triangle \boldsymbol{FO_{it}} + \boldsymbol{\eta} \triangle \boldsymbol{z_{it}} + \boldsymbol{d_{it}} + \triangle \boldsymbol{v_{it}} \qquad (14)$$

where: $i = 1 \ldots N$ *and* $t = 1 \ldots 7$; $\triangle Y_{it} = Y_{it} - Y_{i,t-1}$; $\triangle Y_{i,t-1} = Y_{i,t-1} - Y_{i,t-2}$; $\triangle Y_{i,t-2} = Y_{i,t-2} - Y_{i,t-3}$. By taking the first differences, the time-invariant effect (μ_i) presented in equation (12) is eliminated (Phung, 2015). The instruments are drawn from the set of lagged dependent or explanatory variables i.e. $Y_{i,t-k}$; FO_{it-k}; $z_{i,t-k}$[4] where $k > 2$. Hence, historical values of firm performance, the percentage of foreign ownership, and other firm-specific variables that are older than two years were used as instruments.

The model, however, presents drawbacks in that if the original model is conceptually in levels, differencing can potentially decrease the power of the tests by reducing the variation in the explanatory variables (Levine, Loayza and Beck, 2000) and variables in levels may be weak instruments for first differenced equations (Arellano and Bover, 1995).

3.5.3.3 System GMM

To mitigate the shortcomings of the first difference GMM, Arellano and Bover (1995) and Blundell and Bond (1998) proposed an augmented version, which included the levels equations in the estimation procedure (Wintoki *et al*., 2012). This model is called the system GMM and uses lagged levels as instruments for differenced equations and lagged differences as instruments for levels equations (Baltagi, 2008). Wintoki *et al*. (2012: 27) notes that "the system GMM estimator makes an additional exogeneity assumption that any correlation between our endogenous variables

[4] $z_{i,t-k}$ does not include instruments of firm age and industry and time dummies as these variables are considered as exogenous.

and the unobserved (fixed) effect is constant over time". This assumption enables the inclusion of the levels equations with the GMM estimates. According to similar research (such as Roodman, 2009; Phung, 2015), the system GMM approach is favoured over the first difference GMM.

Under the system GMM, a level equation was added to the differenced equation to form a system of equations as follows[5]:

$$\triangle \boldsymbol{Y_{it}} = \boldsymbol{\beta_0} + \boldsymbol{\lambda_1} \triangle \boldsymbol{Y_{i,t-1}} + \boldsymbol{\lambda_2} \triangle \boldsymbol{Y_{i,t-2}} + \boldsymbol{\beta_1} \triangle \boldsymbol{FO_{it}} + \boldsymbol{\eta} \triangle \boldsymbol{z_{it}} + \boldsymbol{d_{it}} + \boldsymbol{v_{it}}$$

$$\boldsymbol{Y_{it}} = \boldsymbol{\beta_0} + \boldsymbol{\lambda_1 Y_{i,t-1}} + \boldsymbol{\lambda_2 Y_{i,t-2}} + \boldsymbol{\beta_1 FO_{it}} + \boldsymbol{\eta z_{it}} + \boldsymbol{d_{it}} + \boldsymbol{v_{it}} \qquad (15)$$

where i = 1…N and t = 1…7.

More instruments are introduced in the system GMM from the levels equation, which may, therefore, increase efficiency (Roodman, 2009). The potential instruments that can be used for the differenced and levels equations were[6]: $Y_{i,t-k}; FO_{i,t-k}; z_{i,t-k}$ and $\triangle Y_{i,t-k}; \triangle FO_{i,t-k}; \triangle z_{i,t-k}$, where $k > 2$.

Roodman (2009: 97) asserts that "a crucial assumption for the validity of GMM is that the instruments are exogenous". The biggest concern in this regard is whether sufficient lags have been included to control for the dynamic aspects of the foreign ownership-performance nexus. In the case that enough lags are included, Wintoki *et al*. (2012: 15) states that "any historical value of firm performance beyond those lags is a potentially valid instrument since it will be exogenous to current performance shocks". In order to verify the validity of the GMM model, Arellano and Bond (1991) suggested a series of tests to examine whether the instruments are exogenous. These tests are the Arellano-Bond autocorrelation test, Hansen test and the Difference-in-Hansen test, which are discussed in the next section.

[5] When dealing with the second research question, $\triangle HS_{i,t-k}$ and HS_{jt} are included in the first differenced and levels equations, respectively.

[6] $z_{i,t-k}$ and $\triangle z_{i,t-k}$ do not include instruments for firm age and industry and time dummies as these variables are considered as exogenous.

3.5.3.4 Arellano-Bond Autocorrelation Test

The Arellano-Bond autocorrelation test is used to check for first- (AR (1)) and second-order (AR (2)) serial correlation in the residuals of the first difference equation (Roodman, 2009). If the assumption of exogeneity among instruments is valid, the residuals in the first differences (AR (1)) should be correlated, but there should be no second-order serial correlation (AR (2)) (Akbar *et al*., 2016). This is depicted in the hypotheses below.

1. Test for AR (1):

$$\boldsymbol{H_0}: \boldsymbol{E}(\triangle \boldsymbol{v_{it}}/\triangle \boldsymbol{v_{i,t-k}}) = \mathbf{0} \qquad (16)$$

$$\boldsymbol{H_1}: \boldsymbol{E}(\triangle \boldsymbol{v_{it}}/\triangle \boldsymbol{v_{i,t-k}}) \neq \mathbf{0} \qquad (17)$$

2. Test for AR (2):

$$\boldsymbol{H_0}: \boldsymbol{E}(\triangle \boldsymbol{v_{it}}/\triangle \boldsymbol{v_{i,t-k}}) = \mathbf{0} \qquad (18)$$

$$\boldsymbol{H_1}: \boldsymbol{E}(\triangle \boldsymbol{v_{it}}/\triangle \boldsymbol{v_{i,t-k}}) \neq \mathbf{0} \qquad (19)$$

If the assumption of exogeneity was valid, then the results should return a rejection of the null hypothesis for the first-order serial correlation in the first differenced errors, and an acceptance for the second-order serial correlation in the first differenced errors (Phung, 2015). If the null hypothesis was rejected for AR (2), the instruments were not strictly exogenous, therefore, the model would require the addition of further lags (Roodman, 2009).

3.5.3.5 Hansen Test of Overidentifying Restrictions

In addition to the Arellano-Bond autocorrelation test, the Hansen or Sargan test for joint overidentifying restrictions (testing the joint validity of the instruments) is standard after the GMM estimation. However, the Sargan test statistic may be inconsistent for robust GMM (Roodman, 2009; Pitt, 2011). Baum, Schaffer and Stillman (2002) also argue that the J-statistic of Hansen (1982) is more commonly employed to test overidentifying restrictions. Hence, only the Hansen test of overidentifying restrictions was implemented in this study. This is in accordance with previous research on GMM (such as Wintoki *et al*. 2012; Nguyen *et al*., 2015; Akbar *et al*., 2016; Duru, Iyengar and Zampelli, 2016). This test yields a J-statistic that follows a chi-squared (χ^2) distribution under the null hypothesis that there is no correlation between the instruments and the disturbances.

The hypothesis test is presented below:

$$\boldsymbol{H_0}^{7}: \boldsymbol{E(v_{i,t}/Y_{i,t-k}; FO_{i,t-k}; z_{i,t-k},\ \triangle Y_{i,t-k}; \triangle FO_{i,t-k}; \triangle z_{i,t-k}) = 0} \quad (20)$$

$$\boldsymbol{H_1 : E(v_{i,t}/Y_{i,t-k}; FO_{i,t-k}; z_{i,t-k},\ \triangle Y_{i,t-k}; \triangle FO_{i,t-k}; \triangle z_{i,t-k}) \neq 0} \quad (21)$$

If the null hypothesis of the Hansen test was not rejected, then it can be concluded that there was no correlation between the instruments and the error term. If the null hypothesis was rejected, then it suggested that the instruments were not exogenous. However, Roodman (2009: 98) states that the Hansen test "should not be relied upon too faithfully, because it is prone to weakness". This is due to the fact that the test becomes weaker as more moment conditions are included. Furthermore, Arellano and Bond (1991) claimed that the Arellano-Bond autocorrelation test had more power than the Hansen or Sargan tests to detect lagged instruments being made invalid through autocorrelation.

3.5.3.6 Difference-in-Hansen Test of Exogeneity

Closely related to the Hansen test for the validity of the full instrument set is the difference-in-Hansen test that is used to test the validity of subsets of the instruments, which was also implemented in this study. This was conducted by testing the additional exogeneity assumption made by the system GMM that any correlation between endogenous variables and the unobserved (fixed) effect is constant over time, as outlined in section 3.5.3.3. This test also yields a J-statistic that distributes a chi-squared (χ^2) under the null hypothesis that the subset of instruments used in the levels equations are exogenous (Wintoki *et al*., 2012; Akbar *et al*., 2016). The hypothesis test was as follows:

$$\boldsymbol{H^{8}_0 : \triangle Y_{i,t-k},\ \triangle FO_{i,t-k}\ and\ \triangle z_{i,t-k}\ are\ exogenous} \quad (22)$$

$$\boldsymbol{H_1 : \triangle Y_{i,t-k},\ \triangle FO_{i,t-k}\ and\ \triangle z_{i,t-k}\ are\ not\ exogenous} \quad (23)$$

If the null hypothesis was rejected, the subset of instruments used for the levels equation are endogenous and, therefore, invalid. The rejection of the null hypothesis violates the additional assumption of the system GMM.

[7] When dealing with the final research question, $HS_{j,t-k}$ and $\triangle HS_{i,t-k}$ are also included in this test.
[8] When dealing with the final research question, $\triangle HS_{i,t-k}$ are also included in this test.

3.5.3.7 Strength of Instruments

A secondary specification test of the system GMM can be conducted by examining the goodness-of-fit of the first-stage regressions (Schultz *et al*., 2010). Several authors (such as Staiger and Stock, 1997; Stock and Yogo, 2005) argue that GMM estimates may potentially be biased if the endogenous variables are only weakly correlated with the instruments. No single criterion exists to evaluate the joint strength or weakness of the instrument set of the system GMM. Nonetheless, Staiger and Stock (1997) and Stock and Yogo (2005) outlined a procedure using a standard 2SLS regression. This approach has been used in several studies, such as Wintoki *et al*. (2012) and Schultz *et al*. (2010) and was thus adopted to evaluate the strength of the instruments used in the system GMM in this study.

For this analysis, a first stage regression of endogenous variables on the instruments was estimated and thereafter an examination of the F-statistics was performed. The null hypothesis of each of the tests is that the set of instruments are weak. To examine the strength of the instruments, equation (15) was separated into its constituent levels and difference equations. Thereafter this study independently estimated the strength of: (1) lag differences as instruments in the level equations; and (2) lagged levels as instruments in the differenced equations (Wintoki *et al*. 2012).

The model for the equation in levels was as follows:

$$\boldsymbol{Y_{it}} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1 FO_{it}} + \boldsymbol{\beta_2 HS_{jt}} + \boldsymbol{\eta z_{it}} + \boldsymbol{d_{it}} + \boldsymbol{v_{it}} \qquad (24)$$

Instruments: $\triangle FO_{i,t-2}; \triangle HS_{i,t-2}; \triangle z_{i,t-2}$

The model for the equation in differences was as follows:

$$\triangle \boldsymbol{Y_{it}} = \boldsymbol{\beta_0} + \boldsymbol{\beta_1} \triangle \boldsymbol{FO_{it}} + \boldsymbol{\beta_2} \triangle \boldsymbol{HS_{jt}} + \boldsymbol{\eta} \triangle \boldsymbol{z_{it}} + \boldsymbol{d_{it}} + \boldsymbol{v_{it}} \qquad (25)$$

Instruments: $FO_{i,t-3}; HS_{i,t-3}; z_{i,t-3}$

For the variables in levels, the F-statistics were obtained by regressing each variable on all the lagged differences used as instruments ($\triangle FO_{i,t-2}; \triangle HS_{i,t-2}; \triangle z_{i,t-2}$). Similarly, for the variables in differences, the F-statistics were obtained by regressing each variable on all the lagged levels used as instruments *($FO_{i,t-3}; HS_{i,t-3}; z_{i,t-3}$).*

If the F-statistic was significant, the null hypothesis of weak instruments was rejected. However, if the F-statistic was insignificant, the null hypothesis of weak instruments could not be rejected; thereby suggesting that the results of the GMM estimates are driven by weak instruments.

3.5.4 Summary of Estimation Procedure

As discussed, it was proposed to select an estimation technique based on the results of the series of endogeneity tests. Hence, the first step of the estimation was to ascertain whether endogeneity existed in the relationship between foreign ownership and firm performance. On the one hand, if endogeneity was not present, the FEM was selected. On the other hand, if the issue of endogeneity was detected, the system GMM was adopted. The chosen technique was then used to estimate equations (1), (2) and (7), with the SLM test performed alongside the estimation of equation (2).

3.6 Conclusion

In this chapter, the dataset and methodology used in this study was discussed in detail, including the justifications for the techniques chosen. The data sample consisted of an unbalanced panel over seven years, for 247 firms which translated into 1320 annual observations. The empirical models for the linear and non-linear relationship between firm financial performance and foreign ownership were outlined, as well as the development and incorporation of horizontal spillover effects. The series of endogeneity tests were used to determine if exogeneity assumptions were violated in the foreign ownership-performance nexus. The estimation model selected was dependent on the results of the endogeneity test. The next chapter focuses on analysing and interpreting the results obtained from the methodology described in this section.

CHAPTER 4: DATA ANALYSIS AND RESULTS

4.1 Introduction

This chapter presents the results from the models and procedures described in the preceding chapter. Firstly, the descriptive statistics are reported, after which the results for the endogeneity tests are discussed. Subsequently, the results of the system GMM model, that was used to estimate the linear and non-linear relationship between foreign ownership and firm performance, are examined in conjunction with the output of the SLM test. Thereafter, the results from the second system GMM, used to determine the effects of horizontal spillovers, are analysed. Lastly, the results of the robustness tests are explained.

4.2 Descriptive Statistics

This section provides a review of the summary statistics and the correlation matrix for firm performance, foreign ownership and the control variables of the JSE-listed firms in the sample.

