Inward FDI and economic spillover effects: The case of the automotive industry in South Africa

KL Mushathoni

orcid.org/0000-0001-8641-8747

Dissertation accepted in fulfilment of the requirements for the degree Master of Commerce in Economics at the North-West University

Supervisor: Prof C Claassen

Graduation: June 2023

Student number: 39824535

DECLARATION

I declare that the dissertation titled:

Inward FDI and economic spillover effects: The case of the automotive industry in South Africa

is my own work and I have acknowledged all the resources used or quoted using complete referencing and in-text citation. In addition, I declare that I have not submitted this dissertation in another institution before for degree purpose.

Khensani Lydia Mushathoni

ACKNOWLEDGEMENTS

This study for the Degree: Master of Commerce in Economics at North-West University has been a journey in growth and discovery. I owe a debt of gratitude to many, some that I will not be able to mention given this limited space. First and foremost, I thank God the Almighty for his grace and unending love for me.

I thank my supervisor Professor Carike Claassen for her patience and wise guidance without which I would not have been able to complete this study. The North-West University gave me an institutional home from which I pursued this study. The scholars whose work I consulted and cited became a pillar of support for me.

My employer, the Department of Trade, Industry and Competition (**the dtic**) of South Africa for giving me the time and the financial support that enabled me to proceed with this study in relative comfort, many other students in South Africa have not enjoyed such a privilege.

My husband, Nditsheni Mushathoni supplied me the love, emotional support and prayers that I needed most.

My mother, Mithavini Rose Hlungwani and my siblings (Abel, Mikateko and Portia) stood by me with prayers and support. My children, Katlego, Nkhumeleni, and Ronewa endured my absences and inattention for them with stoic patience. It is because of them that I want to do better and better in my studies and in my profession. Finally, I thank Dr William Mpofu for editing this research report.

ABSTRACT

The present study investigates the economic spillover effects of inward Foreign Direct Investment (FDI) in South Africa's automotive sector. To achieve this objective, seminal and contemporary theories in international business, economics, trade and industry were used to illuminate the driving aspects of economic spillover effects. In particular, the Eclectic Theory was deployed to illuminate firm level efficiencies that drive the process of the internationalisation of business. Secondary data was collected from reliable sources. The time span of data collected is from 1990 to 2020. Consistent with the objectives of the study, the Vector Error Correction Model (VECM) was adopted to test the short-run and long-run economic spillover effects in inward FDI in the automotive industry in South Africa. In addition, the study employed the Panel Auto Distributive Lagged Model and Panel Generalised Methods of Moments (GMM) to test the pattern of the economic spillover effects. The results of these tests suggest that there are positive and statistically significant relationships between value chains (geographical location) and economic spillover. That means that the procurement of factor inputs from the host market by MNEs will result in economic spillover in the South African automotive industry. On the contrary, the results suggest a significant negative relationship between Horizontal FDI and Economic spillover in the South African automotive sector. The study recommends that South African domestic firms need to improve absorptive capacities so that they can be able to provide value chains to investing MNEs in the automotive industry and so that they may reap the benefits of economic spillover. In its own way, the present study contributes to the growing literature in the subject areas of commerce, economics, business and international trade.

Key words*: Foreign Direct Investment, Economic spillover, Value chains, South Africa, Automotive Sector.*

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ADPD	Automotive Production and Development Programme
AIS	Automotive Investment Scheme
APDP	Automotive Production and Development Programme
BAIC	Beijing Automotive Group
BMW	Bavarian Motor Works
DFDI	Downward Foreign Direct Investment
ECT	Error Correction Terms
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
Geo	Geographical Dispersion
GMM	Generalised Method of Moments
GVC	Global Value Chain
HFDI	Horizontal Foreign Direct Investment
MIDG	Motor Industry Task Group
MIDP	Motor Industry Development Programme
MNE	Multinational Enterprise
NAAMSA	National Association of Automobile Manufacturers of South Africa
OLS	Ordinary Least Square
R & D	Research and development
ROA	Return of Assets

SAAMP	South African Automotive Master Plan
The dtic	The Department of Trade, Industry and Competition
UFDI	Upper Stream Foreign Direct Investment
UNCTAD	United Nations Conference on Trade and Development
USA	United States of America
VAA	Vehicle Assembly Allowance
VALA	Volume Assembly and Localisation Allowance
VECM	Vector Error Correction Model
VFDI	Vertical Foreign Direct Investment
WIR	World Investment Report
WTO	World Trade Organization

CHAPTER ONE
INTRODUCTION

1.1 INTRODUCTION AND BACKGROUND OF THE STUDY

The present study seeks to investigate the economic spillover effects of inward Foreign Direct Investment (FDI) in the South African automotive sector. Similar to other developing countries, South Africa adopted economic policies that seeks to attract inward FDI to boost economic growth and economic development. Economists and policy makers argue that for South Africa to tackle the triple threats of unemployment, poverty and inequality, the country needs to increase its level of investment in order to boost economic growth (South African Investment Conference 2018). After this, in 2018, President Cyril Ramaphosa embarked on a R1.2 trillion investment drive to stimulate sustainable, equitable and inclusive growth as the foundation for socioeconomic transformation in the country (South Africa Investment Conference 2018). This investment drive was based on the idea that FDI could stimulate economic growth through, for instance, supplementing insufficient savings in developing countries. According to Seetanah & Khadaroo (2007), foreign capital inflows accelerate the growth performance of an economy by complimenting domestic resources which are insufficient to domestic demand. This is confirmed by Baharumshah & Thanoon (2006) who find that countries that have been able to attract substantial FDI have shown better growth results than those that do not attract enough FDI. Indeed, a large portion of empirical literature suggests that there is a positive relationship between inward FDI and economic growth (Orlic, Hashi & Hisarciklilar, 2018, Bruno & Cipollina, 2018; Demena & Murshed, 2018).

Another channel through which FDI is traditionally understood to enhance economic growth, is through spillovers. Indeed, FDI is often viewed as generator of competitiveness, high productivity, technology spillovers, and also employment (Alshehry, 2015). Inward FDI could be an important factor in the growth of the country due to capital inflows, technology acquisition, training and human skills, employment and spillover effects to domestic companies. Thus, inward FDI enhances growth as it complements domestic investment (Denisia, 2010). Nonetheless, a research gap does exist particularly in the context of the economic spillover effects of inward FDI. For instance, emerging literature casts uncertainty on the notion that FDI leads to economic spillover effects. Various studies (Bruno, and Cipollina, 2018; Demena, and Murshed, 2018) suggest that firm level behaviour can reduce economic spillover effects in host markets.

Firm level behaviour is important to investigate, since firm level behaviour is diverse in time and relative in character, underpinned by firm level heterogeneities and diverse FDI motives

(Demena, and Murshed, 2018; Bruno, and Cipollina, 2018; Poncet 2010). Following Dunning's Eclectic Theory and the taxonomy of FDI, MNEs invest in specific host markets for different motives. Hence, they behave differently in host markets depending on whether FDI is resource seeking, efficiency seeking or market seeking (Dunning 2015; Sibindi 2019; Szunomár, 2020). Different firm level motives might reduce economic spillover effects in host markets (Sibindi 2020; Szunomár, 2020).

Furthermore, differences in MNEs origin also influence their contribution to spillover effects in host markets. In He, Kwan, and Fan (2019), empirical evidence suggests that inward FDI from China has no causal effect on economic growth in Sub-Saharan Africa (Claassen, Loots, and Bezuidenhout 2011). Within the context of the debate on spillover effects, some evidence points to the fact that spillovers from FDI may not be a clear-cut case for South African firms in particular. Josue, Magwiro, Klingelhofer, and Kaggwa (2014), found that MNEs in South Africa tend to be more productive than local firms and that there could be negative intra-industry spillovers from inward FDI to firms in the host country. Contrary to this, Gerschewski (2013) found a positive inter-industry spillover from inward FDI to local firms. In addition, they found that South African local firms do not have the adequate absorptive capacity such as labour, infrastructure and distribution networks to benefit from inward FDI spillovers (Gerschewski 2013).

It is important to address the issue of FDI spillovers in South Africa. According to UNCTAD (2022), South Africa managed to attract the largest amount of inward FDI in Sub-Saharan Africa. Approximately 65% of FDI into South Africa is implemented through international mergers and acquisitions. The most prominent sources of inward FDI in South Africa have been developed economies such as the United Kingdom, Germany, United States, Australia, Japan, Canada and Switzerland. However, developing economies such as Malaysia, China, India and Korea have also provided a sustainable amount of inward FDI (UNCTAD 2022).

In particular, South Africa is the leader of Africa's automotive industry, with more than 600 000 motor vehicles produced in 2018. This amounted to 0.64% of global production (Deloitte**,** 2019). Therefore, in South Africa, inward FDI in the automotive industry contributes almost 8.3% of Gross Domestic Product (GDP)(Deloitte, 2019). Additionally, the automotive industry employs approximately 6% of the working population. In terms of productivity, the automotive industry in South Africa is the largest manufacturing sector and contributes 33% of South Africa's manufacturing output (**Deloitte,** 2019). Furthermore, the automotive industry generated approximately R303 billion in 2020.

It is thus evident that both inward FDI, and the automotive sector, are important aspects of the South African economy. This study specifically investigates FDI inflows to the automotive industry. The motivation for this is threefold:

First, following Baldwin and Gu (2011), spillover effects from MNEs enhance firm level capacity of domestic firms in host markets. These authors suggest that, through increasing value chain activities, inward FDI causes economic spillover effects and supports firm level adjustment, which enhances industry competitiveness of an investing MNE in host market (Sibindi 2019). Given the importance of the automotive sector, there is a need for understanding the role that this sector plays in acquiring these spillover effects from MNEs.

Second, a recent surge in globalisation literature substantiates, that due to inappropriate investment policies and firm level heterogeneity, inward FDI might not lead to economic spillover effects. Consequently, inward FDI might reduce firm level competitiveness in host markets (Park and Choi 2014; Lo, Hong and Li 2016). Without responsible policy frameworks and supporting industries in host markets, inward FDI might not result in increased firm level competitiveness (Buckley, Clegg and Wang 2010; Jeon, Park and Ghauri, 2013; Perri and Peruffo, 2016). For South Africa in particular, Sibindi's (2019) empirical evidence suggests that FDI does not always lead to economic spillover effects. Indeed, due to the high cost of factor inputs in host markets, investing Multinational Enterprises (MNEs) tend to rely on their domestic markets for a supply network of factor inputs. This deprives the value chain streams in host markets of business opportunities that are critical for economic growth and industry competitiveness of host markets (Stiglitz, 2020). There is a gap in knowledge specifically on the issue of FDI spillovers within the automotive industry in South Africa. Lawana (2016) studied the impact of inward FDI on labour productivity in the automotive industry in South Africa, covering the period 1995 to 2013. The study found that FDI has a significant and positive impact on labour productivity in South Africa. The present study seeks to update this knowledge in order to illuminate the impact of inward FDI and economic spillover effects particularly on automotive industry in South Africa using data from 1990 until 2020.

Third, from a development perspective, increased value chain activities through responsible policy would result in the improvement of macroeconomic indicators such as employment, GDP, balance of payments and inflation (Zhang 2017; Park and Choi 2014; Lo, Hong and Li 2016). A more in-depth understanding of these value chain activities and policies could benefit not only the automotive sector, but other South African industries involved in MNEs. The problem statement below flows from this background and is formally formulated in the following section.

1.2 PROBLEM STATEMENT

The prevailing problem is that inward FDI does not always lead to economic spillover effects. This is due to firm heterogeneity and the exclusion of domestic value chain streams by investing MNEs in host markets (Poncet 2010; Pan, Wei, Muralidharan, Liao & Andreosso-O'Callaghan 2020). For instance, MNEs in the automotive sector have been resident in the South African economy since 1920s when two companies, namely General Motors and Ford, began assembling vehicles intended for the domestic market. Since 1994 there has been a steady upward increase of inward FDI in the automotive industry as illustrated in Figure 2.3 (available in the following chapter). In addition, South Africa's automotive sector is the largest in Africa. Nonetheless, as noted in Figure 2.3, the increase of inward FDI is not constant with the spillover effects in related industries as measured in the employment created by inward FDI in the automotive sector. These problems manifest in the context of economic growth and firm level competitiveness. The automotive industry is an important industry in the South African manufacturing context, of which little is as yet known about these dynamics and the ways in which economic spillover effects are influenced by firm heterogeneity and value chains. This study addresses that gap by answering the following overarching research question:

What is the impact of inward FDI on economic spillover effects in the automotive sector of South Africa?

The overarching research question is answered by addressing various smaller, relevant research questions, which are outlined here below.

1.3 RESEARCH QUESTIONS

Consistent with the problem statement, the following research questions are formulated:

- What is the nexus between inward FDI and economic spillover effects in the automotive industry in South Africa?
- What is the short-run determinist trend between inward FDI and firm level competitiveness in South Africa's automotive industry?
- What is the long-run deterministic trend between inward FDI and firm level competitiveness in host markets?

1.4 THEORETICAL PERSPECTIVE AND FRAMEWORK

The study adopted the eclectic theory as well as FDI spillover effects as the theoretical framework of the study. A more in-depth theoretical and literature survey is provided in Chapter 3.

1.4.1 The Eclectic Theory

In Eclectic theory, Dunning (2015) posits that outward FDI patterns and volumes are influenced by three aspects:

First, the location choice. In this strategy, the investing MNE selects host destinations with market dynamics that enhance the firm's objective of making profits. Furthermore, vertical outward FDI seeks to exploit low-cost advantages such as productivity and investment incentives. Thus, from the location perspective, MNEs invest in economies that are appropriate for firm heterogeneity to exploit market potential and mitigate market risk (Dunning 2015).

Second, ownership advantages. In this instance, the firm uses specific ownership advantages to reallocate resources, such as tangible assets as well as intangible assets such as goodwill, patents and intellectual property (Dunning 2015).

Third, Internalisation is the last aspect of the Eclectic model. In this aspect, Dunning (2015) posits that competitive and cost advantages of own production are fundamental in outward FDI as opposed to non-equity strategies such as licensing or strategic partnership arrangement. In this view, MNEs might create, enhance and exploit market opportunities through employment and deployment of their core competencies. The present study supplements theory from the Eclectic model with theory on spillover effects, a brief overview of which is discussed below.

1.4.2 The theory of FDI Spillover Effects

Via a thorough literature review, the following theoretical objectives were met:

- To provide a theoretical overview on the role of firm level heterogeneity in economic spillover effects of inward FDI.
- To provide a theoretical overview on the role industry value chains in economic spillover effects.
- To provide a theoretical overview on economic spillover effects of inward FDI from developing markets in the South African automotive sector.
- To understand economic spillover effects of inward FDI.

1.4.3 Empirical Objectives

The following empirical objectives are formulated

- To empirically test the short-run determinist between inward FDI and firm level competitiveness in South Africa's automotive industry.
- To empirically test the long-run deterministic effects between inward FDI and firm level competitiveness in host markets.

The following section discussed the research design and methodology employed to achieve the research objectives.

1.5 RESEARCH OBJECTIVES

1.5.1 Primary Objective

From the above background, the following primary objective is formulated;

To determine the nexus between inward FDI and economic spillover effects in the automotive industry in South Africa.

1.5.2 Theoretical Objectives

Via a thorough literature review, the following theoretical objectives were met:

- To provide a theoretical overview on the role of firm level heterogeneity in economic spillover effects of inward FDI.
- To provide a theoretical overview on the role industry value chains in economic spillover effects.
- To provide a theoretical overview on economic spillover effects of inward FDI from developing markets in the South African automotive sector.
- To understand economic spillover effects of inward FDI.

1.5.3 Empirical Objectives

The following empirical objectives are formulated

- To empirically test the short-run determinist between inward FDI and firm level competitiveness in South Africa's automotive industry.
- To empirically test the long-run deterministic effects between inward FDI and firm level competitiveness in host markets.

The following section discussed the research design and methodology employed to achieve the research objectives.

1.6 RESEARCH DESIGN AND METHODOLOGY

An in-depth exposition on the methods employed for the empirical analysis in this study is presented in Chapter 4. This section provides an introductory overview of the research design.

1.6.1 Study Design and Context

This study adopted a positivist research approach. In this approach, according to Creswell and Creswell (2017), the researcher opts to use experimental and empirical evidence as a means of uncovering the study hypothesis. As opposed to an interpretivist research approach, the positivist approach considers evidence from experiments and econometric analysis as the basis of research findings.

1.6.2 Literature Review

For the purpose of the literature review, the study employed resources such as journal articles, working papers, text books and dissertations in order to gain understanding of the nexus between FDI inflow and spillover effects such that it answer the theoretical questions.

1.6.3 Empirical Study

The present study used secondary firm level data collected from NAAMSA, **the dtic** and ORBIS and FDI Intelligence databases. The total population of MNEs in South Africa's automobile industry is 23. In terms of the sample size, the study considered 16 MNEs in South Africa who have invested in outward Foreign Direct Investment (FDI).

1.6.4 Econometric Methods of Analysis

The study employs an Auto regression Panel Dynamic Estimation and the Vector Error Correction Model. In particular, in the Auto Regression Distributive Lag model the study tests the pattern of the economic spillover effects. Additionally, for short-run and long-run deterministic trends the study employs the VECM. Thus, the VECM will also provide the speed of the economic spillover effects.

1.6.5 Study Hypothesis

From the initial research questions and research objectives, the following study hypothesis is formulated:

- Null hypothesis – There is no relationship between inward FDI and economic spillover effects in the automotive industry of South Africa.
- Alternative hypothesis – There is a relationship between inward FDI and economic spillover effects in the automotive industry of South Africa.

1.7 ETHICAL CONSIDERATIONS

The study did not have contact with human participants and employed secondary data which is available in the public domain. In addition, it went through all ethical clearance processes and a clearance certificate was issued as required by the faculty of Economic and management Sciences of the North-West University.The Ethics Clearance Certificate number is NWU-000854-21-A4.

1.8 CHAPTER OUTLINE

The study consists of six chapters that are outlined as follows:

Chapter one: Introduction and background to the study

Chapter one provides an introduction and background to the study, by presenting the Research Problem, Study Objectives, Research Hypothesis, Theoretical Framework and outline of the study.

Chapter Two: Contextualising the South African automotive sector

This chapter contextualises recent global, regional and South African FDI inflow trends and presents a review of the policy implemented within the automotive industry in South Africa, since 1995 until to date.

Chapter Three: Theoretical foundation and literature review

Chapter Three focuses on the dynamics of inward FDI economic spillover effects in South Africa by providing theories illuminating the nexus between the FDI inflow and FDI spillover effects and provides a theoretical framework of the study. In addition, it provides empirical perspective, considering the evidence gathered from studies that proved this significance of this study's variables using an economic lens.

Chapter Four: Research design and Methodology

In Chapter Four, the Research Design and Methodology are presented together with the description of variables to be employed in the empirical analysis.

Chapter Five: Data Analysis and Discussion

This chapter presents data analysis and results, this is shown by presenting tests and its results illuminating the link between FDI inflow and Spillover effects.

Chapter Six: Conclusions and recommendations

Chapter Six as the concluding chapter, presents the key findings and conclusions of the study and its policy recommendations**.**

CHAPTER TWO
CONTEXTUALISING THE SOUTH AFRICAN AUTOMOTIVE SECTOR

INTRODUCTION

This chapter fleshes out the context of the South African automotive sector which is the site of the present study. The chapter provides an overview of automotive policy in South Africa and its impact on the performance of the industry, in order to provide broader context for this study and its focus on South African automotive sector. This chapter will be presented in three parts. The first part presents broad trends in FDI inflows. The second part presents a brief history of the automotive sector in South Africa. Third and lastly, a brief overview of automotive policy and its impact on the sector is given.

2.1 BROAD TRENDS IN FDI INFLOWS

2.1.1 Global FDI inflows

According to the WIR (2022), global FDI flows increased by 64% to $1.58 trillion by end of 2021. This followed a large decrease to its lowest point since 2005; from US$1.5 trillion in 2019 to $1 trillion in 2020. This decrease was due to global lockdowns to prevent the spread of COVID 19. Developed regions such as Europe benefited from the resurgence of FDI flows, with FDI inflows to Europe increasing by 50%. According to the WIR (2022), the United States is the main recipient of global FDI inflows, with flows increasing from $251 billion to $367 between 2020 and 2021. In total, 34 out of 48 developed countries experienced an increase in FDI inflow during this time period (WIR, 2022). In addition, the WIR (2022) reports that FDI flows to developing economies rose by 30% by end of 2021, reaching a level of $837 billion. Thus far, this is the highest level of FDI inflow attained in developing countries. This was due in particular to high growth in Asia, improvements in Africa, Latin America and Caribbean economic activity. For developing countries, FDI remains the main source of external finance. However, FDI inflow in developing countries it is expected to decline due to the effects of Russia-Ukraine war. High food and energy prices are the major cause of a possible decline in FDI inflow to developing countries (WIR 2022).

Transition economies have already experienced a downward trend, with FDI inflows declining by 28%. This decline was driven inter alia by the fact that the Russian Federation (the largest FDI recipient and biggest economy in the group) experienced a 50% decline in FDI inflows. For Africa in particular, the WIR (2022) confirms that FDI inflow to Africa rose from $39 billion in 2020 to $83 billion in 2021. This represents a global FDI inflow share of 5%. Though the majority of African countries recorded a moderate increase in FDI inflows following a sharp

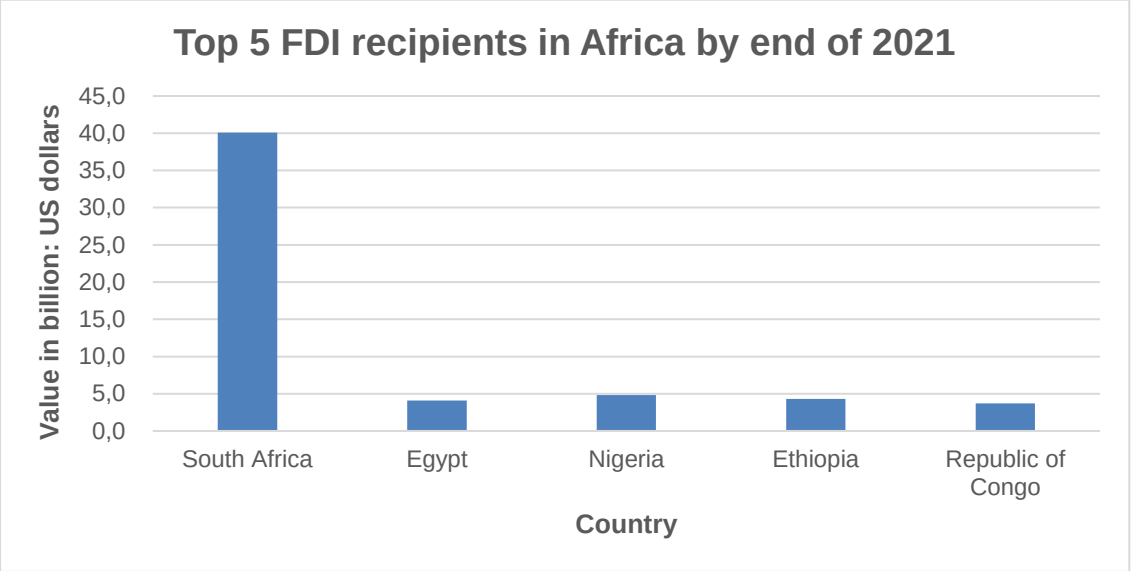
decline due to the COVID19 pandemic, the increase in aggregate FDI inflow to the continent was boosted by a large increase in FDI to South Africa. The following section will further analyse broad FDI trends in Africa and South Africa, in order to provide context for the literature and empirical analyses which follow.

2.1.2 FDI Trends: Africa

FDI inflows to Africa tend to vary regionally. In North Africa, for instance, there was 5% decline in FDI inflow to $9.3 billion in 2021. This was particularly associated with a 12% decrease of FDI inflow to Egypt, due to disinvestment in exploration and production agreements. However, there is a hope that Gulf States pledges to the value of $22 billion might boost FDI inflow. Morocco beat the regional trend and recorded an increase of 52% to $2.2 billion by end of 2021 (WIR 2022). In West Africa, FDI inflows rose to $14 billion, representing a 48% increase on the 2020 value. Nigeria in particular managed to double its FDI inflow to the value of $4.8 billion as a result of the investment in oil and gas projects (WIR, 2022). Extractive industries boosted FDI inflow in Ghana by 39% to the value of $2.6 billion.

According to the WIR (2022) East Africa recorded an increase of 35% in FDI inflows, to the value of $8.2 billion. Ethiopian FDI inflow amounted to $4.3 billion, thanks to Chinese investment through China's Belt and Road Initiative. FDI inflow to Uganda and Tanzania rose by 31% and 35% respectively. FDI inflow to Central Africa remained constant at $9.4 billion. This was reflected by FDI inflow to the Democratic Republic of the Congo that recorded an increase of 14% to $1.9 billion, while Congo contracted by 8% to $3.7 billion (WIR 2022). FDI in Southern Africa soared to $42 billion due massive investment to South Africa recorded during quarter three of 2021. This was dominated by pledges of investment projects in green energy from United Kingdom and United States (WIR, 2022). To situate South African FDI inflows within the broader context of these FDI flows to Africa, figure 2.1 below illustrates the top 5 recipients of FDI in Africa by the end of 2021.

Figure 2.1: Top Five Inward FDI Recipients in Africa



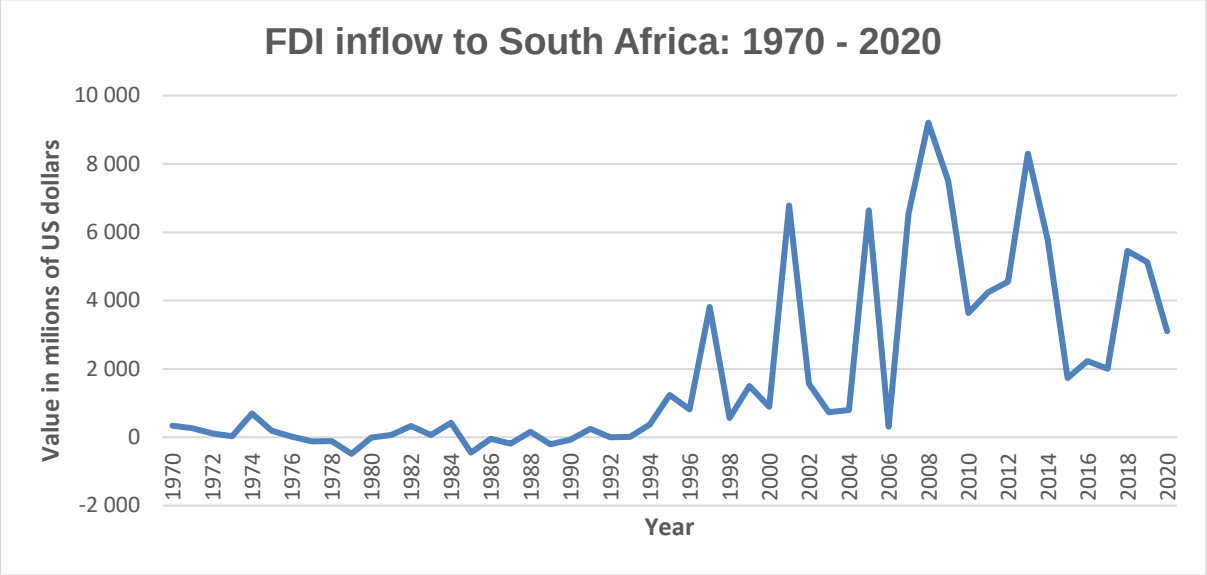
Source: (UNCTAD), World Investment Report, accessed 15 July 2022

As shown on Figure 2.1 above, South Africa surpassed Egypt and became the largest FDI recipient in Africa, with inflows of $40.1billion. Egypt received the second-largest amount of FDI inflow at $5.1 billion. Nigeria is third (4.8 billion), while Ethiopia ($4.3 billion) and Republic of Congo ($3.7 billion) are the other top largest FDI recipients in Africa. This illustrates the importance of FDI inflows to the South African economy, and why it is important to analyse and understand the potential benefits, such as spillover effects, which can accompany such investments. Given that, we turn out attention to important FDI trends for South Africa in particular in the following section.

