

**INFRASTRUCTURE, INSTITUTIONAL QUALITY, AND THE INTENSITY OF
KENYAN FIRM EXPORTS**

By

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DECLARATION

I hereby declare that this research project is my original work and has not been submitted previously for examination to any university or college for an academic award.

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This research project has been submitted for examination with my approval as the University Supervisor.

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DEDICATION

This project is dedicated to Miriam Ambasa and John Ndale, for their unconditional love and support.

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LIST OF ABBREVIATIONS

2SLS	Two Stage Least Square
AfCFTA	African Continental Free Trade Area
AGOA	Africa Growth and Opportunity Act
ASEAN	Association of South East Asian Nations
DHM	Double Hurdle Model
EAC	East African Community
EPA	Economic Partnership Agreement
EPC	Export Promotion Council
EPZs	Export Processing Zones
ERSP	Economic Recovery Strategy Paper
EU	European Union
FE	Fixed Effects
GATS	General Agreement on Trade in Services
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
IV	Instrumental Variable
LM	Lagrange Multiplier
OECD	Organization for Economic Coordination and Development
OLS	Ordinary Least Square
PLS	Partial Least Square
PMG	Pooled Mean Group
PPML	Poisson Pseudo Maximum Likelihood
pVAR	Panel Vector Autoregression
RE	Random Effects
SEA	South East Asia
SMEs	Small and Medium Enterprises
SSA	Sub Saharan Africa
VECM	Vector Error Correction Model
VIF	Variance Inflating Factor
WBES	World Bank Enterprise Survey
WTO	World Trade Organization

ABSTRACT

This research explained export intensity in Kenya using infrastructural development and institutional quality, among other factors. The research applied linear panel regression model. The research utilized panel data drawn from the World Bank Enterprise Surveys of 2013 and 2018, and employed both the fixed effects and the random effects models. The Hausman test results led to the adoption of the random effects model. This research concluded that when faced with obstacles related to transport, a firm's export intensity rose; website ownership reduced export intensity, and; age of the firm increased export. Export intensity declined in tax administration. This paper recommends streamlining tax administration as a first step towards increasing export intensity. Streamlining tax administration could be realized through for example through reducing "unnecessary" paperwork, reducing compliance checks, and making the tax policy as simple as possible to understand. To control corruption, crackdown on corrupted officials by setting up of punitive measures against corrupt government officials. To address the negative effect of certain infrastructural factors on exports such as water shortage public-private partnerships ought to be pursued in addressing water shortage problems such as drilling of boreholes and the construction of dams that would serve as a long-term solution.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Although international trade fuels growth (Bahri et al, 2020), in Kenya and other developing countries, export trade remains relatively low. This has been argued to arise for four reasons. One, although the demand for services and manufactured goods has risen globally, developing countries tend to rely heavily on agriculture and other extractive activities. This has consequently meant that trade benefits in export services and manufactures go largely untapped by developing countries. Two, low levels of infrastructural development (Andresen, 2017; Akims and Danyil, 2018; Ahmad et al, 2021), punitive corruption (Turner, 2021; Olney, 2016; Bahri et al, 2020), and restrictive/uncertain trade policies (Smith et al, 2018; Tam, 2018) have served to raise the cost of trade. With rising trade costs, exporters in these economies find little to no incentive in expanding export-oriented production. Third, low levels of industrial development in developing countries have meant little value addition in the primary commodities produced. This then pushes these countries into exporting unfinished/primary products while importing finished/processed goods. Besides, low level of industrialization has meant that export diversification remains low (Fonchamnyo and Akame, 2017). Fourth, large populations relative to available resources and economic under-diversification have meant that only a small fraction of agricultural products is available for exports after meeting domestic demand for food (Fonchamnyo and Akame, 2017; Hanson, 2012). Besides, relative resource scarcity in developing countries has occasioned the importation of intermediary commodities in the course of export production (Riad et al, 2012).

At the global level, export-oriented production is dominated by large multinational firms (Tintelnot, 2017) with global trade output coming disproportionately from a few highly-industrialized countries (Andresen, 2017). Prior to 1994, international trade was predominantly an undertaking of

high-income economies (Hanson, 2012). According to Hanson (2012), the integration of emerging economies into trade after 1994 increased the participation of developing economies in export trade. In particular, India's and China's industrialization enhanced diversification as well as large scale commodity production enabling the two emerging economies to effectively tap into export trade. Hanson (2012) reveals that developing countries contributed 43% to global exports in 2008, the share having risen from 1992's 21%. Worsening trade tensions in the wake of rising protectionism, however, threaten to hold back global trade (Freund et al, 2018). The tariff war that pitted China against the United States in 2018 was, for instance, estimated to have stalled 3% of global exports (Freund et al, 2018).

Evolution of trade has evidenced a focus on both inter-continental and intra-continental trade. In many developing countries, however, inter-continental trade dominates intra-continental trade. United Nations (UN) COMTRADE dataset, for instance, indicates that although Uganda was the world's leading importer of Kenya's commodities over the period 2015-2019, Kenya was the 12th leading importer of Uganda's products. Even then, large discrepancy was evident in the Kenya-Uganda trade with Kenya's exports and imports to Uganda over the 5year period averaging at US \$3143million and US \$1648million per annum, respectively. Indicative in this is unequal trade reciprocity between Kenya and Uganda. At the regional level, COMTRADE indicates that India and China are the leading Sub-Saharan Africa (SSA) region's trading partners with South Africa coming in third. Although the SSA is a net exporter as an entire region, only 17% of trade is intra-African trade.