4.2.1 Summary Statistics and Correlation Analysis for all Variables

Table 4-1: Summary Statistics of all Variables from 2012-2018

Variable	Mean	Std. Dev.	Min	Max
ROA	0.029	0.142	-0.845	0.748
ROE	0.085	0.242	-0.987	0.972
TQ	6.850	9.502	0.055	57.749
FO	0.179	0.193	0	0.979
HS	0.212	0.373	0	1.963
LNSIZE	20.874	2.044	11.113	26.155
LNAGE	3.394	0.870	1	6.077
LEV	0.190	0.213	0	2.884
DIVPAY	0.276	0.314	0	1.776
ASTO	1.240	0.863	0	6.802

Notes: Std. Dev. is the standard deviation, Min is minimum, and Max is maximum. ROA represents the firm's returns on assets, ROE represents the firm's return on equity, TQ represents Tobin's Q, FO represents the percentage of foreign ownership in firms, HS is the percentage of horizontal spillovers from FDI, LNSIZE is the natural logarithm of the firm's net assets, LNAGE is the natural logarithm of the number of years since the establishment of the firm to the observation date, LEV is the leverage ratio of the firm, DIVPAY is the dividend payout ratio and ASTO represents the asset turnover ratio for the firm. See chapter 3 for complete definitions of all variables.

As displayed in table 4-1, the average ROA and ROE over the period 2012 to 2018 are 2.9% and 8.5%, respectively. Both performance indicators are characterised by the large deviations around their respective means. The mean value of Tobin's Q is 6.85, which demonstrates a relatively high valuation of the listed firms. Since the estimate for Tobin's Q is greater than one, it is deduced that

the market value of a JSE-listed firm, on average, is more valuable than its replacement cost (Phung, 2015). The control variables, except for firm age, have a relatively low dispersion around their respective means, as indicated by their low standard deviation. The average net assets of the firms in the sample is R1 162 687 532 in net assets[9]. The average firm age of 30[10] years reflects that most companies listed on the JSE have been in operation for a long period of time. The mean value of the leverage ratio shows that the companies use only 19% of debt to finance their assets. This low usage of debt indicates that these companies are less risky (Salin and Yadav, 2012).

The mean value of the dividend payout ratio suggests that, on average, 27.6% of earnings are distributed to shareholders. Vries, Erasmus, Hamman and Wesson (2012) estimated the average dividend payout ratio of JSE-listed firms, from 2000 to 2009, to be 28.33%. This implies that the average dividend payout ratio has decreased over time (from 28.33% to 27.6%), however, unlike this study, Vries *et al*. (2012) included financial firms in their study sample which may account for the differences observed. The average asset turnover ratio of 1.24 indicates that for every rand of assets, firms generate R1.240 in revenue, suggesting that firms efficiently utilise their plant and equipment (Fairfield and Yohn, 2001).

Foreign ownership constitutes 17.9% of the total shareholding on average. This differs substantially from Dube (2018), who found that the average foreign shareholding on the JSE was 6.36% from 2004 to 2014. This may be attributable to the fact that Dube (2018) only included the top one, two, three, five and 10 foreign shareholders of firms, consequently excluding foreign shareholders that did not fall into that category, thus resulting in a lower average. The average value of horizontal spillovers is 21.2%, with significant variation across the sample (from 0 to 196%).

[9] Average firm size of R1 162 687 532 = $e^{20.874}$
[10] Average firm age of 30 = $e^{3.394}$

Table 4-2: Pearson Correlation Matrix

	ROA	ROE	TQ	FO	HS	LNSIZE	LNAGE	LEV	DIVPAY	ASTO
ROA	1.000									
ROE	0.728	1.000								
TQ	0.240	0.211	1.000							
FO	0.176	0.176	0.092	1.000						
HS	0.171	0.161	0.073	0.333	1.000					
LNSIZE	0.385	0.088	-0.004	0.299	0.305	1.000				
LNAGE	0.1322	0.1223	-0.035	0.242	0.169	0.276	1.000			
LEV	-0.215	0.019	-0.111	-0.097	-0.036	-0.416	-0.076	1.000		
DIVPAY	0.430	0.446	0.1204	0.211	0.208	0.307	0.225	-0.139	1.000	
ASTO	0.225	0.302	0.132	0.001	0.116	0.022	0.005	-0.062	0.273	1.000

Notes: This table shows the correlation coefficients between performance measures, foreign ownership characteristics and control variables for the period of 2012 to 2018. ROA represents the firm's returns on assets, ROE represents the firm's return on equity, TQ represents Tobin's Q, FO represents the percentage of foreign ownership in firms, HS is the percentage of horizontal spillovers from FDI, LNSIZE is the natural logarithm of the firm's net assets, LNAGE is the natural logarithm of the number of years since the establishment of the firm to the observation date, LEV is the leverage ratio of the firm, DIVPAY is the dividend payout ratio and ASTO represents the asset turnover ratio for the firm. See chapter 3 for complete definitions of all variables.

As is clear from the results presented in table 4-2, the correlations of each pairwise variable are low, except for ROA and ROE, which is consistent with the findings of Mao (2015) in China and Okundamiya and Okundamiya (2017) in Nigeria. ROA and ROE exhibit weak positive correlation with Tobin's Q, demonstrating that market-based measures and accounting-based measures capture different aspects of firm performance. As mentioned in chapter 3, on the one hand, accounting-based measures evaluate a firm's profitability (Masa'deh, Tayeh, Al-Jarrah and Tarhini, 2015) from a backward-looking perspective and reflect what the firm has accomplished. On the other hand, market-based measures are indicators of investment opportunities from a forward-looking perspective and reflect what a firm will accomplish (Demsetz and Villalonga, 2001; Hu and Izumida, 2008).

All firm performance measures are positively correlated with foreign ownership, but foreign ownership has a stronger relationship with the accounting-based measures than with Tobin's Q. It is also evident that foreign ownership shares a relationship of the same magnitude with both ROA and ROE of 0.176. Foreign ownership and horizontal spillovers share a positive correlation, which is expected since spillovers are a result of FDI (Tong and Hu, 2003).

Firm size is positively associated with ROA and ROE but negatively associated with Tobin's Q. The positive correlation with the accounting-based measures coincides with Chhibber and Majumdar (1999), who expressed that larger firms benefit from economies of scale, market power and better access to external finance, which may enhance their profitability. The negative correlation with Tobin's Q is supported by Offenberg (2010), who argued that firms become relatively less valuable as they grow larger. This is due to the inability of shareholders to minimise agency costs in larger companies.

The negative correlation between foreign ownership and the leverage ratio suggests that foreign investors are deterred from investing in firms that contain large levels of debt. This is in line with Ostadi and Ashja (2014), who observed that existing debt had a significant adverse effect on the inflow of FDI. The leverage ratio shares negative correlations with all variables except for ROE. The difference in correlations between leverage and ROE, and leverage and ROA are similar to the findings of Krishna and Kumar (2018) in India and the previously mentioned Nigerian study by Okundamiya and Okundamiya (2017). Both studies found a positive correlation between leverage and ROE and a negative correlation between leverage and ROA. Krishna and Kumar

(2018) argued that debt is considered as the cheapest source of finance and, therefore, resulted in an increase in the return to the equity shareholders in India. Okundamiya and Okundamiya (2017) stated that the relative efficiency of asset usage by Nigerian firms was negatively affected by their capital structure where debt was heavily employed, resulting in a diminishing ROA. The negative effect of debt on efficient usage of assets further suggests that debt decreases the asset turnover ratio, which corresponds with the findings in table 4-2.

According to Uluyol, Lebe and Akbas (2014), at an ideal level of financial leverage, a company's ROE would increase. Therefore, the positive correlation between ROE and the leverage ratio may indicate that firms listed on the JSE achieve an optimal level of leverage. The negative correlation between Tobin's Q and the leverage ratio postulates that firms with more debt are less valuable in the market (Mao, 2015). The negative correlation that the leverage ratio shares with ROA and Tobin's Q coincides with the pecking order theory that assumes a negative relation between leverage and firm performance since profitable firms are in less need of debt (Samour and Hassan, 2016).

In accordance with Phung and Hoang (2012), the correlation between firm age and Tobin's Q is negative, inferring that the market value of firms decreases with their age. On the contrary, firm age produces a positive correlation with ROA and ROE. The asset turnover ratio is positively correlated with all performance measures. This positive correlation illustrates that firms on the JSE make efficient usage of their assets, thereby exhibiting a positive influence on firm performance (Baik, Chae, Choi and Farber, 2013).

The dividend payout ratio is positively correlated with all performance measures and is particularly strong with the accounting-based measures. This is consistent with the findings of Murekefu and Ouma (2012) in Kenya. Furthermore, the positive correlation between dividend payout ratio and firm performance supports the agency theory view of dividends, as discussed in section 2.2.1.1. As previously outlined, paying dividends to shareholders reduces free cash flows. This forces firms to raise funds externally for new investments, which, in turn, increases the level of external monitoring (Jiraporn, Kim and Kim, 2011). There is thus improved corporate governance, which positively affects a firm's performance (Murekefu and Ouma, 2012).

Similar to the correlation between firm performance and the dividend payout ratio, Chai (2010) claimed that the positive relationship between the dividend payout ratio and foreign ownership,

identified in Korea, could also be justified by the agency theory view of dividends, i.e., dividends can substitute for direct monitoring of firms by large external shareholders (Rozeff, 1982; Easterbrook, 1984; Khan, 2006).

In summary, ROE is the only performance measure that is positively correlated to all variables, whereas ROA is negatively correlated to leverage but positively correlated to all the other variables. Tobin's Q shares a positive correlation with all variables except for the leverage ratio, firm size and firm age. The leverage ratio is the only variable negatively correlated to foreign ownership.

4.2.2 Summary Statistics of Foreign Ownership

Table 4-3: Summary Statistics of Foreign Ownership from 2012-2018

Year	Mean	Std. Dev.	Min	Max
2012	0.140	0.171	0.000	0.859
2013	0.150	0.174	0.000	0.772
2014	0.166	0.187	0.000	0.784
2015	0.180	0.186	0.000	0.812
2016	0.206	0.211	0.000	0.867
2017	0.214	0.211	0.000	0.979
2018	0.217	0.206	0.000	0.778

Notes: This table displays the summary statistics of the variation of foreign ownership for the period 2012-2018. Std. Dev. is the standard deviation, Min is minimum, and Max is maximum.

Table 4-3 shows that the percentage of foreign ownership in JSE-listed companies followed an upward trend, increasing from 14% in 2012 to 21.7% in 2018. Peyper (2017) asserted that South Africa remains the largest hub of FDI on the continent despite its political uncertainty. During this period, the South African government has made numerous attempts to attract more foreign capital to achieve the goals of job creation and inclusive growth (National Treasury, 2017; Cronje, 2018; Villers, 2019), with the evidence suggesting that these efforts have yielded some success. As stated in chapter 1, the current policy on FDI in South Africa does not place any restriction on the level of foreign ownership in South African firms, which assists the continual increase in foreign shareholding. Aside from the efforts of the government, South African companies have also worked hard to attract offshore investors, contributing to the growth in foreign ownership. As of 2015, the lion's share of the top 40's profit is earned outside of the country's borders (Hogg, 2015). The international operations of these companies have gained the attention of offshore investors, resulting in a surge in foreign ownership.

Table 4-4: Summary Statistics of Foreign Ownership across Industries from 2012-2018

Industry	Mean	Std. Dev.	Min	Max
Basic Materials	0.206	0.236	0.000	0.867
Consumer Goods	0.155	0.146	0.000	0.496
Consumer Services	0.244	0.210	0.000	0.979
Health Care	0.176	0.185	0.000	0.766
Industrials	0.137	0.150	0.000	0.625
Oil and Gas	0.132	0.121	0.004	0.402
Technology	0.117	0.137	0.000	0.585
Telecommunications	0.207	0.211	0.001	0.595

Notes: This table displays the summary statistics of the variation of foreign ownership across different industries for the period 2012-2018. Std. Dev. is the standard deviation, Min is minimum, and Max is maximum.

The results from table 4-4 reveal that, on average, the consumer services industry has the highest level of foreign shareholding during the seven-year period. The South African retail scene is dominated by a small number of major retail companies, which make them appealing for foreign investments and takeovers. An example of this is the high-profile acquisition of Massmart by the American MNC retail company Walmart that acquired a 51% share of the target company in 2011 (PriceWaterhouseCoopers, 2016; Omarjee, 2017). Foreign shareholders have significant stakes in almost half of the JSE top 40 companies, such as Mr. Price, Shoprite, and Woolworths (Hogg, 2015), that are from the consumer services industry. Between the period 2013 to 2019, the international holdings of Clicks and Lewis also expanded (Wasserman, 2019). Other major companies within the consumer services industry that contain significant levels of foreign ownership are Famous Brands, Spar, The Foschini Group and Truworths.

The telecommunications and basic materials industries follow the consumer services industry closely in terms of foreign shareholding, with 20.7% and 20.6%, respectively. Based on evidence from Pau (2013) and Atiyas, Levy and Walton (2017), it is deduced that South Africa's four licensed mobile operators (i.e., Vodacom, MTN, Cell C[11] and Telkom) are widely held by foreign shareholders. Vodacom's largest shareholder is Vodafone Group plc, which is based in the UK (National Treasury, 2017). Prior to 2018, Saudi Oger, an international telecommunications holdings firm in Saudi Arabia, was the majority shareholder of Cell C. In 2015, Vodacom and MTN were among the JSE top 40 companies with a controlling share of foreign ownership (Hogg, 2015). Although foreign investors recently sold notable stakes in Vodacom and MTN, they were net buyers of Telkom (Wasserman, 2019). Naspers, a multinational internet group and a large-cap

[11] Blue Label Telecoms, which owns Cell C, has a substantial level of foreign shareholding.

stock, is predominantly owned by foreigners as well and known to employ most of their staff from outside South Africa (Chandler, 2016).

The basic materials industry contains the third highest percentage of foreign ownership, as South Africa is well endowed with natural resources (Asiedu, 2006), such as coal, diamonds, and gold. Mining companies such as Anglo Gold, Anglo American and Anglo Platinum are in the group of JSE top 40 companies where foreign shareholders have the controlling share (Hogg, 2015). In addition, Gold Fields, Harmony and Anglo Gold are among the top five foreign-owned stocks in South Africa (Wasserman, 2019).