2.1.3 South Africa: FDI trends

Having now established broader FDI trends for the African continent in the previous section, the focus now turns more narrowly on FDI inflows to South Africa, and the South African automotive industry in particular.

Figure 2.2: ***FDI Inflow to South Africa 1970 -2020***



Source: **www.unctadstat.unctad.org**, *accessed March 2022*

From Figure 2.2 above, it is clear that the inflow of FDI in South Africa had been very low between 1970 and 1994. This is likely due to world sanctions associated with the Apartheid regime. During this time, FDI inflows to South Africa fell significantly from $335 million in 1970 to -$78 million in 1990. From 1990 onward, FDI flows began to show an upward trend, though inflows have clearly remained volatile between 1994 to 2021. South African FDI inflows have ranged from its lowest base of $394 million in 1994 to its peak at $9,2 billion in 2008.By end of 2021, FDI inflow decreased by 39% from $5,1 billion in 2020 to its current value of $3,1 billion. It is evident from the figure above that South African FDI inflows have not managed to recover to their 2008 highest level. Given our interest in developing a more sectoral understanding of FDI in South Africa, the following section will discuss sectoral trends in South African FDI.

2.1.4 Foreign Direct Investment Inflows into South Africa by Sector

In this section, we zoom in more locally to explore sectoral FDI inflows to South Africa. According to the FDI market intelligence database (2021), between January 2003 and April 2021, there were about 1 576 companies investing in South Africa. These investments occurred in different sectors and different cities, with a capital investment amounting to R543 billion. In addition, the manufacturing sector is reported to be largest recipient of inward FDI in South Africa, and is the largest employer as compared to other sectors. The capital investment in this sector amounted to R227 billion.

According to FDI market Intelligence (2021) amongst the different industries in South Africa, the automotive industry is the largest recipient of inward FDI, with investment to the value of R102 billion. This is followed by metals and renewable energy. Furthermore, China as largest investor has brought inward FDI to the value of R116 billion followed by the United Kingdom, and the United States. In terms of investment destinations, Johannesburg is the largest recipient followed by Durban and Port Elizabeth. The leading investors are Volkswagen South Africa, Ford South Africa and Enel Green Power FDI Market Intelligence (2021). Here, we begin to see the importance of the automotive industry. In particular, given the decline in FDI inflows since 2008 (illustrated in Figure 2), as well as the volatile nature of FDI inflows to South Africa focus on this leading industry is important for FDI considerations. Therefore, the following section further breaks down important trends, policies and history in the South African automotive industry.

2.1.5 Trends in FDI Inflows in the Automotive Industry in South Africa

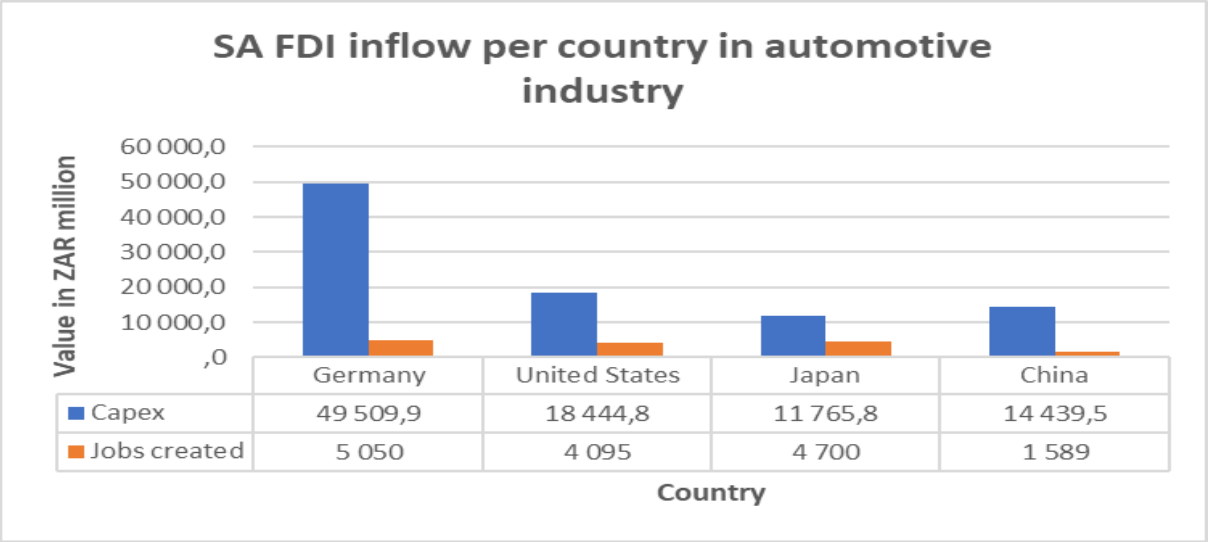
As indicated in Chapter 1, South Africa is the leader of Africa's automotive industry comprising 0.64% of global motor vehicle production (Deloitte**,** 2019). It was also established that, in South Africa, inward FDI in the automotive industry contributes almost 8.3% of Gross Domestic Product (Deloitte**,** 2019), Department of Trade, Industry and Competition, (**the dtic**), (2019). Additionally, the automotive industry makes important contributions to employment and productivity. The industry contributes 33% of South Africa manufacturing output (Deloitte**,** 2019) and a revenue of approximately R303 billion in 2020.In 2019, the industry produced more than 600 000 cars employed around 457,000 (110 000 direct jobs) including indirect employment downstream and upstream, across the South African economy's formal sector

The industry consists of the manufacturing, distribution, servicing, and maintenance of motor vehicles and components. To date, there are seven major vehicle assemblers of medium and heavy commercial vehicles and buses. Furthermore, the industry has approximately 500 automotive component suppliers, including 180 first-tier suppliers. Recently, the automotive industry faced the global Coronavirus pandemic along with other sectors and industries. According to the National Association of Automobile Manufacturers of South Africa (NAAMSA, 2021), the pandemic had a negative effect on the performance of the South African automotive industry. By the end of 2020, South Africa was ranked as the 22nd largest automotive producer in the world. It has a global market share of 0.58% (down from 0.69% in 2019). During the same period, South Africa produced 447 218 units of vehicles, representing a decline from 2019). Of the 447 218 units of vehicle produced, 271 288 vehicles were exported. In addition, the South Africa automotive industry accounted for 62% of vehicle production on the African continent (NAAMSA, 2021), **the dtic** (2019). Even though the sector contracted due to the

pandemic, the automotive industry remains the largest in the manufacturing sector of South Africa.

Given this importance, the automotive industry is specifically investigated in this study. The remainder of this section provides important context for better understanding the South African automotive industry.

Figure 2.3: FDI Inflow to SA's Automotive Industry Per Source Country 2003-2022



Source: FDI Intelligence, accessed March 2022`

As seen in the figure 2.3 above, Germany is the largest investor in the South African automotive industry in terms of number of companies and capital expenditure (value of investment). It is followed by United States of America (USA), Japan and China. The value of investments differs quite broadly between these top investors, with investments from Germany reaching R49,5 billion, whereas FDI from China is R14 billion. Within the broad source country trends, it is also interesting to note the individual companies most active in FDI in this sector. According to FDI intelligence (2022), between January 2003 to January 2022, a total of 28 companies invested in South Africa in the automotive industry. Total investment amounted to R94 billion. The FDI Intelligence (2022), further reports that the top 10 investors in the South African automotive industry are:

1. Volkswagen South Africa (Germany)
2. General Motors South Africa (USA)
3. Mercedes-Benz South Africa (Germany)
4. BMW South Africa (Germany)
5. Ford South Africa (USA)
6. Toyota South Africa (Japan)

7. Tesla Motors (USA)
8. Mahindra (India)
9. BAIC (China)
10. Zhejiang Gonow Automobile (China)

Having established the important players and key trends in FDI within the South African automotive sector, the attention now turns to a broader understanding of the policy landscape in which the sector operations. The following section provides broad background to the South African automotive sector. This serves to further contextualise current debates surrounding the automotive industry, and in particular speaks to the research problem under investigation in this dissertation by analysing the impact of the Automotive policy in the South African automotive industry and the economy as whole.

2.2 SOUTH AFRICAN AUTOMOTIVE POLICY: HISTORY AND BACKGROUND

According to Black (2001), the automotive sector in South Africa started in the 1920s when two companies, namely General Motors and Ford, began assembling vehicles intended for the domestic market. Following its establishment, the industry achieved significant growth for a period of four decades as more vehicle manufacturers joined the South African automotive sector.

Between 1980 and 1994, the South African automotive industry was isolated due to sanctions driven by the Apartheid regime (Bronkhorst, Steyn & Stiglingh, 2013). Poor quality products, inward oriented industry and inefficient supplier chains were, amongst others, the factors that impeded the industry's efforts to create economies of scale and increase the number of vehicle models produced locally (Bronkhorst, Steyn & Stiglingh, 2013). Implementation of local content industrial policies also failed to address those challenges (Bronkhorst, Steyn & Stiglingh, 2013).

Following the recommendations by the Motor Industry Task Group (MIDG), the Motor Industry Development Programme (MIDP) was developed, and it came into effect in September 1995. The MITG investigated the automotive industry of South Africa and aimed to improve the industry's international competitiveness and attract more foreign investment into the industry.

According to the Department of Trade, Industry and Competition (**the dtic,** 1997) the main objectives of the MIDP were:

- To provide high quality and affordable vehicles and components to the domestic and international markets

- To provide sustainable employment through increased production
- To make a greater contribution to the economic growth of the country by increasing production and achieving an improved sectoral trade balance.

According **the dtic,** (1997), he MIDP used the following policy instruments to achieve the abovementioned objectives:

- A gradual and continuous reduction in tariff protection, so as to expose the industry to greater international competition.
- The encouragement of higher export volumes of motor vehicles and a greater degree of specialisation by allowing exporting firms to earn rebates on automotive import duties.
- The introduction of a range of incentives designed to upgrade the capacity of the industry in all spheres.

The following section evaluates the success of the MIDP by providing an overview of whether these stated objectives were met or not.

2.2.1 The Performance of the MIDP in Achieving its Objectives

The MIDP had a positive impact on the automotive industry of South Africa, as it managed to realise most of its objectives. The industry has improved its global competitiveness, as shown by increased exports of both vehicle components and completely built-up vehicles. Furthermore, domestic customer burden was reduced as vehicle affordability increased (Bronkhorst 2010).

Between 1996 and 2004, the productivity of the South African automotive industry improved to be on par with other low production countries (productivity increased from 7.5 units to 14.4 units per employee) (NACAAM, 2011. However, compared to India and China, the MIDP did not assist the South African automotive industry in becoming a sustainable global market share contender, Automotive Industry Development Centre (AIDC), 2014. A literature review on the performance of the MIDP conducted by Bronkhorst (2010), also indicated that the MIDP was not successful in achieving all the policy objectives set by the South African government. According to Bronkhorst (2010) the impact of the MIDP on the automotive industry can be summarised as follows:

2.2.1.1 Positive impacts

- Exports of both components and completely built vehicles increased rapidly.
- Foreign investment increased although there was still room from improvement.

- Vehicle affordability increased for domestic customers, as prices decreased in real terms
- Rationalisation improved significantly.
- Improved competitiveness and more integrated to global market

Bronkhorst (2010) the following were the negative impacts of the MIDP**:**

2.2.1.2 Negative impacts

- Increased imports due to the import rebate
- As the country moved towards global integration, this led to more foreign ownership. The whole assembly sector is now foreign owned, and also a large share of the components sector.
- The automotive industry supply chain is still under-developed and vehicle assemblers rely on heavily on imports.
- MIDP had a risk of being WTO non-compliant

This section highlighted the MIDP policy, and its performance; the weakness of the MIDP was addressed by the introduction of the APDP policy that is discussed in the next section.

2.2.2 Automotive Production and Development Programme (APDP)

The dtic (2019) notes that in order to deal with the shortcomings of the MIDP, the government introduced the Automotive Development Programme (APDP) in 2013. The main aim of the ADP is to increase local content of vehicle production. In addition, the APDP aims to increase its vehicle production to 1.2 million vehicles per year by 2020. The APDP has two phases namely: Phase one (2013 – 2020) and phase two (post 2021) According to **the dtic** (2019) the following are the pillars of APDP phase one (2013-2020):

Tariffs: this is applicable to automotive components and vehicles imports to South Africa which imposed 25% on Completely Build Up (CBU) vehicles and 20% for components used by vehicle assemblers. However, since South Africa has a Preferential agreement with the EU, imported vehicles from the EU will be charged only 18%. Although there is tariff or import duty on vehicle and components imports its purpose is not revenue generation but to incentivise the industry. The main aim of the import duty is to protect automotive manufacturing by discouraging imports.

Vehicle Assembly Allowance (VAA): This is a kind of import credit that enables vehicle manufacturers with a plant of 10 000 or more units per year to import a percentage of the vehicle components duty free. The value is approximately 3.6% of the vehicle price since

2015. The VAA is used to encourage more production of motor vehicles by providing lower duty rates.

An Automotive Investment Allowance in the form of a direct cash grant to support investment in new plants and machinery. This benefit is valued at between 20% and 35% of project value, payable over 3 years from start of production. The specific level of benefit is influenced by a variety of issues, such as expenditure on local tooling, local research & development as well as employment creation and localisation, amongst others.

According to **the dtic** (2019) the following are the pillars of APDP phase two (2013-2020):

- **Import duties (tariffs)** keep Import Duties stable. There is however a need to harmonise duties on vehicles of less than 1000cc (one litre) engines from the European Union by negotiating an increase from the current level of 0% to 18% in line with the Economic Partnership Agreement (EPA).
- **Change Volume Assembly Allowance (VAA) to a Volume Assembly and Localisation Allowance (VALA).** As part of ADPD phase two Volume Assembly and Localisation Allowance (VALA) replaced Vehicle Assembly Allowance (VAA) and started working in 2021. It is based on value addition rather than manufacturing sales. It is valued at 35% of local value added for Original Equipment Manufacturer (OEM) above 10 000 vehicles produced annually per plant from 2026. Transition (Value added on a product) is set at 40% in 2021 and will reduce annually to 35% by 2026. This will provide a support level of 3.2% at 40% local content but could increase to 4.2% if local content increases to 60%.]
- **Production Incentive** under phase two, production Incentives increased from the current 10% to 12.5% of manufacturing value added in order to encourage further localisation.
- **The Automotive Investment Scheme (AIS)** to be reduced by 5percentage points if there is no investment in local tooling but, should broadly remain as a cash grant payable over three years.

As with the MIDP, we now turn the attention to exploring the performance of the ADPD

2.2.3 The Performance of the ADPD in Achieving its Objectives

According to **the dtic** (2019) the APDP had a positive impact on the automotive industry of South Africa as it managed to realise most of its objectives. The industry has managed to deal with the weakness of the MIDP; as it increased production and competitiveness but there is

still room for improvement because it still struggling to reach its target of one million vehicle production.

2.2.4 South African Automotive Master Plan (SAAMP) 2021-2015

The dtic (2019) states that the APDP phase two will operate within the framework of the SAAM, and provides the incentive framework for the industry for the period from 2021 to 2035. The implementation of the SAAMP or ADPD phase two was supposed to start in January 2021, however, due to Covid19 it has been postponed to July 2021. The South African Automotive Master Plan (SAAMP) as amendment of the ADPD, has as its vision to make the automotive industry to be a globally competitive and transformed industry that actively contributes to the sustainable development of South Africa's productive economy, creating prosperity for industry stakeholders and broader society.

According to **the dtic** (2019) the following are the six objectives of SAAMP:

- Produce 1% of global production (about 1.4million units of vehicles in 2035)
- Increase local content in South African assembled vehicles to 60% (from <40%).
- Double employment (to 224,000).
- Improve manufacturing competitiveness levels to that of leading competitor levels.
- Transform the industry across the value chain in areas of identified opportunity.
- Deepen value addition, especially in respect of regional market supply.

It is within this policy context that this study focuses on FDI to the automotive industry in South Africa. Though improvements have been made, we see that the industry is a large industry which is very important to the manufacturing industry of South Africa, and that the industry still has important targets to achieve. Understanding the ways in which incoming FDI spillovers are affecting this industry could help to further strengthen policy for this sector.

2.3 CONCLUSION

This chapter outlined trends in global, regional and domestic FDI inflows and presented an overview of the most pertinent policies relating to the South African automotive industry. Though not always stable, we have seen that FDI inflows to South Africa are the largest on the African continent, and that the South African economy has not managed to return to its 2008 levels of FDI inflows. The automotive industry is a large and important part of South Africa's manufacturing landscape, and throughout the years, various policy initiatives have aimed at establishing the industry as a globally competitive player. These policies started with the MIDP, which allowed the industry to improve its global competitiveness as shown by increased exports of both vehicle components and completely built-up vehicles. In addressing

the weakness of the MIPD the government introduced the APDP policy, which had a positive impact on the automotive industry of South Africa, as it managed to realise most of its objectives. Although there is still room for improvement, the automotive industry of South Africa has grown as the country shifted to a more open economy by the introduction of MIDP and ADPD. It is within this context that this study situates its analysis of the FDI inflows to the automotive industry, and in particular the issue of whether or not the industry is managing to benefit from positive spillovers is further analysed. As outlined in Chapter 1, there is some debate in the literature surrounding this exact issue. For further context, an in-depth literature review is provided in the following chapter.

CHAPTER THREE
THEORETICAL FOUNDATION AND LITERATURE REVIEW

INTRODUCTION

The aim of this chapter is to flesh out both the theoretical and empirical literature review concerning the nexus of inward FDI and economic spillover effects. In order to illuminate the link between inward FDI and spillover effects, the theory of FDI spillover effects, as well as the eclectic theory of FDI as the theoretical framework of the study, are discussed in this chapter. In addition, this chapter provides a literature review of empirical studies relating to the subject area of the study. For that reason, the first part of the chapter outlines and clarifies commonly used definitions and concepts that are relevant to this study. The second part of the chapter presents theory which further clarifies the link between inward FDI and spillover effects. Third and lastly, an overview of empirical studies previously published on this topic is presented.

3.1 CLARIFICATION OF DEFINITIONS AND CONCEPTS USED IN THE STUDY

The following are the definitions and concepts frequently referred to in this study.

3.1.1 Foreign Direct Investment (FDI)

The OECD (2009) defines foreign direct investment (FDI) as investment by a firm from one country to another firm in a foreign country, where the investor has control over the purchased firm. There are two categories of FDI namely: Horizontal and Vertical. When an investment takes place in the same industry as in the home country, it is called Horizontal FDI (HFDI). HFDI tends to deal with the same services both at home and in foreign markets. Market seeking strategies tends to drive HFDI. When a firm establishes manufacturing facilities in different countries, each making a different input to, or stage of, the firm's manufacturing process, it is called a Vertical FDI (VFDI) (OECD, 2009).

3.1.2 Multinational Enterprise (MNE)

A multinational Enterprise (MNE) has facilities and other assets in at least one country other than its home country. A multinational company generally has offices and/or factories in different countries, and a centralized head office where they coordinate global management. These companies, also known as international, stateless, or transnational corporate organizations tend to have budgets that exceed those of many small countries (OECD, 2005). The focus of this study is particularly on MNE's that partake in FDI in the automotive industry in South Africa – concepts relating to relevant FDI terms are further discussed below:

3.1.3 Absorptive Capacity

Absorptive capacity is the ability of firms to identify, assimilate and exploit knowledge from the environment. It also includes the ability of firms to identify and exploit new scientific and technological knowledge generated by public research centres and universities. Absorptive capacity is crucial for the ability of domestic firms to benefit from FDI. The absorptive capacity of domestic firms explains their ability to capture knowledge spillovers and endure competitive pressures (UNCTAD, 2003).

3.1.4 Spillover Effect

Economic spillover refers to a transmission of managerial practices, production methods, marketing techniques or any other knowledge embodied in a product or service without a contract between the MNE and a local firm. (Gorodnichenko et al, 2014). Winkler (2013) defines spillovers as an improvement in productivity of local firms as results of transmission of knowledge from MNEs.Further differentiation can be made technology and productivity spillovers, as outlined below.

3.1.5 Difference between Technology and Productivityspill overs

According to Winkler (2013) technology spillovers refer to the transmission of technology and know-how from MNEs to firms in the host market, which leads to improved efficiency and innovation capacity. Productivity spillovers are defined as the effect of the presence of foreign firms on productivity in domestic firms (Gorg and Strobl, 2001) in the form of increased availability of information regarding more efficient production processes of foreign firms in a host economy. As mentioned in chapter 1, these transmissions can be unintentional or intentional, and occur in various forms. Vertical and horizontal spillovers will be further disambiguated here below.

3.1.6 Vertical or Inter-Industry Spillovers

Inter-industry or vertical spillover takes place through forward linkages and backward linkages. Backward linkages occur when there is a contract between domestic suppliers of intermediate inputs and their MNEs customers in downstream sectors in the recipient country. Forward linkages occur when there is a contract between MNEs suppliers of intermediate inputs. Under the inter-industry spillover, MNEs and local firm are not competitors. Therefore, the chances of technology transfer are very high as foreign firms and domestic firms complement each other in the production process. The nature of their business should be such that at least one has to depend on the other for production (Lipsey and Sjöholm 2005).

3.1.7 Horizontal or Intra-Industry Spillovers

There are four channels in which horizontal or intra-industry spillover can take place, namely: Demonstration effects, competition effects, and labour mobility or training effects (Josue et al 2014). As explained in Josue et al (2014), the demonstration effect occurs when domestic firms take advantage of technological spillover by imitating the production methods of foreign firms in order to improve their competitiveness and productivity.

Competition effects occur when foreign firms enter a market, and local firms are forced to improve their efficiency such that they are competitive against their foreign competition. In striving to be competitive, the local firms improve their productivity. When local firms fail to compete, they will be forced to leave the market. (Aitken and Harrison, 1999). Labour mobility enables domestic firms to experience spillover effects (Gerschewski, 2013). This is also sometimes referred to as the training effect. It occurs when workers transfer the skill and knowledge acquired from a previous employer (MNEs) to domestic firms (current employers). These better skilled workers from MNEs improve competitiveness and productivity of the local firms which is their current employer (Fosfuri, Motta, and Rønde, 2001; Ghebrihiwet, 2019).

Subsequent to the clarification of the definitions and concepts used in the study, the following section will discuss the theoretical framework of this study.

3.2 THE THEORETICAL FRAMEWORK

Though various FDI-related theoretical perspectives have been suggested by Vernon (1966), Kojima (1973) and Dunning (1993), it is argued that, given this study's focus on spillover effects of FDI in the South African automotive industry, the most relevant framework for this study to consider is theory of FDI spillover effects, with supplementation from the eclectic theory.

3.2.1 The Theory of FDI Spillover Effects

The theory of economic spillovers, also referred to as externalities, was developed by Alfred Marshall in 1890. This theory states that economic participants do not always experience benefits of their economic activities (Marshall, 2009). As outlined in the section above, FDI can also give rise to various horizontal and or vertical spillovers. In particular, given the context of this study, we are interested in understanding the spillover effects which FDI may have on economic growth.

The following section presents an overview of Dunning's OLI theory, in order to further supplement the theory of spillover effect as the theoretical framework of this study.

3.2.2 The Eclectic Theory (OLI)

The Eclectic Paradigm is an FDI theory developed by Dunning in 1973 (Dunning 2015). The eclectic theory illuminates the existence of Multinational Enterprises (MNEs) and ways in which MNEs accelerate production of firms in the host country. Moreover, it is a framework for determining the extent and patterns of production by foreign firms operating in a foreign land (host country), as well as production by local firms. Dunning (2015) further states that, for a foreign firm to be profitable in a foreign market, it must possess three advantages, which are readily transferable yet not shared by its domestic competitors. These advantages influence FDI patterns.

First, **ownership advantage (o)**: Answers the question why MNEs invest abroad. For the firm to invest in a foreign country it must ensure that it has competitive advantage to reallocate resources such as tangible assets and intangible assets such as goodwill, patents and intellectual property to enable the MNE to have a superior value and be competitive (Dunning 2015).

Second, **the location advantage (L):** Answers where to invest. It refers to the foreign place of investing. The investing MNE selects host destinations with market dynamics that enhance the firm level objective of making profits. As its location strategy, the MNE should consider factors that determines its profitability such as size, market potential, production cost, and political, economic as well as social factors. In view of the location argument, MNEs invest in economies that will enable firm heterogeneity to exploit market potential and mitigate market risk (Dunning, 2015).

Third, the **Internalisation advantage (I)** is the last aspect of the Eclectic model. Internalisation advantages aims to illuminate how the MNE's decision to invest abroad is made. Internalization takes place when the MNE or business entity conducts its own transaction, rather than contracting another entity to render a particular service. The internalization theory compares benefits of a firm when internationalising whether to internationalise using investing abroad (FDI). Or, internationalise using non-FDI measures such exporting, franchising and licencing. Due to internalisation advantages MNES prefers FDI expansion much better than non-FDI. According to the Eclectic paradigm, cost advantage through own production and competitiveness are considered fundamentals for investing abroad as compared to non-equity strategies. It is for this purpose that foreign firms are able to create and exploit in the market by utilising its fundamental capabilities (Dunning, 2015).

Buckley and Casson (2015) The internalisation theory forms part of the OLI model used as one part of the theoretical model of this study. The theory states that, in order to maximise

product/service quality and cost reduction, it is better for MNEs to own the production chain. These will have a negative impact on the economic spillover on the host economy as it excludes domestic firms from the value chain. The majority of the firms in the South African automotive sector are foreign and tend to bring their value chain instead of using South African firms. For example, BMW bring their value chain from Germany in that case there will be little or no spillover at all (Dunning, 2015).

Buckley and Casson (2015) the theory emphasises that when external supplies, production, and distribution become imperfect and inefficient, then MNEs can invest in foreign countries to create their own supply, production and distribution streams. There are a lot of advantages associated with such move by MNEs including avoiding search and negotiating costs; costs of moral hazard (especially actions by external partners); litigation and contract violation costs and government interventions. MNEs could also get a better application of cross-subsidization, predatory pricing and transfer pricing whiles controlling market and supply outlets. Thus, the foundation of the internalisation theory is based on market imperfection, as it is very crucial in transnational business (Buckley 2016). In MNEs in developing business strategies, they consider market imperfection in host market, which enables coordination of economic activities amongst countries. By responding to market imperfections MNEs become efficient by incentivising cost reduction, improve resource allocation and coordination efficiency (Buckley 2016).

3.3 THEORTICAL OVERVIEW: FOREIGN DIRECT INVESTMENT AND EFFECTS

This section presents a discussion of the conceptual or theoretical literature. The theoretical literature survey analyses long-standing theories that explain the association between FDI and economic growth. In addition, the theories articulate reasons behind foreign firms investing in another country, and how FDI through capital accumulation has an impact on the economic growth of the host economy or country.

3.3.1 New FDI-Growth Model by Neuhaus

The New FDI-growth model was developed by Neuhaus in 2006 with the purpose of clarifying the relationship between growth and inward FDI in both transition and the emerging countries. Contrary to most FDI theories that emphasise the motives behind FDI, the new FDI growth model focuses on the effect of FDI on Gross Domestic Product (Neuhaus, 2006).

Within this framework, it is argued that FDI induces accumulation of capital and thus boosts economic growth. Furthermore, the existence of FDI in a developing country enables the host country to adopt new technology from foreign firms, which could improve productivity and

eventually economic growth. Thus, the model acknowledges the importance of technological spillovers as one of the long-term effects of FDI on economic growth. The following section will discuss the Bhagwati hypothesis.

3.3.2 The Bhagwati Hypothesis

The Bhagwati hypothesis was developed by JN Bhagwati in 1988. According to countries that employ an export-promotion (EP) strategy, tend to attract more FDI than those using import substitution. Bhagwati (1988) argued that the ability to take advantage of technology spillovers is particularly crucial for EP driven countries. The Bhagwati theory thus encourages countries to implement an Export Promotion strategy, such that it liberalises trade and enhances benefit from inward FDI economic spillovers. It is possible that the motive behind FDI can have an impact on the extent of spillover effects generated by that FDI. Therefore, the following section presents the link between FDI motives and spillover effects. To further contextualise the existing knowledge on spillover effects which will be empirically investigated in this dissertation, the following section will present the overview of theories explaining the link between inward FDI and Spillover effects.