Amidst the unequal trade reciprocity among developing countries, of concern has been existing red tapes and infrastructural underdevelopment. Within SSA, Calderón et al. (2018) and Lakmeeharan et al. (2020) argued that infrastructural gaps in the region varied across countries as well as sectors. These gaps involve either water and sanitation, transportation, electric power, or

telecommunications (Calderón et al, 2018; Mutiiria et al, 2020). The Global Competitiveness Report reveals that the bottlenecks facing infrastructural development in SSA are severe. Calderón et al (2018) argued that infrastructural underdevelopment aggravates the region's geographic disadvantage which then raises the cost of trade by raising transportation costs. There have been, however, noticeable developments in other infrastructural dimensions, namely; electric power and telecommunications. The Global Competitiveness Report shows that although internet connectivity, mobile phone subscriptions, and telephone lines in SSA rose over the period 1990 to 2015, electric power disruptions too rose. Besides, the region's electric power generation potential remains largely underutilized (Calderón et al, 2018). In Kenya, the 2018 World Bank Enterprise Survey (WBES) indicated that firms faced minor and moderate obstacles in transport and electricity supply, respectively. These obstacles then stood in the way of firms raising output, and subsequently implied that less output would be available for export than it would without the obstacles.

1.1.1 Evolution of Kenyan Exports, 1990-2022.

Export performance in Kenya has generally been low over the years with the country being a net importer (Wamalwa and Were, 2021). Over the period 2010-2014, Uganda and Tanzania were

Kenya's leading exports recipients with COMTRADE indicating Tanzania dropping to the 6th place over the period 2015-2019. The decline in Kenya's exports to Tanzania has been argued to arise from political hostilities between the two trading partners (Seno, 2019). Although the backlash appears to be politically-motivated (Ogutu, 2021; Seno, 2019), Leyaro (2021) argued that Tanzania considered herself shortchanged by Kenya. That is, Tanzania was importing more of Kenya's commodities than it was exporting to Kenya (Leyaro, 2021). A closer examination of Kenya's trade flow reveals a slight decline in exports' share of total trade from 26.60% for the 2010-2014 period to 26.42% for the 2015-2019 period.

At the micro level, WBES (2018) reveals that only 10.7% of firms in Kenya are export-oriented with indirect and direct exports constituting a combined total of 14.4% of the total sales made on average. In 2020, supply chains were disrupted both domestically and globally following the imposition of lockdowns in response to coronavirus (COVID)-19 pandemic. Socrates (2020), however, indicated a rise in Kenya's exports in the wake of lockdowns. The above notwithstanding, export-oriented production and export trade in Kenya faces hurdles with varying degrees of severity. According to WBES (2018), firms in Kenya reported that whereas trade regulations, labor regulations, transport and tax administration were minor obstacles, obstacles related to electric power, tax rate, and corruption were moderate. These obstacles not only raise the cost of production but also raise trade costs (Simiyu and Mbinya, 2022).

In addressing the various obstacles to exporting trade, Kenya has embarked on ambitious policy formulation initiatives. In the 1990s, trade liberalization was accompanied by a brutal focus on export promotion alongside decisive efforts by Kenya to integrate with other countries (Wamalwa and Were, 2021). In the early 2000s, the country initiated the Kenya Vision 2030 which further emphasized expansion of the export sector without forgetting infrastructural development (Wamalwa and Were, 2021; Lesutis, 2021). For the export sector to expand and contribute towards Kenya's growth, the Kenya Vision 2030 was to build upon the 2003-2007 'Economic Recovery Strategy Paper' (ERSP) which underlined the need to diversify Kenya's export by increasing services and manufactured goods' shares in exports. Other initiatives included signing up for the Africa Growth and Opportunity Act (AGOA), and the Economic Partnership Agreement (EPA) with the European Union. Despite these initiatives, export performance in Kenya remains discouraging (Socrates et al, 2020). Besides, distrust between Kenya and fellow trading partners, notably Tanzania, within the East African Community (EAC) stalled the conclusion of EPA. Thus, Kenya is yet to receive duty-free low-income exporter privileges within the European Union (EU). Even then, Kenya remains resilient

in the quest to integrate and foster trade. Demonstrably, mega-infrastructureal projects have been undertaken, some underway while others are complete (Lesutis, 2021; Gambino and Gambino, 2022; Mbataru, 2018). These infrastructureal developments not only connect localities but also open up regions and the country for trade. The Thika Super-Highway, for instance, connects Kiambu business hubs to Nairobi City as well as various export processing zones (EPZs) within Nairobi's metropolis (Kimari and Lesutis, 2022). The Northern Corridor, on the other hand, will connect the port of Lamu to Ethiopia and South Sudan when complete (Lesutis, 2020). This will consequently enhance the movement of people and commodities between Kenya and her two Northern neighbors. Last, in 2019, Kenya joined other African States in establishing the African Continental Free Trade Area (AfCFTA), a trade protocol which seeks to foster intra-African trade by dismantling trade barriers, encourage intra-regional connectivity, and boosting integration (Raga et al, 2022). Since then Kenya has exported Exide batteries and tea exports to Ghana being the first and second trade consignment respectively under the AfCFTA framework.

1.2 Statement of the Problem

Despite attempts by the government to boost export trade, Kenya remains a net importer with less than 1 in every 5 firms, on average, producing for exports (Wamalwa and Were, 2021; WBES, 2018). This has meant that the country's export capacity remains underutilized with firms reporting various hurdles which hinder both export production and exporting. According to WBES (2018), enterprises in Kenya faced minor to moderate obstacles with less than 15% of total sales arising from exports. Beginning with a change of focus from import substitution to export promotion in the 1990s, the 2003-2007 ERSP, and the Kenya Vision 2030, export expansion has been at the heart of Kenya's developmental agenda. In the recent past, the country has witnessed mega-infrastructureal developments, the establishment of Export Promotion Council (EPC), membership to regional economic blocs such as the AfCFTA, and concerted efforts towards negotiating EPAs with Kenya's

trading partners. Compared to the 1990s, more enterprises in Kenya are currently connected to infrastructure including water infrastructure, electric power, transport, and telecommunications. Even then, the infrastructural gap in the country has not been bridged (Ombara, 2018; Orero, 2019; Onjala, 2018).

