THE EFFECT OF CORRUPTION ON THE PRODUCTIVITY OF MANUFACTURING FIRMS IN KENYA

Esther Nyakoboke Henry

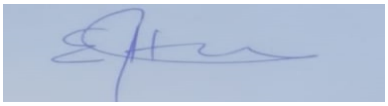
X51/5971/2017

A Research Paper Submitted to the School of Economics in Partial fulfilment of the Requirements for the Award of a Master of Arts Degree in Economic Policy Management of the University of Nairobi

2021

DECLARATION

This research project is my original work and has not been presented to any other institution of higher learning for any award.

Sign  **Date**: 25.11.2021

Esther Nyakoboke Henry

X51/5971/2017

This project has been submitted for defence with my approval as the university supervisor.

Sign_ **Date** 29.11.2021

Dr. Bethuel Kinyanjui

School of Economics

University of Nairobi

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to the Almighty God for being able to complete this paper. My sincere appreciation goes to my Supervisor Dr. Kinyanjui for his thorough guidance and timely advice. My gratitude also goes to Mr. Wycliff and Mr. Kevin who sacrificed their time and guided me through the technical part of the paper. I won't forget my sister Annah who has supported me both financially and morally just to make this dream come true. Finally, a big thank you for my dad who has played a great role in ensuring that I don't give up on my dreams.

TABLE OF CONTENTS

DECLARATION ..... **ii**
ACKNOWLEDGEMENT ..... **iii**
TABLE OF CONTENTS ..... **iv**
LIST OF TABLES ..... **vi**
LIST OF FIGURES ..... **vii**
LIST OF ABBREVIATIONS ..... **viii**
ABSTRACT ..... **ix**
CHAPTER ONE: INTRODUCTION **1**
1.1 Background to the Study 1
1.2. Overview of corruption, productivity and manufacturing sector in Kenya 3
1.3 Statement of the Problem 9
1.4 Research Objective 10
1.4.1 Specific Objectives 10
1.5 Research Question 10
1.5.1 Specific questions 11
1.6 Significance of the study 11
1.7 Scope of the study 12
CHAPTER TWO: LITERATURE REVIEW **13**
2.1. Introduction 13
2.2. Theoretical literature 13
2.3. Empirical Literature 15
2.4. Overview of the literature 28
CHAPTER THREE: METHODOLOGY **22**
3.1. Introduction 22
3.2. Conceptual Framework 22
3.3. Theoretical framework 25
3.4 Empirical model 28
3.4.1. Model specification 28
3.4.2 Data Source 32

3.4.3 Estimation and testing procedure 32
CHAPTER FOUR: RESULTS AND INTERPRETATION 33
4.1 Introduction 33
4.2 Summary Statistics 33
4.3 Correlation Matrix 36
4.4 Hausman Test 37
4.5 Testing for Random Effects: Breusch-Pagan Lagrange Multiplier (LM) 37
4.6 Model Results 39
4.7 Post Estimation Tests 41
CHAPTER FIVE: SUMMARY, CONCLUSION AND POLICY IMPLICATION 43
5.1 Summary 43
5.2 Policy Implications 44
5.3 Limitations of the Study and Areas for Further Study 44
REFERENCES 45
Appendix I: Corruption laws reforms in Kenya over the years 49

LIST OF TABLES

Table 1.1: Comparison of Corruption issues between Kenyan firms, SSA countries and all countries as a whole 4
Table 1.2: Obstacles for Firms 5
Table 1.3: Manufacturing sector output, value added and compensation to employees in Billions 6
Table 3.1: Variable Definitions and Source 31
Table 4.1: Summary Statistics 33
Table 4.2: Descriptive Statistics of Credit Access and Ownership 34
Table 4.3: Descriptive Statistics of Size and Ownership 34
Table 4.4: Descriptive Statistics of Corruption and Size of the firms 36
Table 4.5: Correlation Matrix 36
Table 4.6: Results of the Hausman Test 37
Table 4.7: LM Test for Panel Effects 38
Table 4.8: Model Results 39
Table 4.9: Results for Breusch Pagan test for serial correlation. 41
Table 4.10: Results for Studentized Breusch-Pagan test for Heteroscedasticity 42

LIST OF FIGURES

Figure 1.1: Corruption perception index score 4
Figure 1.2: FDI Inflows in Kenyafrom 2004 to 2018 8

LIST OF ABBREVIATIONS

CPI	Corruption Perception Index
EACC	Ethics and Anti- Corruption Commission
ES(s)	Enterprise Survey(s)
FDI	Foreign Direct Investment
KACC	Kenya Anti-Corruption Commission
KAM	Kenya Association of Manufacturers
KNBS	Kenya National Bureau of Statistics
MNEs	Multinational Enterprises
OLI	Ownership Location Internalization
SSA	Sub Saharan Africa
TCE	Transaction Cost Economics
UNCTAD	United Nations Convention for Trade and Development
US	United States
WB	World Bank

ABSTRACT

This study sought to determine the effect of corruption on productivity of manufacturing firms in Kenya. Specifically, the study sought to investigate the extent to which the productivity of firms in the manufacturing sector is affected by corruption. Additionally, the study compared how corruption affects the productivity of different firm sizes. The study employed panel data from the World Enterprise Survey covering the period 2007-2018. The study found out that corruption had an insignificant positive effect on the productivity of manufacturing firms. Ownership type has also an insignificant effect on productivity. However, large firms engaged in corrupt activities showed a positive effect on their productivity compared to medium sized firms which also showed a positive effect when compared to smaller firms. Thus overall, corruption positively affects the productivity of large firms: large firms have the financial muscles for paying bribe tax and time tax reducing bureaucracies hence improved efficiency.

CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

Corruption involves making unofficial payments or gifts by business entities to government officials to quickly facilitate processes or to circumvent certain regulations to setting up or running certain business operations. Corruption has been identified as one of the major obstacles for doing business both in developed and third world economies (Svensson, 2005; World Bank, 2018). Corruption is known to cause economic distortions which are harmful as they often lead to misallocation of resources and negatively influence fundamental activities such as investment, technological innovation, entrepreneurship, growth and productivity (Fisman and Svensson, 2007).

Corruption acts makes it difficult for foreign firms to enter into an economy since it reduces the firms' overall performance (Campos et al. 2010). For instance, the cost of corruption could involve but not limited to allocation of a firm's resources to inefficient processes and lowering the drive for firms to be innovative. Corruption erodes trust in government officials, pushes resources away from productive use and lowers investment (Boudreauxet al., 2018; Hung 2008). These costs can lower profitability of a firm's activities resulting in insufficient valuation of human resource, technology and innovation. Firms get an incentive to provide investment for growth, expansion and improved productivity under very strict anti-corruption policies (Xu and Yano, 2017). Thus corruption is considered as 'sand in the wheels' (Woo and Heo, 2009; Moen and Sekkat, 2005). It could also prevent the entry of new firms, those already in existence offer substandard services which in turn lower benefits to the society in which they operate. On the other hand, corruption is perceived to speed up processes, save resources and improve

productivity by circumventing unnecessary long bureaucratic processes. It actually cuts the long-time that's needed for some processes, saving on the costs of having to wait for very long before a process is finished. In highly regulated environments, corruption acts as a grease to ease the process of entry and establishment of a firm (Dreher et al., 2007).

Kenya has significantly improved its effort in nurturing businesses and in creating a conducive environment for both the local and foreign firms that are in the manufacturing sector. This is in an effort to raise the country's regional competitiveness as well as increase the manufacturing sector's contribution to GDP to at least 15 percent. Generally, foreign firms in Kenya tend to be more productive in terms of labour, capital and technology (Rasiah and Gachino, 2005). The corrupt nature of the country is making it difficult for businesses to comply with the administrative procedures which take a long time in the absence of bribes making several firms give in to corrupt demands by public officials either willingly or unwillingly.

According to Transparency International, the figures on corruption are always on the rise. The bribe tax which is of key interest to this study is an informal payment made to people in office to help the payer of the bribe to get things done (De Rosa et al., 2010). Bribe tax is considered more general than the time tax because it involves making some form of payments in either cash or kind to get things done, evade some regulations or even shorten the period which some processes take.

Several studies have led to a debate on the impact that corruption has on the overall productivity of firms. Over the years, literature on this matter has remained inconclusive with very few studies concentrating on Kenya and Africa as a continent. Recent empirical studies have also found contradicting results on how corruption affects firms' productivity. Some of these studies

have shown a positive effect of corruption under high levels of regulation than in low levels of regulation, Jiang and Nie (2014). Further, corruption positively affects exports and product innovation Sharma and Mitra (2015) since firms that evade tax pay bribes.

Corruption and firm productivity are negatively related; corruption adversely affects economic growth by lowering investment levels and FDI inflows to a country, Hossain (2016). The effect is also found to be higher on larger and older firms as compared to smaller and younger firms. There's no single country specific study on how corruption directly affects the productivity of foreign-owned firms for African countries and for Kenya in particular. Therefore, owing to the critical role the foreign sector plays in Kenya, the ever-rising incidences of corruption, the study intends to find the effect of corruption on Kenya's foreign firms that are to the county's in manufacturing sector.

1.2. Overview of corruption, productivity and manufacturing sector in Kenya

Corruption

In 2019, Kenya, a lower middle-income country, was ranked in position 137 out of 180 participating countries by Transparency international. The Corruption Perception Index (CPI) indicates a perception of the corruption levels in the country's public sector by carrying out surveys on business executives. This means that Kenya is among the top 40 most corrupt countries in the world scoring 28 out of 100, which is below the global average of 43 out of 100. It is believed that high levels of economic growth go hand in hand with a low levels of corruption (Baiet al., 2013). Below is a table that shows a comparison of the corruption issues between Kenya, sub–Saharan Africa Countries and all the other countries as surveyed by the World Bank.