3.3.3 Links between FDI Motives and Spillover Effects

According to Dunning (1993), there are four motives for firms to set up production plants in a foreign country. These are: natural resource seeking, market seeking, efficiency seeking and strategic asset seeking. Natural resource seekers choose to set up a production plant in a foreign market in order to get access to the best quality natural resources at a lower cost in order to maximise profitResource seeking FDI is associated with lower potential for FDI spillover as it is capital intensive and has limited time horizons (Farole and Winkler, 2014). Reyes (2017) found no confirmation of positive FDI spillover from natural-resource seeking FDI.

Dunning (1993) states that market-seeking FDI will invest in a country where there is a high demand for the firm's product and services. This ensures that the firm s closer to consumers or can export to neighbouring countries cheaply. German car manufacturer BMW for instance, invested in South Africa in order to sell their cars to South Africa and other African countries. (Dunning 1993) Market seeking FDI can also allow foreign firms to invest in a foreign country where most of their suppliers are located; this will mean easy access to all their suppliers. Market seeking FDI can have a positive spillover, if the MNE's include the domestic firms in the value chain by employing local production inputs. Farole and Winkler (2014) suggest foreign firms have options with regard to input sourcing. Firstly, MNEs might decide to utilise global sourcing (co-sourcing strategies) which might result on more dependence on imported

inputs. On the other hand, when foreign firms choose co-location strategies that require establishing an input supplier in the host economy; both co-location and co-sourcing strategies have a negative impact on the competitiveness and the potential FDI spillover effects of domestic firms.

In the automotive sector in South Africa, the industry is dominated by foreign firms who tend to bring their own value chain – this may mean that negative rather than positive spillover is likely to occur (Bronkhorst, 2010). According to Dunning (1993), efficiency seekers are usually large, more experienced firms at the stage of standardising their product. Subsequent to being efficiency seekers, the MNE's have been resource and market seekers. The aim of efficiency seekers is to maximise the utilisation of factor endowments in the host market. Reyes (2017) finds that efficiency-seeking FDI leads to higher share spillovers than market-seeking FDI, due to the pressure of competition brought by these types of FDI in the host market.

This section illuminated different FDI motives and their impact on the economy of the host economy, particularly on production and trade. The FDI motives of an MNEs can explain the different characteristics of a firm, which in turn plays an important role in determining the potential FDI spillover. The next section will clarify the role of competitiveness in inward FDI spillover.

3.3.4 The Role of Competitiveness in FDI Spillover

Consistent with Heckscher Ohlin type theories, Porter (1990) argues that inward FDI has a substantial impact on economic growth through economic spillover effects. Porter (1990) assumes there are four aspects in which a nation's competitive advantage is measured, namely size of the economy, size of supporting industries, factor prices, and infrastructural development.

First, the theory argues that the size of the economy enhances FDI inflows to a host market and is positively related to inward FDI. Second, that the size of supporting industries also attract inward FDI flows, there exist a positive relationship between the size of industry in the host market. Third, the theory states that factor prices in host markets have an inverse relationship with inward FDI. Fourth, Porter (1990) also assumes that the infrastructural development of the host market has a positive nexus with inward inflows. Thus, these channels need to receive attention in order to ensure that a host country is competitive, since the host country needs to be competitive in order to benefit from FDI spillover effects (Porter, 1990). The competitiveness of the host market is positively related to absorptive capacity, which in turn is impacted by inter alia, the country's income per capita, learning and innovation infrastructure, trade policy, business and investment climate, access to finance and labour

market regulations (Farole & Winkler, 2014) These characteristics speak to the fact that not all firms are homogenous, and that firm level heterogeneity will play an important role in how well a firm really is able to benefit from FDI spillovers (or alternatively, how large the firm's absorptive capacity is).The following section more closely analyses firm level heterogeneities which influence a host country's absorptive capacity.

3.3.5 The Role of Firm's Heterogeneity in Inward FDI Spillover

The following are the factors determining foreign firms potential for spillover effect:

3.3.5.1 The degree of foreign ownership

The degree of foreign ownership affects the domestic firm's potential to absorb FDI spillovers (Farole and Winkler 2014). The share of foreign ownership is negatively related to the foreign firm's incentive to transfer knowledge to domestic firms. This means that, the higher the degree of foreign ownership, then the lower the potential for FDI spillover (Farole and Winkler 2014). On the contrary, larger domestic ownership benefits local firms. The interest of the foreign investor or MNE is protected, which enables technology spillover through the demonstration effect. Large domestic ownership might enhance domestic suppliers to be part of the value chain i.e improve localisation. Large domestic ownership shares result in more inter-industry linkages (Tóth, 1999).

3.3.5.2 The technology gap

The technology gap between foreign and domestic firms has been identified as one the most important mediating factors for FDI spillovers (Kokko 1994; Kokko, Tansini, and Zejan 1996; Grünfeld 2006). Views on the role of the technology gap for FDI spillovers conflict. Some studies find that a large technology gap is beneficial for local firms since their catching-up potential increases (Findlay 1978; Wang and Blomström 1992; Smeets 2008). Similarly, Masron et al (2012) postulate that a larger technological gap between MNEs and domestic firms tends to be associated with high potential for productivity and technology transfer.

3.3.5.3 Technology intensity

The technology intensity of MNEs affects its prospective for Spillover effects. According to Paus and Gallagher (2008), further R&D and technology enhances knowledge and broadens skills. Buckley et al (2010) established that higher technology intensity in Western-owned affiliates had a positive FDI spillover effect in China. These were the outcomes of the study done by Buckley et al (2018) in China. The following section discuss the factors determining the potential for domestic firms to benefit from FDI spillover.

Local innovation and learning infrastructure

Local innovation and learning infrastructure have an impact on the share of human capital at firm-level. Meyer and Sinani (2009) identified three measures of a country's human capital availability:

1. the Private sector Research and Development (R&D) intensity
2. number of patents per billions of US dollars granted to the residents of a host country
3. share of workers with tertiary education;

Tytell and Yudaeva (2005) confirmed that FDI productivity spillover was significantly lower in the manufacturing sector in regions with a low education share in Romania (Rosa, Gugler, and Verbeke, 2020)

3.3.5.4 Firm size

According to Farole and Winkler (2014) the size of a firm has a positive relationship with the capacity of a domestic firm to absorb FDI spillover effects. This means that larger firms are capable of competing with foreign firms and have capacity to imitate technology brought by MNEs. Similarly, larger firms are capable of paying higher wages to attract skilled workers from foreign firms and therefore, raises potential for the training effect through labour mobility. Likewise, Aitken and Harrison (1999) found small firms in Venezuela to be less competitive and unable to absorb FDI spillover effects. In contrast to this, Sinani and Meyer (2004) postulate that small and medium-sized firms are capable of absorbing FDI spillover, particularly firms with a high share of skilled labour.

3.3.5.5 Firm location

The location of a domestic firm determines its potential for FDI spillover effect (Farole and Winkler, 2014). Demena and van Bergeijk (2019) postulate that geographical proximity is crucial, as it enhances competitiveness and productivity of domestic firms through the demonstration effect. Wang et al (2016) confirmed the importance of the location of a domestic firm for its FDI spillover potential.

Demena & Bergeijk (2019) found that approximately 80% of local firms that learn through imitation are able to do so due to their close proximity location. Barrios, Görg, and Strobl (2006) confirmed that agglomeration in the similar region and same industry increases employment and productivity of domestic manufacturing firms in Ireland. Similar outcomes were confirmed by Aitken and Harrison (1999) in Russia. In contrast, Abraham et al. (2010) found that location of a firm in a Special Economic Zones (SEZ) might impact negatively on FDI spillover,

particularly on SEZ that focused on export processing which has a high share of imported inputs (low local content).

3.3.5.6 Local exporting firms

According to Farole and Winkler (2014), firms that are exporting are considered to be productive. This is because they are able to acquire knowledge through learning by exporting, which improves their competitiveness against MNEs. In addition, as domestic firms increase their export capacity, they experience less competition against MNEs. Although numerous studies confirmed lower productivity spillover for exporters, Sinai and Meyer (2004) found the contrary: That larger exporting firms do benefit from FDI spillover. This section highlighted the role that characteristics of a domestic firm play in enhancing inward FDI spillover. The next section analyses the link between value chains and potential FDI spillovers.

3.3.6 The Link between Value Chains and Inward FDI Spillover Effects

A series of seminal studies in international economics suggest that the inward FDI spillover effect is influenced by the presence of value chain streams that enable both absorptive capacities in domestic firms, and firm level competitiveness (Akinleye and Dadepo 2019, Javorcik, 2004 and Blalock and Gertler 2005). This argument is particularly relevant to this study, as it illuminates on the presence of downstream FDI, upper stream FDI, horizontal and vertical FDI as conduits of inward FDI spillover effects. This section will therefore take a closer look at value chains and their role in spillover effects. The concept of the value chain was first developed by Michael Porter in his Competitive Advantage book in 1985. According to Porter (2001), “value chain” refers to activities by an entity to develop a product or service, from beginning to the finished product or service. This encompasses elements such as design, production and distribution. In today’s globalised economy, this concept has expanded to become known as the Global Value chain (GVC).

Many developing countries, faced with socio economic challenges, implement economic policies that seek to attract inward FDI. Developing countries do this, because FDI serves as a vehicle to connect developing countries to the GVC, as MNEs mostly trade in value added through intra-industry and inter-industry linkages (Taglioni and Winkler, 2016; UNCTAD 2013). FDI spillover are therefore partly determined by GVC integration and local sourcing (Paus and Gallagher, 2008; Farole and Winkler, 2014). According to Farole and Winkler (2014), a country’s level and approach of integration determines domestic production pattern and the skills content of domestic firms.

In particular, Cheng, Rehman, Seneviratne, Zhang (2015) posits that developing countries need an opportunity to participate in the Global value Chain (GVC) by being part of the production cycle. Being part of the GVC enables firms from developing countries to be part of the global market, as they are part of the production process. In addition, GVC participation enables developing countries to utilise their comparative advantage, without the need to develop all of the capabilities encompassed by the whole production chain.

Akinleye and Dadepo (2019) further emphasise the important role that this can play for developing countries. The authors state that spillover effects are enabled by the demand for local supply of production inputs and supplier assistance offered by MNEs to their local supplier. Farole and Winkler (2014) MNEs may assist the suppliers (local firms) so that they have quality inputs for their production to ensure they produce better quality final products. It is a win-win situation; the MNE's will gain high quality inputs for their production whilst domestic firms might improve their productivity through improved competitiveness, since they are expected to supply high quality production inputs. (Farole and Winkler, 2014). Therefore, participation of domestic firms in the production value chain enables the host economy to access the economic spillovers from inward FDI.

However, in practice the opposite often occurs, and MNEs exclude local firms from taking part in value addition during preproduction and postproduction activities. This could be due to that fact that MNEs regard those activities as important competencies and a main source of profit (Farole and Winkler, 2014). In such cases, local firms do not benefit as much from spillover effects. Local firms are more productive when they are involved in relational value chains than captive value chains. In relational value chains, there are complex relations between buyers and sellers. Geographical proximity, as well reputation and trust provide the benefit of equilibrium in such systems (Blalock and Gertler, 2005).

It should also be noted that GVCs can have a negative effect on FDI spillover effects (Farole and Winkler, 2014). This occurs when a country's participation in GVC results in labour and natural resource exploitation, often as results of preferential international agreements. In addition, even though compliance with international standards enhance the competitiveness of domestic firms; this compliance can serve as barriers for local suppliers as it might be costly to adhere to standards.In such cases, MNEs may not source input from domestic suppliers, hence reducing opportunities for local sourcing (Farole and Winkler 2014). This section highlighted the importance of domestic firm participation on global value chain, which will enhance their potential to experience economic spillover. The following section analyses institutional arrangements and their influence on spillovers.

3.3.7 The Link between Institutional Arrangements and Inward FDI Spillover Effects

This section presents an overview of key aspects of a given host country's institutional context, which may influence FDI spillover effects.

3.3.7.1 Labour market regulations

According to Farole and Winkler (2014), labour market regulations have an effect of FDI spillover potential, via the absorptive capacity of a domestic firm as well as the form of and amount of FDI attracted. Javorcik and Spatareanu (2005) established that flexibility of labour markets had a positive effect on potential FDI spillover of various Eastern and Western countries. In addition, labour market regulations have an impact of the capacity of a domestic firm to absorb FDI spillovers. A study by Hale and Long (2011) found that factors such as wage limitations, labour market regulations, and labour skills level had an impact on absorptive capacity. Moreover, excess inflexible labour markets reduce the potential labour turnover as well as FDI spillover. However, over flexible labour markets is also a challenge, as it leads to frequent labour turnover and decreases the potential of knowledge and skills transfer between MNEs and domestic firms (Farole and Winkler 2014.)

3.3.7.2 Role of financial markets

Financial markets play an important role in determining the absorptive capacity for FDI spillover, particularly in developing countries (Farole and Winkler 2014). Alfaro, Kalemli-Ozcan, and Chanda (2010) argue that MNEs might have an inconclusive effect on domestic firm's access to finance. MNEs may either improve access to finance for domestic firms by providing scarce capital, or they may add to the existing financial constraint of domestic firms by borrowing money from local institutions (Farole and Winkler, 2014). Overall, studies conclude that well developed financial markets might enhance the absorptive capacity of a domestic firm. Agarwal et al (2011), found that Chinese manufacturing firms that are credit-constraint have lesser or negative FDI spillover effects. According to Javorcik & Spatareanu (2009), firms that have a lower liquidity constraint tend to self-select to supply MNEs investing in their country.

3.3.7.3 Investment promotions

Most countries, including South Africa, implement policy that seeks to promote and attract FDI, by providing investment incentives and establishing dedicated investment policies for this purpose. Du, Harrison, and Jefferson (2011) established that in China, MNEs benefiting from investment incentives generate positive backward spillovers, whereas foreign firms who are not beneficiaries of investment subsidies generate negative spillovers.

3.3.7.4 Trade policy

The trade policy of a host country has an effect on both domestic firms as well as foreign firms (Farole and Winkler 2014). Open trade regimes encourage domestic firms to be more competitive, as they are confronted with international competition which enhances their capacity to absorb FDI spillover (Crespo and Fontoura, 2007). Meyer and Sinani (2009) concluded that countries with open trade tend to experience FDI spillover. Countries that implement open trade policy attract more foreign investors than countries that are inward-orientated. Open trade policy draws FDI that is export orientated, in the process increasing opportunities for domestic suppliers to start exporting also. Meyer and Sinani (2009) furthermore, argue that open trade enables foreign investors to be more integrated globally and are able to access the latest technology. Crespo and Fontoura (2007) posit that foreign investors in inward-orientated policy administration focus on bringing new technology to the host market.

3.3.7.5 Weak institutions

Issues such as red tape, corruption, or intellectual property that are associated with protectionism (for the benefits of firms in host markets) have a negative effect on FDI spillover (Farole and Winkler 2014). These issues discourage MNEs from utilising their competitive advantage in full. Moreover, it might affect the absorptive capacity of a domestic firm and the nature of FDI attracted. However, empirical evidence is mixed. Using firm-level data for emerging countries over the period 2002-2005, Gorodnichenko, Svejnar, & Terrell (2014) found that FDI spillover is not affected by degree of corruption and red tape. Meyer and Sinani (2004) found a non-linear (U-shaped effect) relationship between FDI spillover and transparency. Countries with low and high transparency levels experienced high FDI spillovers, while countries with low and medium transparency levels experienced the lowest share of FDI spillover (Meyer and Sinani 2004).

3.3.7.6 Competitiveness

Domestic firms' competitiveness at a sectoral level might reduce the pressure of the competition brought by foreign firms (Farole and Winkler 2014). Moreover, in the case of exports, domestic firms from competitive sectors may be discouraged to improve, which results in less benefits for spillover of FDI. Sinani and Meyer (2004) established that further competition at a sector level for both MNEs and local firms had a positive impact on the growth of sales of local firms in Estonia, but did not control for the interaction of competition with FDI. Furthermore, these authors suggest that lower sectoral competition as indicated by a higher

Hirschman-Herfindahl index (HHI), improves the productivity benefits from FDI in Spain which discourages improvement (Barrios and Strobl 2002).

From the discussions above it can be seen that the level of FDI spillover which firms in the South African automotive industry could experience depend on numerous factors. These include country institutional context, each heterogenous' firm's absorptive capacity, degree of foreign ownership within the firm, and others. This theoretical understanding provides a context against which further empirical analysis will be undertaken in the following chapters. What we see from this literature overview is that the environment of the host market is very important in determining the capacity of the host country to benefit from FDI spillovers. Therefore, it is important for government to implement policies that promote an environment that is conducive to FDI spillover**.**

3.3.8 Summary and synthesis

According to Dunning (2015), for foreign production to take place, the MNE needs to possess all three advantages mentioned above. The firm will exploit these advantages by internalisation of FDI rather than outsourcing. As much as internalisation enhances MNE's competitiveness and profits, it might discourage FDI spillover to domestic firms as they are excluded in the production value chain. The location advantage might have a positive effect on knowledge and technology transfer from MNEs to domestic firms through the demonstration effect.

Furthermore, as elaborated upon in Section 3.3.3 above, developing countries must attract market seeking and other assets seeking types of FDI in order to benefit from spillovers (Narula & Dunning, 2000). The shift to market seeking FDI and encouraging FDI in value added projects will enhance the FDI spillover. The FDI spillover potential could be improved by country's specific advantages (absorptive capacity). Dunning (2000) confirmed that the presence of foreign firms had a positive effect on the productivity of domestic supplies and also had positive spillover for the entire sector.

Lawana (2016) criticised the eclectic paradigm due to its difficulty in measuring these variables (Ownership advantage, Location advantage and Internalisation) such as internationalisation, location and ownership advantages of MNEs, as they are integrated and take place simultaneously. Although the Eclectic Paradigm explains why and where foreign firms invest abroad (ownership and location strategies) it does not clearly illuminate the FDI spillover effects on domestic firms. For instance, in the Eclectic theory, firm level adjustment is not regarded as a critical aspect in increased investment. Following the Eclectic Model (Dunning 2015), recent empirical evidence suggests that industry competitiveness is critical in firm level

adjustment in host markets (Sibindi 2019). Firm level adjustment enhances competitiveness and enables knowledge and technological spillover effects flowing from inward FDI to domestic firms. Furthermore, in the link between the inward FDI and spillover effect, the Eclectic Theory (Dunning 2015) posits that firm heterogeneity is influential in the decision of MNEs to invest abroad. Particularly, the Eclectic Theory, illuminates the heterogeneity (Internalisation) of a foreign firm on the potential economic spillover on the host economy. Thus, we see that these theories are most relevant to this study because it clarifies the link between inward FDI and spillover effect in the domestic economy. In the section below, presents the overview of empirical studies relating to Inward FDI and its economic effects on the economy of the host country.

3.4 EMPIRICAL LITERATURE REVIEW

Empirical literature refers to a description of studies done on a particular topic using econometric models. For the purpose of this study, empirical studies published between 1999 and 2020 were reviewed in order to present an overview of the empirical state of knowledge in this field. While the theoretical literature presented above shows that the host country largely benefits from FDI through spillover effects (depending on mediating factors such as absorptive capacity), it is shown in the discussion below, that there is no consensus on empirical studies with regard to nexus between inward FDI and spillover effects.

3.4.1 Literature Review on FDI Spillover on Domestic Enterprises

Empirical studies on FDI spillover effects on domestic enterprises are briefly reviewed in the section below. While the focus of this study is on the South African automotive industry in particular, broader studies are referenced here below for context.

3.4.1.1 Studies in the rest of the world

Pavlínek and Žížalová (2016) studied the links between spillovers from foreign firms to domestic firms in automotive industry in the Czech Republic. Their study employed a qualitative questionnaire method, using data collected from 317 foreign and domestic firms in 2009. In addition, the researchers sourced data by conducting on site interviews of 100 firms conducted in 2009 and 2011 (Pavlínek and Žížalová, 2016). The study found that domestic firms vary in their capabilities and absorptive capacity which, along with the particular nature of the contemporary automotive value chain, significantly influence their ability and potential to benefit from linkages and spillovers.

Silajdžić and Mehic (2015) employed the granger causality test, using pooled cross-sectional data from 2000 to 2013 to investigate the impact of FDI and its externalities on economic

growth in transition economies. The study identified that FDI had a positive indirect impact on economic growth through knowledge spillovers. They also recommended that host economies improve innovation and technology such that it complements the spillovers.

Bruhn, and Calegario, (2014) employed moderate multiple regression and a generalised linear model to examined FDI spillovers on the productivity of the Brazilian processing industry. The outcomes of the study were that inward FDI results in positive spillover effects in high-absorption industries. However, FDI had negative effects on labour-intensive industries.

Gallagher and Zarsky (2007) confirmed the existence of positive horizontal and vertical spillover in East Asia, while Amsden and Chu (2003) found that vertical partnerships enhanced domestic competitiveness in the electronic industry in Taiwan and China. The study confirmed the existence of positive spillovers, and that domestic firms benefit from the presence of MNEs, particularly in related industries in the province. In addition, there is apositive relation between the technological gap and spillover potentials, meaning that a large technological gap enhances the potential for technology spillover. Likewise, Cheung, and Ping, (2004) using provincial data over the period 1995 to 2000 to examine FDI spillover on innovation in China. The results found that FDI had a positive spillover effect on patents of domestic firms.

Aitken and Harrison (1999) utilised a panel data of more than 4,000 Venezuelan plants between 1976 and 1989 sourced from Venezuela's National Statistical Bureau, the Oficina Central de Estadistica e Informatica (OCEI). The study employed the Ordinary least Squared method to identify the effects of MNEs on domestic firms. The study found foreign equity participation is positively related to increases in productivity of domestic firms with less than 50 employees. In addition, increase in foreign ownership is negatively related to productivity of wholly domestically owned firms in the same industry (intra-industry spillover).

Huynh, Nguyen, Trieu, and Tran (2021) investigated the impact of FDI and related externalities on economic growth in transitional economies. The study employed the fixed effect model and used firm level panel data from 2011 to 2015. Data of unlisted Vietnam manufacturing firms sourced from the General Statistics Office (GSO) of Vietnam, focusing on six regions in Vietnam was analysed. The study found high level of a negative horizontal (intra-industry) spillover in all the regions in Vietnam. In addition, these authors, found an insignificant positive backward spillover which was overpowered negative intra-industry (vertical) forward spillover (Huyn et al 2021). Thus, consistent with these results Huyn et al (2021) reiterated the importance of absorptive capacity to enhance productivity spillover.

Nguyen, Tran, Le and Trieu (2020) examined the effects of FDI spillover effects on the productivity of Vietnamese firms. The study employed the Generalised Method of Moments (GMM) method using the data for the period 2007-2015. The study found that horizontal and forward linkage spillovers impact negatively on the productivity of domestic firms, while backward spillovers have a positive effect on local productivity. The human capital, financial development, and technology gap are confirmed as vital conditions for technology spillovers. The results suggest that in order to capture the benefits of FDI spillover, the first step is to increase the ability of the local workforce and create more training programs and opportunities for the local labour to reduce the technology gap. According to the result, the presence of foreign entities is proven to have negatively affected domestic firms' productivity, which outweighs the positive effects of technology spillovers. Therefore, more support from the Vietnamese government is required, such as further investment in the education system.

Wang et al (2016) examined the role of region-specific institutions on FDI spillover effects in China. The study found that firms that located in regions characterised by international openness, high levels of intellectual property and market development have better capacity to absorb FDI spillovers. The study confirmed that the location of a domestic firm is important with regard to FDI spillover potential.

Mao and Yang, 2016) used province level panel data sourced from China Tourism Statistical Yearbook to investigate the FDI spillover in the hotel industry in China for the period 2001 to 2012. The study employed a fixed effects Model and found a significant FDI intra-industry spillover from MNEs to local hotels in China, but that this varies in terms of nature and magnitude. Moreover, the study concluded that absorptive capacity of both local hotels and regions are prerequisite for FDI spillover (Mao and Yang, 2016).

Newman, Rand, Talbot and Tarp (2015) employed Generalized Method of Moments (GMM) to explore the link between inward FDI and productivity in Vietnam. The study used a sample of 4000 manufacturing firms in Vietnam sourced from four rounds of the Vietnam Technology and Competitiveness Survey. The study confirmed the existence of positive vertical spillovers from downstream FDI firms to local input suppliers, particularly in joint ventures. In addition, negative spillovers from MNEs in upstream to local producers in downstream is evidenced in the reduction of economic value chains in the economy. Moreover, the study concluded that negative spillovers are less particularly on local firms connected directly to wholly owned MNE.

Masron, Zulkafli and Ibrahim (2012) employed simple correlation analysis to examine the FDI spillover effect and also gauge the extent of the spillover in manufacturing sector in Malaysia for the period 1999 to 2004. In addition, the study also examined the heterogeneity and

productivity performance for the period 2010-2016. The study found a potential for spillover however, also a possibility of crowding-out effect.

Hongyu, Meiyue and Yang, (2011) employed the Ordinary Least Square (OLS) to investigate the FDI spillover effects in China's manufacturing sector. The Data used was sourced from China Industry Economy Statistical Yearbook. The study found positive significant effects on both State Owned Enterprise (SOE) and private companies. Furthermore, with regard to FDI from Taiwan, Macao and Hong Kong, the study found positive effects only in private companies, and negative effects on SOE.

Buckley, Clegg and Wang (2010) investigated the relationship between FDI inflow and spillover effects in China. These scholars found that the origins of foreign firms had a significant impact on the productivity spillover effects in China. The study found the relationship between inward FDI spillover effects is curvilinear for Hong Kong, Macau ad Taiwan but non-curvilinear for firms from the West.

Furthermore, Blalock and Gertler (2005) investigated the relationship between inward FDI and spillover effects in Indonesia's manufacturing industry by calibrating primary data with Panel Regression analysis. In conclusion, these authors suggest that a strong intervention is critical in enhancing the spillover effect in Indonesia. For instance, results from this study suggest that there is evidence of the spillover effects in geographical dispersion and upper stream FDI (distribution network) while in downstream FDI similar evidence is elusive. This suggests that MNEs in Indonesia's manufacturing sector rely on their domestic value chain streams for operational efficiencies in Indonesia.

3.4.1.2 Studies in South Africa and Africa

Mebratie (2010) employed Ordinary Least Squared (OLS) method with firm level cross sectional data to examine the impact of inward FDI on the productivity of manufacturing industries in South Africa for only two years, 2003 and 2007. The study found that at firm level, inward FDI is positively related to labour productivity. In addition, the study suggests that improved labour productivity was due to training and other techniques offered by MNEs to the domestic workers.

Following a study by Mebratie (2010), Mebratie & Bedi (2013) conducted a similar study using a panela data from South African manufacturing firms for the period between 2003 and 2007. The study examined the impact of foreign ownership of a firm on its own productivity and on the productivity of domestically owned enterprises. The study found no evidence of the effect of firm-level BEE compliance and firm profitability as well as labour productivity. In addition,

Foreign owned firms were more productive than their domestic counterparts. Conversely, estimates using panel data confirmed that FDI is attracted to more productive firms and, conditional on controlling for firm fixed-effects there was no foreign-owned productivity effect.

Lawana (2016) examined the impact of FDI on labour productivity on the South African automotive industry for the period 1995 to 2013. The study employed the Johansen cointegration test to analyse the long-term relationship between FDI and labour productivity. The study discovered that there is a long-term relationship between the two variables, FDI and labour productivity. Furthermore, the study employed the Vector Error Correction Model to examine the short-term relationship between the variables and concluded that FDI has a positive, statistically significant impact on labour productivity in South Africa. The results suggest that policies aimed at enhancing FDI should be pursued as this enhances productivity in the automotive sector which will spill over to other sectors of the economy**.**

Kleynhans (2016) employed a regressions and panel data analysis to determine how micro-economic spillovers enhance the competitiveness of firms and industries in manufacturing firms in South Africa. The study used employed a cross sectional regression on a sample of 267 manufacturing firms from Gauteng and the North West Province The study used data sourced from the 2011 Manufacturing Firm Survey done by World Bank, which covered the first decade of the third millennium, including the world economic crises. The study found that technological expenditures provided lower advantages to firm's spillovers, as compared to spillovers derived from Research and Development, which enhance competitiveness. Furthermore, the study discovered that a number of new firms including privately owned firms discouraged competitiveness however, communication expenditure, machinery and equipment, exports, skilled workers and innovation improved sales. Moreover, the study concluded that corruption, theft, and crime increase negative spillovers and also restrict competitiveness.