Although tremendous progress has been realized in the development of telecommunication infrastructure such as internet connectivity, broadband, and telephone lines as well as mobile phone subscriptions, the supply of generated electric power to firms remains low relative to demand. Moreover, blackouts, industrial water shortages, and poor transport network in some parts of the country create bottlenecks which disincentivize both production and export trade. That is, existing bottle necks not only stifle firms' productivity but also stand in the way of producing for export trade and the effective participation in export trade. This does not, nevertheless, imply that the challenges posed by poor transport network or power disruptions can be ignored. Poor transport network such as impassable roads, for example, means that commodity's ferrying could take longer than the norm with commodity markets remaining inaccessible. In the case of perishables such as vegetables and horticultural crops, transportation delays could amount into spoilage and wastage. Thus, costs of poor infrastructural development are more real than imagined, and when felt, the effect is devastating.

1.3 Research Questions

Against the aforementioned, this research will endeavor to answer the following questions:

- i. To what extent does transport, telecommunication, and electricity infrastructure impact Kenyan exports?
- ii. To what extent does institutional quality impact Kenyan exports?

1.4 Objectives of the Study

The main objective of this study is to analyze how infrastructural development and institutional quality impact Kenyan exports. The realization of this goal necessitates the pursuit of the following goals in specificity:

- i. To analyze transport, telecommunication and electricity infrastructure impact on Kenyan exports.
- ii. To analyze institutional quality's impact on Kenyan exports.
- iii. To derive policy implications from the findings of the study.

1.5 Significance of the Study

Previous studies investigated how export trade was affected by infrastructural development/underdevelopment as well as institutional quality and other factors. The conclusions drawn, however, differed across the studies and were context specific. This meant that is the conclusions varied across countries. This meant that suggestions for policy were varied. While contributing to literature, this research made certain observations which are useful when adopted by policy makers and firms. This paper recommends streamlining tax administration as a first step towards increasing export intensity. Streamlining tax administration could be realized through for example through reducing paperwork, reducing compliance checks, and making the tax policy as simple as possible to understand. To control corruption, crackdown on corrupted officials by setting up of punitive measures against corrupt government officials. To address the negative effect of certain infrastructural factors on exports such as water shortage public-private partnerships ought to be pursued in addressing water shortage problems such as drilling of boreholes and the construction of dams that would serve as a long-term solution. Firms are advised to increase their human capital in order to increase the export intensity. A comfortable tax environment should be considered by the government such as offering tax holidays to exporting firms as a motivation to increase their output.

Lastly, although this research was limited, its shortcomings could be beneficial to future research work.

1.5 Organization of the Study

Following this introduction, the rest of the paper is organized as follows. Chapter two presents the literature review which is divided into three sections namely, theoretical literature, empirical literature and the overview of the literature. The overview of the literature summarizes the literature discussed as well as provides the gaps realized in the literature. Chapter three presents the methodology of the study, which consists of the theoretical and analytical model. In addition, the definition of variables, relevant econometric issues and the data sources are also discussed. Chapter four presents the analyses, results and discussions comprising of the descriptive statistics, model estimation, interpretation and the discussion of the results. Finally, chapter five gives the summary, conclusions and policy implications of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In appreciating previous research, the review is divided into theoretical and empirical literature. Theoretical literature is intended at shading light on the theoretical foundations of this research. However, the theoretical literature shifts away from stand-alone theories to factors underlying those theories. Empirical literature builds upon the factors identified in the theoretical literature and discusses the evidence presented by previous studies. Finally, an overview of the literature is presented.

2.2 Theoretical Literature

The contribution of infrastructure on export trade cannot be wished away. For instance, it is argued that infrastructural development following the industrial revolution bolstered trade more than globalization did in the latter years. Existing literature on infrastructural development and export trade looks at infrastructural types (namely; water and sanitation, energy, telecommunications, and transport), cost dimensions (laying down infrastructure and using a given infrastructure), quality, reach and connectivity, and the associated trade costs alongside other barriers to trade as well as other trade enablers.

Transport infrastructure enhances connectivity between traders and trading partners which consequently reduces the time taken in completing a trade transaction (Ding et al, 2022) as well as enhancing market accessibility for trade (Fiorini et al, 2019). This then implies that within a given span of time, more trade transactions can be carried out due to reductions in delays and prolonged waiting. Besides, Miloslavskaya et al (2019) hypothesized that transport modernization not only reduces the time taken to deliver shipments but also cuts down on costs. At times, however, existing infrastructure might not meet cargo needs (Nazia and Normaz, 2019). Thus, the infrastructure may in

its own right present bottlenecks to trade. Although transport infrastructure enhances trade, delays in freight clearance and inspection may distort the incentives to trade. Clearance and inspection, however, need not necessarily be a major obstacle to trade.

In international trade, different transportation modes tend to be both complementary and supplementary to each other (Nazia and Normaz, 2019). Airports and sea ports, for example, are often connected conspicuously to either road or rail network (Sénquiz-Díaz, 2021). Ferrying exportable solid goods including agricultural perishables from the hinterland to a harbor or airport usually involves land transport using either railway or roads (Nazia and Normaz, 2019). Thus, how fast commodities are ferried from the hinterland to the port depends on the density and quality of existing road and railway networks. Flihr et al (2019) and Rahman et al (2020) argued that poor infrastructural conditions derail smooth movement of export goods.

Since transport costs affect trade costs (Victoria et al, 2021; Flihr et al, 2019), export decision tends to be informed in part by costs of transportation and partly by other considerations. According to Victoria et al (2021), when transport costs erode the gains from export trade, export-oriented producers may be discouraged to export. As a result, the chances of exporting dwindle in environments where transport costs are unbearable.