Table 1.1: Comparison of Corruption issues between Kenyan firms, SSA countries and all countries as a whole

Indicator	*Form of ownership*	*Kenya*	*SSA*	*All countries*
Percentage of firms that experience at least one bribe payment request	Domestic	23.7	21.7	17.1
	Foreign	24.9	23.6	18.8
Percentageoffirmsexpectedtopaybribestoreceivec onstructionpermits		32.8	23.5	16
	Foreign	38.3	23.4	14
Percentage of firms that named corruption as the major obstacle	Domestic	40.1	42.4	33.9
	Foreign	55.2	38.6	30.1

Source: World Bank Enterprise Survey 2018, Obstacles for firms.

Despite the existence of many anti-corruption establishments, corruption still remains a major problem in the country. Paying bribes to officials in the public sector by is a major challenge to those in business, with the intensity and amount of bribes being very high. (Guerogruiev and Malesky, 2012).

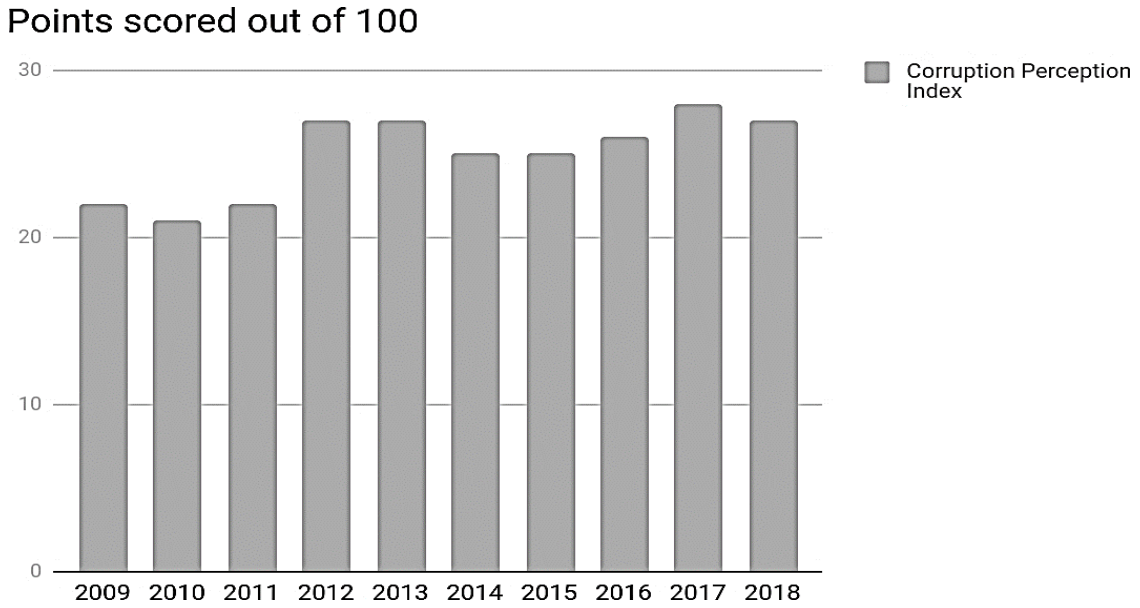


Figure 1.1: Corruption perception index score

Source: Transparency International Kenya

Table 1.2: Obstacles for Firms

Indicator	Form of Ownership	Kenya	SSA	All countries
Capacity Utilization (%)	Domestic	69.8	70.3	72.3
	Foreign	71.5	68.8	72.8
Real Annual sales growth(%)	Domestic	-0.5	2.9	2
	Foreign	-6.6	5.2	4.1
Annual employment growth (%)	Domestic	5.7	6.6	4.8
	Foreign	5	8.2	6
Real annual labour productivity	Domestic	-5.5	-3.1	-2.5
	Foreign	-8.6	-0.8	-1
%of firms buying fixed assets	Domestic	33.9	40	41.3
	Foreign	32	46.3	48.6

Source: World Enterprise Survey

Further, a look of the performance of the manufacturing firms' performance measured by various indicators like real annual sales growth and percentage growth in labour productivity shows a lower percentage growth rate for the foreign firms in Kenya as compared to the rates for domestically owned firms. The values are also lower for Kenya when compared to Sub Saharan African (SSA) countries and those of the rest of the world. The fact that foreign manufacturing firms in Kenya reported lower percentage performance indicators together with the high percentage of these firms citing corruption as a major hindrance to doing business forms the basis of this study that intends to probe whether the said corruption has an effect on the firms' productivity.

The manufacturing sector

In Kenya, the manufacturing sector is key in the country's journey to attaining full economic development because it makes a major contribution to national output and exports as well as creating employment opportunities for the country's labour force. In Kenya's Vision 2030, the manufacturing sector plays the role of employment and wealth creation. To achieve Vision 2030 goals, the government has come up with what is now famously referred to as the 'Big 4 Agenda' for development having manufacturing as one of the agenda. Over the last few years, the manufacturing sector's contribution to GDP has been below 10% on average (BPS, 2020). There is an intention to increase the share of manufacturing in the country's GDP from an average of below 10% to an average of 15% by the year 2022. Over the past years, the sector's output value, value added and compensation of employees has been on an increase, with formal employment in the sector accountingfor11.1%of the total formal employment in 2018.

Table 1.3: Manufacturing sector output, value added and compensation to employees in Billions

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Value of Output	0.74	0.77	0.84	1.58	1.62	1.73	1.82	1.98	2.13	2.25	2.41
Valued Added	0.22	0.23	0.25	0.44	0.47	0.50	0.54	0.59	0.65	0.66	0.69
Compensation to employees	0.06	0.07	0.08	0.09	0.10	0.13	0.15	0.16	0.17	0.19	0.21

Source: KNBS Economic surveys 2008-2018

The manufacturing sector expansion has been driven by several factors, one of which is the entry of global brands in the local market (Ministry of Trade, Industry and cooperatives 2018). The launch of the Kenya Investment policy is considered a milestone in an effort to improve

thecountry'scompetitivenessasanattractiveinvestmentenvironmentalongsideinvestmentincentives such as supportive regulation, innovation and access to market and skilled human resources.

Foreign firms in Kenya

Foreign Direct Investment (FDI) is an investment based in a different country whose ownership is controlled by an individual(s) who is not a citizen of the country of investment. A foreign firm in this study is any a firm with a minimum 10 percent of share ownership held by a foreigner. Kenya is ranked as a complex market for those foreign firms that seek to setup their businesses in the country. In a recent study that comprised countries like India, Philippines, South Africa, Sri Lanka, and Trinidad and Tobago. Kenya was ranked the 6th as a builder country which simply means that it is a country that's more attractive as a production location but less so as a market for goods[1].Further, in the World Bank's 2020 Ease of Doing Business report, Kenya ranked 56th with an improved score of 73.2 up from a score of 71.0 in Doing Business 2019. In 2015, the number of registered companies in Kenya increased by 53 percent with more foreign than local companies being registered[2]. This improvement can be attributed to the several policies that the country has put in place to improve the country's attractiveness as an investment destination to foreign firms (UNCTAD, 2018). In regard to this, the country is making efforts in facilitating private enterprises and foreign investment with an example of the Export Processing Zones being marketed as destinations for manufacturing foreign oriented investment. The enactment of the Special Economic Zones Act 2015 made Kenya to be the first country in Africa to create Special Economic Zones in Kisumu, Mombasa and Lamu. These are aimed at creating ample investment

[1]Ivy Nyayieka,"Kenya is a 'complex', market forforeignfirms-Study",*BusinessDaily,*March3rd,2019.
[2]Dominic Omondi, "Number of Companies registered in Kenya increase by 53 percent", S*tandard Digital,* November 7th, 2015

environments for both foreign and local investors in these especially designated zones. All these have led to a significant upward trend in the amount of FDI that the country's been receiving over the years. The figure below shows the increasing trend of FDI inflows to Kenya for the years 2004-2018.