The average foreign shareholding of the consumer services, telecommunications and basic materials industry differ from the findings of Dube (2018), who observed that from 2004 to 2014, foreign shareholding was highest in the basic material industry, followed by the consumer services industry and thereafter the telecommunications industry. This implies that, during the seven-year period, the preferences of foreign investors changed from the basic material industry to the consumer services and telecommunications industries, respectively. This shift in preferences may be a consequence of the Marikana Massacre in 2012, which caused a steady decline in the production and value of the South African mining industry (Hill and Maroun, 2015).

Interestingly, figure 4-1 displays an upward trend of foreign ownership in the basic materials industry since 2016. Although the consumer services and telecommunications industries have a higher average foreign shareholding than the basic materials industry during the seven-year period, figure 4-1 reveals that in 2018, the basic materials industry received the largest share of foreign capital. This suggests that, as of 2018, the preference of foreign investors has reverted to the basic materials industry, as per Dube (2018). This is further supported by Wasserman (2019), who stated that 62% of mining shares on the JSE are currently in foreign hands. Furthermore, offshore investors increased their mining holdings over 2018, particularly in platinum and gold companies, except for Harmony.

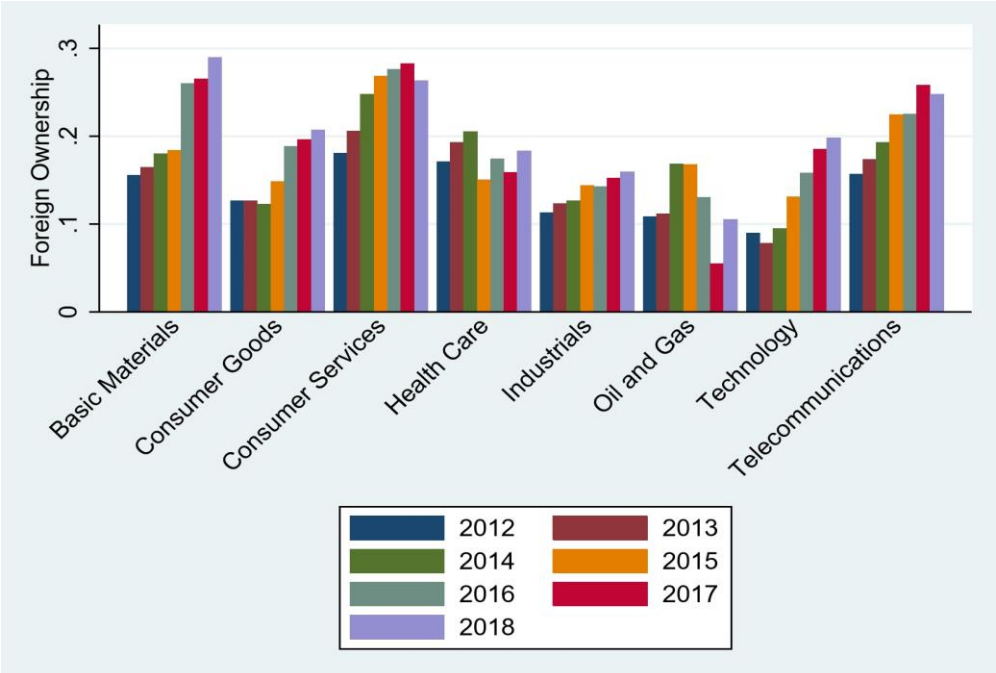
As presented in table 4-4, the health care, consumer goods, industrials, and oil and gas industries contained moderate levels of foreign ownership, with a small variation between the industries. Figure 4-1 shows that foreign ownership began to increase in the consumer goods industry since 2015. Hogg (2015) labelled Tiger Brands as one of the JSE top 40 companies that had a substantial level of foreign equity. Other major firms with foreign shareholding, in the consumer goods

industry, are Clover Industries, Illovo Sugar, RCL Foods and Bidvest. The JSE-listed firms in the health care industry, such as Netcare, Life Healthcare, Mediclinic and Aspen, are leading healthcare brands with significant levels of foreign capital. The percentage of foreign ownership across the health care industry fluctuates during the seven-year period.

The lowest level of average foreign shareholding is in the technology industry, as illustrated in table 4-4. This may be a result of South Africa not being as technologically advanced as the countries of foreign investors. This is supported by Dube (2018), who also observed the lowest portion of foreign ownership present in the technology industry. However, figure 4-1 indicates that, as of 2016, the technology industry has attracted more foreign investors than the industrials and oil and gas industries. This may suggest that South African firms are becoming more innovative. The oil and gas industry also experienced a large drop in 2017, met by a slight increase in 2018.

Overall, figure 4-1 suggests that although the preferences of foreign investors may have alternated, the three major industries responsible for the inflow of foreign capital are still the basic materials, consumer services and telecommunications industries. It is also recognized that as of 2016, the least attractive industry for foreign investors diverted from the technology industry to the oil and gas industry.

Figure 4-1: Average Level of Foreign Ownership across Industries for the period 2012-2018



4.2.3 Summary statistics for Performance Measures

Table 4-5: Summary Statistics of the Performance Measures from 2012-2018

Year	ROA	ROE	TQ
2012	0.038	0.086	7.442
2013	0.024	0.072	7.248
2014	0.019	0.092	7.056
2015	0.032	0.106	7.300
2016	0.035	0.088	6.557
2017	0.029	0.090	6.290
2018	0.028	0.061	5.614

Notes: This table displays the mean values for ROA, ROE and TQ for the period 2012-2018. ROA represents the firm's returns on assets. ROE represents the firm's return on equity. TQ represents Tobin's Q.

It is clear from table 4-5 that all performance measures fluctuated during the seven-year period. Firms achieved their highest ROA and Tobin's Q in 2012 and their highest ROE in 2015 while experiencing their lowest ROE and Tobin's Q in 2018 and lowest ROA in 2014. Tobin's Q fluctuated less compared to the accounting-based measures. The average ROA is substantially lower than the ROE in every year, indicating that companies have more assets than shareholder equity. The fluctuation in the performance averages, combined with the uniform increase of foreign ownership from 2012-2108 (in table 4-3), indicates that if a relationship were to exist between foreign ownership and firm performance, it might be non-linear. The estimates of ROA, ROE and Tobin's Q are also attributed to firm-specific characteristics.

Table 4-6:Summary Statistics of the Performance Measures across Industries from 2012-2018

Industry	ROA	ROE	TQ
Basic Materials	-0.014	0.009	3.907
Consumer Goods	0.057	0.121	6.971
Consumer Services	0.086	0.207	9.624
Health Care	0.024	0.056	8.970
Industrials	0.029	0.068	5.736
Oil and Gas	-0.065	-0.057	4.857
Technology	0.009	0.116	11.732
Telecommunications	0.061	0.123	11.714

Notes: This table shows the mean values of ROA, ROE and Tobin's Q across different industries from 2012-2018. ROA represents the firm's returns on assets. ROE represents the firm's return on equity. TQ represents Tobin's Q.

Table 4-6 shows that the consumer services industry achieves the highest averages of ROA and ROE, and the telecommunications industry earns the second highest ROA, ROE and Tobin's Q. These top performing industries also hold the highest levels of foreign ownership, respectively. On the one hand, the high returns may be a potential reason as to why foreign shareholders invest

frequently in the consumer services and telecommunications industries. On the other hand, the high returns could be a result of the large share of foreign investors, who transfer new technology and introduce better managerial and innovative production processes, as discussed in section 2.2.1.2.

Firms in the basic materials industry performed poorly in terms of all performance measures. This poor performance may be due to the Marikana Massacre in 2012 that was mentioned in the previous section. Furthermore, the costs associated with extracting minerals from deeper in the mines continue to rise as well as increased electricity and labour costs. Despite the dismal performance of the basic materials industry, foreign investors seem to still find it attractive as it holds the third largest portion of average foreign shareholding from 2012-2018. The oil and gas industry experienced negative returns for ROA and ROE. This can be attributable to the fact that the gas sector spent more than it earned for three consecutive quarters, thereby resulting in significant losses (Stats SA, 2017). The health care and industrials industries share satisfactory performance averages for all measures. These industries also have a moderate level of foreign ownership.

The performance of the technology industry varies substantially depending on the performance indicator, with the highest Tobin's Q, a moderate ROE and a weak ROA. According to Bharadwaj, Bharadwaj and Konsynski (1999), information technology contributes to a firm's future performance potential, which a forward-looking measure such as Tobin’s Q, is more likely to capture.

4.3 Regression Results for the Endogeneity Tests

As stipulated in section 3.5.1, dynamic completeness tests, reverse causality tests and the test of strict exogeneity were used to examine whether foreign ownership, horizontal spillovers and the control variables were related to the past or future performance of firms. The results of these tests determined the estimation technique (FEM or GMM) that was most suitable for this study.

4.3.1 Regression Results for Test of Dynamic Completeness

As mentioned in sections 3.5.1.1 and 3.5.3.1, although two lags of performance are deemed sufficient to capture the persistence of profitability over time, this study still follows the testing procedure of Wintoki *et al.* (2012) to verify this assertion. The results thereof are presented in table 4-7. In columns 1, 3 and 5, four lags of the performance measure are included, whereas in columns 2, 4 and 6, the two recent lags are dropped and only the third and fourth lags are included.

Table 4-7: OLS Regression Results for the Test of Dynamic Completeness

	ROA	ROA	ROE	ROE	TQ	TQ
$Performance_{t-1}$	**0.389**		**0.613**		**0.437**	
	(3.53)* **		**(7.82)*** **		**(4.61)** **	
$Performance_{t-2}$	0.023		0.026		**0.270**	
	(0.39)		(0.39)		**(3.51)** **	
$Performance_{t-3}$	**0.239**	**0.310**	-0.009	**0.175**	0.018	**0.376**
	(2.99)* **	**(3.86)*** **	(0.10)	**(2.06)** **	(0.14)	**(3.62)*** **
$Performance_{t-4}$	0.019	**0.143**	0.039	**0.160**	0.011	0.133
	(0.31)	**(1.90)** *	(0.68)	**(2.62)*** **	(0.14)	(1.53)
LNSIZE	-0.003	-0.001	**-0.007**	**-0.013**	-0.114	-0.097
	(0.69)	(0.30)	**(1.83)** *	**(2.32)** **	(1.23)	(0.85)
LNAGE	-0.001	-0.003	-0.001	0.000	0.221	0.092
	(0.09)	(0.37)	(0.09)	(0.03)	(0.97)	(0.21)
LEV	-0.019	-0.027	0.029	-0.008	-1.673	-3.042
	(0.78)	(0.99)	(0.80)	(0.15)	(1.41)	(1.80)
DIVPAY	**0.084**	**0.109**	**0.170**	**0.258**	1.386	**1.783**
	(4.53)* **	**(5.60)*** **	**(4.80)*** **	**(5.93)*** **	(1.97)	**(1.64)** *
ASTO	**0.010**	**0.011**	**0.017**	0.020	0.555	0.293
	(2.13) **	**(1.87)** *	**(1.98)** *	(1.53)	(1.24)	(0.38)
R^2	0.52	0.41	0.54	0.34	0.64	0.42

Notes: All t-statistics in parenthesis are based on robust, firm clustered standard errors. *, ** and *** indicate significance at 10%, 5% and 1% respectively for the t-test. Year and Industry dummies are included in all specifications. ROA represents the firm's returns on assets, ROE represents the firm's return on equity, TQ represents Tobin's Q, LNSIZE is the natural logarithm of the firm's net assets, LNAGE is the natural logarithm of the number of years since the establishment of the firm to the observation date, LEV is the leverage ratio of the firm, DIVPAY is the dividend payout ratio and ASTO represents the asset turnover ratio for the firm. See chapter 3 for complete definitions of all variables

As can be seen from table 4-7, when all four lags are included, the first and third lags are significant for ROA, the first lag is significant for ROE and the first and second lags are significant for Tobin's Q. Thus, the results vary depending on the performance measure, but it is evident that the first lag is needed for all three measures. The only lag significant beyond the second past measure of performance is for ROA. After the first and second lags are dropped, the third and fourth lags become statistically significant for ROA and ROE, while the third lag is still significant for Tobin's Q. The fact that more of these later lags become significant when the past lags are dropped attests to the fact that they include relevant information but that the more recent lags mostly subsume this information. These findings are broadly consistent with those of Wintoki *et al.* (2012), in that the later lags emerge as more significant when the past lags are dropped.

As such, in light of these results, this study follows the assumption of Glen *et al.* (2001) and Gschwandtner (2005) that performance is exogenous beyond two lags.

4.3.2 Regression Results for Reverse Causality

This section presents the results from OLS regressions of the percentage of foreign ownership, horizontal spillovers and control variables on the performance and control variables from one year prior. Tables 4-8, 4-9 and 4-10 display results for ROA, ROE and Tobin's Q, respectively.