Trade impediments emanating from electric power supply disruptions and water shortages cannot be wished away (Maruyama et al, 2019; Calderón et al, 2018). Many production processes in firms require a stable supply of adequate water as well as electricity (Yousif et al, 2022; Calderón et al, 2018; Donati and Tukker, 2022). Disruptions in the supply for water and electricity present obstacles to production while simultaneously contributing to loss of revenues (Deutschmann et al, 2021). Production obstacles consequently lead to less commodities being produced, and thus less being available for trade. Thus, electricity blackouts and water supply disruptions could stand in the way of firms increasing output as well as hindering the effective firm participation in export trade.

Besides, enterprises incur additional expenses in the face of water shortages or electricity blackouts. For instance, a firm may be forced to seek an alternative source of electric power such as investing in captive generators (Falentina and Resosudarma, 2019; Maruyama et al, 2019). Maruyama et al (2019) estimates \$82billion sales losses annually in 137 emerging market economies due to electricity blackouts.

The rise in global demand for services has meant that firms and other economic agents tap on telecommunications infrastructure. According to Nordas (2020), telecommunications leverage service exports with a rise in services rendered using various media such as facsimile, email, the Internet, and even cellular connectivity. Besides, advancements in telecommunications have made it possible for trade deals to be negotiated and concluded virtual in what has evolved to be known as the ‘virtual market’.

Institutional quality affects both infrastructural development and export trade (Singh and Delios, 2017). Institutions refer to formal and informal rules as well as standards which control how people behave (North, 1990). Weak institutions, for instance, are fertile grounds for corruption and impunity. Corruption reduces both direct exports and domestic sales while boosting indirect exports (Olney, 2016). That is, high levels of corruption incentivize firms to export indirectly through intermediaries (Olney, 2016). Ochieng et al (2020) argued that good institutions and low levels of corruption are trade-enhancing. Misgovernance or poor governance, on the other hand, creates operational inefficiencies which distort service quality. In Indonesia, for instance, Falentina and Resosudarmo (2019) argued that poor governance at the national electricity company led to electricity blackouts. Blackouts then forced companies to seek alternative power supply schemes such as self-generation of electricity.

The World Bank identifies other institutional factors, including: custom and trade regulation, court systems, tax rates, tax administration, business licensing and permits, political instability and

labor regulation. Trade literature in the recent decades considers the effects of increased institutional quality on exports with consensus indicating that better institutions and governments will boost the flow of international trade (Bilgin et al. 2018). External institutions influence domestic firms' export intensity. For instance, Nuruzzaman et al (2021) found out that firms tapping into the WTO experienced a higher growth in export intensity if the managers had positive perceptions on the domestic institutions while otherwise when managers perceived the domestic institutions as obstacles. Furthermore, Adu-Gyamfi, (2020) indicated that although tax rules in Senegal suffocated export-processing zones (EPZs), tax breaks in Kenya and Botswana boosted exports.

2.3 Empirical Literature

In line with the factors discussed in the previous section, this section extends the discussion by focusing on the methods employed in previous studies as well as the findings realized, explanations extended, and the shortcomings. These factors relate to the three infrastructural aggregations, namely; telecommunications, energy and water supply, and transport infrastructure. A cross-cutting factor, i.e., institutional quality, is also explored whereas some of the other relevant factors from previous studies are only mentioned in passing.

In investigating trade flow between 6 ASEAN countries and China's Shanghai, the panel vector autoregression (pVAR) in Ding and Wang (2022) suggested that current period's exports declined as the container freight charge in the previous period rose. According to Ding and Wang (2022), export charges were discouragingly low at Shanghai port, and thereby incentivized carriers to ship empty containers to the ASEAN countries in anticipation of returning with imports. That is, import freight charges were substantively high. Even then, it is unclear why carriers could not bid for higher export freight charges. Besides, logit estimates in Nazeer et al (2019) indicated that, in Pakistan, the chances of exporting 'kinnows' to the United States (US) declined as freight charges rose. It is plausible that the decision to ferry empty containers on the export route in Ding and Wang

(2022) was informed by the time taken loading shipments. Ding and Wang (2022) could, perhaps, have controlled for the freight loading duration. A shortcoming in Nazeer et al (2019) is the erroneous interpretation of the freight charges' coefficient. That is, the coefficient of freight charges was '+0.029' but Nazeer et al (2019) interpreted it as a negative. Moreover, in Nazeer et al (2019) the variance inflating factor (VIF) for exporter's age and education, cost of packaging, and domestic and international prices was greater than 5. It was, nevertheless, not evident that Nazeer et al (2019) had addressed this issue. A remedy could have been for Nazeer et al (2019) to estimate the model without the highly co-linear variables.

Physical transport infrastructure has been argued to shape trade. In understanding the dynamics of Pakistan's exports to 20 countries, fixed effects (FE) estimate in Nazia and Normaz (2019) suggested that exports rise significantly when the exporter's road density increases. The same was true for airports. The random effects (RE) estimate which was found appropriate, however, suggested that exports rise significantly when exporter's port container traffic increases as well as the importer's port container traffic rise. According to Nazia and Normaz (2019), Pakistan's commodities are predominantly exported via seaport, and hence expanding seaports mattered a lot in enhancing export trade. It is, however, probable that there are spillover effects. Having an airport in an area, for instance, increases the chances of road network development within that area.

In Nigeria, Olukunle (2020) established that cocoa bean's competitive advantage was significantly enhanced by road infrastructural development. Olukunle (2020), nevertheless, offered no explanation on the findings made. In 31 Chinese provinces, the nested FE and RE estimates in Rahman et al (2020) revealed that highways and roads enhanced regional exports. According to Rahman et al (2020), region-specific effects were absent in the 31 provinces with trade effects arising from road length. Even then, it is possible for exports from one province to depend on another province's per capita incomes which shape demand. Perhaps, Rahman et al (2020) could have

incorporated importing province's per capita incomes as opposed to only the exporter's income. In South East Asia (SEA), Rehman et al (2020)' pooled mean group (PMG) estimates suggested that transport infrastructure boosts exports in the long-run. With infrastructural development, Rehman et al (2020) argued that trade costs declined while simultaneously enhancing the ease of doing business. In Rehman et al (2020), transport infrastructure was pooled rendering it difficult to tell the contribution of each mode of transport on its own. In Ethiopia, Fiorini et al (2019) showed that road development enhanced market accessibility which in turn led to a decline in input tariff, and consequently increasing the productivity of firms.