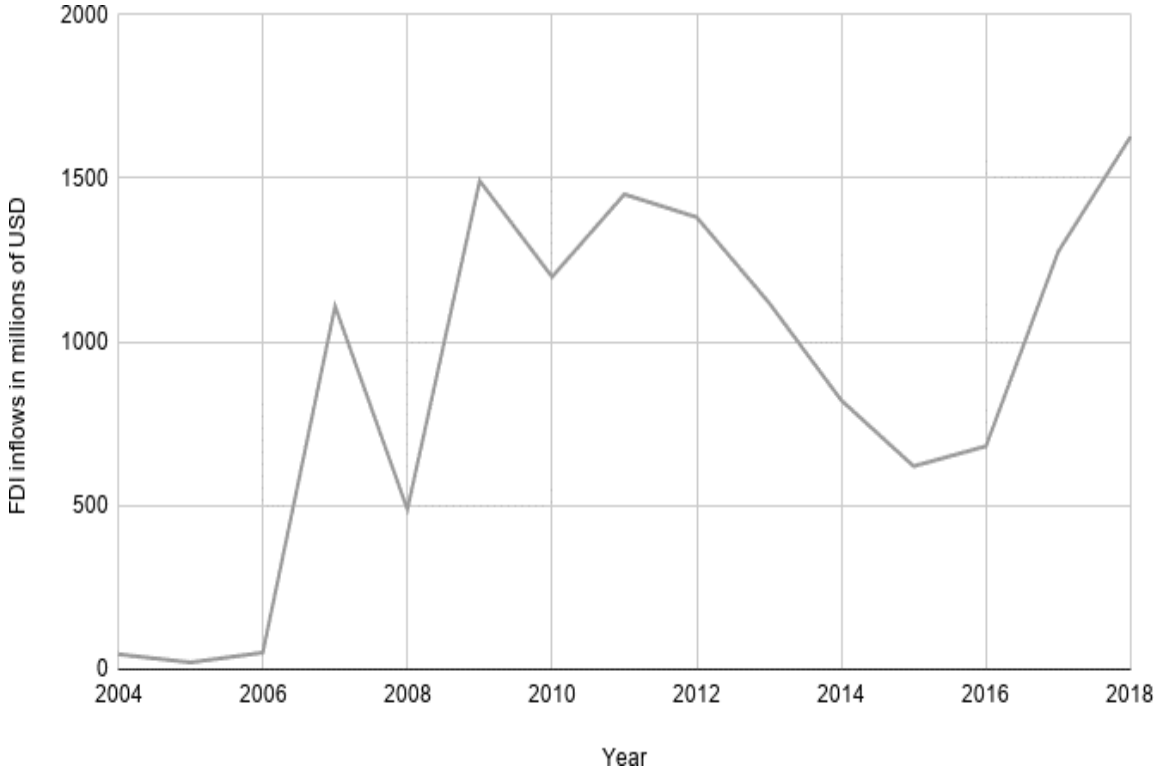


Figure 1.2: FDI Inflows in Kenyafrom2004to2018

Source: United Nations Conference on Trade and Development

There has been an upward trend in the levels of Foreign Direct investment flows into the country as shown by the figure above. This shows that more and more firms are choosing the country as a host for their investment activities. This makes the foreign sector an important aspect in the economy of Kenya.

The advantages of the foreign sector in every economy in most cases outweigh the disadvantages.

For any foreign firm to continue being in operation in a certain economy, profitability is the key driver. The relationship between productivity and corruption is of key interest to Multinational Enterprises (MNEs) that are keen on setting up their businesses abroad. The role of foreign firms in the country's economy can't be underestimated. Since 1986, the manufacturing Sector in Kenya has been dominated by foreign firms with high fixed capital ownership of 60 percent when compared to local firms. These firms have been proven to be more productive in terms of technology, labour and capital than similar local firms (Gachino, 2017). This difference inefficiency is explained by the fact that most foreign owned firms provide avenue for the transfer of managerial skills, technology, skills and market information from abroad to the local economy (Cheruiyot, 2017). These foreign companies in Kenya are thought to enjoy an extra advantage that is not accessible by the local firms (Ongore, 2011). Owing to its crucial role in Kenya's economy and the fact that corruption is on the rise in the economy despite efforts to curb it, makes this research worthwhile.

1.3 Statement of the Problem

Corruption is named as one of the biggest obstacles to businesses in Kenya with a percentage of 7.7 percent index (WBES 2018). It is detrimental to entrepreneurship in countries with existing formal efficient institutions. It has been found to undermine the policies that the government put in place as incentives for entrepreneurship. Greater opportunities for corrupt practices divert the efficient use of human resources to rent seeking. Unaccountability for corruption could lead to improper understanding of the relationship that exists between a firm's ownership and performance. This is because corruption is a key institutional factor affecting firm performance levels and ownership structure. Kenya Association of Manufacturers (KAM) released a report in 2018 that named corruption as one of the challenges that firms the manufacturing sector firms face.

As a result, a proposal to total elimination of corruption made as a solution to the problem. This brings the question: in what mechanism is corruption a challenge to the firms in the manufacturing sector? How does it affect their productivity?

According to a Kenyan market overview report published in 2019 by the US Department of Commerce report, corruption is one of the challenges that are facing business operations in Kenya. Further, under the WBES 2018, 7.7 percent of firms said they experienced corruption as the major obstacle to establishing and running businesses. Further, the extent to which foreign firms are affected by corruption when compared to local firms is inarguably larger in percentage when compared to domestic firms; a percentage higher in Kenya when compared to SSA firms and the world. This shows that for the foreign firms in Kenya, corruption affects their operations to a larger extent when compared to other foreign firms in the SSA and the rest of the world. The manufacturing sector is also a key component in the country's total GDP. It consists of majorly foreign firms with a potential of attracting more investors to the sector hence its importance in general. Since no study has been carried out for Kenya on the subject, there exists a need to establish whether a relationship exists between the productivity of the various resources employed by these firms and corruption.

1.4 Research Objective

To establish the effect of corruption on the productivity of firms in the manufacturing sector in Kenya.

1.4.1 Specific Objectives

i. To investigate the extent to which local and foreign firms' productivity is affected by corruption.

ii. To compare the extent to which corruption affects the productivity of different firm sizes.

1.5 Research Question

What is the impact of corruption on the productivity of manufacturing firms in Kenya?

1.5.1 Specific questions

i. What is the extent to which local and foreign firms' productivity are affected by corruption?

ii. What is the extent to which corruption affects the productivity of differently sized firms?

1.6 Significance of the study

Corruption is a thorn in the flesh of many economies today, with no exception to Kenya. Understanding the nature of the relationship between corruption levels and productivity levels of foreign firms will be of great help the country's policy makers to make sound decisions that may create a conducive environment to attract foreign manufacturing firms owing to their significance in any given economy and for Kenya, it's a key driver in the country's Vision 2030. Sound policies that are made in regard to the findings of the study may increase the country's competitiveness amongst other countries in the region. This will enable it to receive foreign direct investment whose advantages include technological advancement, product innovation and talent utilization.

On the scholarly hand, understanding the effect that corruption has on productivity of foreign firms add on to the existing, limited and inconclusive literature on the subject. It would be among the few studies involving Kenya as an African country on its own since previous studies have included a number of African countries together.

MNEs could also use the results of the study as a guide to make investment decisions in Kenya. Further the results of the study in Kenya can be applied to other countries (mostly African) that are similar to Kenya in terms of economic, geographic or demographic terms. This is also a new area of interest for students of Economics to be able to gain an understanding of and develop

interest for further study.

1.7 Scope of the study

The study used the World Bank Enterprise Surveys Data for firms in the Manufacturing sector in Kenya for the years 2007, 2013 and 2018. This is data collected from both foreign and local firms as classified by the percentage of ownership: foreign firms are those with a minimum 10% shares owned by non-citizens. The firms are classified as small: having 0-19 employees, 20-99 employees as medium and those with over 100 employees as large.

CHAPTER TWO

LITERATURE REVIEW

2.1. Introduction

In this chapter, we examine the theoretical and empirical literature on the research topic are examined. On the theoretical part, we examine the major theories that have been in existence with regard to the subject matter. We also review several works of literature that have tried to explore this area both in the African continent and the rest of the world. We look at studies that examine regions, countries and economic zones on the topic of how corruption influences firms' productivity corruption and productivity.

2.2. Theoretical literature

Early literature gives an indication that corruption through bribery results in improved efficiency and growth of the bribe paying enterprise. This is the early *'grease on wheels*' hypothesis. Upon payment of a bribe, any bureaucratic rigidity is removed thus speeding up the commercial processes (Cuervo-Cazurra, 2016). The payment of bribes lowers the transaction costs that would otherwise be incurred had the firms complied with the bureaucratic regulations. Corruption enables firms to achieve aims by saving time and conducting businesses speedily (Vial and Hanoteau, 2010). These bribes tend to shorten the normal period in which certain processes take to be complete. This is the 't*ime tax*'. Corruption is seen as a hedging tool against inefficient bureaucratic policies. It is seen as a second best option to ease some long bureaucratic processes. The payment of informal costs is considered investing in great business networks (De Jong and Bogmans, 2011). It helps firms overcome the hurdles that exist when entering a new market thus enhancing higher financial performance.

Contrary to the early theory of grease on the wheels, recent literature has come up with the *'sandonwheels'*hypothesis.Inenvironmentswherecorruptionlevelsarehigh,highlevelsofproductivity are enjoyed by firms that do not pay bribes (De Rosa et al. 2010). The hypothesis that bribes serve to shorten the lengthy bureaucracies fails to stand. However, choice of whether to pay or not to pay a bribe remains solely a managerial decision since the environment in most cases is taken as given. For firms that are considering first time ventures, the decision is to choose whether to engage their business in such highly corrupt countries or not. Firms in countries with corruption levels and weak legal framework weak, experience poor productivity (De Rosa, et al. 2010; Moen and Sekkat, 2005). Poor bureaucratic quality and high levels of corruption negatively affect productivity (Faruq et al. 2013). The existence of strict regulations is often associated with very corruption levels and less better quality of both public and private goods. It is seen to distort the efficient allocation of a firm's resources economic growth in the long run (Mauro, 1995). Corruption tends to lower the quality of institutions which in turn affects the quality of macroeconomic policies that are put in place (Ibrahim et al. 2015) this erodes any gains from investment. The costs associated with the payment of bribes include erosion of critical resources such as a firm's culture and reputation, motivation for innovation and efficient resource allocation. The costs drive away or lower the firms' profits and result in technological and innovative inefficiency (Hung, 2008).