Table 4-8: OLS Regression Results for the Relationship between Foreign Ownership, Firm-specific Variables and Past ROA

	FO	HS	LNSIZE	LEV	DIVPAY	ASTO
ROA_{t-1}	0.052	0.032	**1.322**	-0.004	**0.246**	**-0.243**
	(1.22)	(0.46)	**(1.73)***	(0.08)	**(4.47)*****	**(2.07)****
$LNSIZE_{t-1}$	**0.013**	**0.036**	**0.933**	-0.007	**0.007**	0.001
	(5.27)***	**(7.29)*****	**(14.48)*****	(0.99)	**(2.80)*****	(0.17)
$LNAGE_{t-1}$	**0.034**	**0.042**	**0.104**	-0.000	**0.017**	-0.016
	(4.61)***	**(3.51)*****	**(1.68)***	(0.01)	**(2.28)****	(1.42)
LEV_{t-1}	0.037	**0.194**	0.103	**0.868**	0.007	-0.071
	(1.43)	**(4.92)*****	(0.38)	**(14.73)*****	(0.24)	(1.28)
$DIVPAY_{t-1}$	**0.058**	0.035	0.188	0.018	**0.521**	0.072
	(2.64)***	**(0.96)**	(1.44)	(1.19)	**(10.13)*****	(1.51)
$ASTO_{t-1}$	-0.001	**0.058**	0.013	-0.001	**0.026**	**0.868**
	(0.03)	**(3.39)*****	(0.29)	(0.31)	**(3.16)*****	**(15.99)*****
R^2	0.18	0.21	0.81	0.69	0.48	0.85

Notes: All t-statistics in parenthesis are based on robust, standard errors. *, ** and *** indicate significance at 10%, 5% and 1% respectively for the t-test. Items in boldface are significant at the 10% level or higher. Year and Industry dummies are included in all specifications. ROA represents the firm's returns on assets, FO represents the percentage of foreign ownership in firms, HS is the percentage of horizontal spillovers from FDI, LNSIZE is the natural logarithm of the firm's net assets, LNAGE is the natural logarithm of the number of years since the establishment of the firm to the observation date, LEV is the leverage ratio of the firm, DIVPAY is the dividend payout ratio and ASTO represents the asset turnover ratio for the firm. (t-1) is a subset of past values of ROA and the control variables. See chapter 3 for complete definitions of all variables

Table 4-9: OLS Regression Results for Relationship between Foreign Ownership, Firm-specific Variables and Past ROE

	FO	HS	LNSIZE	LEV	DIVPAY	ASTO
ROE_{t-1}	**0.089**	**0.128**	**0.786**	0.013	**0.150**	**-0.198**
	(3.65)* **	**(3.36)*** **	**(2.53)** **	(0.30)	**(4.10)*** **	**(4.02)*** **
$LNSIZE_{t-1}$	**0.014**	**0.036**	**0.947**	-0.007	**0.009**	-0.002
	(5.86)* **	**(7.78)*** **	**(15.00)*** **	(0.94)	**(4.16)*** **	(0.46)
$LNAGE_{t-1}$	**0.033**	**0.041**	0.092	-0.000	**0.014**	-0.013
	(4.48)* **	**(3.44)*** **	(1.55)	(0.02)	**(1.96)** **	(1.15)
LEV_{t-1}	0.028	**0.182**	-0.005	**0.867**	-0.013	-0.047
	(1.09)	**(4.63)*** **	(0.02)	**(14.41)*** **	(0.43)	(0.82)
$DIVPAY_{t-1}$	0.041	0.005	0.130	0.014	**0.509**	**0.097**
	(1.83)	(0.13)	(0.89)	(1.52)	**(9.56)*** **	**(2.09)** **
$ASTO_{t-1}$	-0.003	**0.053**	-0.006	-0.002	**0.022**	**0.874**
	(0.53)	**(3.07)*** **	(0.13)	(0.51)	**(2.80)*** **	**(16.02)*** **
R^2	0.18	0.21	0.81	0.69	0.49	0.86

Notes: All t-statistics in parenthesis are based on robust, standard errors. *, ** and *** indicate significance at 10%, 5% and 1% respectively for the t-test. Items in boldface are significant at the 10% level or higher. Year and Industry dummies are included in all specifications. ROE represents the firm's return on equity, FO represents the percentage of foreign ownership in firms, HS is the percentage of horizontal spillovers from FDI, LNSIZE is the natural logarithm of the firm's net assets, LNAGE is the natural logarithm of the number of years since the establishment of the firm to the observation date, LEV is the leverage ratio of the firm, DIVPAY is the dividend payout ratio and ASTO represents the asset turnover ratio for the firm. (t-1) is a subset of past values of ROE and control variables. See chapter 3 for complete definitions of all variables

Table 4-10: OLS Regression Results for Relationship between Foreign Ownership, Firm-specific Variables and Past Tobin's Q

	FO	HS	LNSIZE	LEV	DIVPAY	ASTO
TQ_{t-1}	**0.002**	**0.002**	0.002	**-0.001**	0.001	-0.001
	(3.96)* **	**(1.67)***	(0.65)	**(1.72)***	(1.07)	(0.72)
$LNSIZE_{t-1}$	**0.014**	**0.037**	**0.949**	**-0.007**	**0.010**	-0.002
	(5.70)* **	**(7.51)*** **	**(15.01)*** **	**(4.98)*** **	**(4.12)*** **	(0.68)
$LNAGE_{t-1}$	**0.034**	**0.043**	**0.099**	-0.000	**0.016**	-0.015
	(4.72)* **	**(3.58)*** **	**(1.65)***	(0.07)	**(2.15)** **	(1.39)
LEV_{t-1}	**0.049**	**0.204**	0.068	**0.863**	0.003	-0.071
	(1.87)*	**(5.00)*** **	(0.26)	**(40.64)*** **	(0.10)	(1.35)
$DIVPAY_{t-1}$	**0.060**	0.035	**0.334**	0.019	**0.548**	0.047
	(2.80)* **	(0.99)	**(2.32)** **	(1.34)	**(10.87)*** **	(1.00)
$ASTO_{t-1}$	-0.001	**0.057**	0.028	-0.001	**0.028**	**0.866**
	(0.10)	**(3.38)*** **	(0.70)	(0.14)	**(3.46)*** **	**(15.95)*** **
R^2	0.19	0.21	0.81	0.69	0.47	0.85

Notes: All t-statistics in parenthesis are based on robust, standard errors. *, ** and *** indicate significance at 10%, 5% and 1% respectively for the t-test. Items in boldface are significant at the 10% level or higher. Year and Industry dummies are included in all specifications. TQ represents the firm's Tobin's Q. FO represents the fraction of the percentage of foreign ownership in firms. HS is the percentage of horizontal spillovers from FDI. LNSIZE is the natural logarithm of the firm's net assets. LNAGE is the natural logarithm of the number of years since the establishment of the firm to the observation date. LEV is the leverage ratio of firms. DIVPAY Is the dividend payout ratio. ASTO represents the asset turnover ratio. (t+1) is a subset of past values of TQ and control variables. See chapter 3 for complete definitions of all variables

From the three tables above, it can be gathered that past performance, when measured by ROE and Tobin's Q, is a significant determinant of the current level of foreign ownership and horizontal spillovers. In accordance with Akbar *et al.* (2016), this finding raises two critical issues: (i) there is reverse causality in which past values of ROE and Tobin's Q determines the level of foreign ownership and horizontal spillovers, but not vice versa and; (ii) foreign ownership and horizontal spillovers could be determined simultaneously with ROE and Tobin's Q, due to the omitted variables bias.

Similar to El-Faitouri (2014), tables 4-8, 4-9 and 4-10 also indicate that the control variables are potentially dynamically endogenous. On the one hand, when past performance is measured by ROA and ROE, the indicators are significant for all the control variables, except for the leverage ratio. On the other hand, when Tobin's Q measures past performance, it is only significant when the leverage ratio is the dependent variable. That being said, although the leverage ratio does not display a significant relation with the past performance of ROA and ROE, it still retains a certain amount of dynamic endogeneity with firm performance because it is significantly related to the past performance of Tobin's Q (Akbar *et al.*, 2016). Correspondingly, the control variables that

are insignificant for the past performance of Tobin's Q are also considered as endogenous because they are significantly related to the past performance of ROA and ROE. Past firm size is significantly related to the current levels of foreign ownership, horizontal spillovers and the dividend payout ratio for all three performance measures. Past performance, when measured by ROA and ROE, positively influence the current firm size, suggesting that "firms that have done well in the past will be larger today" (Wintoki *et al*., 2012: 23).

Based on the results of this test, all variables are thus considered as dynamically endogenous as each variable is significant for at least one of the performance measures. This highlights the fact that it is not only the explanatory variables (foreign ownership and horizontal spillovers) that can be considered as endogenous, but also the control variables that are used as proxies for the firm's operating and contracting environment.

4.3.3 Regression Results for the Strict Exogeneity and DWH Tests

Despite the fact that all variables are found to be endogenous in section 4.3.2, a second test to examine exogeneity was conducted as suggested by Wooldridge (2002), Wintoki *et al*. (2012) and El-Faitouri (2014), as outlined in section 3.5.1.3. Tables 4-11, 4-12 and 4-13 show the results thereof for ROA, ROE and Tobin's Q, respectively.

Table 4-11: FE Regression Results for Test of Strict Endogeneity for ROA

	ROA	ROA	ROA	ROA
FO	0.045	0.063	0.047	0.046
	(0.84)	(1.71)	(0.86)	(0.85)
HS	0.002	-0.003	-0.003	-0.004
	(0.24)	(0.43)	(0.40)	(0.53)
LNSIZE	**0.013**	**0.013**	**0.013**	**0.011**
	(5.47)* **	**(5.45)*** **	**(5.44)*** **	**(2.81)*** **
LNAGE	-0.002	-0.002	-0.002	0.006
	(0.22)	(0.21)	(0.23)	(0.63)
LEV	0.002	0.002	0.002	0.010
	(0.05)	(0.06)	(0.05)	(0.17)
DIVPAY	**0.058**	**0.058**	**0.058**	**0.055**
	(3.67)* **	**(3.70)*** **	**(3.69)*** **	**(3.60)*** **
ASTO	**0.027**	**0.027**	**0.027**	**0.031**
	(2.82)* **	**(2.82)*** **	**(2.81)*** **	**(2.13)** **
FO_{t+1}	0.026		0.022	0.017
	(0.58)		(0.48)	(0.36)
HS_{t+1}		0.012	0.011	0.010
		(1.51)	(1.34)	(1.12)
$LNSIZE_{t+1}$				0.003
				(0.57)
$LNAGE_{t+1}$				-0.011
				(1.17)
LEV_{t+1}				-0.009
				(0.24)
$DIVPAY_{t+1}$				**0.027**
				(2.38) **
$ASTO_{t+1}$				-0.010
				(0.70)

Notes: All t-statistics in parenthesis are based on robust, standard errors. *, ** and *** indicate significance at 10%, 5% and 1% respectively for the t-test. Items in boldface are significant at the 10% level or higher. ROA represents the firm's returns on assets, FO represents the percentage of foreign ownership in firms, HS is the percentage of horizontal spillovers from FDI, LNSIZE is the natural logarithm of the firm's net assets, LNAGE is the natural logarithm of the number of years since the establishment of the firm to the observation date, LEV is the leverage ratio of the firm, DIVPAY is the dividend payout ratio and ASTO represents the asset turnover ratio for the firm. (t+1) is a subset of forward values of the foreign ownership characteristics and control variables. See chapter 3 for complete definitions of all variables.

Table 4-12: FE Regression Results for Test of Strict Endogeneity for ROE

	ROE	ROE	ROE	ROE
FO	0.166	**0.181**	0.171	0.164
	(1.58)	**(2.83)*** **	(1.61)	(1.57)
HS	0.020	0.004	0.004	0.004
	(1.77)	(0.33)	(0.34)	(0.28)
LNSIZE	-0.008	-0.008	-0.008	-0.011
	(1.31)	(1.34)	(1.35)	(1.41)
LNAGE	0.015	0.015	0.015	0.003
	(1.06)	(1.05)	(1.04)	(0.14)
LEV	0.004	0.004	0.004	0.001
	(0.09)	(0.08)	(0.08)	(0.02)
DIVPAY	**0.173**	**0.174**	**0.174**	**0.164**
	(5.88)* **	**(5.90)*** **	**(5.89)*** **	**(5.80)*** **
ASTO	**0.063**	**0.063**	**0.063**	**0.086**
	(3.66)* **	**(3.65)*** **	**(3.64)*** **	**(2.55)** **
FO_{t+1}	0.025		0.012	0.008
	(0.28)		(0.13)	(0.09)
HS_{t+1}		**0.034**	**0.034**	**0.033**
		(2.35)*	**(2.24)** **	**(2.26)** **
$LNSIZE_{t+1}$				0.004
				(0.57)
$LNAGE_{t+1}$				0.010
				(0.51)
LEV_{t+1}				0.012
				(0.25)
$DIVPAY_{t+1}$				**0.065**
				(2.90) **
$ASTO_{t+1}$				**-0.048**
				(1.65)*

Notes: All t-statistics in parenthesis are based on robust, standard errors. *, ** and *** indicate significance at 10%, 5% and 1% respectively for the t-test. Items in boldface are significant at the 10% level or higher. ROE represents the firm's return on equity, FO represents the percentage of foreign ownership in firms, HS is the percentage of horizontal spillovers from FDI, LNSIZE is the natural logarithm of the firm's net assets, LNAGE is the natural logarithm of the number of years since the establishment of the firm to the observation date, LEV is the leverage ratio of the firm, DIVPAY is the dividend payout ratio and ASTO represents the asset turnover ratio for the firm. (t+1) is a subset of forward values of the foreign ownership characteristics and control variables. See chapter 3 for complete definitions of all variables.

Table 4-13: FE Regression Results for Test of Strict Endogeneity for Tobin's Q

	TQ	TQ	TQ	TQ
FO	1.633	1.468	1.526	1.776
	(0.75)	(0.50)	(0.69)	(0.81)
HS	-0.421	-0.080	-0.080	-0.184
	(0.72)	(0.11)	(0.11)	(0.25)
LNSIZE	0.073	0.077	0.077	-0.087
	(0.60)	(0.64)	(0.64)	(0.85)
LNAGE	-0.720	-0.716	-0.715	0.005
	(1.52)	(1.51)	(1.51)	(0.01)
LEV	-2.842	-2.840	-2.839	-1.267
	(1.64)	(1.64)	(1.64)	(0.81)
DIVPAY	1.405	1.394	1.394	1.165
	(1.48)	(1.47)	(1.47)	(1.40)
ASTO	-0.269	-0.262	-0.261	-0.725
	(0.33)	(0.32)	(0.32)	(0.79)
FO_{t+1}	-0.370		-0.081	-0.731
	(0.14)		(0.03)	(0.26)
HS_{t+1}		-0.786	-0.783	-0.911
		(0.65)	(0.62)	(0.72)
$LNSIZE_{t+1}$				**0.217**
				(2.10)**
$LNAGE_{t+1}$				-0.946
				(1.53)
LEV_{t+1}				**-2.532**
				(1.72)*
$DIVPAY_{t+1}$				**1.523**
				(1.75)*
$ASTO_{t+1}$				0.813
				(0.82)

Notes: All t-statistics in parenthesis are based on robust, standard errors. *, ** and *** indicate significance at 10%, 5% and 1% respectively for the t-test. Items in boldface are significant at the 10% level or higher. TQ represents Tobin's Q, FO represents the percentage of foreign ownership in firms, HS is the percentage of horizontal spillovers from FDI, LNSIZE is the natural logarithm of the firm's net assets, LNAGE is the natural logarithm of the number of years since the establishment of the firm to the observation date, LEV is the leverage ratio of the firm, DIVPAY is the dividend payout ratio and ASTO represents the asset turnover ratio for the firm. (t+1) is a subset of forward values of the foreign ownership characteristics and control variables. See chapter 3 for complete definitions of all variables.