Asafo-Agyei (2020) employed the Hansen threshold regression model to examine the nature of the relationship between FDI and economic growth, as well as the mediating role of absorptive capacity of the selected countries in Sub-Saharan Africa. In addition, the study employed the Battesse and Coelli stochastic frontier to examine efficiency gains from FDI inflows in the selected countries of Sub-Saharan Africa. As one of the outcomes of the study, the threshold level estimated the FDI inflows to be approximately US$ 44.93 per annum. Furthermore, the study concluded that FDI improves production efficiency level in selected Sub-Saharan African countries. Moreover, the study concluded that sectoral FDI inflow originating primary sources offer more economic spillover effects than FDI inflows from secondary sources. Nevertheless, sectoral Inward FDI from secondary sources had not

significant impact on economic growth in selected countries in the region. In contrast inward FDI from tertiary sources had significant effect on economic growth in Sub-Saharan Africa. Finally, the study established that FDI spillover had significant effects on domestic manufacturing firms' productivity of the selected countries in Sub-Saharan Africa

Asafo-Agyei and Kodongo (2022) employed the threshold regression model to investigate the Impact of inward FDI, and the facilitating role of FDI absorptive capacity, on economic growth in Sub-Saharan Africa. The study used a balanced panel of 25 countries from Sub-Saharan Africa with data collected from World Bank's World Development Indicators and UNCTAD investment databases. They found that for inward FDI to have a positive effect on Economic growth in Sub-Saharan Africa each country needs to have a minimum capacity such that it can absorb the growth-enhancing benefits from FDI inflow. In addition, the study concluded that for the region to reap the benefits of inward FDI, it needs to realize at least a minimum (threshold) FDI inflow of US$ 44.67 per annum per person. Moreover, the technology gap between MNEs and local firms must be more than 0.6904 (Asafo-Agyei and Kodongo 2022). They reiterated the importance of the FDI inflow threshold to complement the FDI incentives (Asafo-Agyei and Kodongo 2022).

The following is the table 3.1 that summarises the review of empirical literature on the study topic:

Table 3.1: Summary of Empirical Literature

Author & year	Method used	Period covered	Country/ geographic region covered	Main findings
Pavlínek and Žížalová (2016)	Qualitative, Data collected from questionnaire	2009 & 2011	Czech Republic	Domestic firms vary in their capabilities and absorptive capacity which, along with the particular nature of the contemporary automotive value chain, significantly influence their ability and potential to benefit from linkages and spillovers.
Silajdžić and Mehic (2015)	Granger causality test. using pool cross sectional data	2000 - 2013	Central and East European countries	Identified the nature of FDI associated with positive indirect impact on economic growth through knowledge spillovers. They also recommended that host economies to improve innovative and technology such that it complements the spillovers.
Newman et al. (2015)	Generalized Method of Moments (GMM)	2009, 2010& 2011	Vietnam	(1) Existence of positive vertical spillovers from downstream FDI firms to local input suppliers, particularly in joint venture. (2) Negative spillovers from MNEs in upstream to local producers in downstream. (3) Negative spillovers are less particularly on local firms connected directly to wholly owned MNE.

Author & year	Method used	Period covered	Country/ geographic region covered	Main findings
Bruhn and Calegorio (2014)	Panel Regression	2000 - 2013	Brazil	Positive spillover effects in high-absorption industries and had negative effects on labour-intensive industries.
Hongyu, L.I., Meiyue, L.I.U. and Yang, Y.U., (2011)	Ordinary Least Square (OLS)	1995-2009	China	(1) Positive significant effects on both State-Owned Enterprise (SOE) and private companies. (2) Furthermore, with regard to FDI from Taiwan, Macao and Hong Kong, the study found a positive effects only in private companies and negative effects on SOE.
Masron et al (2012)	Simple correlation analysis	1999 to 2004	Malaysia	Potential for spillover however, also a possibility of crowding-out effect.
Buckley et al (2010)	Pooled OLS model and fixed effect model	1995 to 1999	China	(1)These scholars found that origins of foreign firms has a significant impact on the productivity spillover effects in China (2) FDI plays a positive role in raising labour productivity in one of China's key sectors.
Blalock and Gertler (2005)	Panel Regression analysis	1975 to 2003	Indonesia	There is evidence of the spillover effects in geographical dispersion and upper stream FDI (distribution network) while in downstream FDI similar evidence is indeed elusive.

Author & year	Method used	Period covered	Country/ geographic region covered	Main findings
Aitken and Harrison (1999)	Ordinary Least Squared model	1976 and 1989	Venezuela	Foreign equity participation is positively related to increase in productivity of domestic firms with less than 50 employees
Mebratie (2011)	OLS cross sectional	2003 & 2007	South Africa	(1) Inward FDI is positively related to labour productivity. (2) Increase in foreign ownership is negatively related to productivity of wholly domestically owned firms in the same industry (intra-industry spillover).
Lawana (2016)	Johansen cointegration test & Vector Error Correction Model	1995-2013	South Africa	Inward FDI has a positive statistically significant impact on labour productivity long-term relationship between the two FDI and labour productivity
Kleynhans (2016)	Cross-sectional regressions	2000 to 2010	South Africa (Gauteng and North West Province)	Technological expenditures provided lower advantages to firm's spillovers as compared to spillover derived from research and development which enhance competitiveness and productivity.
Kleynhans, E.P. and Zwedala, S., (2012)	Generalized Methods of Moments (GMM)	2012	South Africa	FDI has insignificant impact to secondary spillovers to other firms. An increase of FDI in one firm does very little in benefiting the other.

Author & year	Method used	Period covered	Country/ geographic region covered	Main findings
				Benefits occur mostly when domestic firms have the absorptive capacity.
Ghebrihiwet (2019)	Binary Logistic Regression analysis	2002 to 2011	South Africa	MNE in the natural resources sector willmore likely introduce product or process innovations if they engage incooperative research agreements with foreign customers or suppliers. However, the innovation performance of natural resources firms also highly depends on the absorptive capacity of these firms.
Josue	Firm level Cross sectional	2007	South Africa	There are positive inter-industry spillover effects (backward variable) from FDI to local firms while on the other hand, there are negative intra-industry spillover effect (Horizontal variable)
Asafo-Agyei (2020)	OLS for the estimation of spillover effects of FDI inflow on productivity of domestic firms	1980 to 2015	Sub-Saharan Africa	FDI spillover exerts significant effects on domestic manufacturing firms' productivity of the selected countries in Sub-Saharan Africa.
Asafo-Agyei and Kodongo (2022)	Threshold regression model	1993 to 2015	A balanced panel of 25 countries from Sub-Saharan Africa	In order for inward FDI to have a positive effect on Economic growth in Sub-Saharan Africa each country needs to have a minimum capacity such that it can absorb the growth-

Author & year	Method used	Period covered	Country/ geographic region covered	Main findings
				enhancing benefits from FDI inflow. In addition, the study concluded that for the region to reap the benefits of inward FDI, it needs to realize at least a minimum (threshold) FDI inflow of US$ 44.67 per annum per person. Moreover, the technology gap between MNEs and local firms must be more than 0.6904 (Asafo-Agyei and Kodongo 2022). They reiterated the importance of the FDI inflow threshold to complement the FDI incentives.
Nguyen,Tran, Leand Trie (2020).	Generalized Methods of Moments (GMM)	2007 to 2015	Vietnam	Horizontal and forward linkage spillovers impact negatively on the productivity of domestic firms, while backward spillovers have a positive effect on local productivity
Huynh, Nguyen, Trieu, and Tran (2021)	Generalized Methods of Moments (GMM)	2011 to 2015,	Vietnam	Negative horizontal spillover as the most dominant channel in all regions. The positive backward spillover is compensated for by the large magnitude of negative horizontal and forward spillovers.

Author & year	Method used	Period covered	Country/ geographic region covered	Main findings
Huynh et al (2021)	Generalized Methods of Moments (GMM	2011 to 2015	Vietnam	The study established that there is a presence of economic spillover effects in upper value chain streams.
Fan,He, and Kwan (2019)	Meta regression analysis.	2002 to 2016	China	China gains more horizontal and backward spillover effects than the average world.
Demena, and van Bergeijk, (2021)	Qualitative methods using structured interviews and observation.	2015	Uganda	(1) The spillover effects mainly depend on the channel(s) by which they occur (the competition channel is most important while spillover benefits through the worker mobility and the imitation channels are less prevalent) and (2) both positive and negative spillover effects occur within the same channel.
Damijan, Rojec,Majcen and Knell (2013).	Generalized Methods of Moments	1995 to 2005	10 transitional economies in Europe.	Only more productive firms and firms with higher absorptive capacity are able to both compete with foreign affiliates in the same sector and benefit from the increased downstream demand for intermediates created by foreign affiliates.
Wang et al (2016)	Cobb-Douglas Production function		China	Location of a domestic firm importance with regard to FDI spillover potential.

Author & year	Method used	Period covered	Country/ geographic region covered	Main findings
Silajdžić and Mehic (2015)	Granger causality test, using pool cross sectional data	2000 to 2013	10 transition countries in Central and Eastern Europe.	Identified the nature of FDI associated with positive indirect impact on economic growth through knowledge spillovers. Recommended that host economies to improve innovative and technology such that it complements the spillovers.

In general, from the summary above, it can be seen that there is significant impact of the economic spillover effects from inward FDI in upper value chains streams. In particular, this evidence suggests that investing MNEs in host markets might rely on value chains from their domestic markets.

3.5 CONCLUSION

This chapter presents a discussion of the conceptual or theoretical literature. The theoretical literature surveyed and analysed long-standing theories that explain the association between FDI and FDI spillovers. The theories articulated reasons behind foreign firms investing in another country, how FDI through FDI spillover impacts the productivity and the competitiveness of the domestic firms. A variety of theories were discussed, however, the Eclectic theory as well as the FDI Spillover theory were employed as the theoretical framework for the present study. The eclectic theory explains the reasons and patterns for firms to invest in a foreign country. On the other hand, the FDI spillover theory clarifies how inward FDI affects the productivity and competitiveness of firms in the host market. In addition, this chapter reviewed empirical studies done on the topic or other related topics. In other words, the chapter reviewed studies done in the past to illuminate the relation between inward FDI and spillover effect on the competitiveness and productivity of domestic firms. Thus far, there is no consensus in this regard. While some studies found positive impact, others found negative or no impact on domestic firms. There are a number of reasons explaining this, such as firm heterogeneity, absorptive capacity of domestic firms, and the characteristics of the host market. Furthermore, lack of consensus might be due to different study methods, type of data used (time series vs panel) and also unavailability of data. In particular, theoretical and

empirical literature seemingly suggest that the impact of economic spillover effects of inward FDI is more prevalent in upper stream economic value chains that in downstream economic value chains. Given this context, the following chapter will now elaborate on the empirical framework to be employed for this study. In particular, the methodological framework in this study seeks to improve on Blalock and Gertler (2005) which was one of the studies reviewed in this chapter. It seeks to do so by calibrating the Autoregressive Panel Dynamic General Methods of Moments to test changes in inward FDI and firm level growth in South Africa's automotive industry. As such, the study also improves from Blalock and Gertler (2005) by testing for short and long run deterministic trends using the Vector Error Correction Model.

CHAPTER FOUR
RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter outlines a specific methodological framework that was adopted to answer initial research questions. The outline is presented through an overview of the relevant research philosophy; research design; population and sample strategy; data collection; and data analysis.

4.2 RESEARCH PHILOSOPHY

According to Creswell and Creswell (2017), research philosophy is defined a research approach that informs the scientific knowledge process. For the purpose of this study, a positivism research approach was adopted in the context of the scientific process.

In the positivism research approach, a researcher relies on empirical evidence concluded from experiments (or, in this instance - econometric analysis) to test the study hypothesis. Hence, in the positivism approach, the results of the study are informed by the results drawn from the scientific process, such as statistical analysis.

The rationale for adopting a positivist approach is that, since the present study attempts to uncover the economic spillover effects of inward FDI in South Africa's automotive sector, positivism enables the robustness of econometric estimations to answer initial research questions and test the study hypothesis. In particular, the present study uncovered the spillover effects by using a combination of descriptive, inferential and causal inference econometric estimations. These methods are effective in uncovering short and long run economic spillover effects of inward FDI in the automotive industry of South Africa.

4.3 POPULATION, SAMPLING STRATEGY AND SAMPLE SIZE

For the purpose of this study, the population of the study is defined in threefold. First, MNEs that invest in the automobile industry in South Africa. According to the Department of Trade, Industry and Competition (**the dtic**) (2020), a population of twenty-three MNEs invested in inward FDI in South Africa between 1990 and 2020. Second, these firms invest in downstream FDI that provides raw materials and other factor inputs. Third, these firms invest in upper stream FDI that provides distribution of goods and services and technical support.

From the twenty-three investing MNEs which comprise the total possible population, this study analyses a sample size of sixteen MNEs in the automobile industry. The motive for selecting

sixteen MNEs was informed by two reasons. First, the time period. Investment by MNEs did not always overlap in the time period under consideration, and so, not all firms were eligible for consideration. For instance, in the inclusion criteria this study considers MNEs that have invested in South through FDI (Greenfield, Brownfield and Joint Venture). While in the exclusion criteria this study excluded MNEs that participate in the South African automobile industry through exporting and licensing.

Second, availability of data. From the selected MNEs, firms that have a lot of missing data were excluded from the sample size. For the remaining firms that had less missing data, this challenge was mitigated using a 5-year ratio to moving average method to generate missing data values. In econometrics, a ratio to moving average is a technique to get an overall idea of the trends in a data set; it is an average of any subset of numbers. In this study, the ratio to moving average is extremely useful for forecasting long-term trends and filling missing values within the data sets. For example, annual firm level data for a twenty-year period, might be calculated a five-year moving average, a four-year moving average, a three-year moving average and so on. Consistent with Li, Zhang, Wang and Ran (2018) and Murialdo, Ponta and Carbone (2021), the study adopted a 5-year ratio to moving average as a technique to fill missing values due to the fact that, 5-year ratio to moving average have strong deterministic robustness in forecasting as compared to 3 and 4-year ratio to moving average methods.

Following a generally accepted rule of thumb which states that a sample size of more than 25% of the total population is acceptable, sixteen out of 23 firms analysed in this study satisfies external validity concerns. (Creswell and Creswell 2017).

4.4 DATA COLLECTION AND MOTIVATION OF THE STUDY VARIABLES

Measurable variables presented here below will be used to investigate the nexus between inward FDI and economic spillover effects, and are informed by the literature review and analysis as presented in Chapter Two. Firm level secondary data was collected from credible secondary sources, namely NAAMSA, Bloomberg, Inert BFA, ORBIS and the Department of Trade, Industry and Competition (**the dtic**). Data was extracted for the time period between 1990 and 2020.

Motivated study variables are highlighted below,

- Return on Assets (ROA). This variable represents firm level growth. From the literature analysis, in Chapter Two, firm level competitiveness is indicated by the return on investments measures in the resource utilisation. Thus, in financial economics the most comprehensive measure is the Return on Assets as it takes

cognisance utilisation of resource and market level competitiveness. In this study, ROA is the dependent variable that indicate firm level growth and competitiveness (Akinleye and Dadepo 2019).

- Horizontal FDI. This variable represents the presence of MNEs in a specific industry. From the literature analysis, in Horizontal FDI, MNEs produce goods appropriate for host markets (Javorcik 2004). To control for horizontal FDI spillover effects, we measure as follows;

Equation 1

$$HFDI_{jt} = \sum_{i=1}^{m} Y_{it}^{f} / \sum_{i=1}^{m} Y_{it}$$

Where Y_{it}^{f} is the output of the MNE i in the industry t in time and Y_{it} is the output of domestic firm, industry and time.

- Downstream FDI. This variable indicates share of total output of MNEs in the downstream industry. This variable captures the supply chain network of domestic firms and MNEs joint venture investment. For Javorcik (2004) and Blalock and Gertler (2005), downstream joint venture FDI is measured as follows;

Equation 2

$$DFDI_{jt} = \sum_{k=j} a_{jk}\, DFDI_{kt}$$

Where a_{jk} is the fraction of industry j 's output supplied to industry k extracted from input and output tables.

- Upper stream FDI. This is an explanatory variable and represents upper stream sectors produced by MNEs. To compute this variable, we consider the weighted share of output produced by MNEs (Lipsey and Sjöholm 2005). Thus, this variable is calculated in a similar way to downstream FDI; except that goods produced by MNEs for exports are excluded;

Equation 3

$$UFDI_{jt} = \sum_{k \neq j} a_{jk} \quad [\frac{\sum_{j \varepsilon kt}(y_{it}^{f} - y_{it}^{ef})]}{\sum_{j \varepsilon kt}(y_{it} - y_{it}^{e})]}$$

Where a_{jk} is the share of inputs purchased by industry J from industry k in total raw factors sourced by sector jy_{it}^{e} and y_{it}^{ef} represent industry and output of MNEs.

As indicated, raw materials supplied within the sector are not included.

Geographical dispersion. This variable represents reliance of MNEs in close markets value chains. From the literature analysis, MNEs rely on cheaper and closer chain streams to exploit competitive advantages in host markets. Consequently, this variable indicates, on one hand, the internationalization process, while the other hand, it reflects on reliance on close host markets (Rugman and Verbeke 2004). To control for this variable, we suggest;

Equation 4

$$Geo - Disp_{jt} = \sum_{1-r}^{m} P_i^r \; ln \left(\frac{1}{P_i^r}\right)$$

Where r represents the number of MNEs in the automotive industry, P_i^r is the proportion of intra – industry MNEs operating in South Africa from each foreign market and $r - th$ is the total number of MNEs.

- Research and development. This variable represents the proportion annual budget of research and development in each individual firm in the automotive industry. Research and development budget or expenditure in host market is considered a critical aspect in knowledge spillover effects and industry competitiveness (Rosa, Gugler and Verbeke 2020).

Table 4.1: Research Variables and Data Sources

Type of Variable	Brief Description	Source of data	Hypothesised Effects
Firm level Growth (ROA)	Volume of production in local firms that supply raw materials in automotive industry. In this study, ROA is the dependent variable.	Iress, ORBIS, FDI intelligence, NAAMSA	Dependent Variable.
Horizontal FDI	This variable represents the presence of MNEs in a specific industry.	Iress, ORBIS, FDI intelligence, NAAMSA	Positive / Negative
Downstream FDI	This variable represents share of total output of an industry that is sold to MNEs in downstream industry	Iress, ORBIS, FDI intelligence, NAAMSA	Negative
Geographical dispersion	This variable represents reliance of MNEs in their domestic value chains	IRESS, ORBIS, Bloomberg, FDI Intelligence	Positive
Upper stream FDI	This variable represents the presence of MNEs in a specific industry.	Iress, ORBIS, FDI intelligence, NAAMSA	Positive
Research and development	This variable represents the proportion annual research and development budget	Iress, ORBIS, FDI intelligence, NAAMSA	Negative

4.5 RESEARCH HYPOTHESIS

In this section, the study presents research hypotheses that inform the empirical analysis of the present study. In Chapter 1, initial research questions were used to develop research objectives. And, from these objectives the research hypothesis was formulated. Following additionally from the literature review presented in Chapter Two, research hypothesis is formulated below.

- **Null Hypothesis:** There is no causal relationship between the dependent variable (firm level growth) and explanatory variables (research and development, upper stream FDI, Horizontal FDI, Geographical Dispersion and Downstream FDI). This will be tested at 0.01, 0.05, and 0.10 probability values.
- **Alternate Hypothesis:** There is a causal relationship between the dependent variable (firm level growth) and explanatory variables (research and development, upper stream FDI, Horizontal FDI, Geographical Dispersion and Downstream FDI). This will be tested at 0.01, 0.05, and 0.10 probability values.

4.6 DATA ANALYSIS

The present study adopted a series of advanced econometrics methods to test the study hypothesis and achieve the study objectives. In particular, these methods are integrated to improve of the robustness of each selected estimation. In inferential analysis, the present study calibrated the Panel Auto Distributive Lagged Model and Panel Generalized Methods of Moments (GMM). In particular, in the Panel Auto Regression Distributive Lag model used in the study attempts to test the pattern of the economic spillover effects. For instance, to mitigate the problems of endogeneity bias that are caused by a potential correlation of variables used in equation 6, the study adopted orthogonal deviation in the General Methods of Moment environment as recommended by Arellano and Bover (1995). In addition, as noted in Chudik and Peseran (2017) an argument is advanced that individual effects in the series that are unobserved can be cancelled by forwarding orthogonal deviation in multivariate panel data. Following Arellano and Bover (1995) and Chudik and Pesaran (2017), the present study suggests that a GMM estimator is transformed by the forward orthogonal deviation and is more effective than the estimator transformed at first difference in reducing the impact of endogeneity/autocorrelation in estimations. For instance, an orthogonal deviation technique reduces the problem impact of endogeneity, thus, it enables and improves the validity and reliability of estimation in the GMM approach (Baltagi, Kao, and Liu, 2020).

4.6.1 Panel Dynamic Generalised Methods of Moments

Following a series of studies by authors such as Rugman and Verbeke (2004); Javorcik (2004); Blalock & Gertler (2005); the GMM methodology was used with great success. Nonetheless, this study improves on these studies by calibrating Panel Generalized Methods of Moments with the Auto Regressive Distributed Lag model. For instance, Baltagi (2008) suggest that Auto Regressive Lagged model is a time series of estimation of the dependent variable over its own time series. Therefore, the time series of the equation is estimated at

evenly spaced intervals (Chudik, Mohaddes, Pesaran, and Raissi 2017). For instance, $y_t \; on \; y_{t-1}$,

$$Growth_t = B_0 + B_1 - 1 + \mathcal{E}_t$$

In this study, the response of dependent variable growth of the previous time series is transformed into an explanatory variable. Thu s, the function of an autoregressive is informed by the value that precedes values in the series and these values are used to estimate the coefficient of the present time.

Therefore, to estimate the order of auto regression in the interval, the series suggest that $Growth_t$ in the previous interval $Growth_t - 1$, $Growth_t - 1$, $Growth_t - 2$, hence, the autoregressive estimation is illustrated below;

$$Growth_t = B_0 + B_1 \; Growth_{t\,-1} + B_2 \; Growth_{t-2} + \; \mathcal{E}_t$$

The equation above, is the second order auto regression that is expressed as $AR\,(2)$ as the value of time is calculated as $t-1$ and $t-2$. In essence, a k^{th} order of auto regression is $AR(K)$is a multivariate regression in which the linear function at any given time is given as; $t-1,\; t-2, \ldots \ldots t-k$.

Equation 5

$$Log\; Growth_{it}^{j} = a_{oi}^{j} + a_{1t}^{j} \; + Growth_{it}^{j} + \; DFDI_{it}^{j} + UFDI_{it}^{j} + G.D_{it}^{j} + R.D_{it}^{j} + HFDI_{it}^{j} + e_{it}^{j}$$

$Growth_{it}^{j}$ Represents growth of an MNE in the automotive industry of South Africa as the log of $(Growth_{it}^{j}/Growth_{it-1}^{j})$ in the firm i and time t.

Where, $Growth_{it}^{j}$ = $(Growth_{it}^{j}/Growth_{it-1}^{j})$ is the time series of the dependent variable.

Where, $DFDI_{it}^{j}$ = is the downward FDI for industry i time t

Where, $UFDI_{it}^{j}$ = is the upper stream FDI in the industry i time t

Where, $HFDI_{it}^{j}$ = is the horizontal FDI in host markets i time t

Where, e_{it}^{j} is the error term.

4.6.2 Vector Error Correction Model

Furthermore, in this study, Vector Error Correction Modal was adopted to measure short and long run deterministic trends of the spillover effects in the automotive sector in South Africa. Thus, consistent with Baltagi (2008), Baltagi, Fingleton and Pirotte (2014) and Isaacson and Keller (2012), the present study assumes that the error correction terms indicate how the time series adjust to imbalance and imperfection in a specific model. Therefore, in Lütkepohl (2013) the interpretation of the Vector Error Correction estimate suggests that error terms that have positive coefficients would revert through negative future patterns. Nonetheless, in the contrary, error terms that have negative coefficients might be stable after positive trends. In particular, the Error Correction term Z_{t-1} is variable of a long run cointergrating equation that is expressed below;

Equation 6:

$$Z_{t-1} = ECT_{t-1} = Growth_{t-1} - \beta_0 - \beta_i DFDI_{t-1} + G.D_{t-1} + UFDI_{t-1} + R.D_{t-1} + HFDI_{t-1}$$

Where coefficient ECT_{t-1}, Φ is the speed of adjustment, it measures the speed of which dependent variable investment returns to equilibrium after the changes in explanatory variables.

Model estimation

Equation7

$$\Delta\, Growth_{t-1} = \beta_0 + \sum_{i=1}^{n} \beta_i \Delta\, Growth_{t-1} + \sum_{i=1}^{n} \varepsilon_i\, \Delta\, DFDI_{t-1} + G.D_{t-1} + UFDI_{t-1} + R.D_{t-1} + HFDI_{t-1} + \Phi Z_{t-1} + \mu_t$$

Where, $\Delta\, Growth$ = is the dependent variable of the series,

Where, $Growth_{t-1}$ = is the function of time series and previous changes in dependent variable,

Where, $DFDI_{t-1}$ = is the downward FDI for industry i time t

Where, $G.D_{t-1}$ = is the explanatory variable that represent current and past changes in geographical markets close to host markets.

Where, $UFDI_{t-1}$ = is the upper stream FDI in the industry i time t

Where, $R.D_{t-1}$ = is the variable that represent current and past changes in firm level research and development.

Where, $HFDI_{t-1}$ = is the horizontal FDI in host markets i time t

4.7 RELIABILITY AND VALIDITY

Consistent with data analysis, the present section discusses the reliability and validity of research instruments adopted to answer initial research questions and test the study hypothesis, as explained in early sections of this study. In this instance, validity issues are concerned with both external and internal validity. As such, in external validity the study enhanced validity of results by adopting a sample statistic that is representative of the total population. As noted in section 3.2, the sample size is 70% of the study population. Thus, the knowledge generated in this study is considered a true representative of the economic spill over effects in automotive industry of South Africa. In internal validity arguments, such as content and criterion validity issues, the present study ensured these concerns by motivation of study variables (See Section 3.4), in the context of the literature review and analysis as presented in Chapter Two.

For reliability of the present study, a series of pre and post diagnostics test were adopted to ensure the reliability of econometrics measurement, as explained in data analysis section. In particular, for Unit Root Test, the study adopted Panel Unit Root Test of Levin Lin and Chu (2002). In econometrics, a unit root test determines whether a time series variable is non-stationary and possesses a unit root. Therefore, the null hypothesis of a specific series is generally defined as the presence of a unit root and the alternative hypothesis is either stationarity. In post diagnostics estimation, the present study adopted three tests to ensure the reliability of results.

First, the study adopted the Cusum test to measure the reliability of Panel Dynamic Generalised Methods of Moments. In particular, econometrics literature suggests that the CUSUM chart and test is used to monitor if the series of estimations is moving further from the mean. In this study, The CUSUM chart is placed around the mean of the series. The estimation is assumed to be unstable if the cumulative sums of the standardized deviations exceed a specified range.

Second, the study adopted residual diagnostics to test the reliability of the regression model. In econometrics, the analysis of residuals provides an in-depth understanding in the reliability of the regression model. Third, the study adopted the Durbin – Watson measure to test against negative and positive serial correlation. In particular, the coefficient of the Durbin Watson Test informs if the series has a problem of either positive or negative correlation. For instance, if the Durbin Watson test coefficient is around 2, it is assumed that there is no problem if serial correlation. If the coefficient of test is below 1.7, the indication is that; there is a problem of

positive correlation. And, if the Durbin Watson coefficient is more than 2.5 evidence suggest that there is a problem of negative serial correlation.