A third approach to corruption and productivity is institutional *theory*. It describes a firm's behaviour. Paying bribes is thought not to affect the performance of a firm (Wright et al. 2007). The bribe paid is only an entry fee that may facilitate an entry into a new market. Existing firms pay this fee and this exerts pressure on the new firm to follow suit. This does ends up not having any effect on the firm's performance. The quality of institutions determines the extent to which corruption can affect the level of productivity of a firm. Corruption is associated positively with

productivity in those countries with weak institutions (Meon and Weill, 2010). It is less harmful to productivity for those firms in countries with less effective institutions. Costly barriers to entry for foreign firms may be removed by the practice of bribery thus improving the attractiveness of a country for FDI. In this case, it varies positively with corruption (Helmy, 2013).

2.3. Empirical Literature

In recent years, several empirical studies have been carried out on several regions and countries across the world to determine the relationship that exists between corruption and firm productivity. Almost all the studies have been found to concur with at least one of the existing theories on the nature of this relationship. Some studies have also tried to investigate the relationship between corruptions, institutions; that is the level of regulation and the quality of decision making institutions in influencing firms' performance.

Athanasouli et al. (2012) investigated the relationship that existed between the corruption and level of firm performance in Greece. The study utilized data at the firm level for 546 firms spread over 9 regions in Greece for the years 2004 and 2005. The focus was on the impact of administrative corruption, a form of corruption where firms bribe those in government. Generally, corruption was found to be negatively associated with firm growth. A contrast was drawn between a firm's encounter with corruption and the contextual experience of corruption-general corruption in the sector in which the firm is operating, and it was found that this type of corruption is more significant. Further, differently sized firms were found to be differently affected by corruption. Both corruption at the firm level and sectoral corruption had a decreasing effect on firm sales and that corruption negatively affected firm growth. Furthermore, firms large in size suffer more from corruption than medium and small sized firms. This gave the suggestion that firm involvement in corruption is heterogeneous; firms classified as small and medium engage less in corruption thus

their performance is less affected with corruption when compared to that of large firms. The research concluded that individual firms are at liberty to choose the level of corruption that is profit maximizing whereas the effect of contextual type of corruption could either be negative or positive depending on whether the negative spill-over dominate the positive or otherwise.

Jiang and Nie (2014) carried out a study in China to establish the relationship that exists between corruption, regulation and firms' overall performance. The study used data for over 120,000 state owned (majority state capital share) and non-state owned (majority private capital share) firms for the period from 1999 to 2007. Using the Fixed Effects Model, the outcome of the study partly concurred with the grease on wheels hypothesis. Regional corruption positively affects a firm's profitability at higher levels of regulation compared lowly regulated environment, and this affects only privately owned and not public firms. Further the positive correlation is experienced in more competitive industries. The argument here was that there is a causal effect where corruption helps circumvent unproductive regulations. The study suggested that in order to effectively fight corruption, the environment in which corruption breeds needs to be checked by removal unnecessary regulatory policies and excessive marketplace intervention by the government.

Sharma and Mitra (2015) carried out a study that sought to establish the effect of bribe on firm performance in India. They were set to test the grease the wheels and sand the wheels hypotheses. Further the study had an intention of identifying which firms must pay bribes. Firm level data representative of the economy's private sector for 2287 Indian Enterprises across 22 industries from the World Bank Enterprise Survey of 2005-2006 was employed for the research. The findings of the study on bribes and performance posted mixed results with both hypotheses holding true in each case. Bribes act as a tax imposed on profitability leading to reduced efficiency. The results are however inconclusive on productivity. Bribing on the other hand has a beneficial effect on the

export levels and product innovation; contrary to Hung, (2008). On who must pay bribes, the study found out that firms evading tax must pay bribes. A policy impediment was found to be the major cause of bribery (bureaucratic complexities).

Hossain (2016) carried out a study that sought to establish the relationship between corruption and FDI inflows. Panel data for the years 1998 to 2014 across 48 countries was employed for the study since FDI is heterogeneous across countries. He employed three panel estimation methods: Random Effects Model, Feasible Generalized Least Squares and Panel Corrected Standard errors. Results from the three methods showed a 1% significance of corruption and the existence of a negative impact of corruption on FDI. Similar observations were made by Mudambi et al. (2013) who sought to investigate whether corruption can be a major hindrance to FDI inflows for55 countries for a period of 14 years. The study found corruption to statistically influence FDI as well as the level of economic regulation. Corruption is a significant hurdle to economic growth as it affects the level of investments as well as FDI inflows into the country. However, corruption had a positive impact on the level of FDI inflows to Asia and Africa but an adverse impact in the case of Latin America.

Tran et al. (2016) carried out a studied the relationship between corruption, provincial institutions and manufacturing firm productivity in a transitional economy- a case of Vietnam. Firm level data for Small and Medium Enterprises was used in 2005, 2007, 2009 and 2011. The results indicated that there exists a co-movement between low corruption levels and improved firm productivity. Bribe intensity has an adverse effect on a firm's productivity, and it is not whether a particular firm pays a bribe or not. The results of this study for small and medium private enterprises were in contrast to the greasing theory for the East Asian countries where corruption was believed to be positively related to the level of performance of a firm. A dummy variable for the intensity of

bribes was used with control for endogeneity of corruption controlled for. Further, Van Vuetal. (2018) carried out a study to investigate corruption, various types of corruption and their effect on firm financial performance on Vietnamese private firms. It was found out that it is the intensity of the bribe that affects a firm's financial performance as opposed to no effect of bribes on the financial performance.

Abudu (2017) carried out a study to investigate the effect of bureaucratic corruption on firm performance for 15 African countries drawn majorly from the Eastern and Southern Africa region. Firm level data from the WBES for 2006-2015 was utilized for the study. Corruption was the independent variable in the study against sales, labour productivity and employment. The firms in the survey were classified as small- with 5-19 employees, medium with 20-99 employees and large-above 100 employees. The Instrumental Variable approach was used to cater for endogeneity of the dependent variable. The findings of the study showed a negative relationship between corruption and a firm's sales level as well as labour productivity. Precisely, a increasing the level of corruption by 1% led to a 0.9% decrease in both sales and labour productivity. Generally, corruption has a huge adverse effect on larger and older firms as compared to smaller and younger firms.

Bbaale and Okumu (2018) carried out a study that sought to investigate the effect of corruption on a firm's level of productivity in Africa. The question posed in the study is whether the sanding effect or greasing effect to the wheels of commerce holds for corruption. Firm level World Bank Enterprise Survey data set for 2006 to 2017 was used. To control for endogeneity of the dependent variable, IV approach was used. The results of the study confirmed the sanding effect of corruption on productivity-corruption dampens productivity. Further, the study however, fails to find any significant evidence to support the grease on wheels hypothesis that corruption helps circumvent

bureaucratic processes. Practically, firms are better off not paying bribes and channeling their resources to productive activities.

Lingga (2018) carried out a study to investigate the relationship between corruption, foreign ownership structure and productivity in Indonesia. The study employed form level evidence from Indonesian firms in the manufacturing industry. The study had three different aspects in which the three topics were examined. Of interest to this study is the aspect on the effect of corruption on labour productivity. First, he divided corruption into two cases: arbitrariness of corruption which is the uncertainty that exists as to whether a corrupt activity yield the intended results and pervasiveness of corruption which is the probability of a firm having an encounter corruption. He developed three different hypotheses: One, an increase in pervasiveness of corruption decreases the firm's labour productivity. The second was that arbitrariness of corruption increases a firm's labour productivity by discouraging corrupt activities. Lastly, the role played by knowledge in influencing the impact of earlier two in productivity. The study found out that pervasive corruption tends to decrease a firm's labour productivity. This is because resources are misallocated and there is the promotion of rent seeking activities. However, arbitrariness of corruption made a positive contribution to a firm's labour productivity. This is because of the uncertainty that surrounds the outcome of the corrupt activity that makes firms shun corruption.

In a most recent paper, Ashyrov and Masso (2020), carried out an investigation as to whether corruption affects locally owned firms and those owned by foreigners differently. The study usedcross sectional data for firms from 29 countries for the Business Environment and Enterprise Performance Survey (BEEPS) fifth round survey of 2012-2014. The study also examines bribe

perceptions with the age of the firm whereby with age, a firm's bribe perception is lower than that of young firms. This means young firms pay higher bribes than old firms. The results were consistent with the sand on wheels hypothesis: corruption is negatively associated with firm performance. The productivity of foreign firms is largely affected by corruption than that of locally owned firms. The study also indicated that foreign firms pay larger amounts of bribes when compared to locally owned firms. This is because the firms face a lot of regulations of entry and operations when compared to local firms. The foreign firms are also less familiar with corrupt local officials hence payment of higher bribes. The bribes however end up negatively affecting the firms' productivity.

Further, in another recent World Bank Policy Research Working paper, Amin and Ulku (2019) tested whether corruption impedes productivity more at high levels of regulation. The study employed survey data of over 39,000 conducted by the World Enterprise Surveys on private firms from 111 economies spread across six regions in the world. The results showed the existence of a negative relationship between corruption level and firm productivity. This relationship is observed and is significant at high levels of regulation and insignificant at low levels of regulation (like the 25th percentile in the study). Corruption and high levels of regulation reinforce each other. Despite the study incorporating several control variables, it doesn't completely rule out the endogeneity problem and suggest that in future panel data and instrumental variables be used to address the issue. Other issues not addressed by the study include the nature of regulation and also the various mechanisms in which corruption affects productivity.