The PMG estimates in Rehman et al (2020) revealed that development of energy infrastructure in SEA economies significantly improved export trade. In Indonesia, Falentina and Resosudarmo (2019) showed that blackouts reduce productivity in firm, and subsequently negatively affect trade. Employing OLS, Javed et al (2022) showed that Pakistan's manufactured exports significantly declined in energy crisis. Energy crisis was measured by energy shortages in Javed et al (2022). Similarly, Javed et al (2022) established that as the price of energy went up, manufactured exports declined as a share of gross domestic product (GDP). In a related study employing vector error correction model (VECM), Azam et al (2020) found out that exports and electricity supply in Pakistan Granger-caused each other. The VECM results were, nevertheless, not documented in Azam et al (2020). This raises challenges in attempting to discern whether the causal relationship was positive or negative.

A major infrastructural milestone has been in the telecommunications sector. In Indonesia, instrumental variable (IV) dynamic panel FE estimates in Falentina and Resosudarmo (2019) suggested that exports share rose when firms utilized internet as well as when the strength of mobile phone signal rose. Falentina and Resosudarmo (2019) adopted mobile phone signal strength as an instrument for the utilization of internet. In a separate estimation, Falentina and Resosudarmo (2019)

documented that internet utilization rose as mobile data type shifted from 2G through EDGE and 3G TO 4G. Last, whereas online shopping platform, social media, and the website did not significantly affect export share, the share of exports rose significantly in the use of email. In India, the Poisson Pseudo-Maximum Likelihood (PPML) estimate in Nordas (2020) indicated that telecommunications infrastructure in the importer and exporter countries enhanced the export of services. In addition, the findings suggested that mobile phone subscriptions in both the exporter and the importing countries fostered services exports. according to Nordas (2020), the impact of telecommunications on service exports would endure only when countries committed themselves to streamline openness and proper regulation of telecommunications. This was to be realized within the context of the General Agreement on Trade in Services (GATS).

In Ethiopia, Bigsten (2013) showed that firm productivity declines in input tariff and output tariff. As productivity declines fewer output is available for sales in the domestic market as well as export market. It is however possible that productivity is shaped by the size of the firm. Foster and Rosenweig (2022) indicated that smaller farms were more productive than larger farms. Suggestive in this is that worker productivity in smaller farms would outperform worker productivity in larger farms. The finding in Foster and Rosenweig (2022) however disagrees with the conclusions arrived at with Bigsten et al (1999). In Zimbabwe, Kenya, Ghana and Cameroon, Bigsten et al (1999) established that export intensity rises with firm size. According to Bigsten et al (1999) larger firms were able to reduce the cost of capital which then meant that marginal productivity of capital rises. This in turn leads to more output. Thus, more commodities are available both for sale domestically and exports.

Among SEA economies, Rehman et al (2020)'s PMG estimates suggested that export rises significantly in institutional quality. Institutional quality was, furthermore, found to enhance the development of financial, energy, telecommunication, and transport infrastructure (Rehman et al,

2020). The quality of institutions, nevertheless, have far-reaching ramifications on an economy. Weak institutions, for instance, pave way for corruption which in turn further undermines institutions. Corruption distorts trade incentives since exporters have to consider expenses incurred in dishing out bribes to authorities and rent-seekers (Bahri et al, 2020). In Tunisia, Bahri et al (2020)'s partial least squares (PLS) estimate suggested that export intensity declined as corruption rose among 537 small and medium enterprises (SMEs). Corruption was measured on a Likert scale ranging from 0 to 4. In a survey spanning the years 2005-2010 and covering 23317 firms from 80 emerging market economies, the pooled ordinary least squares (POLS) estimate in Olney (2016) suggested that the more severe a firm perceived corruption the larger the fraction of exports. Furthermore, Olney (2016) indicated that as corruption severity rose, the more indirect exports relative to direct exports. In employing probit model on the same dataset, Olney (2016) concluded that corruption severity led firms to be oriented towards export production with firms being more likely to export indirectly than directly. In estimating the likelihood for firms to export indirectly, Olney (2016) conditioned the decision to export. While the conditioning is plausible, it is possible for a firm to select into indirect export participation without actually exporting. A suggestion would have been for Olney (2016) to adopt two-part models such as the double hurdle model (DHM). In the DHM, a firm first chooses to participate in export trade; thereafter, the firm chooses between direct or indirect exports.

In a cross-country survey covering Mauritius, Kenya, and South Africa, Simiyu and Mbinya (2022) established that although corruption negatively affects the probability of a firm exporting as well as the value of the exports, the effect was insignificant. Within the Organization for Economic Coordination and Development (OECD), the OLS estimates in Ruzekova et al (2020) suggested that export performance rose with institutional transparency. Transparency was measured by the corruption perception index whereby good quality was associated with higher rankings. It is, however, possible that transparency and effectiveness of a government are interlinked. For instance,

transparency tends to be high in countries where public services offered are of high quality. Similarly, high quality public services are associated positively with high levels of transparency. Last, weak institutions tend to compound hurdles to production and trade. The Cragg hurdle estimate in Simiyu and Mbinya (2022), for instance, indicated a decline in export value the more severe the hurdles became.