Table 4.2: Pre and Post Estimation Diagnostics Tests

Test	Purpose	Critical Values	Location
Panel Unit Root Test	Unit Root Test	Null hypothesis; 0.01, 0.05;0.10	Chapter Five
Vector Error Correction Model	Stability	Null hypothesis; 0.01, 0.05;0.10	Chapter Five
CUSUM Test	Stability	Null hypothesis; 0.01, 0.05;0.10	Appendix B
Residual test	Model specification	Null hypothesis; 0.01, 0.05;0.10	Appendix C

Source: Author's compilation

4.8 ETHICAL CONSIDERATION

In accordance with rules and guidelines as overseen by the Faculty of Economic and Management Science's Research Ethics Committee from North West University, this study obtained an ethical clearance number and adhered to all the necessary ethical requirements concerning a low-risk study based on publicly available secondary data.

4.9 CONCLUSION

This chapter discussed the methodological framework adopted to answer initial research questions and test the study hypothesis. As noted, in this study secondary data was collected from **the dtic**, NAAMSA, Orbis, FDI intelligence, UNCTAD. For econometric analysis, the study adopted the Vector Error Correction Model and the calibrated Panel Dynamic Generalised Methods of Moments (GMM) and Autoregressive Regression Model. The next chapter presents the discussion and interpretation of results obtained from the data analysis.

CHAPTER FIVE: DATA ANALYSIS, PRESENTATION AND DISCUSSION

INTRODUCTION

The present chapter presents and analyses the results from this study's empirical analysis, which was conducted to test the study hypothesis. As outlined in the previous chapter, econometric estimations in this study are threefold. First, econometric estimations target a descriptive analysis of study variables that is informed by measures of central tendency, measures of variation and measures of skewness. Second, econometric estimations target an inferential analysis the study calibrated panel dynamic General Methods of Moments (GMM) with an auto-regressive lagged model to enhance understanding of the economic spillover effects of inward FDI in the automotive industry of South Africa. This is achieved by allowing dependent variable growth to be regressed against its own time series. Third and lastly, to measure short-run and long-run deterministic trends, the present study adopted the Vector Error Correction (VECM) model. Furthermore, the pre and post diagnostic estimations are presented and analyzed consistent with reliability and validity of econometric estimations.

5.1 DESCRIPTIVE STATISTICS

This section presents the analysis of descriptive statistics which is depicted in Table 5.1 below. As noted above, descriptive analysis informs the study on the measures of central tendency (mean, mode and median), measures of variation (standard deviation, variance and standard error) and measures of symmetry (Skewness and Kurtosis).

Table 5.1 below, illustrates descriptive statistics in the present study.

Table 5.1: Summary of Descriptive Statistics.

	DFDI[1]	GEO[2]	GROWTH	HFDI[3]	R & D[4]	UFDI[5]
Mean	31.04124	25.73739	1.998289	1099.398	5.354813	44.07153
Median	20.81600	19.15145	2.193743	44.96495	3.512250	9.765600
Maximum	122.8745	54.40000	9.517000	7583.590	31.81230	119.8646
Minimum	-0.069200	0.911200	-1.150900	0.808078	-1.228800	-1.431200
Std. Dev.	25.72315	16.00684	1.406370	1752.955	5.969856	46.36343
Skewness	0.703519	0.261677	1.719966	2.198965	1.309732	0.261844
Kurtosis	2.744997	1.734143	9.640846	7.384516	4.793894	1.199309
Jarque-Bera	42.25883	38.77676	1155.969	797.0261	208.3127	72.67925
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	15396.45	12765.75	991.1515	545301.5	2655.987	21859.48
Sum Sq. Dev.	327531.9	126828.3	979.0491	1.52E+09	17641.39	1064036.
Observations	496	496	496	496	496	496

Table 5.1 depicts a summary of descriptive statistics of the variables estimated in the research methodology chapter. Evidence found in this study suggests that the Growth as dependent variable is stable as the standard error of the sample measured by the variance between the mean of the data and standard deviation is small. In econometrics, the case of low standard error as evidenced in dependent variable suggests a more accurate representation of the population data, with the sample means closely distributed around the population mean. Furthermore, in the growth variable evidence suggests that data has a positive skewness with a coefficient of 1.72 and a high Kurtosis of 9.64. This evidence suggests that the distribution of data is inclined on the left and the tail is on the right.

For instance, the stability of dependent variable growth suggests that there is a steady increase of inward inflows of FDI in the automotive industry of South Africa. The increased flow to Africa was due to the continuation of resource seeking investments, slowly expanding diversified and also doubling of FDI flows to South Africa (from $2 billion to $5.3 billion) between 2000 to 2020. Further evidence in Table 5.1 above seemingly suggests that data in Downward Foreign Direct Investment (DFDI) is stable as given by the standard error

[1] Downward Foreign Direct Investment
[2] Geographical Dispersion
[3] Horizontal Foreign Direct Investment
[4] Research and Development
[5] Upper stream Foreign Direct Investment

measured by the variance between the mean (31.04) and the standard deviation (25.72). Furthermore, evidence suggests that the distribution of data in this variable is positively skewed at 0.70 (almost undefined) and an almost normal kurtosis of 2.7. Therefore, in econometrics literature an undefined skewness coefficient suggests that the data is normally distributed, hence, evidence is consistent with literature analysis that FDI inflows in South Africa automotive industry have been in the increase in the past 20 years (UNCTAD, 2022).

Evidence in the Geographical Dispersion variable indicate that the data has a low standard error given by the variance between the mean and the standard deviation of data. Evidence of skewness as noted in Table 5.1 above also suggest that data is positively skewed with a skewness coefficient of 0.26 which is almost symmetrical or undefined skewness. Similar evidence is also recorded in Horizontal FDI (HFDI) where there is a great variance between the mean (1099.398) and standard deviation (1752.955). Furthermore, empirical evidence in Table 5.1 suggests that HFDI reveal a positive coefficient of skewness (2.198965). Following the results in Table 5.1, empirical evidence indicates that the standard error of the sample as depicted by the variance between the mean (44.07153) and the standard deviation (46.363430) is very low and this suggests that there is steady flow of economic spillover effect in the Upper Stream FDI (UFDI). Thus, data in HFDI and Geographical Dispersion suggests that there is a stable increase in inward FDI as evidenced in WIR (2022) reported that Democratic Republic of Congo surpassed South Africa and became is the second largest FDI recipient in Africa with inflow of $4.0 billion following Egypt with inflow of $5.9 billion. South Africa (3.1 billion), Nigeria ($2.1 billion) and Ethiopia ($2.4 billion) are the other top 5 FDI largest FDI recipient in Africa.

Furthermore, in Research and Development evidence as presented in Table 5.1 above suggests that the standard error as measured by the variance between the sample mean (5.354813) and the standard deviation (5.969856) is very low, hence suggesting that there is a steady capitalization of Research and Development initiatives in inward FDI in the automotive industry as evidence in literature analysis that MNEs increase their Research and Development budgets upon investment in host markets (Sibindi 2019).

5.2 PRE AND POST DIAGNOSTICS ESTIMATIONS

This section presents pre-diagnostics estimations as recommended by a series of econometrics studies (Baltagi 2008, Gujarati 2021). Thus, this study adopted the panel Unit Root Test as recommended by Levin Lin and Chu (2002) to test the stationarity of data sets.

According to Levin Lin and Chu (2002), in panel data, it is important to test for stationarity using Unit Root Test to ensure validity and reliability of econometrics instruments in the study

series. Similarly, according to Gujarati (2015), the unit root should be employed to test the stationarity of data sets. In econometrics literature, the Unit Root Test is critical to determine the presence of unit root and stationarity of data. In particular, in time series analysis, this study adopted three Unit Root Tests to examine the presence of unit root. For instance, employed the Levin Lin and Chu, Augmented Dick Fuller Unit Root Test and Im Peseran and Shin W – stat. Table 5.2 below, illustrates the results of the Unit Root test.

Table 5.2: Unit Root Test

Levin Lin and Chu			Augmented Dick Fuller			ImPeseran and Shin W-stat		
Levin, Lin and Chu t*	**Level**	**First Difference**	**ADF - Fisher Chi-square**	**Level**	**First Difference**	**Im, Pesaran and Shin W-stat**	**Level**	**First Difference**
Individual Intercept	-3.61***	-67.59***	Individual Intercept	95.59***	945.79***	Individual Intercept	-6.98***	--57.29***
Obs.	2964	2964	Obs.	2964	2964	Obs.	2964	2959
Intercept and Trend	-5.14***	-95.62***	Intercept and Trend	82.50***	220.629***	Intercept and Trend	-61.46***	-6.11***
Obs.	2959	2959	Obs.	2959	2959	Obs.	2959	2959
None	-4.59***	-52.98***	None	61.82***	1020.08***	None	-	-
Obs.	2959	2959	Obs.	2959	2959	Obs.	-	-

*Using the Levin, Lin & Chu (2002) test, probabilities are computed assuming asymptotic normality***; **; * This indicates that we reject the null hypothesis of unit root at 1%, 5% and 10%.Automatic selection of maximum lags; Automatic lag length selection based on SIC: 0 to 5*

Evidence in Table 5.1 above suggests three empirical positions regarding the validity and reliability of data in the present study. First, in the individual intercept, the Levin Lin and Chu test seemingly suggests that the data is stationary in the level and the first difference. In addition, similar evidence is observed in the Augmented Dick Fuller Unit Root Test, data is stationary in level and the first difference. And lastly, the Im Peseran and Shin W-stat test data is stationary in level and first difference. Second, in intercept and trend, evidence from the Levin Lin and Chu Test suggests that the data is stationary in level and first difference. In addition, in in the ADF test evidence indicates that data is stationary in level and the first difference. According to Table 5.2, evidence suggests that at in Im Peseran Test data is stationary at level as well as first difference.

Thirdly, following evidence in Table 5.2, with regard to None, evidence indicates that the Levin Lin and Chu Test is stationary at level and first difference, as well as that the data is stationary at level and first difference in the ADF test. Therefore, evidence of the Panel Unit Root Test as illustrated in Table 5.2 indicates that data is reliable to provide valid econometrics estimations that are discussed in the methodology chapter.

In this study, a series of post-diagnostic estimations were carried out to validate the reliability of econometric estimations. For serial correlation, the Durbin-Watson Test was used to detect the presence of serial correlation. In Eviews version 10, the Durbin Watson Test is inbuilt and is generated together with the results of the model. Thus, in Table 5.5, evidence suggests that there is no presence of serial correlation (Negative and positive) as the Durbin – Watson coefficient is between 1.7 and 2.3.

Furthermore, to ascertain the normality of data, data was transformed into natural logarithms using the inbuilt Eviews function. In post-diagnostics estimations, two econometrics tests we implemented. First, the CUSUM Test was implemented to establish stability of the model. The results of the CUSUM Test measured at 5% level of significance suggests that model is stable (Appendix 1). Second, Residual Test was implemented to establish the model specification. From the results, the Residual Test suggests that the model is specified as all variables have a significant contribution the Goodness of Fit Test.

5.3 RESULTS OF PANEL DYNAMIC GENERAL METHODS OF MOMENTS (GMM)

In this section, the study presents results of the Panel Dynamic General Methods of Moments (GMM) regression analysis. As noted in Chapter Four (section 4.6.1) the results are presented in the context of the calibrated GMM. Following Baltagi (2015), this is a linear equation that seeks to establish a linear relationship between dependent and explanatory variables. In particular, the regression analysis was adopted to test the influence of changes in explanatory variables in the dependent variable.

Table 5.3 presents the results of the Panel Dynamic General Methods of Moments (GMM).

Table 5.3: Panel Dynamic General Methods of Moments (GMM) Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.411046	0.224464	1.831231	0.0677
GROWTH(1)	0.678614	0.114637	5.919689	0.0000***
GROWTH(2)	0.040346	0.076357	0.528389	0.5975
GROWTH(3)	-0.067552	0.077592	-0.870612	0.3844
GROWTH(4)	0.154224	0.097278	1.585393	0.1136
GROWTH(5)	-0.017491	0.067264	-0.260029	0.7950
[6]DFDI(1)	-0.000199	0.002995	-0.066547	0.9470
DFDI(2)	0.003486	0.002430	1.434378	0.1521
DFDI(3)	-0.000520	0.002855	-0.182065	0.8556
DFDI(4)	0.000935	0.002820	0.331475	0.7404
DFDI(5)	-0.000177	0.002454	-0.072271	0.9424
[7]GEO(1)	-0.074974	0.033042	-2.269045	0.0237***
GEO(2)	0.527683	0.229916	2.295112	0.0222***
GEO(3)	0.009820	0.014878	0.660027	0.5096
GEO(4)	0.946004	0.042009	22.51897	0.0000***
GEO(5)	-0.004645	0.009074	-0.511836	0.6090
[8]HFDI(1)	-0.000135	6.41E-05	-2.099400	0.0363***
HFDI(2)	4.87E-05	5.21E-05	0.934111	0.3507
HFDI(3)	2.29E-05	4.88E-05	0.468463	0.6397
HFDI(4)	8.13E-05	5.93E-05	1.371620	0.1709
HFDI(5)	-1.98E-05	4.04E-05	-0.489722	0.6246
[9]UFDI(1)	0.023416	0.007639	3.065476	0.0034***
UFDI(2)	0.187722	0.027196	6.902472	0.0000***
UFDI(3)	0.003829	0.002870	1.334104	0.1828
UFDI(4)	-0.002044	0.002712	-0.753645	0.4514

6 Downward Foreign Direct Investment
7 Geographical Dispersion
8 Horizontal Foreign Direct Investment
9 Upper stream Foreign Direct Investment

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UFDI(5)	-0.002537	0.001960	-1.294371	0.1962
[10]R&D(1)	0.023260	0.020545	1.132187	0.2581
R&D(2)	-0.280758	0.079391	-3.536375	0.0004***
R&D(3)	-0.243993	0.082017	-2.974915	0.0031***
R&D(4)	0.076062	0.019479	3.904750	0.0003***
R&D(5)	0.494646	0.099911	4.950883	0.0000***
R-squared	0.645376	Mean dependent var		1.995869
Adjusted R-squared	0.622249	S.D. dependent var		1.413317
S.E. of regression	0.868646	Sum squared resid		347.0910
Durbin-Watson stat	1.857514	J-statistic		19.17355
Instrument rank	32	Prob(J-statistic)		0.000012

*Robust standard errors,. *** p<0.01, ** p<0.05, * p<0.1. Cross-section weights instrument weighting matrix and convergence was achieved after 1 weight iterations. Cross-section weights (PCSE) standard errors & covariance (no d.f correction). Maximum lags of dependent and predetermined variables for use as instruments are limited to 1. Period fixed applied in the estimation.*

In the above Table 5.3, depicts a relationship between dependent variable growth and the time series of growth as expressed in the autoregressive disturbed lagged model. The results suggest that the time series of growth recorded a positive and statistically significant relationship with dependent variable growth in lag 1. Sixty seven percent of growth in the first lag is influenced by previous internal inward FDI in the automotive industry. However, coefficients for Growth (2), Growth (3), Growth (4) and Growth (5) are not statistically significant.

The variables labelled “Geo” in the table above represent the relationship between firm level growth and geographical location. In other words, this explanatory variable represents the use value chains of a domestic market of the investing MNE. Alternatively, this can be phrased as the procurement of factor inputs from another host market that MNEs have operations in. Evidence from Table 5.3 suggests that there are positive and statistically significant relationships in three lags. For instance, as observed in Geo (2), the coefficient indicates that 52% of firm level growth is influenced by procurement of raw materials in domestic markets of MNEs, or other host markets which are an alternative in the procurement process. This relationship recorded 0.02 probability value. Similar evidence is also recorded in Geo (4),

[10] Research and Development

which indicates that 94% of firm level growth is influenced by procurement of raw material either from domestic markets of the MNEs or subsidiary of the MNEs in close host markets. In Geo (1) empirical evidence indicates that the firm level growth is influenced by the procurement of resources from the domestic industry in South Africa. Nonetheless, given the evidence in Geo (2) and Geo (4) overwhelming evidence suggest that firm level growth in the automobile industry is influenced by procurement of goods and services from MNEs markets of origin.

When looking at Horizontal FDI, it is inversely related to dependent variable growth in lag 1. For instance, horizontal FDI negatively influences firm level Growth by 1% in HFDI (1) and the probability value is 0.03%. Evidence in this study is consistent with the literature analysis as, it suggests that inward FDI economic spillover effects are not significant in horizontal FDI. Similar evidence was observed in seminal studies of Castellani (2002) for Italian firms, and Barrios, Görg and Strobl (2001) for Spanish firms in the European Union market.

Furthermore, in Upper Stream FDI, coefficients for UFDI (1) and UFDI (2) imply that changes in distribution network in the automotive industry positively influences firm level growth. For instance, in UFDI (1), the coefficient indicates that 0.02% of changes in the distribution network influence firm level growth in MNEs in the automotive industry. And, similar evidence is observed in UFDI (2), as noted. Here, 19% of changes in the distribution network influence changes in firm level growth, with probability value of this relationship being 0.00%. These results suggest that MNEs in the automotive industry use domestic firms to enhance firm level growth in Upper Streams of business networks, such as distribution. This is consistent with empirical evidence in Castellani and Lavoratori (2022) and Castellani, Perri and Scalera (2022). These studies suggests that MNEs invest in Upper Stream FDI for firm level adjustment in host markets.

However, results for the relationship between Research and Development and firm level growth indicates that MNEs in the automotive industry innovate the services and goods particular to each and every domestic market. In the early stages of investment MNEs research and development is inverse to firm level growth while the innovation process seemingly improves upon the time series of the MNEs investment. For instance, coefficients in R & D (2) and R & D (3) reveal that changes in research and development are inversely related to firm level growth. Specifically, In lag 2, the coefficient suggests that 24% of changes in research development negatively influence changes in firm level growth and the probability value is 0.00%. However, n R & D (1), the regression coefficient is 28% and suggests a positive relationship, with a probability value of 0.00%. This positive relationship is re-established again in R& D (4) and R & D (5). In R & D (4), 7% of changes in research and

development budget influences firm level growth, and the probability value is 0.00%. Similar evidence is recorded in lag 5, where 49% of changes in the research and development budget influence changes in the growth of the firm. The probability value is 0.00%. Therefore, the results suggest that some MNEs use the internal research and development budgets to innovate goods and services that are market specific. Or, alternatively, MNEs use the standard goods and services to serve the South African market. The model is well-fitted, with R-squared and relative R-squared of 64% and 62% respectively. The Durbin-Watson statistic does not indicate any problems of multicollinearity.

5.4 RESULTS OF THE VECTOR ERROR CORRECTION: SHORT RUN CAUSALITY

As outlined in the research methodology chapter (section 4.6.2), the Vector Error Correction Model (VECM) was adopted in order to test the short-run and long-run economic spillover effects of inward FDI in South Africa's automotive industry. Thus, the following discussion is informed by empirical evidence concluded from the VECM. Table 5.4 below depicts the results of the VECM cointegrating model.

Table 5.4: Vector Error Correction Model Estimates

	GROWTH	[11]DFDI(-1)	[12]GEO(-1)	[13]HFDI(-1)	[14]R_D(-1)	[15]UFDI(-1)
Lag 1	1.000	-0.057469 (0.01057)** [-5.43821]	-.001853 (0.01679)** [0.11041]	0.041669 (0.00713) [5.84502]	-.156711 (0.03497)** [-.48127]	-3.92E-0 (0.00011)*** [-.35110]
Differenced	-0.146242 0.03037)*** [-4.81594]	0.589423 (0.44363) [1.32862]	-0.005673 (0.10128)* [-0.05601]	33.89086 (15.4565) [.19266]	0.245217 (0.16679) [.47018]	-2.208194 (0.51368) [-4.29878]
Differenced in lag 1	-0.060040 0.04947)** [-1.21361]	0.497380 (0.72276) [0.68817]	-0.127185 (0.16500) [-0.77081]	-5.44279 (25.1813) [-.40750]	0.036812 (0.16120) [.22836]	1.194118 (0.83687) [1.42688]
Differenced in lag 2	-.019456 (0.04781)** [-0.40691]	0.647609 (0.69852) [0.92711]	-0.092363 (0.15947) [-0.57918]	-9.03525 (24.3371) [-.78215]	0.230236 (0.10238) [.24884]	0.515977 (0.80882) [0.63794]

*Estimated coefficients on the first line, standard errors in parenthesis (); and t-statistics in brackets [].The results are computed separately for each equation using the appropriate residuals*** p<0.01, ** p<0.05, * p<0.1 {Emphasis are placed on *** p<0.01, ** p<0.05}*

[11] Downward Foreign Direct Investment
[12] Geographical Dispersion
[13] Horizontal Foreign Direct Investment
[14] Research and Development
[15] Upper stream Foreign Direct Investment

Results depicted in table 5.4 depict the cointegrating equation of the VECM, with firm level growth as the dependent variable. From Table 5.4 it can be seen that he dependent variable (Growth) is statistically significant at various levels: Differenced, differenced in lag 1, and differenced in lag 2. In differenced form, the coefficient reveals that 14% of changes in the explanatory variable has a causal effect on the firm level growth. This relationship is statistically significant at 0.03%.

Differenced in lag 1, the coefficient implies that 0.06% changes in explanatory variables have a casual impact of firm growth. This relationship is statistically significant at 0.04 probability values. Differenced in lag 2, evidence suggests that -0.05% changes in in dependent variable growth and the relationship is statistically significant at 0.04%. In particular, these results suggests that there is a causal impact of changes in explanatory variables on dependent variable firm level growth.

The findings above are consistent with literature reviewed in Chapter Three, which found that MNEs invest in host markets to sustain growth imperatives that are realised in strategic decisions such as procurement and innovation (Castellani 2002). Further to that, evidence in Table 5.4 suggests that downward FDI (DFDI) is statistically significant in lag 1. The coefficient indicates that that 0.001% of changes in DFDI has causal impact on firm level growth. This relationship is statistically significant at 0.01%. Thus, evidence in this study is consistent with literature in chapter three. Literature analysis suggests that the manufacturing sector is reported to be largest recipient of inward FDI in South Africa and is the largest employer as compared to other sectors, its capital investment amounted to R227 billion. Amongst the industries in the manufacturing sector, the automotive industry is the largest recipient of inward FDI with investment to the value of R102 billion followed by metals and renewable energy.

Furthermore, results for geographical dispersion suggest a causal relationship in lag 1 and differenced level. For instance, in lag 1, 0.01% of changes in geographical dispersion have a causal impact on firm level growth. Similar results are recorded in differenced level. The coefficient of -0.005% implies that less than one percent of changes in procurement of raw material from a host domestic market and or a close subsidiary has a causal impact on firm level growth. This relationship has a probability value of 0.00%. This is consistent with literature analysis which suggests that MNEs use their domestic value chain streams for firm level adjustment (Sibindi 2019). Thus, evidence suggests that MNEs in South Africa's automotive industry use their domestic value chain streams to enhance firm level competitiveness.

Results in Table 5.4 further indicate that Research and Development have a statistically significant coefficient in lag 1. From the results, it can be seen investment in Research and Development is statistically significant in lag 1, the error correction coefficient is 15% and the probability value is 0.03%. In Upper Stream FDI (UFDI), evidence suggests that more 0.0003% of distribution of goods and services in South Africa host market has a causal impact in lag 1. The probability value of this causal relationship is 0.001%.

Results thus suggest that investing MNEs in the automobile sector of South Africa results in more Upper Stream supply chain procurement than they do in downward FDI. This informed by two streams of knowledge. First, given the nature of service in Upper Stream FDI, it is difficult to use value chains from outside South Africa to provide service in the distribution network. Second, given the nature and knowledge endowment of Upper Stream FDI it is easier to create or form a strategic alliance in the process of distributing services and goods in the automotive industry (Sibindi 2019).

Table 5.5 below, demonstrates the short-run causality of the dependent variable on downward FDI.

Table 5.5: Short Run Causality Estimates

Error Correction:	(GROWTH)	[16](DFDI)	[17](GEO)	[18](HFDI)	[19](R_D)	[20](UFDI)
D(DFDI(-1))	-0.007441	0.001090	-0.349228	1.392644	-0.082748	-0.103022
	(0.00373)***	(0.01243)	(0.05447)*	(1.89760)	(0.05315)*	(0.06306)*
	[-1.99598]	[0.08768]	[-6.41196]	[0.73390]	[-1.55701]	[-1.63360]
D(DFDI(-2))	0.016279	0.018239	-0.007637	-0.174599	0.020015	-0.007619
	(0.06154)	(0.01257)	(0.01213)**	(1.85162)	(0.01226)	(0.00364)***
	[0.26454]	[1.45109]	[-0.62943]	[-0.09430]	[1.63196]	[-2.09442]

*Estimated coefficients on the first line, standard errors in parenthesis ( ); and t-statistics in brackets [ ].The results are computed separately for each equation using the appropriate residuals*** p<0.01, ** p<0.05, * p<0.1*
*{Emphasis are placed on *** p<0.01, ** p<0.05}*

Results from Table 5.5 above suggest that the growth of the firm has a statistically significant, causal relationship with the dependent variable downward FDI (at differentiated in lag 1 level). Similar evidence is observed in the relationship between downward FDI and procurement of materials in other host markets. For instance, coefficients for GEO indicate that, at lag 1, 34%

[16] Downward Foreign Direct Investment
[17] Geographical Dispersion
[18] Horizontal Foreign Direct Investment
[19] Research and Development
[20] Upper stream Foreign Direct Investment

of changes in downward FDI is influenced by imports of goods and services into the automotive industry. Also, at lag 2, the coefficient for GEO suggests that 0.007% of goods procured in other markets influence downward FDI in the automotive industry.

For the causal relationship between Downward FDI and Research and Development the coefficient for R_D at lag 1 indicates that 0.08% of Research and Development influences the procurement of services from South African suppliers in the automotive industry. The confidence level of this relationship is 0.95%. It can also be seen that Upper Stream FDI (UFDI) has a statistically significant relationship with Downstream FDI. For instance, in lag 1, 10% of changes on Upper Stream FDI have a causal impact in downstream FDI. The probability value of this relationship is 0.00%.

From the results presented here, two observations are noticeable. First, results show a causal relationship between the import of factor inputs and firm level growth in the automotive industry of South Africa. Thus, this evidence suggests that MNEs in the automotive industry rely on their domestic value chain streams to enhance their firm level objectives. Similar evidence is observed in the Geographical Dispersion. These results are consistent with literature analysis, which found that inward FDI spillover effects are influenced by the presence value chain streams that enable both absorptive capacities in domestic firms, and firm level competitiveness (Akinleye and Dadepo 2019, Javorcik 2004 and Blalock and Gertler 2005). However, in the absence of value chains that support MNEs, MNEs might use value chains from their domestic markets or markets that are close to a particular host to enhance their efficiencies.

In Table 5.6 below, the focus now turns to investigating the short run causality of geographic dispersion on the dependent variable.

Table 5.6: Short Run Causality Estimates on Geographical Dispersion

Error Correction:	(GROWTH)	[21](DFDI)	[22](GEO)	[23](HFDI)	[24](R_D)	[25](UFDI)
D(GEO(-1))	0.011188	0.165505	-0.010890	0.204855	0.020110	0.112776
	(0.01544)	(0.22563)	(0.05151)**	(7.86104)	(0.05207)	(0.26125)
	[0.72440]	[0.73353]	[-0.21142]	[0.02606]	[0.38621]	[0.43168]
D(GEO(-2))	-0.006034	0.040551	-0.032842	-4.670370	-0.074613	-0.301918
	(0.01540)**	(0.22505)	(0.05138)*	(7.84076)	(0.05194)*	(0.26058)
	[-0.39169]	[0.18019]	[-0.63923]	[-0.59565]	[-1.43666]	[-1.15864]

Estimated coefficients on the first line, standard errors in parenthesis ( ); and t-statistics in brackets [ ].
The results are computed separately for each equation using the appropriate residuals
**** p<0.01, ** p<0.05, * p<0.1 {Emphasis are placed on *** p<0.01, ** p<0.05}*

From the results above it can be seen that Geographical Dispersion has a causal impact against its time series (specifically at differentiated in lags 1 and 2 level). Differentiated in lag 1, coefficients indicate that 0.01% of the time series of geographical dispersion and the dependent variable geographical dispersion have a causal relationship that is statistically significant at 0.05% probability value. In addition, in differentiated in lag 2, evidence suggest that the time series of the dependent variables has 0.03% causal impact and statistically significant probability value of 0.05%.