Martins et al., (2020) analyzed corruption and firms' performance. The dimensions of firms' performance in the study were investment, sales, employment and productivity growth. The study used firm-level data from the WBES for 117 developing and emerging countries and used 21,250

firms. The study period was 2002 to 2016. The study modelled an instrumental variable panel data. Corruption as measured by bribe tax was found to reduce all the indicators of firm performance i.e. sales growth, employment growth, productivity growth and investment.

CHAPTER THREE

METHODOLOGY

3.1. Introduction

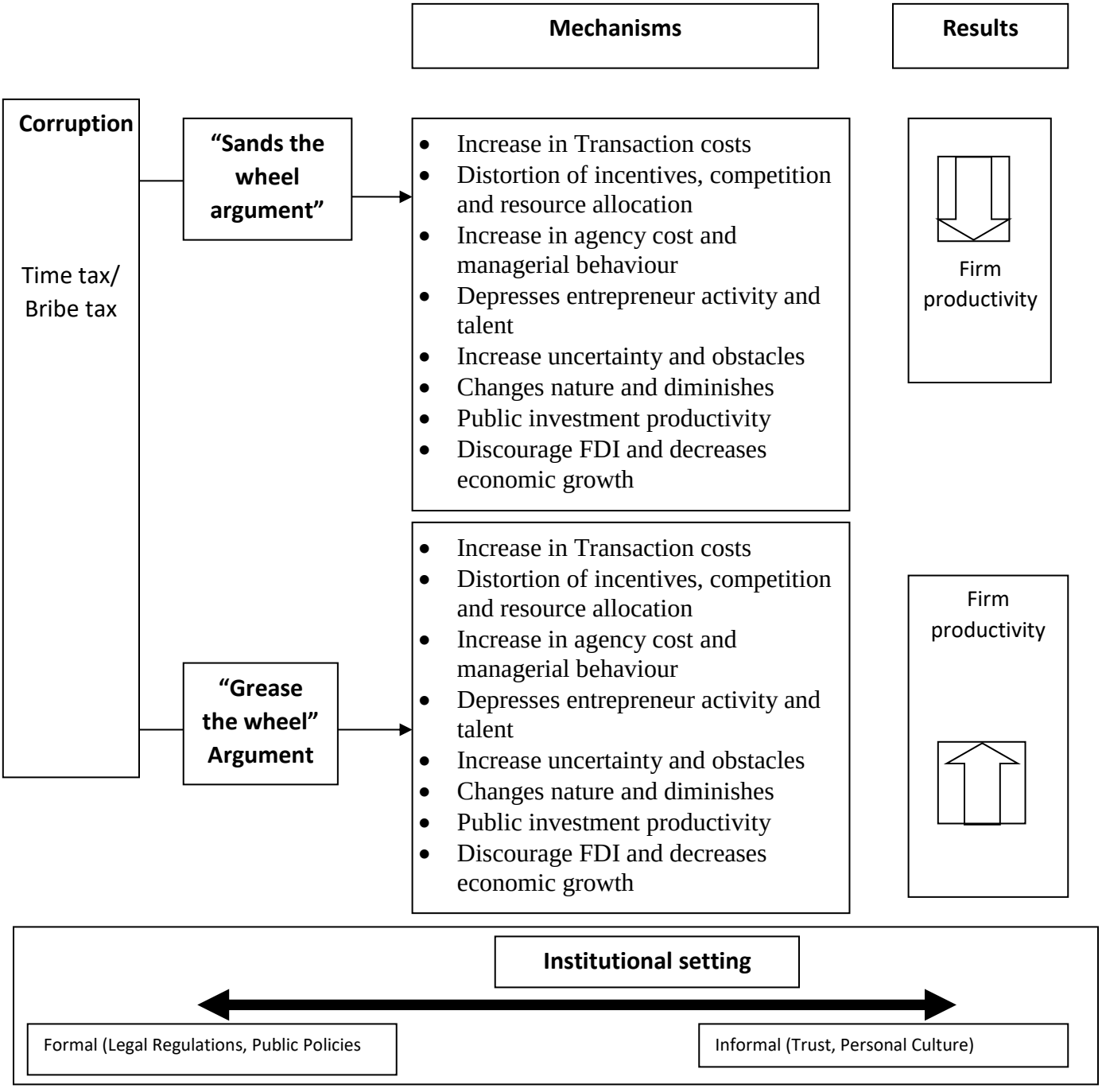
This chapter looks into the theoretical and empirical model that underpins the link between corruption and productivity of foreign firms in Kenya. We also discuss the estimation procedure, diagnostic test, data source and definitions of variables used in the study.

3.2. Conceptual Framework

Here a conceptual framework that links corruption to firm performance based on the two arguments which are; the ‘sand the wheels’ argument and ‘grease the wheels’ argument is presented.

Corruption usually takes place in an institutional setting where there are both formal and informal rules (Martins et al., 2020). There are at least four theories which try to explain how corruption affects the performance of a firm. These theories include; the Transaction Cost Economics (TCE) (Williamson, 1979), the public choice theory, the theory of entrepreneurial allocation and the ownership-location-internalization (OLI) paradigm.

Figure 3.1: Conceptual Framework



Source: Owners compilation of sand on the wheels and grease on wheels hypotheses

According to the TCE theory, corruption is viewed in two ways which affect the transaction cost of a firm. The first argument is the 'grease the wheels' argument which opines that corruption improves the performance of firms by expediting bureaucratic processes and obstacles in service delivery hence reducing the transaction cost of firms. However, the "sand the wheels' argument is that corruption derails a firm's performance by creating obstacles to the firms' operations by means of creating supplementary costs. Firms, therefore, waste time paying bribes thus incurring higher capital costs which reduces their performance. According to Martins *et al.*, (2020), the public choice theory views corruption as a rule based undertaking which determines the market incentives faced by the participants. Public officials are rational, opportunistic and are rent-seeking (Buchanan and Tollison, 1984). Firms usually require publicly provided goods and services such as permits and licenses. But since the rational bureaucrats are rational and practice rent-seeking, then firms are affected in terms of increased costs of investments by means of 'hidden tariffs'.

The theory of entrepreneurial allocation views corruption as a destructive activity which distorts the efficient allocation of resources (Baumol, 1990). The distortion in resource allocation brought about by corruption is as a result of higher rent-seeking activities returns compared to the productive processes. Bureaucrats usually intentionally delay processes in firms' orders suppressing their efficient operations, investments and growth (Rose-Ackerman, 1996).

The OLI paradigm is based on how transaction cost affects FDI. According to this theory, firms which depend on FDI inflows must take account of the corruption levels in a country since this is considered an extra cost for foreign firms. Cuervo-Cazurra (2016) notes that corruption limits foreign firm's entry into a country since corruption reduces their productivity than the domestically owned firms.

3.3. Theoretical framework

According to the theory of the firm, a firm's main objective is profit maximization. This objective of profit maximization is achieved through an increase in the productivity of all the factors employed in production. The firms are also assumed to be rational and have full knowledge about past performance, the present and the future conditions that may affect the firm (Ogun, 2014)

The total factor productivity of a firm is a measured by dividing the aggregate production by the factor inputs. The factor inputs here are labour and capital.

There is need to understand total factor productivity because it represents growth in real output in excess of growth in factor inputs.

The most popular production function is the Cobb-Douglas function which can be presented as shown in equation 3.1 below.

$$Q=AK^{\alpha}L^{\beta} \qquad (3.1)$$

Where Q is the total product, K is capital, L is labour, α and β are the output elasticity of capital and labour respectively.

Total factor productivity is given by dividing the total product by the weight sum of the inputs. This is shown in equation 3.2 below.

$$TFP=A=\frac{TotalProduct}{WeightedAverageofInputs}=\frac{Q}{K^{\alpha}L^{\beta}} \qquad (3.2)$$

Equation 3.2 above shows an upward change in total production which is in excess of the increase

in labour and capital. Equation 3.2 above gives the gives the total factor productivity. It is however pertinent look at the increase in total factor productivity over a period of time rather than concentrating at the absolute values. Equation 3.3 presents the growth in total factor productivity overtime popularly known as the growth accounting equation.

$$\frac{\Delta Q}{Q} = \alpha \times \frac{\Delta K}{K} + \beta \times \frac{\Delta L}{L} + \frac{\Delta A}{A} \qquad (3.3)$$

Rearranging to get the growth in total factor productivity, equation 3.4 is obtained.

$$\frac{\Delta A}{A} = \frac{\Delta Q}{Q} - \left(\alpha \times \frac{\Delta K}{K} + \beta \times \frac{\Delta L}{L}\right) \qquad (3.4)$$

Equation 3.4 above gives the relationship between growth in total factor productivity, growth in labour and growth in capital. It shows that growth in total factor productivity is a function of growth in total product, growth in capital and labour.

Measures of Total Factor productivity

There are two commonly used methods to measure total factor productivity. These methods are as discussed below.

The Olley and Pakes(OP)Approach

Since there are factors which affects productivity that are not in the data but known by the firm, estimating a production function may result to simultaneity. This method shows how investment proxy can be used to control for the correlation between inputs levels and the unobserved productivity shock.

The Levinsohn-Petrin Method

Levinsohn and Petrin (2003) approach uses a similar approach to the OP method but instead of inverting the investment demand function, it inverts the input demand function to control for the unobserved productivity. This method is mainly suitable because of data availability. The investment proxy is only useful for firms that report non-zero investment. The use of intermediate inputs helps in addressing the problem of investment data unavailability since with inputs; almost every firm reports a positive use of input such as water and electricity.