Table 4-12 shows that the coefficient estimates for the future values of horizontal spillovers are significant in all three specifications of ROE. The future values of some control variables are significant for certain performance measures, such as the dividend payout ratio and asset turnover ratio for ROE. Firm size, the leverage ratio and the dividend payout ratio are significant for Tobin's Q in table 4-13, whereas only the dividend payout ratio is significant for ROA in table 4-11. The significance of these variables declares a rejection of the null hypothesis of strict exogeneity

indicating that future realisations of these control variables are, in fact, related to current performance and, therefore, cannot be considered strictly exogenous (Wintoki *et al*., 2012). This corresponds with the results of the first test of endogeneity performed in the previous section.

With respect to foreign ownership, the findings of the first test conflict with the results in table 4-11, 4-12 and 4-13, where future values of foreign ownership did not display statistical significance with any firm performance measures, across any of the specifications; thus, suggesting that the foreign ownership variable does not adjust in response to firm performance.

Due to the difference in results across these two endogeneity tests, the DWH test was performed as an additional robustness check, as stipulated in section 3.5.1.4. The results thereof, shown in table C-1 of appendix C, confirm the results of the reverse causality test, as it was found that all variables (including foreign ownership) are in fact endogenous. The DWH test rejects the null hypothesis that the explanatory and control variables are exogenous, thus supporting that endogeneity is a significant concern when using ROA, ROE and Tobin's Q as performance indicators. Hence, the results of the DWH test reinforces that endogeneity is an issue in this study. This is supported by previous research of Schultz *et al*. (2010), Wintoki *et al*. (2012) and El-Faitouri (2014), who observed endogeneity biases in firm performance-related studies.

With support from the findings of all endogeneity tests and the justifications in section 3.5.3, the FEM is deemed as an unreliable and biased technique for this study. Therefore, this study employed the system GMM, which is "robust to dynamic endogeneity, simultaneity and unobservable heterogeneity" (Schultz, 2010: 161).

4.4 System GMM Regression Results for the Direct Effect of Foreign Ownership

4.4.1 The Base Model

Table 4-14 reports the results from equation (1) of the base model that was implemented by the system GMM of equation (15). As discussed in section 4.3.1, two lags of performance (ROA, ROE and Tobin's Q) were included in the system GMM models.

Table 4-14: GMM Regression Results for Linear Relationship between Foreign Ownership and Firm Performance

	ROA	ROE	TQ
$Performance_{t-1}$	**0.328**	**0.447**	**0.457**
	(2.29)**	**(4.10)*****	**(3.06)*****
$Performance_{t-2}$	**0.113**	0.074	0.145
	(1.78)*	(0.84)	(1.09)
FO	0.069	**0.241**	2.787
	(0.96)	**(2.01)****	(0.97)
LNSIZE	0.002	**-0.015**	0.020
	(0.30)	**(2.27)****	(0.09)
LNAGE	-0.010	-0.013	-0.248
	(1.31)	(1.04)	(0.88)
LEV	-0.017	-0.035	-1.505
	(0.42)	(0.54)	(0.90)
DIVPAY	**0.089**	0.158	0.116
	(2.23)**	(1.57)	(0.05)
ASTO	-0.016	-0.017	**-1.299**
	(0.83)	(0.43)	**(1.87)***
AR(1) test (p-value)	0.025	0.004	0.041
AR(2) test (p-value)	0.136	0.765	0.938
Hansen test (p-value)	0.319	0.610	0.710
Diff-in-Hansen (p-value)	0.358	0.791	0.792

Notes: All z-statistics in parenthesis are based on robust, standard errors. *, ** and *** indicate significance at 10%, 5% and 1% respectively. Items in boldface are significant at the 10% level or higher. AR(1) and AR(2) are tests for first-order and second-order serial correlation in the first-differenced residuals under the null of no serial correlation. The Hansen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen tests of exogeneity are under the null that instruments used for the equations in levels are exogenous. ROA represents the firm's returns on assets, ROE represents the firm's return on equity, TQ represents Tobin's Q, FO represents the percentage of foreign ownership in firms, LNSIZE is the natural logarithm of the firm's net assets, LNAGE is the natural logarithm of the number of years since the establishment of the firm to the observation date, LEV is the leverage ratio of the firm, DIVPAY is the dividend payout ratio and ASTO represents the asset turnover ratio for the firm. (t-1) and (t-2) are subsets of past values of ROA, ROE and Tobin's Q. See chapter 3 for complete definitions of all variables.

The results in table 4-14 demonstrate that foreign ownership is positively related to all three performance measures; however, it is only found to be statistically significant for ROE, by which a 1% increase in foreign ownership increases ROE by 0.22%. These findings are supported by Marashdeh (2014) and Khan and Nouman (2017), that are reviewed in section 2.3.1. Marashdeh (2014) observed a positive relationship between foreign ownership and firm performance in Jordan only when firm performance was measured with ROE, whereas Khan and Nouman (2017) found an insignificant relationship in Pakistan when Tobin's Q and ROA were utilised as performance measures. The significance of ROE, particularly, may allude to the presence of competitive advantage in firms with foreign ownership, which is outlined in the resource-based theory in section 2.2.1.2.

Turning to the control variables, the dividend payout ratio exhibits a positive effect on ROA, suggesting that the higher the dividend payout ratio of JSE-listed firms, the higher the firm's performance, in terms of ROA. This coincides with the expectations of the relationship between the dividend payout ratio and firm performance, which is outlined in section 3.3.1.3. In addition, Amidu (2007) also observed that the dividend payout ratio of companies listed on the Ghanaian Stock Exchange affected their performance, primarily when measured by ROA. Gedajlovic, Yoshikawa and Hashimoto (2005) and Gurbuz and Aybars (2010) obtained similar results.

Firm size demonstrates a negative coefficient that is statistically significant for ROE. The occurrence of a negative relationship between firm size and performance is highlighted in previous studies (such as Himmelberg *et al*., 1999; De Miguel *et al*., 2003; Mishra, 2014). A potential reason for this is because large firms are more susceptible to agency problems and information asymmetry that hinder their firm performance (De Miguel *et al*., 2003). In line with the findings in table 4-12, an Indian study by Chadha and Sharma (2015) also discovered a negative relationship between Tobin's Q and the asset turnover ratio.

Table 4-14 also reports the results of the specification tests discussed in sections 3.5.3.4, 3.5.3.5 and 3.5.3.6. The Arellano-Bond autocorrelation test yields p-values that are less than the 5% level of significance for all three performance measures. This results in the rejection of the null hypothesis for the first-order (AR (1)). The null hypothesis for the AR (2) test cannot be rejected for all performance measures as the resulting p-values are greater than the 10% level of significance. The rejection of the null hypothesis for AR (1) and the failure to reject the null

hypothesis for AR (2) reinforce the validity of the system GMM results (Roodman, 2009). This is because the residuals in the first-order are correlated, whereas there is no second-order serial correlation, hence, the exogeneity assumption is satisfied (Phung, 2015). Concerning the Hansen test, the insignificant p-values in table 4-14 reveal that the null hypothesis that the instruments are valid cannot be rejected (Wintoki *et al*., 2012). Similarly, the difference-in-Hansen test also fails to reject the null hypothesis that the instruments used for the levels equation are exogenous. Thus, all specification tests support the validity and reliability of the system GMM results.

4.4.2 The Non-Linearity ("U-shaped") Test

Taking into consideration the empirical evidence presented in chapter 2, it is necessary to consider that different quantities of foreign ownership can have different impacts on financial performance and thus, non-linearity tests were performed. As discussed in section 3.3.2.2, these tests include the quadratic regression, given by equation (2) and the SLM test. Table 4-15 displays the results of the quadratic regression, for all three performance measures, using the system GMM estimation approach.

Table 4-15: GMM Regression Results for the Test of Non-Linearity between Foreign Ownership and Firm Performance

	ROA	ROE	TQ
$Performance_{t-1}$	**0.330**	**0.455**	**0.416**
	(2.24)**	**(3.60)*****	**(2.57)****
$Performance_{t-2}$	**0.112**	0.051	0.158
	(1.73)*	(0.51)	(1.13)
FO	0.190	**0.951**	9.930
	(0.85)	**(2.61)*****	(1.21)
FO^2	-0.201	**-1.184**	-12.304
	(0.55)	**(1.89)***	(0.97)
LNSIZE	0.001	**-0.014**	0.045
	(0.23)	**(2.63)*****	(0.22)
LNAGE	-0.010	-0.015	-0.332
	(1.27)	(1.18)	(1.09)
LEV	-0.022	-0.040	-1.309
	(0.48)	(0.63)	(0.68)
DIVPAY	**0.086**	0.124	0.672
	(2.17)**	(1.38)	(0.36)
ASTO	-0.020	-0.025	**-1.567**
	(1.11)	(0.81)	**(1.93)***
AR(1) test(p-value)	0.026	0.007	0.054
AR(2) test(p-value)	0.138	0.905	0.968
Hansen test(p-value)	0.249	0.436	0.599
Diff-in-Hansen(p-value)	0.279	0.465	0.714

Notes: All z-statistics in parenthesis are based on robust, standard errors. *, ** and *** indicate significance at 10%, 5% and 1%. Items in boldface are significant at the 10% level or higher. AR(1) and AR(2) are tests for first-order and second-order serial correlation in the first-differenced residuals under the null of no serial correlation. The Hansen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen tests of exogeneity are under the null that instruments used for the equations in levels are exogenous. ROA represents the firm's returns on assets, ROE represents the firm's return on equity, TQ represents Tobin's Q, FO represents the percentage of foreign ownership in firms, FO^2 represents the quadratic term of foreign ownership, LNSIZE is the natural logarithm of the firm's net assets, LNAGE is the natural logarithm of the number of years since the establishment of the firm to the observation date, LEV is the leverage ratio of the firm, DIVPAY is the dividend payout ratio and ASTO represents the asset turnover ratio for the firm. (t-1) and (t-2) are subsets of past values of ROA, ROE and Tobin's Q. See chapter 3 for complete definitions of all variables.

Similar to the results of the base model shown in table 4-14, the specification tests (i.e., the Arellano-Bond autocorrelation test, the Hansen test and the difference-in-Hansen test) in table 4-15 indicate that the system GMM results and instruments are valid. The results also reinforce the non-existent relationship between foreign ownership and ROA, and Tobin's Q.

The linear coefficient of foreign ownership for ROE is significantly positive, whereas the quadratic term for foreign ownership is significantly negative; thereby indicating an inverse U-shaped relationship between foreign ownership and ROE. The presence of an inverse U-shaped relationship implies that when the level of foreign ownership increases, the ROE of JSE-listed firms initially improves, however, once foreign ownership rises above a certain level, it begins to erode the ROE of firms.

As discussed in section 3.3.2.2, the quadratic regression alone is insufficient for detecting the presence of a non-linear relationship, therefore, in order to confirm non-linearity between foreign ownership and ROE, the SLM test was performed. This test also determined the optimal level of foreign ownership for JSE-listed firms. The results are presented in table 4-16. As mentioned in chapter 3, firms with less than 10% of foreign ownership are excluded as they are considered domestic-owned firms.

Table 4-16: U-Test Regression Results of the SLM Test

Dependent Variable: ROE		
Bounds	FO_{min}	FO_{max}
Interval	0.1	0.979
Slope	0.714	-1.368
p-value	0.002	0.063
Overall test of the presence of a U-shape		
p-value	0.063	
Extreme point	0.401	
95% Fieller interval for extreme point	[0.298; 0.925]	

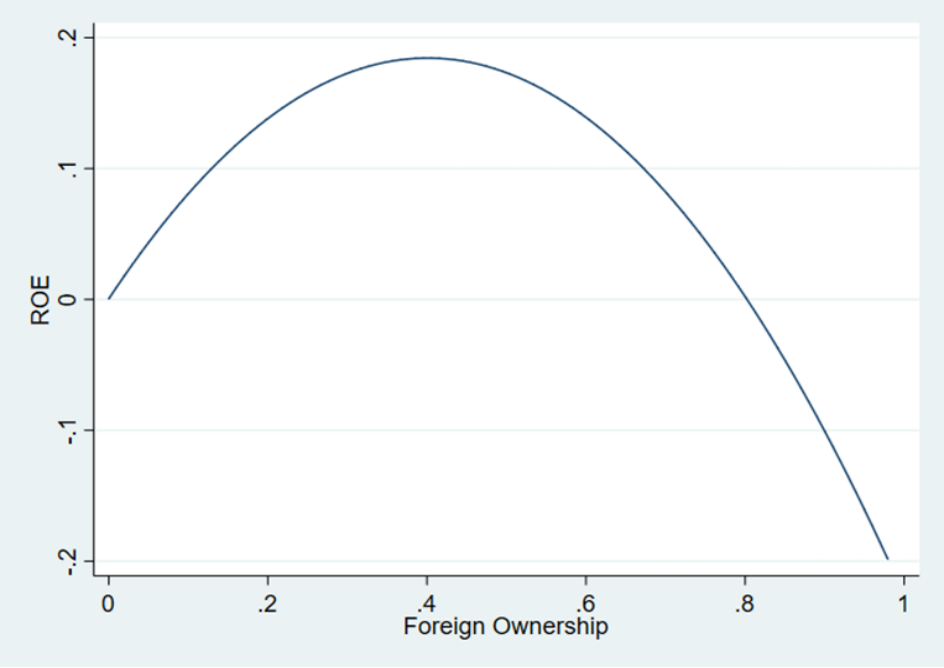
Notes: FO_{min} and FO_{max} represent the minimum and maximum level of foreign ownership in JSE-listed firms. The slope at $FO_{min}=\beta + 2\lambda(FO_{min})$ and the slope at $FO_{max}= \beta + 2\lambda(FO_{max})$.

The results from table 4-16 confirm that the slope at the minimum level (0.714) and the maximum level (-1.368) are consistent with the characteristics of an inverse U-shape (i.e., positive slope followed by a negative slope). Based on the p-values, the slopes are significant at the 1% and 10% level of significance, respectively. The extreme point (0.401) and the lower and upper bounds of the Fieller interval (0.298 to 0.925) lie within the interval between the minimum and maximum

level of foreign ownership in JSE-listed firms (0.1 to 0.979). These estimates violate the condition for a U-shape that is captured in equation (3). Accordingly, this study fails to reject the null hypothesis in equation (4) of an inverse U-shaped relationship and rejects the alternative hypothesis in equation (5) of a U-shaped relationship as the slope at FO_{min} is greater than 0 ($\beta + 2\lambda(FO_{min}) = 0.714$) and the slope at FO_{max} is less than 0 ($\beta + 2\lambda(FO_{max}) = -1.367$); thereby satisfying the conditions of an inverse U-shaped curve. This confirms the results of table 4-15 and the expectation of a non-linear relationship, stated in section 4.2.3. The inverse U-shaped relationship between foreign ownership and firm performance is in accordance with many studies that are discussed in section 2.3 (such as Gurbuz and Aybars, 2010; Choi *et al.* 2012; Greenaway *et al.* 2014; Viet, 2013; Phung, 2015).