For Growth at D(GEO(-2)), coefficients show that 0.006% of changes have a causal impact on geographical dispersion, the statistical significance of this relationship is 0.01%. Evidence in Research and Development suggests that there is causal impact in differentiated in lag 2, as observed in differentiated in lag 2, 0.07% of changes in research and development influence changes in the dependent variable.

Thus, the results from this analysis suggest that MNEs in South Africa's automotive industry rely on their domestic value chain streams to enable firm level adjustment to inward FDI in host markets (Sibindi 2019). Furthermore, empirical evidence suggests that there is a significant increase in research and development budgets in MNEs upon entry into host markets. This evidence is consistent with seminal literature that suggest that innovation is the key driver of the internationalization process (Sibindi, 2019).

[21] Downward Foreign Direct Investment
[22] Geographical Dispersion
[23] Horizontal Foreign Direct Investment
[24] Research and Development
[25] Upper stream Foreign Direct Investment

Table 5.7 below, illustrates results of the dependent variable Horizontal FDI.

Table 5.7: Short Run Causality Estimate of Horizontal FDI

Error Correction:	(GROWTH)	(DFDI)	(GEO)	(HFDI)	(R_D)	(UFDI)
D(HFDI(-1))	-8.60E-05	-0.001695	-6.36E-05	0.008627	-5.74E-05	-0.000224
	(9.6E-05)	(0.00140)***	(0.00032)***	(0.04870)	(0.00032)***	(0.00162)***
	[-0.89859]	[-1.21265]	[-0.19930]	[0.17715]	[-0.17785]	[-0.13827]
D(HFDI(-2))	-4.81E-05	0.000637	-0.000113	-0.003995	4.56E-06	-0.000880
	(9.6E-05)	(0.00140)	(0.00032)	(0.04869)***	(0.00032)	(0.00162)***
	[-0.50310]	[0.45560]	[-0.35276]	[-0.08204]	[0.01414]	[-0.54379]

Estimated coefficients on the first line, standard errors in parenthesis (); and t-statistics in brackets [].
The results are computed separately for each equation using the appropriate residuals
**** p<0.01, ** p<0.05, * p<0.1 {Emphasis are placed on *** p<0.01, ** p<0.05}*

In the Table 5.7, illustrated above, evidence suggests that Downward FDI has causative effect on horizontal FDI in differentiated in lag 1. It can be seen above in DFDI that more than 0.001% of changes in downward FDI influence horizontal FDI. This relationship has 0.00% probability value. Furthermore, evidence in the nexus between Geographical Dispersion and Horizontal FDI seemingly suggests that 0.00% of changes in Geographical Dispersion have a causal impact on Horizontal FDI in differentiated in lag 1.

For HFDI in the table above, at the second lag of D(HFDI), coefficients show that 0.003% of changes in the time series influence changes in the dependent variable, Horizontal FDI. The relationship has 0.04% probability value.

Results furthermore show that the relationship between Upper Stream FDI and Horizontal FDI is causative and statistically significant in differentiated in lags 1 and 2. For instance, in differentiated in lag 1, 0.000% changes in Upper Stream FDI has a causative influence on the dependent variable. The probability value of this relationship is 0.00%. Similar evidence is recorded in differentiated in lag 2, as noted, evidence suggest that 0.000% of changes in Upper Stream FDI influence changes in the dependent variable with a confidence interval of 100%.

For instance, evidence in this section is consistent with the results in other sections as it suggests that the MNEs in the automotive sector rely heavy on their value chains for firm level adjustment. Thus, this firm level behavior reduces the impact of economic and knowledge spillover effect in host markets (Sibindi 2019).

Table 5.8 below illustrates results of the dependent variable, Research and Development

Table 5.8: Research and Development.

Error Correction:	(GROWTH)	[26](DFDI)	[27](GEO)	[28](HFDI)	[29](R_D)	[30](UFDI)
D(R_D(-1))	0.000101	0.153514	0.048856	5.615815	-0.222748	-0.413530
	(0.01449)	(0.21173)	(0.04834)	(7.37684)	(0.04886)**	(0.24516)
	[0.00700]	[0.72504]	[1.01073]	[0.76128]	[-4.55870]	[-1.68677]
D(R_D(-2))	-0.017247	0.009996	0.001376	1.660383	-0.219375	-0.246129
	(0.01426)**	(0.20838)	(0.04757)	(7.25995)	(0.04809)**	(0.24128)
	[-1.20923]	[0.04797]	[0.02892]	[0.22870]	[-4.56196]	[-1.02012]

*Estimated coefficients on the first line, standard errors in parenthesis (); and t-statistics in brackets [].The results are computed separately for each equation using the appropriate residuals*** p<0.01, ** p<0.05, * p<0.1 {Emphasis are placed on *** p<0.01, ** p<0.05}*

In the context of results in Table 5.8 above, empirical evidence indicates that, differentiated in lag 1, Growth has a causative impact on Research and Development. The coefficient shows that 0.017% changes in the size of the firm cause the investment in Research and Development.

Furthermore, it can be seen that 0.22% of changes in the time series of Research and Development influence the dependent variable research and development at a confidence level of 97%. Similar evidence is noted in differentiated in lag 2, where coefficients confirm that 22% of changes in the time series of the dependent variables have a causal impact on the dependent variable.

In light of results above, empirical evidence suggests that there is a steady increase of the Research and Development budget for MNEs in post host market entry. Therefore, this evidence is consistent with Lin and Cheung (2004). These authors used provincial data over the period 1995 to 2000 examine FDI spillover on innovation in China. The results found that a FDI has a positive FDI spillover effect on patents of domestic firms.

Table 5.9 depicts the results of the dependent variable Upper Stream FDI.

[26] Downward Foreign Direct Investment
[27] Geographical Dispersion.
[28] Horizontal Foreign Direct Investment
[29] Research and Development
[30] Upper stream Foreign Direct Investment

Table 5.9: Short-run Causality of Dependent Variable Upper Stream FDI

Error Correction:	D(GROWTH)	D(DFDI)	D(GEO)	D(HFDI)	D(R_D)	D(UFDI)
D(UFDI(-1))	-0.002228	0.111527	-0.002981	-0.863430	-0.028292	0.027136
	(0.00318)***	(0.04640)	(0.01059)**	(1.61658)	(0.01071)**	(0.05373)
	[-0.70142]	[2.40364]	[-0.28143]	[-0.53411]	[-2.64221]	[0.50509]
D(UFDI(-2))	0.003355	0.034590	0.005425	0.223005	-0.009407	0.009978
	(0.00319)	(0.04664)	(0.01065)	(1.62512)	(0.01076)**	(0.05401)
	[1.05095]	[0.74156]	[0.50943]	[0.13722]	[-0.87394]	[0.18475]

Estimated coefficients on the first line, standard errors in parenthesis (); and t-statistics in brackets [].
The results are computed separately for each equation using the appropriate residuals
**** p<0.01, ** p<0.05, * p<0.1 {Emphasis are placed on *** p<0.01, ** p<0.05}*

Following results in Table 5.9 above, evidence suggests that growth of the firm has causative impact on the procurement of goods and services in Upper Stream FDI. The speed of the spillover impact is 0.002 with a confidence interval of 100%. In Geographical Dispersion, evidence suggests that in differentiated in lag 1, 0.002% of changes cause an economic spillover effect in Upper Stream FDI. This relationship has a probability value of 0.01%.

For Research and Development (D_R_D), the coefficient shows that suggests that 0.02% of changes have a causative impact on upper-stream FDI in differentiated in lag 1. Similar evidence is recorded in differentiated in lag 2. In this instance, the coefficient shows that 0.009% of changes in the Research and Development budget influence changes in upper-stream FDI. In this section, results suggests that MNEs invest in Research and Development upon entry in South Africa's automotive industry. Thus, MNEs commit to developing knowledge about goods and services that are specific to the South African market. This includes research on competitive dynamics in the markets such as customer preference, business process and strategic alliances in the Upper Stream FDI (Sibindi 2019).

5.5 LONG-RUN ERROR CORRECTION ESTIMATES

Following the discussion in Chapter Four (section 4.6.2), the Vector Error Correction model was also adopted to test for long-run causal impact of the economic spillover effects of inward FDI in the automotive industry. In this instance, the Error Correction Terms (ECT) indicates how the time series adjusts to imbalance. In particular, Baltagi (2015) suggests that the interpretation of the error model indicates that error terms that have positive coefficients would revert through negative future patterns. Nonetheless, error correction terms with a negative coefficient would attain stability through positive reaction trends. This is the underlying assumption of the short-run deterministic and long-run spillover effects in the present study.

Thus, Table 5.10 below illustrates the Error Correction Terms long-run deterministic trend for dependent variable growth.

Table 5.10: Error Correction Terms Long-Run Deterministic Trend Estimates

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.146242	0.030366	-4.815939	0.0000***
C(2)	-0.060040	0.049472	-1.213613	0.2255
C(3)	-0.019456	0.047813	-0.406912	0.6843
C(4)	-0.007441	0.003728	-1.995979	0.0465
C(5)	-0.007619	0.003638	-2.094422	0.0367**
C(6)	0.011188	0.015444	0.724398	0.4692
C(7)	-0.006034	0.015404	-0.391692	0.6955
C(8)	-8.60E-05	9.57E-05	-0.898588	0.3693
C(9)	-4.81E-05	9.57E-05	-0.503098	0.6151
C(10)	0.000101	0.014493	0.006999	0.9944
C(11)	-0.017247	0.014263	-1.209226	0.2272
C(12)	-0.002228	0.003176	-0.701416	0.4834
C(13)	0.003355	0.003193	1.050948	0.2938
C(14)	0.004260	0.039667	0.107403	0.9145
R-squared	0.081766	Mean dependent var		0.004629
Adjusted R-squared	0.056845	S.D. dependent var		0.906719
S.E. of regression	0.880571	Akaike info criterion		2.611495
Sum squared resid	371.4193	Schwarz criterion		2.730779
Log likelihood	-629.7334	Hannan-Quinn criter.		2.658330
F-statistic	3.281023	Durbin-Watson stat		2.025577

*Robust standard errors,. *** p<0.01, ** p<0.05, * p<0.1. Cross-section weights instrument weighting matrix and convergence was achieved after 1 weight iterations. Cross-section weights (PCSE) standard errors & covariance (no d.f correction). Maximum lags of dependent and predetermined variables for use as instruments are limited to 1. Period fixed applied in the estimation.*

As presented in Table 5.10, results from the VECM model indicates that the error correction estimate in C1 is negative (-0.14) and has a confidence interval of 100%. This evidence suggests a threefold interpretation. First, the coefficient indicates that there is a causal economic spillover effects flowing from the explanatory variables (Research and Development, Horizontal FDI, Downstream FDI, Upper Stream FDI and Geographical Dispersion) to dependent variable firm level growth. Second, there is a long-run relationship between the dependent variable (firm level growth) and explanatory variables (Research and

Development, Horizontal FDI, Downstream FDI, Upper Stream FDI and Geographical Dispersion). In particular, the coefficient shows that the speed of economic spillover effects is 14% at a probability value of 0.00%. Third, the results suggest evidence of short-run causality of economic spillover effects.

Thus, in light of these results, the evidence is consistent with literature reviewed in Chapter Three which suggests that inward FDI spillover effects can be effective in both short and long run effects (Buckley et al, 2010). For instance, in the literature review evidence from a series of studies suggest an economic spillover effect seemingly value in the context of value chains involved in the production process (Sibindi 2019).

Table 5.11 illustrates the Vector Error Correction Terms long run deterministic trend for dependent variable downstream FDI.

Table 5.11: Vector Error Correction Terms Long Run Deterministic Trend (DFDI)

	Coefficient	Std. Error	t-Statistic	Prob.
C(15)	0.589423	0.443634	1.328625	0.1846
C(16)	0.497380	0.722755	0.688172	0.4917
C(17)	0.647609	0.698524	0.927110	0.3543
C(18)	-0.005673	0.101280	-0.056010	0.9554
C(19)	-0.082748	0.053145	-1.557012	0.1201
C(20)	0.165505	0.225628	0.733533	0.4636
C(21)	0.040551	0.225046	0.180191	0.8571
C(22)	-0.001695	0.001398	-1.212646	0.2259
C(23)	0.000637	0.001398	0.455596	0.6489
C(24)	0.153514	0.211730	0.725045	0.4688
C(25)	0.009996	0.208375	0.047972	0.9618
C(26)	0.111527	0.046399	2.403644	0.0166
C(27)	0.034590	0.046644	0.741560	0.4587
C(28)	-0.065575	0.579514	-0.113155	0.9100
R-squared	0.105271	Mean dependent var		-0.063906
Adjusted R-squared	0.080988	S.D. dependent var		13.41956
S.E. of regression	12.86467	Akaike info criterion		7.974834
Sum squared resid	79274.41	Schwarz criterion		8.094118
Log likelihood	-1951.797	Hannan-Quinn criter.		8.021669
F-statistic	4.335188	Durbin-Watson stat		2.008664
Prob(F-statistic)	0.000001			

*Robust standard errors,. *** p<0.01, ** p<0.05, * p<0.1. Cross-section weights instrument weighting matrix and convergence was achieved after 1 weight iterations. Cross-section weights (PCSE) standard errors & covariance (no d.f correction). Maximum lags of dependent and predetermined variables for use as instruments are limited to 1. Period fixed applied in the estimation.*

In Table 5.11 above, evidence from the VECM model indicates that the error correction estimate in C15 is positive (0.58) and a probability value of 18%. This evidence suggests a twofold interpretation. First, that there is no economic spillover effects flowing from the explanatory variables to Downward FDI. Second, that there is no long-run relationship between the dependent variable (Downstream FDI) and explanatory variables (Research and Development, Horizontal FDI, Growth, Upper Stream FDI and Geographical Dispersion.)

This would suggest that MNEs in South Africa use global value chain streams to enable firm level adjustment in the South African market. Blalock and Gertler (2005)

suggested that MNEs exclude local firms from taking part in value addition during preproduction and postproduction activities. This could be due to the fact that MNEs regard those activities as important competency and main source of profit. Table 5.12 below illustrates the Vector Error Correction Term's long run deterministic trend for the dependent variable, Geographical dispersion.

Table 5.12: Vector Error Correction Terms Long Run Deterministic Trend (Geographical Dispersion)

	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
C(29)	-0.349228	0.054465	-6.411959	0.0000***
C(30)	-0.127185	0.165003	-0.770806	0.4412
C(31)	-0.092363	0.159471	-0.579184	0.5627
C(32)	0.001090	0.012434	0.087682	0.9302
C(33)	-0.007637	0.012133	-0.629432	0.5294
C(34)	-0.010890	0.051510	-0.211420	0.8326
C(35)	-0.032842	0.051377	-0.639230	0.5230
C(36)	-6.36E-05	0.000319	-0.199301	0.8421
C(37)	-0.000113	0.000319	-0.352756	0.7244
C(38)	0.048856	0.048337	1.010728	0.3127
C(39)	0.001376	0.047572	0.028924	0.9769
C(40)	-0.002981	0.010593	-0.281434	0.7785
C(41)	0.005425	0.010649	0.509430	0.6107
C(42)	-0.015012	0.132302	-0.113471	0.9097
R-squared	0.007150	Mean dependent var		-0.015163
Adjusted R-squared	-0.019796	S.D. dependent var		2.908328
S.E. of regression	2.936973	Akaike info criterion		5.020623
Sum squared resid	4131.764	Schwarz criterion		5.139907
Log likelihood	-1223.584	Hannan-Quinn criter.		5.067458
F-statistic	0.265343	Durbin-Watson stat		1.999141
Prob(F-statistic)	0.995594			

*Robust standard errors,. *** p<0.01, ** p<0.05, * p<0.1. Cross-section weights instrument weighting matrix and convergence was achieved after 1 weight iterations. Cross-section weights (PCSE) standard errors & covariance (no d.f correction). Maximum lags of dependent and predetermined variables for use as instruments are limited to 1. Period fixed applied in the estimation.*

Following results in Table 5.12 above, the coefficient C29 is negative (-0.34) and has a probability value of 0.00%. This suggests that 34% of input factors from MNE's domestics markets cause economic spillover effects in the automotive industry of South Africa. Thus, in light of the evidence above three interpretations are suggested. For instance, results suggest that there is evidence of an economic spillover effect flowing from the explanatory variables to Geographical Dispersion. Second, the result suggests that there is a long-run relationship between the dependent variable (Geographical Dispersion) and explanatory variables (Research and Development, Horizontal FDI, Growth, Upper Stream FDI and Downstream FDI.)

Thus, the results suggest that MNEs in the automotive industry rely on foreign value chain streams to outsource factor inputs. This reduces the impact of the economic spillover effects, as spillover conduits are only limited to the Upper Stream business network.

Table 5.13 below, depicts the Vector Error Correction Terms long run deterministic trend for dependent variable Horizontal FDI.

Table 5.13: Vector Error Correction Terms Long Run Deterministic Trend (Horizontal FDI)

	Coefficient	Std. Error	t-Statistic	Prob.
C(43)	33.89086	15.45653	2.192656	0.0288
C(44)	-35.44279	25.18135	-1.407502	0.1599
C(45)	-19.03525	24.33713	-0.782149	0.4345
C(46)	1.392644	1.897604	0.733896	0.4634
C(47)	-0.174599	1.851617	-0.094296	0.9249
C(48)	0.204855	7.861038	0.026059	0.9792
C(49)	-4.670370	7.840759	-0.595653	0.5517
C(50)	0.008627	0.048700	0.177150	0.8595
C(51)	-0.003995	0.048693	-0.082037	0.9347
C(52)	5.615815	7.376840	0.761276	0.4469
C(53)	1.660383	7.259952	0.228704	0.8192
C(54)	-0.863430	1.616584	-0.534108	0.5935
C(55)	0.223005	1.625122	0.137224	0.8909
C(56)	0.065409	20.19072	0.003240	0.9974
R-squared	0.012380	Mean dependent var		-0.032693
Adjusted R-squared	-0.014423	S.D. dependent var		445.0173
S.E. of regression	448.2151	Akaike info criterion		15.07641
Sum squared resid	96229552	Schwarz criterion		15.19569
Log likelihood	-3702.335	Hannan-Quinn criter.		15.12325
F-statistic	0.461892	Durbin-Watson stat		2.002574
Prob(F-statistic)	0.944850			

*Robust standard errors,. *** p<0.01, ** p<0.05, * p<0.1. Cross-section weights instrument weighting matrix and convergence was achieved after 1 weight iterations. Cross-section weights (PCSE) standard errors & covariance (no d.f correction). Maximum lags of dependent and predetermined variables for use as instruments are limited to 1. Period fixed applied in the estimation.*

From the results in Table 5.13 above, the Error Correction estimate in C43 is positive (33.89) and has a probability value of 0.02%. This means that there is no economic spillover effect flowing from Inward FDI in South Africa's automotive industry to Horizontal FDI. Furthermore, there are no short-run causal effects observed in this series. The findings above, demonstrate that there isno long-run economic spillover effects in Horizontal FDI. Contemporary evidence is consistent with Wang et al (2016). For instance, these authors examined the role of region-specific aspects on FDI spillover effects in China. Similarly, the study found that horizontal FDI

was not statistically significant in short-run and long-run economic spillover effect. Table 5.14 underneath illustrates the Vector Error Correction Terms long-run deterministic trend for dependent variable Research and Development.

Table 5.14: Vector Error Correction Terms Long-Run Deterministic Trend (Research and Development)

	Coefficient	**Std. Error**	**t-Statistic**	**Prob.**
C(57)	0.230236	0.102380	2.248838	0.0250
C(58)	0.245217	0.166794	1.470175	0.1422
C(59)	0.036812	0.161202	0.228356	0.8195
C(60)	0.018239	0.012569	1.451095	0.1474
C(61)	0.020015	0.012265	1.631961	0.1033
C(62)	0.020110	0.052069	0.386215	0.6995
C(63)	-0.074613	0.051935	-1.436665	0.1515
C(64)	-5.74E-05	0.000323	-0.177853	0.8589
C(65)	4.56E-06	0.000323	0.014143	0.9887
C(66)	-0.222748	0.048862	-4.558701	0.0000***
C(67)	-0.219375	0.048088	-4.561962	0.0000***
C(68)	-0.028292	0.010708	-2.642207	0.0085***
C(69)	-0.009407	0.010764	-0.873942	0.3826
C(70)	-0.000529	0.133738	-0.003953	0.9968
R-squared	0.107648	Mean dependent var		0.005312
Adjusted R-squared	0.083429	S.D. dependent var		3.101027
S.E. of regression	2.968852	Akaike info criterion		5.042214
Sum squared resid	4221.945	Schwarz criterion		5.161498
Log likelihood	-1228.906	Hannan-Quinn criter.		5.089049
F-statistic	4.444880	Durbin-Watson stat		1.994550
Prob(F-statistic)	0.000000			

*Robust standard errors,. *** p<0.01, ** p<0.05, * p<0.1. Cross-section weights instrument weighting matrix and convergence was achieved after 1 weight iterations. Cross-section weights (PCSE) standard errors & covariance (no d.f correction). Maximum lags of dependent and predetermined variables for use as instruments are limited to 1. Period fixed applied in the estimation.*

The results above demonstrate that the Error Correction estimate in C57 is positive (0.23) and a probability value of 0.02%. This suggests that there is no long-run economic spillover effect in the series. Nonetheless, evidence of short-run spillover speed is recorded in C66 (-.22), 0.00% p-value, C 67 (-0.21), 0.00 p-value and C 68 (-0.02), p-value 0.00%.

Thus, this study finds no long-run causal impact between Research and Development and explanatory variables. This contrasts a series of studies which assert that Research and Development has a long-run causal impact on the economic spillover effects (Asafo-Agyei 2020; Kleynhans 2016; Silajdžić and Mehic 2015). In particular, these studies suggests that, through the Research and Development function, MNEs enable a long-term economic spillover effect in host markets.

Table 5.15 below, illustrates the Vector Error Correction Terms long-run deterministic trend for dependent variable Upper Stream FDI.

Table 5.15: Vector Error Correction Terms Long Run Deterministic Trend (Upper-Stream FDI)

	Coefficient	Std. Error	t-Statistic	Prob.
C(71)	-2.208194	0.513680	-4.298776	0.0000***
C(72)	1.194118	0.836872	1.426882	0.1543
C(73)	0.515977	0.808816	0.637941	0.5238
C(74)	-0.103022	0.063065	-1.633596	0.1030*
C(75)	0.016279	0.061536	0.264542	0.7915
C(76)	0.112776	0.261252	0.431676	0.6662
C(77)	-0.301918	0.260578	-1.158645	0.2472
C(78)	-0.000224	0.001618	-0.138275	0.8901
C(79)	-0.000880	0.001618	-0.543785	0.5868
C(80)	-0.413530	0.245161	-1.686773	0.0923*
C(81)	-0.246129	0.241276	-1.020115	0.3082
C(82)	0.027136	0.053725	0.505093	0.6137
C(83)	0.009978	0.054009	0.184748	0.8535
C(84)	-0.182912	0.671015	-0.272590	0.7853
R-squared	0.049571	Mean dependent var		-0.176533
Adjusted R-squared	0.023777	S.D. dependent var		15.07621
S.E. of regression	14.89590	Akaike info criterion		8.268036
Sum squared resid	106284.3	Schwarz criterion		8.387320
Log likelihood	-2024.071	Hannan-Quinn criter.		8.314871
F-statistic	1.921775	Durbin-Watson stat		2.005763
Prob(F-statistic)	0.025797			

*Robust standard errors,. *** p<0.01, ** p<0.05, * p<0.1. Cross-section weights instrument weighting matrix and convergence was achieved after 1 weight iterations. Cross-section weights (PCSE) standard errors & covariance (no d.f correction). Maximum lags of dependent and predetermined variables for use as instruments are limited to 1. Period fixed applied in the estimation.*

In the context of results in Table 5.15 above, evidence from the VECM model suggests that the Error Correction estimate in C71 is negative (-2.21) and has a probability value of 0.00%. This, shows that 221% of inward FDI has an economic spillover effect on Upper-Stream FDI. Three implications follow from this. For instance, results suggest that there is evidence of an

economic spillover effect flowing from the explanatory variables to Upper Stream business activity. Second, results suggest that there is a long-run relationship between the dependent variable (Upper-Stream FDI) and explanatory variables (Research and Development, Horizontal FDI, Geographical Dispersion and Downstream FDI.)

Following the results in Table 5.15 above, empirical evidence suggests that inward FDI in the automotive industry has a causal impact on the Upper Stream FDI. Similarly, evidence on South Africa MNEs suggests that, in developing economies' MNEs, economic spillover effects are significant in the Upper Stream of business networks, due to the fact that it is difficult for MNEs to rely on value chains from their domestic markets for distribution logistics (Sibindi 2019).

5.6 DISCUSSION ON FINDINGS

In this section, the study presents findings and discussions that flow from the initial research questions, objectives and the study hypothesis. For simple analysis, this discussion is presented in the context of the research questions that this particular evidence targets to answer.

5.6.1 Findings on the Role of Industry Value Chains in Economic Spillover Effects.

As outlined in previous chapters, evidence collected and analyzed in this study target an inclusive analysis of the role of value chains as conduits of economic spillover effects in local value chains in the automotive industry. Thus, in this synopsis we consider evidence from the calibrated Autoregressive Distributed Lagged General Methods of Moments and the Vector Error Correction model. Specific attention is paid to results obtained for Down Stream FDI, Upper Stream FDI and Research and Development variables, as well as Geographical Dispersion.

Table 5.16 below illustrates empirical evidence on the role of value chains in South African in the automotive industry by providing a summary table of the most pertinent findings from the results that have been presented in previous sections of this chapter.

Table 5.16: The Role of Value Chains in the Automotive Industry

Variables	Level of integration	Column 1	Column 2	Interpretation
Explanatory to Dependent Variable	**Lag**	**Regression Coefficient**	**Error Correction Term**	
UFDI	1	0.023416***	-3.92E-0***	Significant
UFDI	2	0.187722***	--2.208194	Significant
R & D	1	0.076062***	-.156711**	Significant
R & D	2	0.494646***	-0.005673*	Significant
DFDI	1	--0.000199	-0.057469**	Significant
Geo	3	0.527683**	-.001853**	Significant
Geo	4	0.946004***	-0.005673**	Significant

*Causality test, F-statistics, *** p<0.01, ** p<0.05, * p<0.1. Regression analysis, robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Cross-section weights instrument weighting matrix and convergence was achieved after 1 weight iterations. Cross-section weights (PCSE) standard errors & covariance (no d.f correction). Maximum lags of dependent and predetermined variables for use as instruments are limited to 1. Period fixed applied in the estimation.*

Results summarized in Table 5.16 above show that country level value chains in the distribution of goods and services provide a platform for the economic spillover effect from inward FDI in the automotive sector of South Africa. In other words, Upper Stream FDI provides a network for distribution of goods and services. In addition, it allows firms to make strategic alliances in supply chain that offer further Upper Stream business services in the automotive industry. As such, the Upper-Stream business network in South Africa's automotive industry seemingly provides a strategic position that enables the economic spillover effect. This is evidenced by statistically significant results of upper FDI in the regression coefficient in lags 1 (0.02341) and 2 and the error term coefficient of the VECM that suggest a 0.003% short run spillover effect from upper stream FDI to dependent variable firm level growth.

Further evidence suggests that there is a causative effect of Research and Development in the creation of value chains streams, and an economic spillover effect. This is deduced from the significance of Research and Development's estimation in the Error Correction term (lag 1, -.156711& lag 2, -0.005673) and a relative regression coefficient (lag 1, 0.076062& lag 2, 0.494646). Thus, evidence in this study is consistent with evidence reviewed in Chapter Three, namely that inward FDI spillover effects are influenced by the presence of value chain streams that enable both absorptive capacities in domestic firms and firm level competitiveness (Akinleye and Dadepo 2019; Blalock and Gertler 2005).