3.4 Empirical model

2.4. Overview of the literature

Most of the findings of the studies above are contradictory to the early ‘grease’ on the wheels hypothesis. All the studies concur that the environment in which corruption breeds needs to be reviewed implying the revision of policies that create an avenue for corrupt practices. Another study indicates that the relationship is a mixed one, supporting both the 'sand the wheels' and 'grease the wheels' hypothesis. One study indicates that it is bribe intensity that has an effect on the level of productivity of firms regardless of whether they are foreign or locally owned firms in all sectors of the economy, and not whether there is the incidence of bribery or not. A dummy variable is employed for a high intensity bribe. Another study shows that foreign-owned firms are affected more than locally owned firms.

In summary, there are four major factors that determine the levels of corruption: firm size, type of ownership, level of regulation (strength of institutions) and bribe intensity. Large firms are negatively affected by bribes than small and medium enterprises. Under high levels of regulation, corruption is positively associated with productivity than under low levels of regulation. On the type of ownership, foreign firms are largely and adversely affected than locally owned firms. This also complements the findings of other studies that corruption negatively affects FDI inflows into a country thus reducing a country's attractiveness as a host for foreign firms.

Only two of the studies have focused on Africa and they show the existence of an adverse relationship between corruption and firm productivity. None of these studies are based on the assumption that a high corruption perception index implies high bribe intensity. A high bribe intensity in turn implies a highly regulated environment with long bureaucratic processes where

foreign firms pay bribes to avoid what they perceive to be too many hurdles for establishing and running their businesses in the countries of interest. Further, most of these studies involve both the private sector and public sector enterprises. None of the studies looks into the manufacturing sector independently. The studies also involve large economic regions or countries that are economically different from Kenya thus the results can't be generalized for a country like Kenya. Further the mixed findings of the studies made it necessary to carry out a study on Kenya's manufacturing sector to be able to establish a finding to aid in the sector’s policy formulation.

3.4.1. Model specification

To evaluate the effect of corruption on productivity of manufacturing firms, the study adopted the equation below:

$$y_{it}=\beta_0+\beta_1 Corr_{it}+\beta_2 O_{1it}+\beta_3 O_{2it}+\beta_4 X_{it}+\gamma_i+U_{it} \quad (3.2)$$

Where y_{it} = log of firm *i*'s productivity at time *t*,

$Corr_{it}$ = measures corruption at firms' level and is defined by "bribe tax",

O_{it} = dummy for form of ownership

X_{it} =vector of control variables.

Control variable captures other key factors affecting firm productivity (for example firm size, firm age human capital, availability of credit and others.)

γ_I is the time fixed effect which captures for time specific fixed effects

U_{it} =disturbance term.

The dependent variable is the productivity of firms in the Kenyan manufacturing sector. The productivity of the firm is measured by three indicators: (1) real annual sales, (2) annual employment growth rates of only the permanent and full-time workers and (3) annual factor productivity growth rates.

Our main variable of interest to this study is corruption. Priori expected sign is negative. A number of control variables are considered. Firm size is expected to have a positive sign. Access to credit expected to have positive sign since this strongly affects firm performance. Lack of access to financial capital is one of the major hurdles to improved firm performance (Buyinza and Bbaale, 2013).

Age of the firm is expected to show a positive effect on its productivity. This is because firms that

have been in operation for long tend to have more advantages over young firms such as access to financial capital mainly because of their established stronger networks (Fisman and Svensson, 2007).

Table 3.1: Variable Definitions and Source

Variable	Definition	Source	Expected Sign
Productivity	Given by Total Factor productivity as measured by the log of Total annual sales use	WBES data	
Corruption	Measured by the log of total annual informal payments by firms	WBES data	-
Type of ownership	A firm is foreign owned if at least 10% shares owned by foreigner and otherwise it is local	WBES data	-
Capital	Funds used for the purchases of machinery, land and buildings	WBES data	+
Labour	Total annual payments to the firms' full time permanent workers (including wages, salaries, and other benefits	WBES data	+
Age	Age of firm in years	WBES data	+
Size	Dummy: 1=Small sized firm, 2=Medium, 3=Large firm	WBES data	+/-
Access to credit	1=Have access to finance 2=No access to finance	WBES data	+

3.4.2 Data Source

Data used in this study was sourced from World Bank Enterprise Surveys data 2007, 2013 and 2018.

3.4.3 Estimation and testing procedure

This study employs a panel data set for firms –both foreign and locally owned firms in the manufacturing sector in Kenya for the years 2007, 2013 and 2018. Panel data is preferred for this study over time series data as it is possible to control for heterogeneity when using panel data (Greene, 2018). Some aspects of heterogeneity for these firms may be observable like the number of skilled workers employed while others may be unobservable like the ability of each of the workers employed. To account for heterogeneity, a panel data model is employed expressed as:

$$y_{it} = \beta_1 Corr_{it} + \beta_2 O_{it} * Corr_{it} + \beta_3 O_{it} + \beta_4 X_{it} + \Upsilon_{it} + \mu_{it}$$

Where y_{it} is the log of firm *i*'s productivity at time *t*, $Corr_{it}$ is the corruption at firm level at a specific time, O_{it} is the form of ownership defined by either foreign or local ownership, X_{it} is a vector of all other control variables that affect productivity, Υ_{it} is the constant observable or unobservable firm specific effects and μ_{it} the disturbance term.

The relationship between firm heterogeneity Υ_{it} and the explanatory variables $Corr_{it}$ and O_{it} will determine the approximation method chosen. The pooled OLS method would be preferred in the event that Υ_{it} is constant. However, if unobserved firm heterogeneity is not correlated to the independent variables, then estimate using the Random Effects model. Otherwise, we choose the Fixed Effects model. To choose most appropriate model between the two, we conduct the Hausman Test for manufacturing firms.

CHAPTER FOUR

RESULTS AND INTERPRETATION

4.1 Introduction

This chapter presents the results and provides a discussion on the study findings. It also presents a summary statistics of the variables used in the study, the correlation, results from the Hausman test carried to determine the choice of model between Fixed and Random Effects model.

4.2 Summary Statistics

This section presets the summary statistics of the variables in the dataset used in the study. It presents measures of central tendency such as the mean and the median. Apart from the measures of central tendency, it also shows the standard deviation and the variance.

Table 4.1: Summary Statistics

	corruption*	age	size*	credit*	ownership*	Labour	capital	productivity
n	1265	1265	1265	1265	1265	1265	1265	1265
mean	1.363	32.432	2.002	1.464	1.117	6.805	17.173	37.386
sd	0.481	18.406	0.783	0.499	0.322	0.861	2.456	616.018
median	1.000	30.000	2.000	1.000	1.000	6.699	17.504	3.900
min	1.000	0.000	1.000	1.000	1.000	4.301	6.908	-47.200
max	2.000	114.000	3.000	2.000	2.000	9.699	24.307	21666.670
range	1.000	114.00	2.000	1.000	1.000	5.398	17.39	21713.870

		0					9	
skew	0.570	0.897	-0.003	0.144	2.380	0.395	-0.592	34.260
kurtosis	-1.677	0.992	-1.368	-1.981	3.669	0.009	0.167	1198.542
se	0.014	0.518	0.022	0.014	0.009	0.024	0.069	17.320

Source: Author's Computation using R version 4.0.4

From Table 4.1, the variables with asterisk are categorical variables and no meaningful interpretation can be drawn from them. The mean age of the manufacturing firms used in the study is about 32 years.

Table 4.2: Descriptive Statistics of Credit Access and Ownership

Table 4.1 shows the grouped summary statistics between credit access and firm ownership.

	Credit Access	**Ownership**	**Number of Firms**
1	No Credit Access	Local	601
2	No Credit Access	Foreign	77
3	Has Credit Access	Local	516
4	Has Credit Access	Foreign	71

Source: Author's Computation using R version 4.0.4

From the table, majority of the local firms have no credit access. However, a substantial amount of the local firms has credit access. The same trend is similar for foreign manufacturing firms.

Table 4.3: Descriptive Statistics of Size and Ownership

	Size	**Ownership**	**Number of Firms**
1	Small	Local	347
2	Small	Foreign	39
3	Medium	Local	434
4	Medium	Foreign	57
5	Large	Local	336
6	Large	Foreign	52

Source: Author's Computation using R version 4.0.4

Table 4.3 details the grouped summary statistics between size of the manufacturing firms and the type of ownership. It shows that majority of the medium-sized manufacturing are locally owned while few of the small-sized are foreign owned.

Table 4.4: Descriptive Statistics of Corruption and Size of the firms

	Corruption	Size	Number of Firms
1	No	Small size	262
2	No	Medium size	298
3	No	Large size	246
4	Yes	Small size	124
5	Yes	Medium size	193
6	Yes	Large size	142

Source: Author's Computation using R version 4.0.4

Table 5.1.3 shows the grouped summary statistics between corruption and firm size. From the table, medium-sized firms tend to register more instances of corruption than small and large manufacturing firms. Again, for those firms that don't register instances of corruption, medium-sized firms also tend to be dominant.