Well performing institutions are a reflection of good governance. The Poisson Pseudo Maximum Likelihood PPML model revealed that export performance rises in good governance (Sabri 2021). Good governance was reflected in effective governance lawfulness and political stability among other considerations. In supporting the role of institutions in shaping Colombia's trade with 136 trading partners, Abreo and Bustillo (2021) established that institutional quality affected foreign sales over the period 2005-2018. In Sub-Saharan Africa, the system GMM estimate in Bah et al (2021) suggested that governance improvements enhance exports of manufactured goods, merchandise, and services. Moreover, good institutions make it possible for firms to expand, be more productive, export more, as well as engage in collaborative research and development. In a study on human capital and the role of firm size in shaping productivity and exports, Söderbom and Teal (2001) showed that size is the most important factor determining earnings across firms as well as export participation.

Tax administration influences an individual's desire to function in any environment with transaction expenses. If taxes are excessive, businesses will cease operations, whereas nations with low taxes or greater tax advantages will attract more enterprises. Tax breaks are a boon to any business. Zhang et al. (2019) examine the influence of export tax rebates on enterprises' Total Factor Productivity in China from 2007 to 2015 utilizing a large panel of manufacturing firms. The author discovers that export tax rebates improve export volume and serve as an alternative financial tunnel to boost enterprises' Total Factor Productivity.

The extent to which corruption "sands" or "greases" the wheels of business differ between continents. According to (Martins et al, 2020), corruption "greases" the wheels of commerce in Africa while sanding the wheels of business in Latin America, the Caribbean, Eastern Europe, Central Asia, and Southern Asia. The author employs instrumental variable (IV) estimations on a sample of 21,250 enterprises from 117 emerging and developing nations. Furthermore, (Amin and Ulku, 2019) use firm level data from more than 39,000 enterprises in 111 economies to test the theory that corruption impedes production more at greater levels of regulation. When regulation is strong, there is a large negative association between corruption and company productivity; when regulation is low, there is an insignificant relationship. These discoveries are resistant to various controls and specifications.

To investigate whether courts impact enterprises' export intensity in South Asian nations, (Kapri, 2021) data show that judicial fairness boosts both intense and extensive trade margins. He contends that if courts decided firm-level matters properly, the costs of resolving conflicts would be reduced. This is accomplished by the businesses bribing the courts, which proves to be costly. The author used pooled cross-sectional data from 2006 to 2014. To evaluate the data, the study used the IV probit and 2SLS models.

In examining the relationship between foreign ownership and export trade, Filatotchev et al. (2008) demonstrates that foreign investor ownership is positively related to export intensity. In addition, the paper examines alternative governance and control configurations in foreign invested businesses, indicating that foreign ownership in company operations have complimentary effects on export intensity. LiPuma et al. (2013) investigate the relationship between business age and financial access. This study implies that changes in access to financing are more strongly connected to new firm export performance than to established business export success.

Between 2003 and 2014, Pietrovito and Pozzolo(2021) used a sizable and diverse sample of small- and medium-sized businesses from 65 emerging and developing nations to explore the relationship between credit limitations and exports. The authors discover strong evidence that financial limitations have a detrimental, statistically and economically significant impact on both the export intensity and propensity. The impact on both export margins is greater for small and young businesses, as well as those operating in nations with less established financial systems, institutions, and levels of overall economic freedom. The authors discover that large businesses export more. Furthermore, from the study's results, older firms tend to export less thus the negative effect of the age of the firms on the export intensity.

The introduction of process innovations has a favorable impact on enterprises' export intensity, (Maria and Ganau, 2014). A company's output is increased along with the amount of sales it generates when a new product is introduced to the market. Only process innovation was determined to be statistically significant, even though the analysis found that both product and process innovations positively increase export intensities.

Using a dynamic random effects tobit model in examining financial constraints and exports in India, Padmaja and Sasidharan (2020) shows that financial constraints have a significant impact on the export intensity. In addition, the authors observe other firm specific characteristics and from their findings the age of the firm is significant and positively affects the export intensity. However, the authors find that foreign ownership, although it has a positive relationship with the export intensity it does not significantly affect the share of exports to total sales.

Labor regulations are viewed by businesses as a limitation on their ability to operate or as a barrier to their ability to expand. The Heckman selection model is used by Correa et al. (2010) to analyze the Investment Climate Survey of Ecuador in order to look into the firm-level export response to trade liberalization. According to the study's findings, businesses raised their overall

proportion of exports even though they viewed labor laws as a barrier to their ability to produce goods. This author supports this finding because they believe that because exporters are more likely to be formal businesses, they must deal with labor regulations more frequently and in more detail than non-exporters. However, in examining the impact of labor regulations on firm outcomes in India, Rana et al (2020) established that labor regulations reduced the output level more for exporter firms than non-exporter firms. The authors utilize garment manufacturers establishment level data between 2009 and 2014.

In an effort to better understand how emerging economy firms perform on the export front, Krammer et al. (2018) find that public ownership and foreign ownership have no discernible impact on export intensity. The author makes it clear that export intensity and export propensity may not be impacted by the same factors, so they should be handled separately. Furthermore, the authors find no significant relationship between managerial experience and export performance. They contend that since many emerging economies still rely heavily on their home countries' comparative advantage in terms of factors, substantial managerial experience is not a particularly crucial skill. However, in testing for the hypotheses on experience and export intensity in Brazilian firms, Mataveli et al. (2021) suggests that managerial experience positively increases the export intensity.

Related previous studies, nevertheless, considered other factors. These factors include, among others: distance (Nazia and Normaz, 2019; Njoroge, 2020; Tintelnot, 2017; Nordas, 2020), relative endowment (Nazia and Normaz, 2019), tariffs (Olukunle, 2020), relative price (Njoroge, 2020), regional integration (Socrates et al, 2020), location (Tintelnot, 2017; Simiyu and Mbinya, 2022), trade openness (Fonchamnyo and Akame, 2017), exchange rate (Fonchamnyo and Akame, 2017), energy price (Javed et al, 2022), firm age and size (Simiyu and Mbinya, 2022), ownership, exchange rate, financing, managerial experience, legal status, income, human capital, and political instability.