For instance, results from this study's analysis demonstrate that the presence of Downstream FDI, Upper Stream FDI, Horizontal and Vertical FDI act as conduits of inward FDI spillover effects. For instance, in Akinleye and Dadepo (2019), an argument is advanced that spillover effects are enabled by the demand for local supplies of production inputs, and supplier assistance offered by MNEs to their local supplier. MNEs may assist the suppliers (local firms) so that they have quality inputs for their production, in order to ensure they produce better quality final products. In so doing, the MNE's will gain high quality inputs for their production, while domestic firms might improve their productivity through improved competitiveness, since they are expected to supply high quality production inputs.

Nonetheless, evidence in this study suggests an inconsistent causative effect between MNE's firm level growth and Down Stream business in the automotive industry. While, in contrast, there is substantial evidence (evidenced by significance of the Error Correction Term of the Geographical Dispersion variable) that indicate that factor inputs are procured in the domestic market of the investing MNEs, or a subsidiary closer to the South African market.

These firm level behaviour can be caused by three reasons. First, the lack of supporting industries in South Africa's automotive industry makes it difficult for an investing firm to secure their factor inputs in the South African domestic market. Second, the pricing of factor inputs in the automotive industry is not competitive and makes it difficult for an investing firm to achieve firm level adjustment and competitiveness. Third, the patent rights and control in the automotive industry makes it impossible for MNEs to use South African Down Stream value chains (Anwar and Sun 2018; Huynh, Nguyen, Trieu and Tran 2021)

For instance, in the automotive industry, MNEs import raw materials from their own home countries, due to patents regulations of factor inputs and knowledge asymmetries that exist in the automotive industry. Thus, observed evidence in this study contrasts with Porter's diamond of competitive advantage theory (1990) and the Dunning's Eclectic Theory (2015).

Consistent with the literature review in Chapter Three, results here suggest that domestic suppliers are excluded from taking part in value addition during preproduction and postproduction activities. This could be due to the fact that MNEs regard those activities as important competencies and main source of profit. This is a substantial drawback in the economic spillover effect argument, since domestic firms need an opportunity as suppliers of MNEs, by being part of the value chain to improve their firm level competitiveness (Sibindi 2019). For instance, the present study argues that domestic firms are more productive when they are involved in relational value chains than captive value chains. Though these were discussed in detail in Chapter two, a brief recap of this dynamic is provided here below.

First, in strategic value chain decisions, there are complex relations between buyers and sellers. Geographical proximity, as well reputation and trust, provide the benefit of equilibrium in such systems (Blalock and Gertler, 2005). In Taglioni and Winkler, (2016), FDI serves as vehicle to connect developing countries to GVC as MNEs mostly trade in value added through intra-industry and inter-industry linkages. FDI spillover are amongst others are determined by the GVC integration and local sourcing.

Second, involvement in GVCs is another dimension that can affect the local sourcing decision through knowledge and economic spillover effects in host markets (Taglioni and Winkler, 2016). Considering the fact that inward FDI has been identified as the most common way to link developing countries to GVCs (Taglioni and Winkler, 2016), because multinational corporations are responsible directly (intra-firm) or indirectly (through contracts), for a large share of trade in value added (UNCTAD, 2013). A few studies highlight that integration in GVCs can affect FDI spillovers, including those connected to local sourcing (Paus and Gallagher, 2008; Farole and Winkler, 2014).

5.6.2 Findings on Short-Run Economic Spillover Effects

The following discussion further unpacks short-run economic spillover effects in the automotive industry of South Africa. This discussion is informed by integration of empirical and literature findings evidence, and, in this argument, the study considers evidence from the calibrated Autoregressive Distributed Lagged General Methods of Moments and the Vector Error Correction model. Thus, we consider evidence in the cointegrating equation of the VECM model.

Table 5.17 below illustrates empirical evidence of the short-run economic spillover effect of inward FDI in the automotive industry of South Africa.

Table 5.17: Short-Run Economic Spillover Effect of Inward FDI in the Automotive Industry of South Africa

Variables	Level of integration	Column 1	Interpretation
Explanatory to Dependent Variable	**Lag**	**Error Correction Term**	
Growth	1	1.000	Cointegrating Equation
Growth	Differentiated	-0.146242***	Short run causality
Growth	Differentiated in lag 1	-0.060040**	Short run causality
Growth	Differentiated in lag 2	-.019456	Short run causality
DFDI	1	-0.057469**	Short run causality
Geo	1	-.001853**	Short run causality
Research and Development	1	-.156711**	Short run causality
UFDI	1	-3.92E-0***	Short run causality

*The results are computed separately for each equation using the appropriate residuals*** p<0.01, ** p<0.05, * p<0.1 {Emphasis are placed on *** p<0.01, ** p<0.05}*

As observed, empirical evidence in Table 5.17 above suggests that the time series of firm level growth has a causative effect on short-run economic spillover impact. This is evidenced in lag1, differentiated, differentiated in lag1 and differentiated in lag 2 for the variable, Growth. Other variables, downstream FDI, Upper Stream FDI, also record a short run spillover effect. Therefore, evidence in this study suggests that aspects of firm heterogeneity are critical in transmitting knowledge and firm level efficiencies in the automotive industry of South Africa. For instance, in this study we find evidence that the size of a firm has a positive relationship with the capacity of a domestic firm to absorb FDI spillover effects and transmit knowledge and economic spillover effects in host economies.

The results from this analysis can be outlined along two lines. First, evidence suggests that larger firms can compete with foreign firms and have capacity to imitate technology brought by MNEs. Second, and likewise, larger firms are capable of innovating goods and services as well as internal processes to enhance firm level adjustments in host markets. Thus, these results are consistent with Aitken and Harrison (1999), who suggest that Small Medium MNEs in Venezuela are unlikely to transmit economic and technological spillover effects in domestic firms more than the large MNEs.

Furthermore, results show that firm level growth and the size of the firm has a causal effect on transmitting technological effects in the automotive industry of South Africa as evidenced

in the statistical significance of the error term that suggest that there is 15% economic spillover effect flowing from research and development to firm level growth. This is consistent with a series of studies reviewed in Chapters Two and Three. For instance, this argument suggests the prominence of firm level heterogeneity in technology spillover effect of inward FDI in host market. According to Paus and Gallagher (2008), further R&D and technology enhances knowledge and broader skills however, production of high-tech products can low-tech process which might offset this effect. Buckley et al (2010) established that higher technology intensity in Western-owned affiliates had a positive FDI spillover effect in China.

5.6.3 Findings on Long-run Economic Spillover Effects

In this section, the analysis is based on empirical evidence deduced from a series of econometric analysis and literature analysis in the literature review chapter. In particular, this evidence is drawn from the Vector Error Correction model long run deterministic trends.

Table 5.18 below summarizes the most pertinent findings from the results that have been presented in previous sections of this chapter.

Table 5.18: Long-Run Economic Spillover Effect of Inward FDI in the Automotive Industry of South Africa

Dependent Variable	Error Correction Term	Long run Causality	Interpretation
Growth	-0.146242***	Significant	Results of the study indicates that there is long run relationship when the dependent variable is firm level growth.
DFDI	0.589423	Insignificant	Results of the study indicates that there is no long run relationship when Downward FDI is treated as dependent variable.
Research and Development	0.230236	Insignificant	Results of the study indicates that there is no long run relationship when Research and Development is treated as dependent variable.
Geo	-0.349228***	Significant	Results of the study indicates that there is long run relationship when Geographical dispersion is treated as dependent variable.
UFDI	-2.208194***	Significant	Results of the study indicates that there is long run relationship when Upper Stream FDI is treated as dependent variable.
HFDI	33.89086	Insignificant	Results of the study indicates that there is no long run relationship when Horizontal FDI is treated as dependent variable.

*The results are computed separately for each equation using the appropriate residuals*** p<0.01, ** p<0.05, * p<0.1 {Emphasis are placed on *** p<0.01, ** p<0.05}*

Empirical evidence illustrated in the above Table 5.18 suggests that Growth, Geographical Dispersion and Upper Stream FDI have a long-run causality impact on economic spillover effects in the automotive industry of South Africa. Thus, consistent with results in this study, a series of studies find that firm level growth has a causative impact on long-run spillover effects. For instance, in the firm level argument, the size as measured in growth enables the investing

MNE to transmit knowledge and economic spillovers in the host market (Sibindi 2019; Orlic, Hashi and Hisarciklilar 2018, Pavlínek and Žížalová, 2016; Winkler 2013).

This argument is contained in the technological gap between foreign and domestic firms that has been identified as one the most important mediating factors for FDI spillovers (Kokko 1994; Kokko, Tansini, and Zejan 1996; Grünfeld 2006). Results from this study, in upper stream FDI suggests that 220% long run economic spillover effects when upper stream FDI is treated as a dependent variable. Thus, this evidence supports a series of studies that a large technology gap is beneficial for local firms since their catching-up potential increases (Findlay 1978; Wang and Blomström 1992). Furthermore, similar evidence is contained in Masron et al (2012) that the larger technological gap between MNEs and domestic firms tends to be associated with high potential for productivity and technology transfer.

5.7 CONCLUSION

In this chapter, data analysis, interpretation and discussion were presented. In particular, this chapter provided evidence of the scientific knowledge developed process that is informed by theoretical, empirical literature and research methodology as explained in Chapter Four. In particular, this study adopted a methodology that tests the short-run and long-run economic spillover effect using the Vector Error Correction Model. From the results, the present study posits that Research and Development, Downward FDI and Upper Stream FDI have causal impacts on the economic spillover effect. However, there is no evidence of Horizontal FDI as a causative effect of the economic spillover effect in the short run. In the long run causality impact, evidence in presence study seemingly suggests that the Upper Stream FDI and the Geographical Dispersion have a long-run causal impact in the economic spillover effect. Therefore, these results suggests that MNEs in the automotive industry rely on their domestic markets for procurement of factor inputs. And they rely on domestic firms for the distribution of their goods and products. In the next chapter, the study will present conclusions and recommendations that are drawn from the scientific knowledge process.

CHAPTER SIX
CONCLUSION AND RECOMMENDATIONS

INTRODUCTION

This chapter presents a summation of the study and the policy suggestions that arise from it. The chapter also points out relevant limitations and possible avenues for future research. In this chapter, it is important to reiterate that this study intended to establish the impact of economic spillover effects of inward FDI, with specific focus on the automotive industry of South Africa. Consistent with this objective, the study further investigated the short and long run economic spillover effects in the automotive industry of South Africa. I can argue, at this juncture, that this study in its own way has contributed to the expansion of literature and scholarship in the subject areas of international business, economics, and international trade.

6.1 SUMMARY OF MAIN FINDINGS AND POLICY IMPLICATIONS

In this section, a summary of findings is presented in sequential order. For simple analysis, each research objective is reviewed in the context of findings that are generated from econometric analysis. In addition, each research hypothesis is presented, and the findings are used to accept or reject the null hypothesis.

6.1.1 Research Objectives

Consistent with Chapter One, the main objective determines the nexus between inward FDI and economic spillover effects in the automotive industry in South Africa. This main objective was achieved through a thorough literature review (presented in Chapter 3), as well as an empirical analysis (the results of which were further elaborated upon in Chapter 5). In particular, the empirical analyses were conducted to test various hypotheses, which had been formulated at the outset of the study (refer to Chapter 1, section 1.5.5). These are reviewed and answered to here below. Broadly speaking, the following central hypotheses were proposed at the outset of this study:

- **Null Hypothesis**: There is no relationship between inward FDI and economic spillover effects in the automotive industry of South Africa.
- **Alternate Hypothesis:** There is a relationship between inward FDI and economic spillover effects in the automotive industry of South Africa.

Following the results, evidence suggests that in the GMM series the null hypothesis was rejected four times, in particular, in upper FDI, research and development and downward FDI

and geographical dispersion the null hypothesis was rejected at 0.00, 0.05 and 0.10 critical values. In short run causality, for instance, the null hypothesis was rejected five times, in growth, upper FDI, geographical dispersion and downward FDI at 0.00, 0.05 and 0.10 critical values. However, in long run causality the null hypothesis was rejected three times, for instance, in growth, research and development, geographical dispersion and upper FDI. In this instance, the null hypothesis was rejected at 0.00, 0.05 and 0.10 critical values. These results are further summarized below:

6.2 SUMMARY OF FINDINGS

In this section, the present study is informed by the research findings in Chapter Five, thus, in the interest of the reader, this section is arranged in line with the discussion in Chapter Five.

6.2.1 Findings on the Role of Industry Value Chains in Economic Spillover Effect.

In the view of results and findings in Chapter Five, empirical evidence collected and analyzed in this study targeted an inclusive analysis and conclusion on the role of value chains streams as a conduit of the spillover effects in the automotive industry of South Africa. In this instance, to prove the Null Hypothesis, the present study considers evidence from the standardized Autoregressive Distributed Lagged General Methods of Moments and the Vector Error Correction model. Therefore, the econometric evidence in the downstream FDI, upper stream FDI and Research and Development and Geographical Dispersion explanatory variables.

Table 6.1 below illustrates empirical evidence on the role of value chains in the South African automotive industry by providing a summary table of the most pertinent findings from the results that have been presented in previous sections of this chapter.

Table 6.1: Decision Rule on Industry Value Chains

Explanatory to Dependent Variable	Lag	Regression Coefficient	Decision Rule	Error Correction Term	Decision Rule
UFDI	1	0.023416***	Reject the Null Hypothesis.	-3.92E-0***	Reject the Null Hypothesis.
UFDI	2	0.187722***	Reject the Null Hypothesis.	--2.208194	Null hypothesis not rejected.
R & D	1	0.076062***	Reject the Null Hypothesis.	-.156711**	Reject the Null Hypothesis.
R & D	2	0.494646***	Reject the Null Hypothesis.	-0.005673*	Reject the Null Hypothesis.
DFDI	1	--0.000199	Null hypothesis not rejected.	-0.057469**	Reject the Null Hypothesis.
Geo	3	0.527683**	Reject the Null Hypothesis.	-.001853**	Reject the Null Hypothesis.
Geo	4	0.946004***	Reject the Null Hypothesis.	-0.005673**	Reject the Null Hypothesis.

*Causality test, F-statistics, *** p<0.01, ** p<0.05, * p<0.1. Regression analysis, robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Cross-section weights instrument weighting matrix and convergence was achieved after 1 weight iterations. Cross-section weights (PCSE) standard errors & covariance (no d.f correction). Maximum lags of dependent and predetermined variables for use as instruments are limited to 1. Period fixed applied in the estimation.*

Evidence presented above in Table 6.1 suggests that the country level value chain in the distribution of goods and services provides a platform for the economic spillover effect from inward FDI in the automotive industry of South Africa. Therefore, this evidence indicates that from the GMM estimation the null hypothesis was rejected six times. For instance, evidence suggests that the null hypothesis is rejected in the relationship between upper stream FDI and dependent variable growth in lag 1 and lag 2. In the relationship between research and development, the null hypothesis is rejected in lags 1 and 2. In the relationship between downward FDI and dependent variable growth, the null hypothesis is not rejected.

Furthermore, from the VECM evidence suggests that the null hypothesis was rejected six times. As such, evidence in table 6.1 suggests that in upper stream FDI the Null Hypothesis was rejected in lag 1, however, the null hypothesis was not rejected in the relationship between upper stream FDI and dependent variable growth in lag 2. In the relationship between research and development and dependent variable growth, evidence suggests that the null hypothesis is rejected in lags 1 and 2. In the relationship between downward FDI and the dependent variable growth, the null hypothesis was rejected in lag 1. Similar evidence is observed in the

relationship between Geographical dispersion and dependent variable growth, evidence suggests that the null hypothesis was rejected in lag 3 and 4.

In this instance, evidence in this study established that explanatory variables geographical dispersion, downward FDI, upper stream FDI create value chains from the economic spillover effects. Therefore, this evidence is consistent with Akinleye and Dadepo (2019) and Blalock and Gertler (2005) that inward FDI spillover economic effect in influenced by the presence of value chain streams that enable both absorptive capacities in domestic firms and firm level competitiveness.

6.2.2 Findings on the Short Run Economic Spillover Effect

In this section, empirical evidence deduced from a series of econometrics estimations inform on the decision rule of the null hypothesis. This discussion is informed by the results of the VECM as illustrated in Table 6.2 below.

Table 6.2: Decision Rule on Short Run Impact

Explanatory to Dependent Variable	Lag	Error Correction Term	Decision Rule
Growth	Differentiated	-0.146242***	Reject the Null Hypothesis.
Growth	Differentiated in lag 1	-0.060040**	Reject the Null Hypothesis.
Growth	Differentiated in lag 2	-.019456	Reject the Null Hypothesis.
DFDI	1	-0.057469**	Reject the Null Hypothesis.
Geo	1	-.001853**	Reject the Null Hypothesis.
Research and Development	1	-.156711**	Reject the Null Hypothesis.
UFDI	1	-3.92E-0***	Reject the Null Hypothesis.

*The results are computed separately for each equation using the appropriate residuals*** p<0.01, ** p<0.05, * p<0.1 {Emphasis are placed on *** p<0.01, ** p<0.05}*

As observed, empirical evidence in Table 6.2 above suggests that the null hypothesis was rejected seven times. For instance, in the time series of firm level growth was rejected in differentiated, differentiated in lag 1, and differentiated in lag 2. In downward FDI, the null

hypothesis is rejected in lag 1. In geographical dispersion, the null hypothesis was rejected in differentiated in lag 1. In research and development, the null hypothesis was rejected in lag 1. In upper stream FDI, the null hypothesis was rejected in differentiated in lag1.

In light of this evidence, the findings in this study posit that aspects of firm heterogeneity are critical in the transmitting knowledge and firm level efficiencies in automotive industry of South Africa. For instance, in this study, empirical evidence suggests that the size of a firm has a positive relationship with the capacity of a domestic firm to absorb FDI spillover effects and transmit knowledge and economic spillover effects in host economies.

6.2.3 Findings on the Long-Run Economic Spillover Effect

The concluding remarks in this section are based on empirical evidence deduced from a series of econometric analysis and literature analysis in the literature review chapter. In particular, this evidence is drawn from the Vector Error Correction model long run deterministic trends. Table 6.3 below illustrates the decision rule on the long run economic spillover effects of inward FDI in the automotive sector of South Africa.

Table 6.3: Decision Rule in the Long-Run Impact

Dependent Variable	Error Correction Term	Long run Causality	Decision Rule
Growth	-0.146242***	Significant	Reject the Null Hypothesis.
DFDI	0.589423	Insignificant	Null hypothesis not rejected.
Research and Development	0.230236	Insignificant	Null hypothesis not rejected.
Geo	-0.349228***	Significant	Reject the Null Hypothesis.
UFDI	-2.208194***	Significant	Reject the Null Hypothesis.
HFDI	33.89086	Insignificant	Null hypothesis not rejected.

*The results are computed separately for each equation using the appropriate residuals*** p<0.01, ** p<0.05, * p<0.1 {Emphasis are placed on *** p<0.01, ** p<0.05}*

Empirical evidence illustrated in the above Table 6.3 suggests that growth, Geographical and Upper stream FDI have a long run causality impact on the economic spillover effect in the automotive industry of South Africa. In light of the evidence observed, the null hypothesis is rejected in 6 occasions. Therefore, a series of studies concur that firm level growth has a causative impact of the long run spillover effect.

In this connection, evidence in the study suggests that the technological gap between foreign and domestic firms that has been identified as one the most important mediating factors for FDI spillovers (Kokko 1994; Kokko, Tansini, and Zejan 1996; Grünfeld 2006).

6.3 SUMMARY OF RESULTS WITHIN THE CONTEXT OF THE RESEARCH OBJECTIVE

The main research objective was outlined in Chapter 1 as toinvestigate the economic spillover effects of inward Foreign Direct Investment (FDI) in the South African automotive sector.

The overarching research question was formulated in Chapter 1 as: “What is the impact of inward FDI on economic spillover effects in the automotive sector of South Africa?”

Within that context, the answer to the research objective and question is now formulated as that there is evidence of economic spillovers effects in the short -run and long-run deterministic trends.

6.4 LIMITATIONS

In firm level analysis, probably, one the most challenging aspect in micro level analysis is the availability of data. Missing data for this study necessitated the use of a 5-year ratio moving average to fill the missing values. More details on this are provided in Chapter 4, section 4.3.

6.5 POLICY IMPLICATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Following the research findings, this section presents recommendations that are observed from literature analysis in Chapters Two and Three, and a series of findings as presented and discussed in Chapter Five. Consistent with the rest of the study, this section accounts for both short-run and long-run economic spillover effects of MNEs in the automotive industry of South Africa.

As indicated in the analysis, evidence suggests that investing MNEs have a potential to have a significant impact on the economic spillover effects in host markets only if the value chains in domestic markets can support their business objectives. To achieve this, there is a need for South African domestic firms to increase the firm level absorptive capacities that enhance them to develop firm level capacities and be able to provide value chains to investing MNEs in the automotive industry. For instance, in Porter’s Diamond model, theoretical evidence suggests that supporting industries are one major consideration for investing MNEs. Thus, empirical findings in this study suggest that both in the short-run and long-run MNEs rely on their domestic value chains for firm level adjustment in host markets (Rugman and Verbeke, 1993; Rugman, Nguyen, Wei and, 2014; Rugman and Eden, 2017).

From the empirical findings, significant evidence suggests that MNEs in the automotive industry rely on upper stream business value chains to distribute their goods and services in the South African host market. This evidence is statistically significant in both the short-run and long-run. Thus, in view of this evidence the present study recommends that a strategic alliance between MNEs and domestic firms in downward FDI must be initiated from policy level engagements, such that domestic firms get the opportunity to absorb economic and knowledge spillover from inward FDI. As such, strategic alliance with domestic firms enables domestic firms to develop firm level behaviour that enhance economic spillover effects. This evidence, in particular, reflects the need to enhance Automotive Industry policy that enables the economic spillover effects from inward FDI to domestic industries in both downward and upper-stream value chain activity of the automotive industry of South Africa.

Such policy could be enabled by, for instance, undertaking from the Department of Trade, Industry and Competition (**the dtic**) that the implementation of the 60% local content requirement be strongly enforced. This aims to regulate the procurement of raw materials by investing MNEs, as stipulated on the South Africa's Automotive industry Master Plan (SAAMP). For instance, empirical evidence suggests that there is no causative relationship between downward FDI spillover and firm level growth in the automotive industry. Consistent with this evidence investing MNEs are expected to procure 40% (to be increased to 60% by 2035) of raw materials or components from South African markets or close markets that have cheaper value chains. This is critical in enhancing economic spillover effects in downstream industries and limits the reliance of MNEs in the automotive industry in South Africa from their own domestic value chains. Moreover, **the dtic** should make the investing MNEs to sign a clause that commit them to skills and technology transfer to South African firms. This will boost capacity building in South Africa's automotive's sector that is currently dominated by foreign firms.

In terms of recommendations for future research, the following is highlighted:

Evidence developed in this study indicates that the economic spillover effect is substantially more significant in upper stream business activity than in downstream business activity in the automotive industry. Further to that, evidence suggests that research and development initiatives are more statistically significant in upper streams business activity than it is in downstream business activities. Therefore, future studies should focus on uncovering the trends in downstream value chain activities in terms of factor pricing and value chain logistics comparisons between domestic markets of MNEs origin and South Africa. In addition, the focus of this study was limited to the automotive industry. Future studies may therefore be required to investigate the impact of economic spillovers in all South Africa industry sectors.

In particular, this might increase the knowledge of the economic spillovers in intra-industry and inter-industry sectors.

6.6 CONCLUSION

This study investigated short-run and long-run economic spillover impacts of inward FDI in the automotive industry of South Africa. From both theoretical and empirical findings, there is undeniable evidence that the economic spillover effects of inward FDI are largely insignificant, due to the fact that MNEs rely on value chains from domestic markets for factor inputs. Nonetheless, in upper-stream value chains, evidence suggests that MNEs incorporate domestic firms to distribute goods and services. Thus, the spillover effects are only concentrated at the upper-stream of business networks, and there is no significant knowledge and technological spillovers as compared to downstream FDI. Empirical evidence from this study suggests that research and development is considerably significant in both short and long estimations of firm level growth. However, within the context of research and development and downward FDI more specifically, the causal impact is statistically insignificant. This shows that MNEs innovate distribution channels in the automotive industry of South Africa and use them to enhance firm level growth. In light of this evidence, this study concludes that MNE economic spillover effects is only concentrated in the upper stream of business activity.

REFERENCE LIST

Abraham, F., Konings, J. and Slootmaekers, V., 2010. FDI spillovers in the Chinese manufacturing sector: Evidence of firm heterogeneity. *Economics of Transition*, Vol.18(1), pp.143-182. http://dx.doi.org/10.1111/j.1468-0351.2009.00370.x

Agarwal, Natasha; Milner, Chris; Riaño, Alejandro (2013): Credit Constraints and FDI Spillovers in China, CESifo Working Paper, No. 4313, Center for Economic Studies and ifo Institute (CESifo), Munich. http://hdl.handle.net/10419/77695

Aitken, Brian, J., and Ann E. Harrison. 1999. "Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela." *American Economic Review*, Vol. 89 (3): 605-618. http://dx.doi.org/10.1257/aer.89.3.605

Akinleye, G.T. and Dadepo, A.O., 2019. Assets utilization and performance of manufacturing firms in Nigeria. *International Journal of Business and Management*, Vol.14(4), pp.107-115. https://doi.org/10.5539/ijbm.v14n4p107

Alexander Chudik & M. Hashem Pesaran, 2017. "A Bias-Corrected Method of Moments Approach to Estimation of Dynamic Short-T Panels," CESifo *Working Paper Series 6688, CESifo*. http://dx.doi.org/10.24149/gwp327

Alfaro, L., Chanda, A., Kalemli-Ozcan, S. and Sayek, S., 2010. Does foreign direct investment promote growth? Exploring the role of financial markets on linkages. *Journal of Development Economics*, 91(2), pp.242-256. https://doi.org/10.1016/j.jdeveco.2009.09.004.

Alshehry, A.S., 2015. Foreign direct investments and economic growth in Saudi Arabia: A cointegration analysis. *Developing Country Studies*, Vol. 20(6), pp.69-76. RePEc:gam:jecomi:v:6:y:2018:i:1:p:18-:d:136954

Amsden, A. H. and W. W. Chu. 2003 .*Beyond Late Development: Taiwan's Upgrading Policies*. Cambridge, MA: MIT Press.

Anwar, S. and Sun, S., 2018. Foreign direct investment and export quality upgrading in China's manufacturing sector. *International Review of Economics & Finance*, Vol. 54, pp.289-298. https://doi.org/10.1016/j.iref.2017.09.009

Aregbeshola, R.A., 2018. The machination of foreign direct investment flow to emerging markets–a focus on Africa. *African Journal of Economic and Management Studies*, Vol.*9*(4), pp.430-448. http://dx.doi.org/10.1108/AJEMS-12-2017-0313

*Arellano, M. and Bover, O., 1995. Anothe*r look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, Vol.68 (1), pp.29-51. https://doi.org/10.1016/0304-4076(94)01642-D

Asafo-Agyei, G. and Kodongo, O., 2022. Foreign direct investment and economic growth in Sub-Saharan Africa: A nonlinear analysis. *Economic Systems*, Vol. 46(4), p.101003. https://dx.doi.org/10.2139/ssrn.4075162

Asafo-Agyei, G.O.K., 2020. Foreign direct investment, spillover effects and economic growth in Africa. Johannesburg: University of Witwatersrand. ((Dissertation-PhD). https://doi.org/10.1016/j.ecosys.2022.101003

Automotive Industry Development Centre (AIDC). (2011). *Automotive Investment Guide & South Africa Automotive Export Manual.* Available at: https://aidc.co.za/aidc-publications/

Baharumshah, A., and Thanoon M. 2006. Foreign capital flows and economic growth in East Asian countries, *China Economic Review, Vol. 17*, Issue 1, pp. 70-83. https://doi.org/10.1016/j.chieco.2005.09.001

Baldwin, J.R. and Gu, W., 2011. Firm dynamics and productivity growth: a comparison of the retail trade and manufacturing sectors. *Industrial and Corporate Change*, Vol. 20(2), pp.367-395. http://dx.doi.org/10.1093/icc/dtq064

Baltagi, B.H., 2008. Forecasting with panel data. *Journal of forecasting*, Vol.*27*(2), pp.153-173. https://doi.org/10.1002/for.1047

Baltagi, B.H., 2015. *Solutions manual for econometrics*. 3rd ed. Heidelberg: Springer Berlin. https://doi.org/10.1007/978-3-642-54548-1.