The optimal level of foreign ownership in this study is represented by the extreme point of 40.1%. Based on this, it is deduced that the inflow of foreign ownership to JSE-listed companies initially improves their performance, but once the level of foreign ownership exceeds 40.1% of the ownership structure, the impact of foreign ownership becomes negative. This is evident in figure 4-2 below, where ROE begins to decline once foreign ownership exceeds 40%.

Figure 4-2: U-shaped Relationship between ROE and Foreign Ownership



Notes: The figure plots the non-linear relationship between ROE and foreign ownership over the period 2012 to 2018.

As discussed in section 2.2.1.1, foreign investors often enhance firm performance because they have incentives to monitor managers and force them to align their goals with shareholders. Foreign investors also introduce know-how, technologies and skills to the firms, which is pivotal in improving performance (Gurbuz and Aybars, 2010). Nonetheless, when foreign ownership exceeds a certain level, foreign investors have an entrenchment effect that reduces performance because as they can expropriate other, smaller shareholders (Phung, 2015). Consequently, the effect of foreign ownership on firm performance thus becomes negative (Greenaway *et al*., 2014).

The recent corporate failures in South Africa, such as the case of Steinhoff and South African Airways (SAA) have been blamed on poor corporate governance, stemming from reporting irregularities and the lack of strategic monitoring. Hence, the improvement of firm performance through foreign ownership could be attributed to the activation of better corporate governance practices by foreign investors (Oxelheim and Randøy, 2003; Phung, 2015). This view is supported by Choi *et al.* (2012), who stated that foreign investors can improve corporate governance by becoming board members, leading to the enhancement of firm performance. According to Kollamparambil and Jogee (2018), MNCs in South Africa have technological advantages over their local counterparts. These technological advantages often arise from the transfer of technical knowledge and leading-edge technology by foreign investors (Sazali, Haslinda, Jegak and Raduan, 2010). Foreign firms in South Africa spend a substantial amount of money and time on training and skills development for local employees. In some cases, international professionals are brought in to train local employees (Kollamparambil and Jogee, 2018). Therefore, the increase in firm performance can also be attributable to the transfer of scarce and valuable resources by foreign investors; thereby signalling a competitive advantage over domestic firms.

However, in developing countries, the protection of minority shareholders is usually insufficient (Gibson, 2003), therefore, like Turkey, China and Vietnam, the performance of South African firms decreases when foreign ownership becomes concentrated enough to effectively control the board. Choi *et al*. (2012), who observed an inverse U-shaped relationship in China, argued that concentrated foreign ownership could erode firm value when the foreign shareholders have controlling power to pursue private interests, such as short-term profit and high dividends, to the detriment of minority shareholders. This highlights the entrenchment effect discussed in section 2.2.1.1.

With respect to Turkey, Gurbuz and Aybars (2010) stated that the local alliances among local firms, their managers and their owners provide certain advantages to domestic-owned firms that cannot be achieved by highly concentrated foreign-owned firms; thereby highlighting the issue of liability of foreignness that is outlined in section 2.2.1.2. This may be applicable to South Africa as well since domestic owners may be more familiar with the South African environment, including governance structures, procedures, business practices and the legal and regulatory frameworks.

Hence, the deterioration of firm performance after foreign ownership exceeds 40.1% may be caused by the entrenchment effect and/or the liability of foreignness. It is thus recommended that domestic investors should form at least 60% of the total shareholdings in order to attain optimal firm performance on the JSE as this prevents foreign investors from having the power to influence managerial decisions in ways that benefit them (Phung, 2015). The optimal level of 40.1% of foreign ownership is similar to previous findings by Akimova and Schwodiauer (2004) and Phung (2015), mentioned in section 2.3.1.2, who estimated optimal levels of foreign ownership to be 39% in Ukraine and 43% in Vietnam, respectively.

The observation of no relationship between ROA and foreign ownership is supported, to an extent, with the results of the prior South African studies of Swart (2013) and Dube (2018). With respect to ROE, these results are similar to those of Dube (2018) but contrast with Swart (2013), who found an insignificant relationship between foreign ownership and ROE. In the case of Tobin's Q, these findings are different from Dube (2018), as the author observed a positive relationship between Tobin's Q and foreign ownership. Swart (2013), on the other hand, did not utilise the Tobin's Q as a performance measure in his study. The differences between these results may exist due to the inclusion of financial firms and the estimation technique used by Swart (2013), and Dube's (2018) disparate composition of percentage of foreign ownership in JSE-listed firms. The other notable differences were that both prior studies did not account for the possibility of a non-linear relationship or the issue of endogeneity.

The statistical insignificance of ROA and Tobin's Q in the foreign ownership-performance nexus creates a level of uncertainty as to whether foreign ownership actually affects firm performance on the JSE. Similarly, Shrivastav and Kalsie (2017) also obtained different results for foreign

institutional ownership when different performance indicators (Tobin's Q, ROA, or ROE) were used.

On the one hand, firms with higher ROE typically possess competitive advantages over their counterparts that translates into superior returns for investors (Kharatyan, Nunes and Lopes, 2016). Therefore, in line with the resource-based theory explained in section 2.2.1.2, the increase in ROE particularly, could be a result of the transfer of scarce and valuable resources by foreign investors (Ghebrihiweta and Motchenkovab, 2017) to JSE-listed firms. This corroborates with the previously discussed findings of Kollamparambil and Jogee (2018).

On the other hand, the ROE performance measure is different from ROA and Tobin's Q as it looks at how effectively a firm is using shareholder’s equity. A high ROE assumes an efficient use of equity. Nevertheless, Jensen and Meckling (1999) argue that, even though many firms make use of ROE, this performance indicator is susceptible to manipulation when managers have the rights to make decisions over the level of investment. As a consequence, investors may be misled by the apparent better performance. In addition, Copeland, Koller and Murrin (1996) claim that ROE is a short-term performance measure and, therefore, may not be appropriate for assessing long-term investments.

In light of the above, South African firms cannot rely on the ROE alone to measure performance (Finegan, 1991). Therefore, taking into consideration the results of all the performance indicators used in this study, it can be concluded that the relationship between foreign ownership and the performance of JSE-listed firms is gathered to be ambiguous as it varies with the use of different firm performance measures.

4.5 System GMM Regression Results for Horizontal Spillovers

This section focuses on the effect of horizontal spillovers from foreign ownership on JSE-listed firms and aims to fulfil the final objective of the study. Table 4-17 displays results estimated from equation (8), using the system GMM.

Table 4-17: GMM Regression Results for the Relationship between Horizontal Spillovers and Firm Performance

	ROA	ROE	TQ
$Performance_{t-1}$	**0.396**	**0.509**	**0.434**
	(2.48)**	**(4.69)****	**(3.19)*****
$Performance_{t-2}$	0.116	0.068	0.201
	(1.57)	(0.75)	(1.64)
FO	0.037	0.167	2.709
	(0.60)	(1.65)	(0.86)
HS	-0.003	-0.001	0.520
	(0.17)	(0.03)	(0.42)
LNSIZE	0.001	**-0.013**	-0.175
	(0.19)	**(2.20)****	(0.66)
LNAGE	-0.011	-0.015	-0.166
	(1.50)	(1.21)	(0.58)
LEV	-0.009	-0.018	-2.036
	(0.24)	(0.33)	(1.13)
DIVPAY	**0.123**	0.217	1.740
	(2.42)**	(2.08)	(0.58)
ASTO	-0.011	-0.002	-0.615
	(0.79)	(0.07)	(1.00)
AR(1) test (p-value)	0.026	0.002	0.044
AR(2) test (p-value)	0.169	0.874	0.839
Hansen test (p-value)	0.248	0.510	0.403
Diff-in-Hansen (p-value)	0.363	0.699	0.189

All z-statistics in parenthesis are based on robust, standard errors. *, ** and *** indicate significance at 10%, 5% and 1% respectively. Items in boldface are significant at the 10% level or higher. AR(1) and AR(2) are tests for first-order and second-order serial correlation in the first-differenced residuals under the null of no serial correlation. The Hansen test of over-identification is under the null that all instruments are valid. The Diff-in-Hansen tests of exogeneity are under the null that instruments used for the equations in levels are exogenous. ROA represents the firm's returns on assets, ROE represents the firm's return on equity, TQ represents Tobin's Q, FO represents the percentage of foreign ownership in firms, HS is the percentage of horizontal spillovers from FDI, LNSIZE is the natural logarithm of the firm's net assets, LNAGE is the natural logarithm of the number of years since the establishment of the firm to the observation date, LEV is the leverage ratio of the firm, DIVPAY is the dividend payout ratio and ASTO represents the asset turnover ratio for the firm. (t-1) and (t-2) are subsets of past values of ROA, ROE and Tobin's Q. See chapter 3 for complete definitions of all variables.

According to the results presented in table 4-17, the coefficient for horizontal spillovers is statistically insignificant in the equations for all three performance measures. It is thus evident that the entrance of MNCs into South Africa does not affect the financial performance of other companies operating in the same industry. This is consistent with the results of previous research conducted in South Africa (such as Mebratie and Bedi, 2011; Magwiro *et al*., 2014) and internationally (such as Schoors and Tol, 2002; Fatima, 2014; Li and Luo, 2019). Similar to tables 4-14 and 4-15, the specification tests (i.e., Arellano-Bond autocorrelation test, the Hansen test and the difference-in-Hansen test) verify that the system GMM results and instruments are reliable.

As explained in section 3.4.1.2, horizontal spillovers are measured through the channel of competition where the presence of foreign-owned firms indirectly increases the performance of domestic firms in the same industry. This is because the increased competition created by the entrance of foreign firms, in the same industry, force local companies to enhance their production processes by upgrading technology and imitating the innovative processes of MNCs (Wang and Blomström, 1992). Therefore, the absence of horizontal spillovers in this study implies that foreign competition does not have any effect on the productivity or sales of local firms, thereby not impacting firm performance.

In order to realize the benefits from spillovers, firms require an adequate level of absorptive capacity, as acknowledged in section 2.2.2.3. Domestic firms in South Africa are often subjected to weak human capital. Furthermore, Mabena (2012) argued that South African local firms are weaker than MNCs with respect to technology. Schools and tertiary institutions in South Africa do not thoroughly prepare their students for the use of technology in the workplace.

The lack of preparation for the use of technology prevents firms from absorbing horizontal spillovers because local workers do not have the knowledge and capabilities required for using modern technologies as a means to imitate the processes, products and innovations of foreign firms (Wang and Blomström, 1992). This is supported by Mondal and Pant (2010), who claimed that industries dominated by low technology intensive firms lack the ability to absorb horizontal spillovers from foreign competition.

Besides the lack of initial technological knowledge, local workers generally have low levels of education and skills (Mabena, 2012; Mateus, Allen-Ile and Iwu, 2014). As discussed in section 2.2.2.3, human capital and education are crucial for the absorption of benefits from FDI, that occur

through training and learning by doing. South Africa's weakness in this area could be a further consequence that prohibits local workers from imitating the processes of foreign firms due to their lack of skills. Hence, firms may not experience any effects of horizontal spillovers due to their weak absorptive capacity. An additional notable reason for the nonexistence of horizontal spillovers in South Africa may also be attributed to the fact that MNCs have a strong incentive to prevent their firm-specific knowledge from leaking to domestic competitors (Li and Luo, 2019), as discussed in section 2.2.2.1.

4.6 Strengths of Instruments Regression Results

Table 4-18 depicts the results of the first-stage regression to assess the strength of the instruments used in the system GMM estimates, as outlined in section 3.5.3.7.

Table 4-18: First-Stage Regression for System GMM Estimates

Panel A: Dependent variable (X) is in levels		
	F-statistic	R^2
FO	1.981***	0.1968
HS	19.99***	0.2947
LNSIZE	28.943***	0.3675
LEV	64.487***	0.2747
DIVPAY	1.393***	0.2383
ASTO	1.981	0.1968
Panel B: Dependent variable (ΔX) is in first differences		
	F-statistic	R^2
ΔFO	2.725**	0.019
ΔHS	14.518***	0.1694
ΔLNSIZE	82.307***	0.1412
ΔLEV	10.12***	0.2102
ΔDIVPAY	1.250	0.0156
ΔASTO	92.581***	0.1412

This table reports the F-statistics and R^2 of OLS first-stage regressions of levels and first-differenced variables on lagged differences and lagged levels, respectively. All F-statistics in parenthesis are based on robust, standard errors. *, ** and *** indicate significance at 10%, 5% and 1% respectively. Items in boldface are significant at the 10% level or higher. FO represents the percentage of foreign ownership in firms, HS is the percentage of horizontal spillovers from FDI, LNSIZE is the natural logarithm of the firm's net assets, LEV is the leverage ratio of the firm, DIVPAY is the dividend payout ratio and ASTO represents the asset turnover ratio for the firm. For the levels variables(X), the dependent variables are: ΔFO_{t-2}, ΔHS_{t-2}, $\Delta LNSIZE_{t-2}$, ΔLEV_{t-2}, $\Delta DIVPAY_{t-2}$ and $\Delta ASTO_{t-2}$. For the first-differenced variables (ΔX), the dependent variables are FO_{t-3}, HS_{t-3}, $LNSIZE_{t-3}$, LEV_{t-3}, $DIVPAY_{t-3}$ and $ASTO_{t-3}$. See chapter 3 for complete definitions of all variables.

Table 4-18 reveals that most of the instruments have significant F-statistics, with exception to the asset turnover ratio in levels and the dividend payout ratio in first differences; thereby indicating the rejection of the null hypothesis that the instruments are weak. This suggests that the instrument set has significant explanatory power for the endogenous variables (Schultz *et al.*, 2010 and

Wintoki *et al*., 2012). With only five exceptions, the F-statistics are all greater than 10, which is the "rule of thumb" critical value suggested by Staiger and Stock (1997) for assessing instrument strength. Overall, the results from the tests for the strength of the instruments support that weak instruments do not drive the results of the system GMM estimates.