2.4 Overview of the Literature

The reviewed literature revealed the existence of a nexus between exports, institutional quality and infrastructural development. The methods employed differed across the studies, and subsequently led to varied results. Even then, it was evident that there exist certain obstacles which are related to infrastructural development and institutional quality which either fostered or stifled export participation and export trade. Consequently, the present study will attempt to bridge two gaps, namely; a gap in methodology, and a gap in evidence. The methodological gap is based on the shortcomings in the previous studies earlier discussed. The evidence gap is derived first from interpretation of the findings in previous studies seconded by a focus on Kenya.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the theoretical model upon which the research is based followed by the analytical model, operationalization of the research, and a discussion of econometric issues to be addressed.

3.2 Theoretical Model

From the reviewed literature, it was evident that not all firms participate in export trade. Theoretically, the i th firm chooses to export or produce for the domestic market based on an assessment of the perceived net benefits. That is, a firm will export if doing so yields higher benefits than selling domestically. If a firm chooses to export, however, it has to decide between indirect and direct exports as well as the quantity to be exported. Firms are, nevertheless, not omnipotent and hence face certain obstacles in the course of export-oriented production as well as exporting. These obstacles consequently affect the level of production, the extent of export participation and export intensity. Olney (2016), for instance, identified corruption as an impediment to domestic sales and an enabler of export production. Simiyu and Mbinya (2022), on the other hand, identified other impediments to export trade, namely; electricity unreliability and transport. Other obstacles have been documented in WBES such as tax administration, customs and trade regulations, courts, political instability, water shortages, tax rate, business licensing and permits, and labor regulations.

Now, a firm is assumed to use telecommunications infrastructure in complementing transport and energy infrastructure (Nordas, 2020). Following Falentina and Resosudarmo (2019), telecommunications is proxied using ownership of website by firm. In addition, since telecommunications infrastructure is pivotal in information dissemination, two additional proxies are adopted. These are the Internet as a source of information and mobile phone subscription. There are,

nevertheless, other firm-specific characteristics which affect export trade. Thus, export trade (X) is explained by infrastructural development (F), institutional quality (I), and other firm-specific characteristics (O) as per the relation:

$$X_{i,t} = X_{i,t}(F_{i,t}, I_{i,t}, O_{i,t}) \dots \dots \dots (1)$$

Where the subscripts capture time (t) and firm (i). Other firm-specific characteristics include age and size of the firm, managerial experience, firm financing, competition, innovation, ownership, and legal status.

3.3 Analytical Model

Equation (1) suggests that the analysis will be carried out across firms and over time. Olney (2016) and Simiyu and Mbinya (2022) measured export trade by the probability of the ith firm being export-oriented and the value of exports if the ith firm chooses to export, respectively. Since the value of firm i’s exports is only observed when the ith firm chooses to export, assuming that all export-oriented firms export strictly positive quantities, then Linear Panel regression model can be adopted to explain firms’ export trade. The analytical is then given by the executable form:

$$X_{i,t}^q = H_{i,t}\alpha = \alpha_0 + \alpha_1F_{T,i,t} + \alpha_2F_{E,i,t} + \alpha_3FC_{1,i,t} + \alpha_4FC_{2,i,t} + \alpha_5I_{1,i,t} + \alpha_6I_{2,i,t} + \alpha_7I_{3,i,t} + \alpha_8I_{5,i,t} + \alpha_9I_{6,i,t} + \alpha_{10}I_{7,i,t} + \alpha_{11}O_{1,i,t} + \alpha_{12}O_{2,i,t} + \alpha_{13}O_{3,i,t} + \alpha_{14}O_{4,i,t} + \alpha_{15}O_{5,i,t} + \alpha_{16}O_{6,i,t} + \alpha_{17}O_{7,i,t} + \alpha_{18}O_{8,i,t} + \alpha_{19}F_{W,i,t} + \alpha_{20}F_{B,i,t} + r_i + e_{i,t} \dots \dots \dots (2)$$

In (2), vector H captures socio-demographics and firm-specific characteristics, idiosyncratic error is captured in vector e, r is a vector of factors that vary across firms but not over time, X^q captures the intensity of exports and the parameters to be retrieved captured by vector α. In vector H, the following factors will be captured: transport obstacle (FT), electricity obstacle (FE), water supply disruptions (FW), number of electric power disruptions (FB), age of the firm (O2), firm size

(O1), website usage (FC1), internet (FC2), managerial experience (O3), business licensing obstacle (I3), courts obstacle (I5), labor regulations (I2), innovation (O6), tax rate obstacle (I6), tax administration obstacle (I7), corruption obstacle (I1), and competition (O4). Time-invariant firm specific characteristics, r , include legal status of the firm, industry sector, product line, and ownership. Accordingly, only export-oriented firms will be used in the study with data being retrieved from the World Bank Enterprise Surveys (WBES) conducted in the year 2013, and year 2018. In the WBES, obstacles for each relevant factor were recorded on a Likert scale ranging from 0 to 4. Thus, minor, moderate, major, and severe obstacles will be collectively referred to as obstacles (regardless of how severe they are). This then implies that ‘no obstacle’ will be the reference group. In the estimation, therefore, the following variables will be dummy variables: FT, FE, FC1, FC2, I1, I2, I3, I5, I6, I7, O5, O6, O7, O8, and FW. In deciding which model to adopt, the Hausman test will be used to determine whether the random effects estimator (RE) or the fixed effects estimator (FE) is appropriate.