Baltagi, B.H., Fingleton, B. and Pirotte, A., 2014. Estimating and forecasting with a dynamic spatial panel data model. *Oxford Bulletin of Economics and Statistics*, Vol. 76(1), pp.112-138. http://dx.doi.org/10.1111/obes.12011

Baltagi, B.H., Kao, C. and Liu, L., 2020. Testing for shifts in a time trend panel data model with serially correlated error component disturbances. *Econometric Reviews*, Vol.*39*(8), pp.745-762. https://doi.org/10.1080/07474938.2020.1772567

Barrios, S. and Strobl, E., 2002. Foreign direct investment and productivity spillovers: Evidence from the Spanish experience. *Weltwirtschaftliches Archiv*, *138*(3), pp.459-481. http://dx.doi.org/10.1007/BF02707949

Barrios, S., Görg, H. and Strobl, E., 2003. Explaining firms' export behaviour: R&D, spillovers and the destination market. *Oxford Bulletin of Economics and Statistics*,Vol. 65(4), pp.475-496. https://doi.org/10.1111/1468-0084.t01-1-00058

Bhagwati, J.N., 1988. Export-promoting trade strategy: issues and evidence. *The World Bank Research Observer*, Vol.3(1), pp.27-57. http://www.jstor.org/stable/3986522

Black, A., 2001. Globalization and restructuring in the South African automotive industry. *Journal of International Development*, Vol. 13(6), pp.779-796. https://doi.org/10.1002/jid.812

Blalock, G. and Gertler, P.J., 2005. Foreign direct investment and externalities: The case for public intervention. *Does foreign direct investment promote development*, pp.73-106

Bronkhorst, E., 2010. The review of the Motor Industry Development Programme. Pretoria: University of Pretoria. (Dissertation - MCOM). http://hdl.handle.net/2263/26692

Bronkhorst, E., Steyn, J. and Stiglingh, M., 2013. The Automotive Production And Development Programme: An Analysis Of The Opinions Of South African Stakeholders. *Journal of Applied Business Research (JABR)*, Vol.*29*(5), pp.1281-1300. http://dx.doi.org/10.19030/jabr.v32i5.9762

Bruhn, N.C.P. and Calegario, C.L.L., 2014. Productivity spillovers from foreign direct investment in the Brazilian processing industry. *BAR-Brazilian Administration Review*, Vol. *11*, pp.22-46. DOI:10.1590/S1807-76922014000100003

Bruno, R.L. and Cipollina, M., 2018. A meta-analysis of the indirect impact of foreign direct investment in old and new EU member states: Understanding productivity spillovers. *The World Economy*, *41*(5), pp.1342-1377. http://dx.doi.org/10.1111/twec.125587.

Buckley, J. P., Clegg J., and Wang (2002). "The impact of inward FDI on the performance of China's manufacturing firms", *Journal of International Business Studies,* Vol. 33(4), pp. 637-655.

Buckley, P.J. and Casson, M.C., 2015. The internalisation theory of the multinational enterprise: A review of the progress of a research agenda after 30 years. *International business strategy*, Vol.40, pp. 1563–1580. https://doi.org/10.1057/j.jibs.2009.49.012

Buckley, P.J., 2016. The contribution of internalisation theory to international business: New realities and unanswered questions. *Journal of World Business*, Vol. 51(1), pp.74-82. https://doi.org/10.1016/j.jwb.2015.08.012

Castellani, D., 2002. Firms' technological trajectories and the creation of foreign subsidiaries. *International Review of Applied Economics*, Vol.*16*(3), pp.359-371. http://dx.doi.org/10.2139/ssrn.281368

Castellani, D., Lavoratori, K., Perri, A. and Scalera, V.G., 2022. International connectivity and the location of multinational enterprises' knowledge-intensive activities: Evidence from US metropolitan areas. *Global Strategy Journal*, Vol.*12*(1), pp.82-107. https://doi.org/10.1002/gsj.1404

Cheng, M.K.C., Rehman, S., Seneviratne, M. and Zhang, S., 2015. Reaping the benefits from global value chains. *International Monetary Fund*, Working Paper No. 2015/204.

Cheung, K.Y. and Ping, L., 2004. Spillover effects of FDI on innovation in China: Evidence from the provincial data. *China Economic Review*, Vol.15(1), pp.25-44. https://doi.org/10.1016/S1043-951X(03)00027-0

Chudik, A., Mohaddes, K., Pesaran, M.H. and Raissi, M., 2017. Is there a debt-threshold effect on output growth?. *Review of Economics and Statistics*, 99(1), pp.135-150. https://doi.org/10.1162/REST_a_00593

Claassen, C., Loots, E. and Bezuidenhout, H., 2011. Chinese foreign direct investment in Africa. Economic Research Southern Africa Working Paper, 261. RePEc:rza:wpaper:261.

Crespo, N. and Fontoura, M.P., 2007. Determinant factors of FDI spillovers–what do we really know?. *World Development*, Vol. 35(3), pp.410-425. *RePEc:ise:isegwp:wp62005*

Creswell. J.W. and Creswell, J.D. (2017) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 4th Edition. Newbury Park: Sage publications.

Deloitte South Africa, (2019). *Rooting SA: Strengthening the local automotive industry*. https://www2.deloitte.com/za/en/pages/consumer-industrial-products/articles/rooting-sa.html.

Demena, B.A. and Murshed, S.M., 2018. Transmission channels matter: Identifying spillovers from FDI. *The Journal of International Trade & Economic Development*, Vol. 27(7), pp.701-728. https://doi.org/10.1080/09638199.2018.1439083

Demena, B.A. and van Bergeijk, P.A., 2019. Observing FDI spillover transmission channels: Evidence from firms in Uganda. *Third World Quarterly*, Vol.40(9), pp.1708-1729. https://doi.org/10.1080/01436597.2019.1596022

Denisia, V., 2010. Foreign Direct Investment Theories: An Overview of the Main FDI Theories. *European Journal of Interdisciplinary Studies*, *2*(2), p.104. RePEc:jis:ejistu:y:2010:i:02:id:357.

Department of Trade, Industry and Competition (**the dtic**). (1997). *National Industrial Policy Framework.* the Government of South Africa, Pretoria. Available online at http://www.dti.gov.za/saeconomy/sectors.htm [Accessed: June 2022].

Department of Trade, Industry and Competition (**the dtic).** (2019*). Portfolio Committee on Trade and Industry South Africa Automotive Masterplan: Post 2020 Policy Framework.* Available online at: http://www.thedtic.gov.za/wp-content/uploads/Automotives.pdf.

Department of Trade, Industry and Competition (**the dtic).** (2021). South Africa Automotive Masterplan: Post 2020 Policy. Available online at http://www.thedtic.gov.za/wp-content/uploads/Auto_Master_Plan.pdf [Accessed: June 2022]

Du, L., Harrison, A. and Jefferson, G., 2011. *Do institutions matter for FDI spillovers? the implications of China's" special characteristics"*. Policy Research working paper ; no. WPS 5757. World Bank. © World Bank. https://openknowledge.worldbank.org/handle/10986/3518

Dunning, J.H. (2015). *The Eclectic Paradigm of International Production: A Restatement and Some Possible Extensions*. In: Cantwell, J. (eds) The Eclectic Paradigm. London: Palgrave Macmillan. https://doi.org/10.1007/978-1-137-54471-1_3.

Dunning, J.H., 1993. Internationalizing Porter's diamond. MIR: *Management International Review*, Vol. 33 (7) pp.7-15.

Dunning, J.H., 2015. The eclectic paradigm of international production: A restatement and some possible extensions. *The Eclectic Paradigm: A Framework for Synthesizing and Comparing Theories of International Business from Different Disciplines or Perspectives*, pp.50-84. London: Palgrave Macmillan. https://doi.org/10.1007/978-1-137-54471-1_3

Farole, Thomas, Deborah Winkler, Farole Thomas, and Deborah Winkler. "The role of mediating factors for fdi spillovers in developing countries: Evidence from a global dataset." *Making Foreign Direct Investment Work for Sub-Saharan Africa: Local Spillovers and Competitiveness in Global Value Chains, Washington, DC: The World Bank* (2014): 59-86.

FDI Intelligence (2013), Data from the Financial Times Ltd 2021. Available at: https://www.fdiintelligence.com.

Findlay, R., 1978. Relative backwardness, direct foreign investment, and the transfer of technology: a simple dynamic model. *The Quarterly Journal of Economics*, Vol. *92*(1), pp.1-16. https://doi.org/10.2307/1885996

Fosfuri, A., Motta, M. and Rønde, T., 2001. Foreign direct investment and spillovers through workers' mobility. *Journal of International Economics*, Vol. 53(1), pp.205-222. https://econpapers.repec.org/RePEc:eee:inecon:v:53:y:2001:i:1:p:205-222

Gallagher, K.P. and Zarsky, L., 2007. The enclave economy: foreign investment and sustainable development in Mexico's Silicon Valley. Mit Press.

Gerschewski, S., 2013. Do local firms benefit from foreign direct investment? An analysis of spillover effects in developing countries. *Asian Social Science*, Vol. 9(4), pp.67-76. http://dx.doi.org/10.5539/ass.v9n4p67

Ghebrihiwet, N., 2019. FDI technology spillovers in the mining industry: Lessons from South Africa's mining sector. *Resources Policy*, Vol.62, pp.463-471. https://doi.org/10.1016/j.resourpol.2018.04.005.

Gorg, H. and Strobl, E., 2001. Multinational companies and productivity spillovers: A meta-analysis. *The Economic Journal*, Vol.111(475), pp.723-739.

Gorodnichenko, Y., Svejnar, J. and Terrell, K., 2014. When does FDI have positive spillovers? Evidence from 17 transition market economies. *Journal of Comparative Economics*, Vol. 42(4), pp.954-969. https://doi.org/10.1016/j.jce.2014.08.003.

Grünfeld, L.A., 2006. Multinational production, absorptive capacity, and endogenous R&D spillovers. *Review of International Economics*, 14(5), pp.922-940. http://dx.doi.org/10.1111/j.1467-9396.2006.00622.x

Gujarati, D., 2015. *Econometrics by example*. 2nd Ed. second edition. London: Palgrave Macmillan

Gujarati, D.N., 2021. *Essentials of econometrics*. New York: Sage Publications.

Hale, G., Long, C. Did Foreign Direct Investment Put an Upward Pressure on Wages in China?. IMF Econ Rev 59, 404–430 (2011). https://doi.org/10.1057/imfer.2011.14.

He, S., Kwan, Y.K. and Fan, H., 2019. In search of FDI horizontal spillovers in China: Evidence from meta-analysis. *Quality & Quantity*, *53*, pp.1505-1527. http://dx.doi.org/10.1007/s11135-018-0825-3

Helmut Lütkepohl, 2013. "Vector autoregressive models," Chapters, in: Nigar Hashimzade & Michael A. Thornton (ed.), Handbook of Research Methods and Applications in Empirical Macroeconomics, chapter 6, pages 139-164, Edward Elgar Publishing. RePEc:elg:eechap:14327_6

Hongyu, L.I., Meiyue, L.I.U. and Yang, Y.U., 2011. The spillover effect of FDI on the manufacturing industry in China. *International Business and Management*, Vol.3(1), pp.200-208. http://dx.doi.org/10.3968/j.ibm.1923842820110301.1Z0508

Huynh, H.T., Nguyen, P.V., Trieu, H.D. and Tran, K.T., 2021. Productivity spillover from FDI to domestic firms across six regions in Vietnam. *Emerging Markets Finance and Trade*, Vol. 57(1), pp.59-75. http://dx.doi.org/10.1080/1540496X.2018.1562892

Isaacson, E. and Keller, H.B., 2012.) *Analysis of Numerical Methods*. Dover Publications. Available at: https://www.perlego.com/book/110553/analysis-of-numerical-methods-pdf

Javorcik, B.S. (2004) Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers through Backward Linkages. *American Economic Review*, Vol.94, 605-627. http://dx.doi.org/10.1257/0002828041464605

Javorcik, B.S. and Spatareanu, M., 2005. Do foreign investors care about labor market regulations?. *Review of World Economics*, Vol.141, pp.375-403. https://doi.org/10.1007/s10290-005-0035-7

Javorcik, B.S. and Spatareanu, M., 2009. Liquidity constraints and firms' linkages with multinationals. *The World Bank Economic Review*, Vol. 23(2), pp.323-346. http://dx.doi.org/10.1093/wber/lhp002

Jeon, Y., Park, B.I. and Ghauri, P.N., 2013. Foreign direct investment spillover effects in China: Are they different across industries with different technological levels?. *China Economic Review*, Vol. 26, pp.105-117. https://doi.org/10.1016/j.chieco.2013.05.001.

Josue, D.M., Magwiro, A., Klingelhofer, H.E. and Kaggwa, M., 2014. Does Foreign Direct Investment (FDI) crowd-in Domestic Investment (DI) in South Africa?. *Africa Growth Agenda*, Vol. 2014 (7), pp.4-6.

Kleynhans, E.P. and Zwedala, S., The Contribution of fdi, Technology and R & D to Spillovers in Industrial Development: A South African Firm-Level Investigation. *Managing Global Transitions*, *10*(4), pp.341-359. http://dx.doi.org/10.19030/jabr.v32i2.9594.

Kleynhans, E.P., 2016. Factors determining industrial competitiveness and the role of spillovers. *Journal of Applied Business Research* (JABR), Vol. 32(2), pp.527-540. http://dx.doi.org/10.19030/jabr.v32i2.9594

Kojima, K., 1973. A macroeconomic approach to foreign direct investment. *Hitotsubashi journal of economics*, Vol. *14*(1), pp.1-21. http://dx.doi.org/10.15057/8008

Kokko, A., 1994. Technology, market characteristics, and spillovers. *Journal of development economics*, Vol. *43*(2), pp.279-293. https://doi.org/10.1016/0304-3878(94)90008-6

Kokko, A., Tansini, R. and Zejan, M.C., 1996. Local technological capability and productivity spillovers from FDI in the Uruguayan manufacturing sector. *The Journal of Development Studies*, Vol. 32(4), pp.602-611. https://doi.org/10.1080/00220389608422430 .

Lawana, N., 2016. The impact of foreign direct investment on labour productivity of the automotive sector in South Africa. East London: University of Fort Hare. (Dissertation - MCOM).

Levin, A., Lin, C.F. and Chu, C.S.J., 2002. Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of econometrics*, Vol. *108*(1), pp.1-24. https://doi.org/10.1016/S0304-4076(01)00098-7

Li, L., Zhang, J., Wang, Y. and Ran, B., 2018. Missing value imputation for traffic-related time series data based on a multi-view learning method. IEEE *Transactions on Intelligent Transportation Systems*, Vol. 20(8), pp.2933-2943. https://doi.org/10.1109/TITS.2018.2869768.

Lipsey, R.E. and Sjöholm, F., 2005. The impact of inward FDI on host countries: why such different answers?. *Does foreign direct investment promote development*. Pp. 23-43Washington DC: Institute for International Economics. pp.23-43.

Lo, D., Hong, F. and Li, G., 2016. Assessing the role of inward foreign direct investment in Chinese economic development, 1990–2007: Towards a synthesis of alternative views. *Structural Change and Economic Dynamics*, Vol. 37 (c), pp.107-120. https://doi.org/10.1016/j.strueco.2016.01.004.

M. Rugman, A., T.K. Nguyen, Q. and Wei, Z. (2014), "Chinese multinationals and public policy", *International Journal of Emerging Markets*, Vol. 9 No. 2, pp. 205-215. https://doi.org/10.1108/IJoEM-08-2013-0127.

Mao, Z.E. and Yang, Y., 2016. FDI spillovers in the Chinese hotel industry: The role of geographic regions, star-rating classifications, ownership types, and foreign capital origins. *Tourism Management*, ElsevierVol. 54 (c), pp.1-12. https://doi.org/10.1016/j.tourman.2015.10.011.

Mao, Z.E. and Yang, Y., 2016. FDI spillovers in the Chinese hotel industry: The role of geographic regions, star-rating classifications, ownership types, and foreign capital origins. *Tourism Management*, *54*, pp.1-12. http://dx.doi.org/10.5772/intechopen.93290.

Marshall. 2009. Marshall, A., 2009. *Principles of economics: unabridged.*8th ed. London: McMillan.

Masron, T. A., Zulkafli, A. H., & Ibrahim, H. (2012). Spillover Effects of FDI within Manufacturing Sector in Malaysia. Procedia: Social and Behavioral Sciences, 58, 1204-1211. https://doi.org/10.1016/j.sbspro.2012.09.1102

Mebratie, A.D., 2010. Foreign Direct Investment and Labour Productivity in South Africa'. The Hague: Institute of Institute of Social Studies. The Hague: Netherlands (Dissertation - MA).

Mebratie, A.D. and Bedi, A.S., 2013. Foreign direct investment, black economic empowerment and labour productivity in South Africa. *The Journal of International Trade & Economic Development*, Vol. 22(1), pp.103-128. https://doi.org/10.1080/09638199.2013.745287.

Meyer, K.E. and Sinani, E., 2009. When and where does foreign direct investment generate positive spillovers? A meta-analysis. *Journal of International Business Studies*, Vol. 40, pp.1075-1094. http://dx.doi.org/10.1057/jibs.2008.111.

Murialdo, P., Ponta, L. and Carbone, A., 2021. Inferring multi-period optimal portfolios via detrending moving average cluster entropy (a). *Europhysics letters*, 133(6), p.60004. http://dx.doi.org/10.1209/0295-5075/133/60004

National Association of Automobile Manufacturers of South Africa (NAAMSA). (2005). *Quarterly review of business conditions: Motor vehicle manufacturing industry: 1st quarter 2022.*

National Association of Automobile Manufacturers of South Africa (NAAMSA). (2021). *Quarterly review of business conditions: Motor vehicle manufacturing industry: 1st quarter 2022.*

National Association of Automobile Manufacturers of South Africa (NAAMSA). (2022). *Quarterly review of business conditions: Motor vehicle manufacturing industry: 1st quarter 2022.*

National Association of Automotive Component and Allied Manufacturers (NAACAM). (2011). The South Africa automotive industry: the MIDP and APDP. Available at / https://naacam.org.za/wp-content/uploads/pdf/apdpinfodoca.pdf. [Accessed: 20 June 2022].

National Association of Automotive Component and Allied Manufacturers (NAACAM). (2022). The South Africa automotive industry: the MIDP and APDP. Available at www.naacam.co.za [Accessed: 20 June 2022].

Neuhaus, M., 2006. *The impact of FDI on economic growth: an analysis for the transition countries of Central and Eastern Europe* Heidelberg : Physica Verl.

Newman, C., Rand, J., Talbot, T. and Tarp, F., 2015. Technology transfers, foreign investment and productivity spillovers. *European Economic Review*, Vol. 76, pp.168-187

Nguyen, P.V., Tran, K.T., Le, N.T.T. and Trieu, H.D.X., 2020. Examining FDI spillover effects on productivity growth: Firm-level evidence from Vietnam. *Journal of Economic Development*, Vol. 45(1). p97-121. 25p. RePEc:jed:journl:v:45:y:2020:i:1:p:97-121.

OECD (2009), *OECD Benchmark Definition of Foreign Direct Investment 2008: Fourth Edition*, OECD Publishing, Paris, https://doi.org/10.1787/9789264045743-en.

Orlic, E., Hashi, I. and Hisarciklilar, M., 2018. Cross sectoral FDI spillovers and their impact on manufacturing productivity. *International Business Review*, Vol. 27(4), pp.777-796. https://doi.org/10.1016/j.ibusrev.2018.01.002

Pan, C., Wei, W.X., Muralidharan, E., Liao, J. and Andreosso-O'Callaghan, B., 2020. Does China's outward direct investment improve the institutional quality of the belt and road countries?. *Sustainability*, Vol. 12(1), p.415. https://doi.org/10.3390/su12010415.

Park, B.I. and Choi, J., 2014. Foreign direct investment motivations and knowledge acquisition from MNEs in overseas subsidiaries. *Canadian Journal of Administrative Sciences/Revue canadienne des sciences de l'administration,* Vol.31(2), pp.104-115.

Paus, E.A. and Gallagher, K.P., 2008. Missing links: Foreign investment and industrial development in Costa Rica and Mexico. *Studies in Comparative International Development*, Vol. 43, pp.53-80. https://doi.org/10.1007/s12116-007-9016-2.

Pavlínek, P. and Žížalová, P., 2016. Linkages and spillovers in global production networks: firm-level analysis of the Czech automotive industry. *Journal of Economic Geography*, 16(2), pp.331-363. https://doi.org/10.1093/jeg/lbu041.

Perri, A. and Peruffo, E., 2016. Knowledge spillovers from FDI: a critical review from the international business perspective. *International Journal of Management Reviews*, 18(1), pp.3-27. https://doi.org/10.1111/ijmr.12054

Poncet, S. (2010). *Inward and Outward FDI in China. In: Greenaway, D., Milner, C., Yao, S. (eds) China and the World Economy*. London: Palgrave Macmillan. https://doi.org/10.1057/9781137059864_6

Porter, M.E. (1990), "New global strategies for competitive advantage", *Planning Review*, Vol. 18 No. 3, pp. 4-14. https://doi.org/10.1108/eb054287.

Porter, M.E., 2001. The value chain and competitive advantage. *Understanding Business Processes*, 2, pp.50-66.

Reyes, J.D., 2017. FDI spillovers and high-growth firms in developing countries. *World Bank Policy Research Working Paper*, (8243). Washington DC: World Bank.

Rosa, B., Gugler, P. and Verbeke, A., 2020. Regional and global strategies of MNEs: revisiting Rugman & Verbeke (2004). *Journal of International Business Studies*, Vol. *51*, pp.1045-1053. https://doi.org/10.1057/s41267-020-00347-5

Rugman, A., TK Nguyen, Q. and Wei, Z., 2014. Chinese multinationals and public policy. *International Journal of Emerging Markets*, Vol. 9(2), pp.205-215. http://dx.doi.org/10.1108/IJoEM-08-2013-0127

Rugman, A.M. and Eden, L., 2017. *Multinationals and transfer pricing*. 1st ed. London: Routledge. https://doi.org/10.4324/9781315277554

Rugman, A.M. and Verbeke, A., 1993. How to operationalize Porter's diamond of international competitiveness. *The International Executive*, Vol.35(4), pp.283-299. https://doi.org/10.4324/9781315277554

Rugman, A.M. and Verbeke, A., 2004. A perspective on regional and global strategies of multinational enterprises. *Journal of International Business Studies*, Vol.35, pp.3-18. https://doi.org/10.1057/palgrave.jibs.8400073

Rugman, A.M. and Verbeke, A., 2017. *Regional multinational corporations and triad strategy. In* Sustainability, Civil Society and International Governance. 1st ed.(pp. 123-136). London: Routledge. https://doi.org/10.4324/9781351148283

Ruhanya, P. (eds) The History and Political Transition of Zimbabwe. African Histories and Modernities. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-47733-2_15

Saglam, B.B. and Sayek, S., 2011. MNEs and wages: the role of productivity spillovers and imperfect labor markets. Economic Modelling, Vol. 28(6), pp.2736-2742. https://doi.org/10.1016/j.econmod.2011.06.029

Seetanah, B. and Khadaroo, A.J., 2007. Foreign direct investment and growth: New evidences from Sub-Saharan African countries. University of Mauritius, 27.

Sibindi, M., 2019. Internationalisation theories and outward Foreign Direct Investment: the case of South African multinational firms. Pretoria: University of South Africa. (Dissertation – PhD) University of South Africa). http://hdl.handle.net/10500/25771

Sibindi, M. (2020). Foreign Direct Investment in the Post-Mugabe Era. In: Ndlovu-Gatsheni, S.J., Ruhanya, P. (eds) The History and Political Transition of Zimbabwe. African Histories and Modernities. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-47733-2_15

Silajdzic, S. and Mehic, E., 2015. Knowledge spillovers, absorptive capacities and the impact of FDI on economic growth: empirical evidence from transition economies. *Procedia-Social and Behavioral Sciences*, 195, pp.614-623. http://creativecommons.org/licenses/by-nc-nd/4.0

Sinani, E. and Meyer, K.E., 2004. Spillovers of technology transfer from FDI: the case of Estonia. *Journal of Comparative Economics*. Vol. 32(3), pp.445-466. http://dx.doi.org/10.1016/j.jce.2004.03.002

Smeets, R., 2008. Collecting the pieces of the FDI knowledge spillovers puzzle. *The World Bank Research Observer*, Vol. *23*(2), pp.107-138. https://doi.org/10.1093/wbro/lkn003

South African Investment Conference, 2018. President Rampahosa's speech. Available at: https://www.sainvestmentconference.co.za/.

Stiglitz, J., 2020. We need a better balance between globalization and self-reliance. Stiglitz, J. et al.(2020) How the economy will look after the coronavirus pandemic. Foreign Policy. Retrieved from: https://foreignpolicy. com/2020/04/15/how-the-economy-will-look-after-the-coronavirus-pandemic/(Accessed May 20, 2020). http://dx.doi.org/10.19030/jabr.v32i2.9594

Szunomár, Á., 2020. Theories of Internationalization and Foreign Direct Investment: How to Explain FDI from Emerging MNEs?. Emerging-market Multinational Enterprises in East Central Europe, pp.3-19. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-030-55165-0_1

Taglioni, D. and Winkler, D., 2016. Making global value chains work for development. World Bank Publications. Wasgington DC. https://doi.org/10.1596/978-1-4648-0157-0

Tóth, I.J., 1999. *Ownership structure, business links and performance of firms in a transforming economy-The case of Hungary*. Institute of Economics, Hungarian Academy of Sciences. http://hdl.handle.net/10419/108017

Tytell, I. and Yudaeva, K., 2005. The Role of FDI in Eastern Europe and New Independent States: New Channels for the Spillover Effect. *Foreign direct investment in Europe*, pp.53-57. *RePEc:csl:devewp:217*

United Nations Conference on Trade and Development (UNCTAD). (2013), *World Investment Report (Global Value chains: Investment and Trade for Development).* Geneva. Avaialble at: https://unctad.org/system/files/official-document/wir2013_en.pdf

Vernon, R., 1966. Product Life-Cycle Theory. *The Quarterly Journal* of *Economics, Vol. 80 (2) pp. 190–207. http://dx.doi.org/10.2307/1880689*

Wang, J.Y. and Blomström, M., 1992. Foreign investment and technology transfer: A simple model. *European Economic Review*, 36(1), pp.137-155. https://doi.org/10.1016/0014-2921(92)90021-N

Wang, Y., Ning, L., Li, J. and Prevezer, M., 2016. Foreign direct investment spillovers and the geography of innovation in Chinese regions: The role of regional industrial specialization and diversity. *Regional Studies*, 50(5), pp.805-822. https://doi.org/10.1080/00343404.2014.933800

Winkler, D.E., 2013. Potential and actual FDI spillovers in global value chains: the role of foreign investor characteristics, absorptive capacity and transmission channels. *World Bank Policy Research Working Paper*, (6424). RePEc:sgm:jbfeuw:v:2:y:2018:i:10:p:5-44.

World Investment Report (WIR). (2022). *Global investment trends*. United Nations Conference on Trade and Development, Geneva. Availability at: https://unctad.org/publication/world-investment-report-2022

Zhang, L., 2017. The knowledge spillover effects of FDI on the productivity and efficiency of research activities in China. China Economic Review, 42, pp.1-14. http://dx.doi.org/10.1016/j.chieco.2016.11.001

ANNEXURES

ANNEXURE A: DECLARATION OF LANGUAGE EDITING

Editorial Letter

25/ 11/ 2022

From: Dr William J. Mpofu

Wits Centre for Diversity Studies

13th Floor, University Corner

University of the Witwatersrand

Johannesburg

South Africa

To: Who it may Concern

Ref: Confirmation of Editing of a master's Dissertation

This is to confirm that I have carried out editorial work on the dissertation: ***Inward FDI and Economic Spillover Effects: The Case of the Automotive Industry in South Africa***, by Khensani Mushathoni, student number: 39824535.

For any further information please do not hesitate to contact me: William.mpofu@wits.ac.za. (0027-718022947).

Dr William J Mpofu