4.3 Correlation Matrix

Table 4.5: Correlation Matrix

	Corruption	Age	Size	Credit	Ownership	Labour	Capital	Productivity
Corruption	1.000	-0.018	0.036	0.04	0.012	0.05	0.029	0.032
Age	-0.018	1.000	0.184	0.062	0.034	0.207	0.018	-0.001
Size	0.036	0.184	1.000	0.166	0.04	0.551	0.016	0.05
Credit	0.04	0.062	0.166	1.000	0.011	0.221	0.073	-0.032
Ownership	0.012	0.034	0.04	0.011	1.000	0.04	-0.011	-0.011
Capital	0.05	0.207	0.551	0.221	0.04	1.000	0.033	-0.029
Capital	0.029	0.018	0.016	0.073	-0.011	0.033	1.000	-0.008
Productivity	0.032	-0.001	0.05	-0.032	-0.011	-0.029	-0.008	1.000

Source: Author's Computation using R version 4.0.4

The correlation matrix in Table 4.4 shows the degree of association among the variables used in the study. From the above matrix, none of the variables are highly correlated. Labour and size of the firm have the highest correlation of 0.551. All the other variables have correlations below this value. This is a clear indication that there's no multi collinearity in the results of the study.

4.4 Hausman Test

The study estimated the Hausman test to select the most efficient model between the Random and the Fixed Effects Model. The hausman test asumes that the null hypothesis is the preferred model against the alternative hypothesis that the FEM is the consitent one, Greene (2008).

The table below shows results of the hausman test.

Table 4.6: Results of the Hausman Test

Hausman Test
data: productivity ~ corruption * ownership + age + size + credit + ...
chisq = 1.3042, df = 8, p-value = 0.9955
alternative hypothesis: one model is inconsistent

Source: Author's Computation using R version 4.0.4

From the above table, the p-value is insignificant implying that we cannot reject the null hypothesis. Therefore, we conclude that the random effects model is most effective model over the fixed effects model.

4.5 Breusch-Pagan Lagrange Multiplier (LM) Test for Random Effects:

The Hausman Test has revealed that the Random Effects model is the most consistent one. However, there is need to determine whether the panel effects are really necessary or whether we can just estimate a pooled ordinary least squares model. The Lagrange Multiplier determines

between which model to use between the OLS model and the random effects model. The null hypothesis is that the variance across the firms are zero implying that there are no significant differences across the entities. If we reject the null hypothesis, we maintain the Random Effects model.

Table 4.7: LM Test for Panel Effects

Balanced panels Test: Lagrange Multiplier Test - (Breusch-Pagan)
data: productivity ~ corruption * ownership + age + size + credit + ...
chisq = 6.9233e-06, df = 1, p-value = 0.9979
alternative hypothesis: significant effects

Source: Author's Computation using R version 4.0.4

Table 4.7 shows not enough evidence to reject the null hypothesis since the p-value is insignificant. The LM test therefore supports the estimation of the Pooled OLS model.

4.6 Model Results

Table 4.8: Model Results

	Dependent variable:	
	Productivity	
	(1)	(2)
corruption1	50.072	2.946
	(38.427)	(67.198)
ownership1	-7.660	-25.696
	(68.170)	(53.911)
age	0.055	0.063
	(0.966)	(0.966)
size2	43.153	42.644
	(44.521)	(53.666)
size3	152.516***	104.368*
	(53.307)	(62.306)
credit1	38.714**	35.56**
	(35.710)	(35.755)
log(Labour)	-54.799**	-53.716**
	(24.609)	(24.651)
log(Capital)	1.257**	1.543**
	(7.074)	(7.069)
corruption1:ownership1	-41.347	
	(111.277)	
corruption1:size2		5.149**
		(88.148)
corruption1:size3		129.640**
		(93.466)
Constant	369.106*	381.936**
	(193.030)	(194.348)
Observations	1,265	1,265
R^2	0.487	0.562
Adjusted R^2	0.462	0.547
F Statistic	5.425 (df = 9; 1255)	7.533 (df = 10; 1254)
Note:		*p**p***p<0.01

Source: Author's Computation from R version 4.0.4

The table above shows the findings of the study. The two models are slightly of good fit with coefficients of determination of about 48.7 percent and 56.2 percent respectively. These coefficients are slightly low since the study used panel data unlike time series where variables are used highly correlated and high coefficients of determination is expected. With regard to model coefficients, the following interpretations can be drawn.

Corruption has a positive coefficient on productivity: however, the coefficient is insignificant for both models. Firm ownership has also an insignificant effect on productivity. The same effect is also observed for age. The size of a firm is a significant determinant of a firm's productivity. Large firms are more productive as compared to smaller firms. With a coefficient of about 152, large firms increase production by about 152 units compared to smaller firms. The second model also displays similar results with coefficients being significant at 1 percent and 10 percent levels respectively.

Access to credit is an important determinant of a firm's productivity. With coefficients of about 38 and 35 respectively, firms with access to credit experience about 38 and 35-unit increase in productivity as compared to firms without credit access.

Labour has a negative effect of manufacturing firms' productivity. From economic theory, an increase in labour is expected to have a positive effect on productivity. However, this study finds conflicting results to those proposed by economic theory. A unit increase in labour costs leads to about 55 and 54 units decline in productivity. This may be due to the fact that the labour used does not lead to an increase production since it may be inefficient due to diminishing returns as long as capital is fixed.

With regards to how corruption affects the productivity of different firm sizes, the following

discussions can be drawn from the above table. Firms with medium sizes who are engaged in corrupt deals are more productive compared to small firms. With a coefficient of about 5, the medium sized firms are more productive with 5 units compared to small firms. Larger firms engaged in corruption report more advances in production than medium sized firms. Large firms engaged in corruption report about 130 units increase in productivity compared to small firms engaged in corrupt deals. This supports the hypothesis that large firms have the financial muscles to pay bribe tax which reduces bureaucracies hence leads to efficiency and increase production.

4.7 Post Estimation Tests

This section presents the post estimation tests that the study carried out in order to determine whether the model results were robust. The study used the Breusch-Godfrey test for autocorrelation and the student-Breusch Pagan test to test for heteroscedasticity and the results are as shown below.

***Table 4.9: Results for Breusch Pagan test for autocorrelation*.**

Breusch-Godfrey/Wooldridge test for autocorrelation
data: productivity ~ corruption * ownership + age + size + credit + ownership + Labour + Capital
chisq = 0.026291, df = 1, p-value = 0.8712
alternative hypothesis: idiosyncratic errors are autocorrelated

Source: Author's Computation using R version 4.0.4

The null hypothesis of the Wooldridge test for serial correlation is there is no autocorrelation. Since the p-value of the test in insignificant, we cannot reject the null hypothesis of no serial correlation.

Table 4.10: Results for Studentized Breusch-Pagan test for Heteroscedasticity

Studentized Breusch-Pagan test
data: POLS BP = 9.1718, df = 9, p-value = 0.4216

Source: Author's Computation using R version 4.0.4

Breusch-pagan test tests for heteroscedasticity. Just like the Wooldridge test, the null hypothesis of the test is that the model residuals are homoscedastic. With a p-value of 0.4216, there is no enough evidence for the null hypothesis to be rejected. The model residuals are therefore homoscedastic.

CHAPTER FIVE

SUMMARY, CONCLUSION AND POLICY IMPLICATION

5.1 Summary

The study was set to determine the impact of corruption on the productivity of manufacturing firms in Kenya. Specifically, the study tried to determine the extent to which local and foreign firm's productivity are affected by corruption and the extent to which corruption affects the productivity of different firm sizes. Using the WBES survey data and estimating a pooled panel model the study found out that corruption showed an insignificant negative effect on the productivity of firms with a significant negative influence experienced by foreign firms. The existence of stringent regulations that are faced by foreign firms as they try to set up and run their operations in the country explains this. These costs increase the transaction costs of a firm, negatively affecting its productivity.

Further, the size of a firm was an important variable in positively influencing a firm's productivity. Larger firms were found to be more productivity as compared to small firms. This presents the aspect of economies of scale. This study further reveals that large manufacturing firms that engaged in corruption are more productive than small firms that engaged in corruption.

Further, the study found out that labour had an adverse effect on a firm's overall productivity. This is possible due to the fact that additional labour holding all other things constant leads to diminishing returns which has a negative effect on productivity. Credit access and labour were found to increase firm's productivity. Credit availability leads to increased investment in capital goods which boosts a firm's productivity.

Finally, the study carried out robustness test and determined that the models were robust. The

Wooldridge test and the Breusch-Godfrey test did not find the evidence of existence of serial correlation and heteroscedasticity respectively.

5.2 Policy Implications

This study showed that corruption positively affects the productivity of large when compared to small firms. Therefore, small firms should stay away from corrupt practices and channel their resources to the more profitable activities. Further, large firms despite having improved productivity should also concentrate their resources on factors like capital and technological innovations to avoid realizing diminishing marginal returns due to fixed levels of capital and labour investments.

Firms should monitor their labour costs since not all increase in labour costs leads to increased productivity. There is an aspect of diminishing returns. All the firms should strive to increase their capital investment since capital is an important factor in increasing a firm's productivity. There is also a need for firms to expand their credit availability avenues since credit availability was found to increase firms' productivity.

5.3 Limitations of the Study and Key Areas for Further Study

This study did not take into consideration the level of regulation in the country as an environment in which corruption breeds. Further study is recommended to investigate how the rules and regulations governing the manufacturing sector hence the level of regulation affect the levels of corruption and how this in turn affect the level of productivity of firms in the sector.

REFERENCES

Abudu, D. (2017). *Corruption and Firm Performance in Africa.* Nottingham: In Seminar Paper Presented at the School of Economics, University of Nottingham.

Amin, M., & Ulku,H.(2019).*Corruption,RegulatoryBurdenandFirmProductivity.*TheWorldBank.

Ashyrov, G., & Masso, J. (2020). Does Corruption affect Local and Foreign -Owned Companies Differently? Evidence from the BEEPS Survey. *Post-Communist Economies, 32*(3), 306-329.