4.7 Conclusion

In this chapter, the results of the procedures described in chapter 3 for the estimation of the various parameters were discussed. The endogeneity tests revealed that the endogeneity issue was present in this study. The results of the system GMM found an inverse U-shaped relationship between foreign ownership and ROE and no significant relationship between horizontal spillovers and firm performance. Lastly, all specification tests of the system GMM confirmed the validity of results. The next chapter, concludes the study, provides a brief overview of the objectives of the research, the relevant findings, and discusses the implications of the results and provides recommendations for future research.

CHAPTER 5: CONCLUSION

5.1 Review of Research Objectives

FDI has been viewed as an essential stimulus for productivity, economic growth and general welfare in developing countries. For countries like South Africa, with a history of political instability, fluctuating economic performance and low domestic savings; the inflow of FDI is required to meet the countries objectives of job creation and inclusive growth. The South African government has acknowledged the importance of FDI and made several efforts to attract more foreign investors. By the end of 2015, FDI was the largest source of foreign ownership in JSE-listed companies. The effects of foreign ownership on domestic firms can be divided into two categories: direct and indirect effects. Direct effects to MNCs occur through access to know-how, technology, better managerial practices, production processes and the enhancement of skills of domestic labourers. Nevertheless, direct effects can also materialise through negative effects such as entrenchment and liability of foreignness. Indirect effects occur through spillovers (horizontal or vertical), where the benefits and drawbacks of foreign ownership are experienced by domestic firms that were not recipients of FDI.

As discussed in section 1.2, a considerable amount of research has been undertaken on the determinants and effects of FDI at a macroeconomic level. Furthermore, the studies pertaining to the direct and indirect effects of FDI have mainly been pursued individually. Consequently, the primary objective underlying this study was to ascertain the direct and indirect horizontal effects of foreign ownership on the financial performance of firms listed on the JSE. In analysing this topic, the secondary objectives were considered as follows:

- To explore if endogeneity exists between foreign ownership and firm performance.
- To establish if the direct relationship between foreign ownership and firm performance is either linear or non-linear (with the non-linear relationship being either U- or inverse U-shaped).
- If the direct relationship is non-linear, to determine the optimal level of foreign ownership.
- To ascertain if there are any horizontal spillover effects from foreign firms to domestic firms.

The results of the secondary objectives were discussed first as they formed the basis of the primary objective. The next sections outline the main results obtained, which aim to address each of the research objectives outlined above.

5.2 Summary of Study Findings

5.2.1 The Issue of Endogeneity

To determine the most suitable method to estimate the relationship between foreign ownership and firm performance, the issue of endogeneity was investigated. Despite some conflicting results regarding foreign ownership, the tests confirmed that all variables were endogenous. With respect to foreign ownership and firm performance, this indicates that not only does foreign ownership impact firm performance, but that firm performance also impacts foreign ownership. To account for endogeneity, this study implemented the system GMM.

5.2.2 Linear Versus Non-Linear Relationship Between Foreign Ownership and Firm Performance

The results produced were mixed as a non-linear relationship was observed when firm performance was measured with ROE, however, when ROA and Tobin's Q were used as performance measures; the relationship proved to be statistically insignificant. The non-linear relationship between foreign ownership and ROE was that of an inverse U-shape where the linear coefficient of foreign ownership was significantly positive, and the quadratic term of foreign ownership was significantly negative. The SLM test confirmed that U-shape and revealed that the optimal level of foreign ownership based on ROE was 40.1%. From this finding, it can therefore be seen that the increase in the percentage of foreign ownership is met with an initial increase in the ROE of JSE-listed firms, however, when the level of foreign ownership surpasses 40.1%, the ROE begins to decrease. The initial increase in ROE was explained by the reduction in agency problems, introduction of know-how, skills and technology to the firms, while the subsequent decrease was ascribed to the entrenchment effect and the liability of foreignness. Therefore, it is suggested that domestic shareholders should form at minimum 60% of the ownership structure to achieve optimal firm performance.

Based on the findings that the two other performance measures (ROA and Tobin's Q) shared an insignificant relationship with foreign ownership, there was a certain degree of uncertainty surrounding the foreign ownership-firm performance nexus. However, the case of different

performance measures generating difference results is a common occurrence in prior studies. The three performance measures in this study differ in terms of their implications. The statistical significance of ROE was attributed to competitive advantages attained by JSE-listed firms with foreign ownership, which resulted in superior returns to shareholders. Notwithstanding this, the reliability of ROE was disputed as it is vulnerable to manipulation by managers. South African firms cannot rely on ROE alone to measure performance. Therefore, it was concluded that the relationship between foreign ownership and the performance of JSE-listed firms was ambiguous as it varied with different performance indicators.

5.2.3 Horizontal Spillovers

To determine the indirect relationship between foreign ownership and firm performance, horizontal spillovers were estimated. The results of this analysis revealed that there were no horizontal spillovers from foreign firms to domestic firms listed on the JSE in the same industry. Since the horizontal spillover variable was proxied through the channel of competition, its absence indicated that foreign competition had no influence on the performance of local firms.

The insignificance of horizontal spillovers was attributed mainly to the weak absorptive capacity within the South African environment, specifically in terms of poor human capital and the lack of initial technological knowledge. The other notable reason for the absence of horizontal spillovers was explained by the reluctance of foreign subsidiaries in sharing technology and knowledge with their local competitors.

5.3 Policy Implications

The results of the study give rise to several recommendations for government policy and South African firms, which are discussed below:

- As mentioned in chapter 1, the existing policy on FDI in South Africa does not place restrictions on foreign ownership in South African firms. However, the findings of an inverse-U shaped relationship, with an optimal level of 40.1% of foreign ownership indicates the need for a policy that limits the level of foreign ownership in a listed firm.
- In an emerging market like South Africa, a key policy priority should be the implementation of a corporate governance framework that secures the benefits of large shareholders whilst preventing them from extracting excessive private benefits at the

expense of minority shareholders and firm performance. In addition, the JSE can encourage transparency among shareholders by enforcing mandatory disclosure requirements, to help ensure that the investment environment encourages all types of investors (large and small) feel safe to participate in the stock market.

- Taking into consideration the non-existence of horizontal spillovers attributed to the lack of absorptive capacity of the local workforce, the government should seek to formulate policies focused on human capital accumulation that is targeted on building the absorptive capacity of local workers. Policies should focus on firm learning and innovation in order to reduce the technical and managerial skills gap with foreign-owned firms.
- Based on the occurrence of the liability of foreignness, it is evident that foreign firms experience certain disadvantages from venturing abroad. Thus, the government can establish incentives that help MNCs reduce their liability of foreignness in exchange for their engagement with local firms. This may facilitate local firms learning from foreign firms through demonstrations of their processes, products and technologies. Policymakers can further support networking between foreign and local firms by creating collaborative spaces and programmes. Given that the access to technology from MNCs is a significant source of spillovers, these incentives can also be provided for the transfer and licensing of technology from foreign firms. Incentives for licensing and transfer of technology have proven to be effective in promoting innovation in many developing countries (Farole and Winkler, 2014).

5.4 Opportunities for Further Research

This study, in addressing the question of the direct and indirect spillover effects of foreign ownership in South Africa, has contributed to the knowledge and understanding of the estimation of FDI effects at firm-level. Nevertheless, numerous opportunities for further research that exceed the scope of this study arise. The details of these opportunities are outlined below:

- Although this study only estimates horizontal spillovers, it is acknowledged that vertical spillovers may still exist. Markusen and Venables (1999) and Javorcik (2004) pointed out that if FDI were to generate spillovers, they are more likely to occur through vertical relationships compared to horizontal relationships, as MNCs have no incentive to prevent

technology diffusion to upstream industries. Hence, future research can account for the estimation of vertical spillovers.

- The origin of foreign ownership is an important subject for future research. As per Dunning's (2000) eclectic paradigm, the relationship between foreign ownership and firm performance may vary depending on the source country of the foreign capital. By accounting for the origin of foreign ownership, it is possible to reveal whether the characteristics of foreign investors contribute to the differences in firm performance. This could have direct policy implications regarding the geographical distance of foreign investors in the South African context in particular but also in emerging markets in general.
- Alternative proxies for horizontal spillovers could be used. Aside from the competition channel, horizontal spillovers can be proxied through imitation, skill, employment, exports, and wages (Mondal and Pant, 2018). The use of different horizontal spillover proxies may exhibit different effects on firm performance, implying that more in-depth research into the channels of horizontal spillovers in firms will shed more light on the role of foreign shareholders in the industrial context.
- As highlighted in sections 2.2.2.3 and 4.6, absorptive capacity is an important determinant of FDI spillovers. The measurement of absorptive capacity in future research will provide insight on the ability of domestic firms to identify, assimilate and exploit the benefits spilled over by FDI. It will also serve as an inference behind the results of FDI spillovers.
- The current research was conducted in a single country (South Africa). Although South Africa shares some typical characteristics with other African countries, their financial system is constantly praised as the most sophisticated from all African countries (Wyk, Botha and Goodspeed, 2018). Therefore, the applicability of such results to other African countries may be questionable. Thus, it is recommended that future research incorporate other African countries to make the results more widely applicable.

5.5 Conclusion

The primary objective of this study was to evaluate the direct and indirect horizontal effects of foreign ownership on the performance of firms listed on the JSE. The analysis revealed that the direct effects were ambiguous as they depended on the performance indicators. ROA and Tobin's Q were not impacted by foreign ownership whereas ROE shared a non-linear relationship with foreign ownership, characterised by an inverse U-shape. The significance of ROE may have been due to the competitive advantage in MNCs. The SLM test produced an optimal level of 40.1% of foreign ownership; thereby suggesting that foreign ownership greater than this level will deteriorate firm performance on the JSE. With respect to the indirect effects, there was no evidence found of horizontal spillovers. This is attributed to the inability of local workers in realising the benefits from horizontal spillovers as they lack the required skills and technological knowledge.

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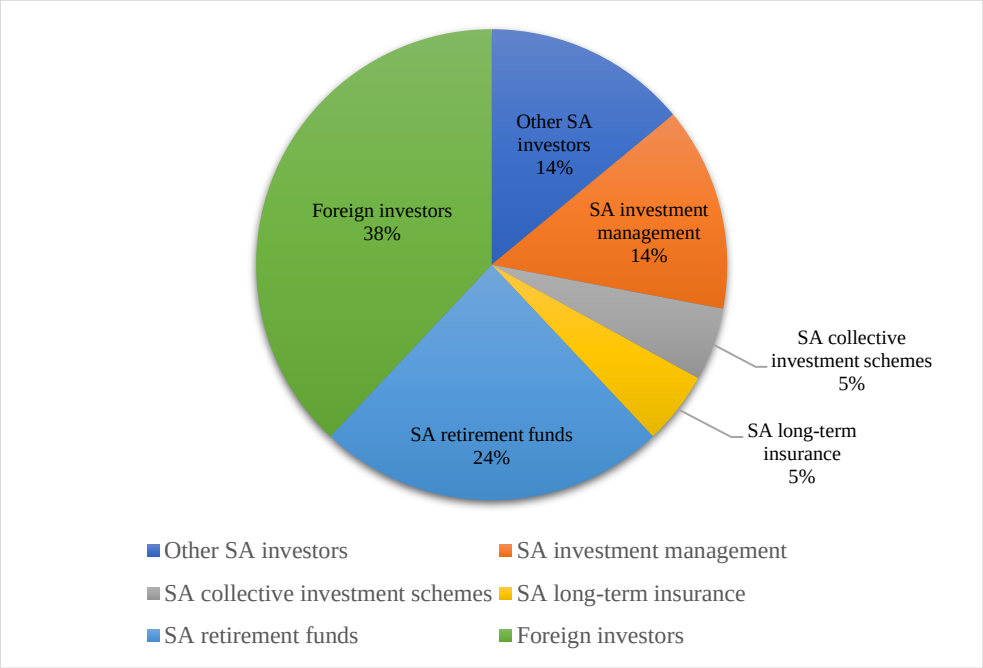
APPENDIX

Appendix A

Figure A-1: Ownership of shares listed on the JSE at the end of 2015



(Source: JSE, 2015; South African Revenue Bank, 2015)

Appendix B

Table B-1: JSE Securities Exchange list of non-financial firms

	Long Name	ICB Industry Long Name
1	1TIME HOLDINGS LTD	Industrials
2	ACCENTUATE LTD	Industrials
3	ADAPTIT HOLDINGS LTD	Technology
4	ADCOCK INGRAM HOLDINGS LTD	Health Care
5	ADCORP HOLDINGS LTD	Industrials
6	ADVANCED HEALTH LTD	Health Care
7	ADVTECH LTD	Consumer Services
8	AECI LTD	Basic Materials
9	AFRICA CELLULAR TOWERS LTD	Basic Materials
10	AFRICAN MEDIA ENTERTAINMENT	Consumer Services
11	AFRICAN OXYGEN LTD	Basic Materials
12	AFRICAN RAINBOW MINERALS LTD	Basic Materials

13	AFRIMAT LTD	Industrials
14	AFROCENTRIC INVESTMENT CORPO	Health Care
15	ALARIS HOLDINGS LTD	Technology
16	ALERT STEEL HOLDINGS LTD	Consumer Services
17	ALLIANCE MINING CORP LTD	Basic Materials
18	ALLIED ELECTRONICS COR-A SHR	Industrials
19	ALLIED TECHNOLOGIES LTD	Basic Materials
20	ALVIVA HOLDINGS LTD	Technology
21	AMALGAMATED ELECTRONIC CORP	Industrials
22	ANGLO AMERICAN PLATINUM LTD	Basic Materials
23	ANGLOGOLD ASHANTI LTD	Basic Materials
24	ARB HOLDINGS LTD	Industrials
25	ARCELORMITTAL SOUTH AFRICA	Basic Materials
26	ARGENT INDUSTRIAL LTD	Industrials
27	ASCENDIS HEALTH LTD	Health Care
28	ASPEN PHARMACARE HOLDINGS LT	Health Care
29	ASSORE LTD	Basic Materials
30	ASTRAL FOODS LTD	Consumer Goods
31	ASTRAPAK LTD-UTS	Basic Materials
32	AVENG LTD	Industrials
33	AVI LTD	Consumer Goods
34	AWETHU BREWERIES LTD	Consumer Goods
35	B&W INSTRUMENTATION AND ELEC	Industrials
36	BARLOWORLD LTD	Industrials
37	BASIL READ HOLDINGS LTD	Industrials
38	BAUBA RESOURCES LTD	Basic Materials
39	BEIGE HOLDINGS LTD	Consumer Goods
40	BELL EQUIPMENT LTD	Industrials
41	BID CORP LTD	Consumer Services
42	BIDVEST GROUP LTD	Industrials
43	BIOSCIENCE BRANDS LTD	Health Care
44	BLUE LABEL TELECOMS LTD	Telecommunications
45	BOWLER METCALF LIMITED	Industrials
46	BRIKOR LTD	Industrials
47	BSI STEEL LTD	Basic Materials
48	BUILDMAX LTD	Basic Materials
49	BUSINESS CONNEXION GROUP	Technology
50	CARGO CARRIERS LTD	Industrials
51	CARTRACK HOLDINGS LTD	Industrials
52	CASHBUILD LTD	Consumer Services
53	CAXTON AND CTP PUBLISHERS AN	Consumer Services
54	CENTRAL RAND GOLD LTD	Basic Materials
55	CHEMICAL SPECIALITIES LTD	Basic Materials

56	CHROMETCO LTD	Basic Materials
57	CIPLA MEDPRO SOUTH AFRICA LT	Health Care
58	CITY LODGE HOTELS LTD	Consumer Services
59	CLICKS GROUP LTD	Consumer Services
60	CLOVER INDUSTRIES LTD	Consumer Goods
61	COGNITION HOLDINGS LTD	Technology
62	COMAIR LTD	Consumer Services
63	COMBINED MOTOR HOLDINGS LTD	Consumer Services
64	COMMAND HOLDINGS LTD	Consumer Services
65	COMPU-CLEARING OUTSOURCING	Technology
66	CONSOLIDATED INFRASTRUCTURE	Industrials
67	CONTROL INSTRUMENTS GROUP PT	Industrials
68	COUNTRY BIRD HOLDINGS LTD	Consumer Goods
69	CROOKES BROTHERS LTD	Consumer Goods
70	CSG HOLDINGS LTD	Industrials
71	CULLINAN HOLDINGS LTD	Consumer Services
72	CURRO HOLDINGS LTD	Consumer Services
73	DATACENTRIX HOLDINGS LTD	Technology
74	DATATEC LTD	Technology
75	DIGICORE HOLDINGS LTD	Technology
76	DIS-CHEM PHARMACIES PTY LTD	Consumer Services
77	DISTRIBUTION & WAREHOUSING	Industrials
78	DON GROUP LIMITED	Consumer Services
79	DORBYL LTD	Consumer Services
80	DRDGOLD LTD	Basic Materials
81	E MEDIA HOLDINGS LTD	Consumer Services
82	EFORA ENERGY LTD	Oil and Gas
83	ELB GROUP LTD	Industrials
84	ELLIES HOLDINGS LTD	Industrials
85	ENX GROUP LTD	Industrials
86	EOH HOLDINGS LTD	Technology
87	ESOR LTD	Industrials
88	ETION LTD	Industrials
89	EVRAZ HIGHVELD STEEL & VANAD	Basic Materials
90	EXTRACT GROUP LTD	Industrials
91	EXXARO RESOURCES LTD	Basic Materials
92	FAMOUS BRANDS LTD	Consumer Services
93	FARITEC HOLDINGS LTD	Technology
94	GIJIMA GROUP LTD	Telecommunications
95	GOLD BRANDS INVESTMENTS LTD	Consumer Services
96	GOLD FIELDS LTD	Basic Materials
97	GOLIATH GOLD MINING LTD	Basic Materials
98	GOODERSON LEISURE CORP LTD	Consumer Services

99	GRINDROD LTD	Industrials
100	GRINDROD SHIPPING HOLDINGS L	Industrials
101	GROUP FIVE LTD	Industrials
102	HARDWARE WAREHOUSE LTD	Basic Materials
103	HARMONY GOLD MINING CO LTD	Basic Materials
104	HOLDSPORT LTD	Consumer Goods
105	HOWDEN AFRICA HOLDINGS LTD	Industrials
106	HUDACO INDUSTRIES LTD	Industrials
107	HUGE GROUP LTD	Telecommunications
108	HULAMIN LTD	Basic Materials
109	IFA HOTELS & RESORTS LTD	Consumer Services
110	ILIAD AFRICA LTD	Consumer Goods
111	ILLOVO SUGAR PTY LTD	Consumer Goods
112	IMBALIE BEAUTY LTD	Consumer Goods
113	IMPALA PLATINUM HOLDINGS LTD	Basic Materials
114	IMPERIAL LOGISTICS LTD	Industrials
115	INFRASORS HOLDINGS LTD	Basic Materials
116	INSIMBI INDUSTRIAL HOLDINGS	Basic Materials
117	INTERWASTE HOLDINGS LTD	Industrials
118	INVICTA HOLDINGS LTD	Industrials
119	ITALTILE LTD	Consumer Services
120	JASCO ELECTRONICS HOLDINGS	Technology
121	JD GROUP LTD	Consumer Goods
122	KAAP AGRI LTD	Consumer Services
123	KAGISO MEDIA LTD	Telecommunications
124	KAP INDUSTRIAL HOLDINGS LTD	Industrials
125	KAYDAV GROUP LTD	Industrials
126	KEATON ENERGY HOLDINGS LTD	Oil and Gas
127	KELLY GROUP SA PTY LTD	Consumer Services
128	KUMBA IRON ORE LTD	Basic Materials
129	LEWIS GROUP LTD	Consumer Services
130	LIFE HEALTHCARE GROUP HOLDIN	Health Care
131	LITHA HEALTHCARE GROUP LTD	Health Care
132	MASONITE AFRICA LTD	Consumer Goods
133	MASSMART HOLDINGS LTD	Consumer Services
134	MASTER DRILLING GROUP LTD	Industrials
135	MASTER PLASTICS LTD	Industrials
136	MAZOR GROUP LTD	Industrials
137	MEDICLINIC INTERNATIONAL RF	Health Care
138	MERAFE RESOURCES LTD	Basic Materials
139	METMAR LTD	Basic Materials
140	MIDDLE EAST DIAMOND RESOURCE	Basic Materials
141	MINE RESTORATION INVESTMENTS	Industrials

142	MONDI LTD	Basic Materials
143	MONEYWEB HOLDINGS LTD	Telecommunications
144	MONTAUK ENERGY HOLDINGS LTD	Oil and Gas
145	MPACT LTD	Industrials
146	MR PRICE GROUP LTD	Consumer Services
147	MTN GROUP LTD	Telecommunications
148	MURRAY & ROBERTS HOLDINGS	Industrials
149	MUSTEK LTD	Technology
150	NAMPAK LTD	Industrials
151	NASPERS LTD-N SHS	Telecommunications
152	NETCARE LTD	Health Care
153	NETCARE LTD	Basic Materials
154	NICTUS LTD	Consumer Services
155	NORTHAM PLATINUM LTD	Basic Materials
156	NOVUS HOLDINGS LTD	Industrials
157	NU-WORLD HOLDINGS LTD	Consumer Goods
158	NUTRITIONAL HOLDINGS LTD	Health Care
159	OAKBAY RESOURCES AND ENERGY	Oil and Gas
160	OCEANA GROUP LTD	Consumer Goods
161	OMNIA HOLDINGS LTD	Basic Materials
162	ONELOGIX GROUP LTD	Industrials
163	OPTIMUM COAL HOLDINGS PTY LT	Basic Materials
164	PALABORA MINING CO LTD	Basic Materials
165	PAMODZI GOLD LTD	Basic Materials
166	PEMBURY LIFESTYLE GROUP LTD	Consumer Services
167	PETMIN LTD	Oil and Gas
168	PHUMELELA GAMING & LEISURE	Consumer Services
169	PICK N PAY STORES LTD	Consumer Services
170	PICK'N PAY HOLDINGS LTD	Consumer Services
171	PINNACLE POINT GROUP LTD	Consumer Services
172	PIONEER FOODS GROUP LTD	Consumer Goods
173	PLATFIELDS LTD	Basic Materials
174	PPC LTD	Industrials
175	PREMIER FISHING AND BRANDS L	Consumer Goods
176	PROTECH KHUTHELE HOLD LTD	Industrials
177	PSV HOLDINGS	Industrials
178	QUANTUM FOODS HOLDINGS LTD	Consumer Goods
179	QUEENSGATE HOTEL AND LEISURE	Consumer Services
180	RACEC GROUP LTD	Industrials
181	RANDGOLD & EXPLORATION CO	Basic Materials
182	RARE HOLDINGS LTD	Basic Materials
183	RAUBEX GROUP LTD	Industrials
184	RCL FOODS LTD/SOUTH AFRICA	Consumer Goods

185	RENERGEN LTD	Oil and Gas
186	REUNERT LTD	Industrials
187	RHODES FOOD GROUP PTY LTD	Consumer Goods
188	ROLFES HOLDINGS LTD	Basic Materials
189	ROYAL BAFOKENG PLATINUM LTD	Basic Materials
190	SANTOVA LTD	Industrials
191	SANYATI HOLDINGS LTD	Industrials
192	SAPPI LIMITED	Basic Materials
193	SASOL LTD	Basic Materials
194	SEA HARVEST GROUP LTD	Consumer Goods
195	SEA KAY HOLDING LTD	Industrials
196	SECUREDATA HOLDINGS LTD	Technology
197	SEPHAKU HOLDINGS LTD	Industrials
198	SHERBOURNE CAPITAL LTD	Industrials
199	SHOPRITE HOLDINGS LTD	Consumer Services
200	SIBANYE GOLD LTD	Basic Materials
201	SIMMER & JACK MINES PTY LTD	Basic Materials
202	SOUTH AFRICAN COAL MINING HO	Oil and Gas
203	SOUTH OCEAN HOLDINGS LTD	Industrials
204	SOUTHERN ELECTRICITY CO LTD	Oil and Gas
205	SOVEREIGN FOOD INVESTMENTS	Consumer Services
206	SPANJAARD LTD	Basic Materials
207	SPAR GROUP LIMITED	Consumer Services
208	SPUR CORP LTD	Consumer Services
209	STEFANUTTI STOCKS HOLDINGS	Industrials
210	STELLA VISTA TECHNOLOGIES	Technology
211	SUN INTERNATIONAL LTD	Consumer Services
212	SUPER GROUP LTD	Industrials
213	TASTE HOLDINGS LTD	Consumer Services
214	TELEMASTERS HOLDINGS LTD	Telecommunications
215	TELKOM SA SOC LTD	Telecommunications
216	THABEX LTD	Basic Materials
217	THARISA PLC	Basic Materials
218	THE FOSCHINI GROUP LTD	Consumer Services
219	TIGER BRANDS LTD	Consumer Goods
220	TONGAAT HULETT LTD	Consumer Goods
221	TORRE HOLDINGS PTY LTD	Industrials
222	TORRE INDUSTRIES LTD	Industrials
223	TOTAL CLIENT SERVICES LTD	Technology
224	TRANS HEX GROUP LTD	Basic Materials
225	TRANSPACO LTD	Industrials
226	TRELLIDOR HOLDINGS LTD	Industrials
227	TRENCOR LTD	Industrials

228	TRUWORTHS INTERNATIONAL LTD	Consumer Services
229	TSOGO SUN GAMING LTD	Consumer Services
230	UBUBELE HOLDINGS LTD	Consumer Goods
231	UNION ATLANTIC MINERALS LTD	Basic Materials
232	VALUE GROUP LTD	Industrials
233	VERIMARK HOLDINGS LTD	Consumer Services
234	VILLAGE MAIN REEF LTD	Basic Materials
235	VODACOM GROUP LTD	Telecommunications
236	W G WEARNE LTD	Industrials
237	WESCOAL HOLDINGS LTD	Basic Materials
238	WESIZWE PLATINUM LTD	Basic Materials
239	WILLIAM TELL HOLDING	Basic Materials
240	WILSON BAYLY HOLMES-OVCON	Industrials
241	WINHOLD LTD	Basic Materials
242	WITWATERSRAND CONSOLIDATED G	Basic Materials
243	WOOLWORTHS HOLDINGS LTD	Consumer Services
244	WORKFORCE HOLDINGS LTD	Industrials
245	YORK TIMBER HOLDINGS LTD	Basic Materials
246	ZAPTRONIX LTD	Industrials
247	ZCI LTD	Basic Materials

Table B-2: Structure of Unbalanced Panel

Year	Number of companies	Percent	Cumulative
2012	217	16.44	16.44
2013	211	15.98	32.42
2014	203	15.38	47.80
2015	189	14.32	62.12
2016	178	13.48	75.61
2017	163	12.35	87.95
2018	159	12.05	100
Total	**1320**	**100%**	

Table B-3: Number of companies selected from each industry

Industry name	Number of companies	Number of observations
Basic materials	60	323
Consumer goods	24	117
Consumer services	45	241
Health Care	14	65
Industrials	70	410
Oil and gas	8	31
Technology	16	75
Telecommunications	10	58
	247	**1320**

Appendix C

Table C-1: Regression Results of DWH Test

	ROA	ROE	TQ
DWH Test Statistic	31.667***	40.415***	14.031**
Degrees of Freedom	6	6	6

The test is based on the levels of firm performance on the foreign ownership, horizontal spillovers and control variables. The instruments are the lags of the differenced firm performance, foreign ownership, horizontal spillovers and control variables. Lags 3 of the differenced foreign ownership and horizontal spillover variables and differenced control variables and lags 1 of the differenced firm performance measures are employed as instruments. *, ** and *** indicate significance and the rejection of H_0 at the 10%, 5% and 1% level, respectively. The test statistic follows a chi-squared distribution. Year, industry dummies and firm age are treated as exogenous variables.

Appendix D: Ethical Clearance

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

Miss Delane Deborah Naidu (214549400)
School of Acc Economics&Fin
Westville

Dear Miss Delane Deborah Naidu,

Protocol reference number: 00001980

Project title: The Impact of Foreign Ownership on Firm Performance: Evidence from South Africa

Exemption from Ethics Review

In response to your application received on 1 June 2019, your school has indicated that the protocol has been granted **EXEMPTION FROM ETHICS REVIEW.**

Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited.

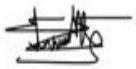
For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

In case you have further queries, please quote the above reference number.

PLEASE NOTE:

Research data should be securely stored in the discipline/department for a period of 5 years. I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,



25 Sept 2019

Prof Josue Mbonigaba
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