Athanasouli, D., Goujard, A., &Sklias, P. (2012). Corruption and Firm Performance: Evidence from Greek Firms. *International Journal of Economic Sciences and Applied Research,5*(2),43-67.

Bai, J., Jayachandran, S., Malesky, E. J., & Olken, B. A. (2013). *Does Economic Growth Reduce Corruption? Theory and Evidence from Vietnam (No.w19483).*National Bureau of Economic Research.

Baltagi, B.H. (2005). *Econometric Analysis of Panel Data.* John Wiley & Sons Ltd.

Banerjee, A., Mullainathan, S., & Hanna, R. (2012). *Corruption (No. w17968).* National Bureau of Economic Research.

Baumol.(1990).Entrepreneurship:Productive,Unproductive,andDestructive.*JournalofPoliticalEconomy, 98*(5), 893-921.

Baumol, W. J. (1990). Quality Changes and Productivity Measurements: Hedonicsandan Alternative. *Journal of Accounting, Auditing and Finance, 5*(1), 105-117.

Bbaale, E., & Okumu, I. M. (2018).*Corruption and Firm-Level Productivity: Greasing or Sanding Effect?* World Journal of Entrepreneurship, Management and Sustainable Development.

Boudreaux, C. J., Nikolaev, B. N., & Holcombe, R. G. (2018). Corruption and Destructive Entrepreneurship. *Small Business Economics, 51*(1), 181-202.

BPS. (2020).*Budget Policy Statement.* Nairobi: The National Treasury.

Buchanan, J. M., & Tollison, R.D. (1984).*The Theory of Pubic Choice--II.* University of Michigan Press.

Buyinza, F., & Bbaale, E. (2013).*Access to Credit and the Effect of Credit Constraints on the Performance of Manufacturing Firms in the East African Region: Micro Analysis.* IDRC.

Campos, N.F., Dimova, R.D., & Saleh, A. (2010).*Whither Corruption. A Quantitative Survey of the Literature on Corruption and growth.*

Cheruiyot,K.J.(2017).DeterminantsofTechnicalEfficiencyinKenyanManufacturingSector. *AfricanDevelopmentReview,29*(1),44-55.

Cuervo-Cazurra, A. (2016). Corruption in International Business. *Journal of World Business, 51*(1), 35-49.

DeJong, E., & Bogmans, C. (2011). Does Corruption Discourage International Trade? *European Journal of Political Economy, 27*(2), 385-398.

DeRosa, D., Gooroochum, N., & Gorg,N.(2010).*Corruption and Productivity: Firm Level Evidence from the BEEPS Survey.* World Bank.

Djankov, S., LaPorta, R., Silanes, L.-d., & Shleifer, A. (2002). The Regulation of Entry. *The Quartelry Journal of Economics, 117*(1), 1-37.

Dreher, A., Kotsogiannis, C., & McCorriston, S. (2007). Corruption around the World: Evidence from a Structural Model. *Journal of ComparativeEconomics,35*(3), 443-466.

Faruq,H.,Webb, M.,&Yi,D. (2013). Corruption, Bureaucracy and Firm Productivity in Africa. *Review of Development Economics,17*(1),117-129.

Fisman, R., & Svensson, J. (2007). Are Corruption and Taxation really Harmful to Growth? Firm LevelEvidence.*JournalofDevelopmentEconomics,83*(1),63-75.

Gachino,G.G.(2017).ForeignDirectInvestmentandFirmLevelProductivityinKenyaManufacturing:A Panel Data Analysis. *Institutions and Economics,* 17-57.

Guerogruiev,D.,&Malesky,E.(2012).ForeignInvestmentsandBribery:AFirmLevelAnalysisof Corruption in Vietnam. *Journal of Asian Economics, 23* (2), 111-129.

Helmy, H. E. (2013). 'The Impact of Corruption on FDI: Is MENA an Exception?', *International Review of Applied Economics, 27*(4), 491-514.

Hossain, S. (2016). Foreign Direct Investment (FDI) and Corruption. Is it a Major Hinderance for Encouraging Inward FDI? *African Journal of Business Management, 10*(10), 256-269.

Hsiao,C. (2005).Why Panel Data? *The Singapore Economic Review, 50*(2), 143-154.

Hung, H. (2008). Normalized Collective Corruption in a Transitional Economy. Small Treasuries in Large Chinese Enterprises. *Journal of Business Ethics, 79*((1-2)),69-83.

Ibrahim, M., Kumi, E., &Yeboah, T. (2015).Greasing or Sanding the Wheels? Effect of Corruption on Economic Growth in Sub-Saharan Africa. *African Journal of Economic and Sustainable Development, 4*(2), 157-173.

Jiang, T., & Nie, H. (2014). The Stained China Miracle: Corruption, Regulation and Firm Performance. *Economics Letters, 123*(3), 366-369.

Lingga,I.(2018).*Corruption, Foreign Ownership Structure, and Productivity: Firm Level Evidence from Manufacturing Industry in Indonesia.*(Doctoral dissertation, National University of Singapore(Singapore).

Martins,L.,Cerdeira, J.,& Teixeira, A.(2020).*Does Corruption Boost or Harm Firm's Performance in Developing and Emerging Economies? A Firm-Level Study.* Porto: Wiley.

Mauro, P. (1995). Corruption and Growth. *The Quarterly Journal of Economics, 110*(3), 681-712.

Meon, P. G., & Weill, L. (2010). Is Corruption an Efficient Grease? *World Development, 38*(3),244-259.

Moen,P. G.,&Sekkat,K.(2005).Does Corruption Grease or Sand the Wheels of Growth? *PublicChoice,122*((1-2)),69-97.

Mudambi, R.,Navarra, P.,&Delios, A.(2013).Government Regulation, Corruption and FDI. *Asia Pacific Journal ofManagement,30*(2),487-511.

Ngunjiri,I.(2010).Corruption and Entrepreneurship in Kenya. *Journal of Language, Technology and Entrepreneurship in Kenya, 2*(1),93-106.

Ogun, O. D. (2014). Corruption and Long Run Growth: A Framework. *International Advances in Economic Research, 20*(2), 245-265.

Ongore, V. O. (2011). The Relationship between Ownership Structure and Firm Performance: AN Empirical Analysis of Listed Companies in Kenya. *African Journal of Business Management, 5*(6), 2120-2128.

Rasiah, R., & Gachino,G.(2005). Are Foreign Firms More Productive and Export-and Technology-Intensive than Local Firms in Kenyan Manufacturing? *Oxford Development Studies,33*(2), 211-227.

Rose-Ackerman. (1996).*When is Corruption Harmful? A Background Paper for World Development Report 1997.* Washington, DC: World Bank (August 1996).

Sharma, C., &Mitra, A. (2015). *Corruption, Governance and Firm Performance.* Evidence from the Indian Enterprises.

Svensson,J.(2005). Eight Questions About Corruption. *Journal of Economic Perspectives,19*(3),19-42.

Tran, T. Q., Houng, V. V., Doan, T. T., & Tran, D. H. (2016). Corruption, Provincial Institutions and Manufacturing Firm Productivity: New Evidence from a Transitional Economy. *Estudiosde Economía, 43*(2).

UNCTAD. (2018).*Trade and Development Report: Power, Reforms and the Free Trade Delusion.* United Nations.

Van Vu, H., Tran, T. Q., Van Nguyen, T., & Lim, S. (2018). Corruption, Types of Corruption and Firm Financial performance: New Evidence from a Transitional Economy. *Journal of Business Ethics, 148*(4),847-858.

Vial,V.,& Hanoteau,J.(2010). Corruption, Manufacturing Plant Growth, and the Asian Paradox: Indonesian Evidence. *World Development, 38*(5),693-705.

Williamson, O. E. (1979). Transaction-Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics, 22*(2),233-261.

Woo, J. Y., & Heo, U. (2009).Corruption and Foreign Direct Investment Attractiveness in Asia. *Asian Politics and Policy, 1*(2), 223-238.

Wooldridge, J. M. (2010). *Econometric Analysis of Cross Section and Panel Data.* Cambridge, MA: MIT Press.

World Bank. (2018).*Enterprise Survey.* Washington DC: World Bank.

Wright, S., Sanchez-Azofeifa, G. A., Portillo-Quintero, C., & Davies, D. (2007). Poverty and Corruption Compromise Tropical Forest Reserves. *Ecological Applications, 17*(5), 1259-1266.

Xu, G., & Yano, G. (2017). How Does Anti-Corruption Affect Corporate Innovations? Evidence from recent Anti-Corruption Efforts in China. *Journal of Comparative Economics, 45*(3),498-519

Appendix I: Corruption laws reforms in Kenya over the years

Anti-Corruption Law	*Mandate*
Public Officers Ethics Act,2003	It provides ethical requirements for all public officers which includes declaration of wealth by each officer
Anti-Corruption and Economic Crimes Act, 2003	It saw the establishment of KACC whose role was to investigate, prevent economic crimes as well as create public awareness on the dangers of corruption
Constitution of2010	Chapter Six of the constitution seeks to promote ethical values among public officers, as well as integrity and servant leadership.
Ethics and Anticorruption Commission Act 2011	The establishment of EACC with the mandate to combat, prevent corruption as well as promote ethical conduct through public awareness, promoting ethical behavior and anti-corruption
Leadership and Integrity Act2012	Leadership and integrity for all public officials and state officers.

Source: Anti-Corruption Authorities (WB)