3.4 Definition of variables, Measurement and A Priori Expectations

Table 1: Operationalization			
Variable	Description	Measurement	A priori expectation
Xq (dependent)	Export intensity	fraction of a firm’s total sales which were exported	–
FT	Transport infrastructural development	A dummy variable assigned 1 if a firm finds transport to be an obstacle, and 0 if otherwise.	-ve (Rahman et al, 2020)
FE	Energy infrastructural development	A dummy variable assigned 1 if a firm finds energy to be an obstacle, and 0 if otherwise.	- ve (Javed et al, 2022)
FC1	Telecommunications infrastructural development	A dummy variable assigned 1 if a firm owns a website and zero if it does not	+ve (Nordas, 2020)

FC2	Internet	Assigned 1 if a firm uses the Internet as the main source of information, and 0 if otherwise	+ve (Falenitina and Resosudarmo, 2019)
I1	Corruption	A dummy variable assigned 1 if a firm finds corruption to be an obstacle, and 0 if otherwise.	+ve (Olney, 2016), (Martins et al, 2020)
I2	Labor regulations	A dummy variable assigned 1 if a firm finds labor regulations to be an obstacle, and 0 if otherwise.	+ve Correa et al (2010)
I3	Business licensing and permits	A dummy variable assigned 1 if a firm finds business licensing and permits to be an obstacle, and 0 if otherwise.	-ve (Fang et al, 2019)
I5	Courts	A dummy variable assigned 1 if a firm finds courts to be an obstacle, and 0 if otherwise.	-ve (Kapri, 2021)
I6	Tax rate	A dummy variable assigned 1 if a firm finds tax rate to be an obstacle, and 0 if otherwise.	-ve (Zhang et al, 2019)
I7	Tax administration	A dummy variable assigned 1 if a firm finds tax administration to be an obstacle, and 0 if otherwise.	-ve (Zhang et al. 2019)
O1	Size of the firm	The natural log of the number of employees (small, medium, large)	+ve (Söderbom and Teal, 2001) (Bigsten et al, 1999)
O2	Age of the firm	The natural log of the number of years that the firm has operated, measured by the year of Enterprise Survey minus the year that the firm began operations.	+ve (LiPuma et al, 2013)
O ₃	Managerial experience	The natural log of the number of years that a firm's top manager has been in the industry sector	+ve Krammer et al. (2018)
O ₄	Competition	The natural log of the number of competitors in main product line.	indeterminate
O ₅	Firm financing	Assigned 1 if a firm accessed credit, and 0 otherwise	+ve (LiPuma et al, 2013)
O ₆	Innovation	Assigned 1 if the firm introduced a new product in the three years to the Survey, and 0 if otherwise.	+ve Maria and Ganau, 2014)

O ₇	Foreign ownership	Assigned 1 if more than 50% of the ownership is held by foreigner, and 0 if otherwise	+ve (Filatotchev et al, 2008)
O ₈	Domestic private ownership	Assigned 1 if more than 50% of the ownership is held by domestic residents, and 0 if otherwise	+ve (Krammer et al. 2018)
FW	Water disruption	Assigned 1 if a firm experienced water shortage, and 0 otherwise.	-ve (Yousif et al. 2022)
FB	Electricity disruptions	The natural log of the number of blackouts experienced in a typical month	- (Falentina and Resosudarmo, 2019)

3.5 Econometric Issues

The ability of panel data to associate unobserved effects with explanatory variables makes it exceptional. For managing time-constant unobserved qualities that might be connected with the explanatory variable in our model, panel data is helpful. To eliminate the unseen effect, one method is to compare data from adjacent time periods. We can tackle the problem now because of the modern software's sophisticated commands. Both the random effect models by Generalized Least Squares and the fixed effect estimator, which is similar to first differencing, employ a modification to eliminate the unobserved effect before estimating.

3.5.1 Heteroskedasticity

In panel data heteroscedasticity indicates that the sample contains observations that are either tiny or large in comparison to the other observations. Heteroscedasticity means that the variance of the errors is not constant across observations. This will be tested using the Lagrange Multiplier (LM) test. The solution at hand would be to use robust standard errors.

3.5.2. Serial Correlation

A lagged version of a given variable and its relationship across time are described by serial correlation. It assesses how a variable's current value stacks up against its prior values. The serial

correlation of a variable shows that it may not be entirely random. Wooldridge asserts that random effects destroy much, if not all, of the serial connection. The random effects estimator should be employed when it is thought that the unobserved effect is uncorrelated with all of the explanatory factors. The resulting serial correlation over time can then be handled using generalized least squares estimation by leaving the unobserved effect in the error term. The Lagrangian-Multiplier test is used to test for serial correlation. However, this study will not be subject to the serial correlation tests as they only apply to macro panels with long time series. That is for periods above 20-30 years.

3.5.3 Cross-sectional Dependence

Long time series macro panels have a problem with this. In macro panels with lengthy time series spanning 20–30 years, cross sectional dependence is a concern. The BP-LM test or the Pasaran CD test can be used to determine whether residuals are associated across entities if the panel is a macro panel. In the case of our study, this is will not be a problem because of the short time period.

3.6 Data Sources and Types

The study used panel data retrieved from the World Bank Enterprise Survey (WBES) for the year 2013 and 2018. This data included the export value data that is reported in Kenya shillings. Export intensity was the fraction of a firm's total sales which were exported. This included both direct and indirect exports. The dependent variable was export intensity. Infrastructural development was described by several characteristics such as transport being an obstacle, electricity disruptions, water supply disruptions, website usage and internet access. Institutional quality was characterized with labor regulations, tax rates, tax administration, corruption, courts, business licensing and permits. Other factors included ownership of the firm (domestic or foreign), age of the firm, size of the firm (small, medium and large), competition as well as innovation.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Introduction

Firm characteristics as well as model estimation was covered in this chapter. Demographics considered were the average, the standard deviation, and the range whereas model estimation made use of the fixed effects estimator and the random effects estimator. The Hausman test was executed to inform the decision between the two estimators. In addition, heterogeneity was tested using the Lagrange Multiplier test. Lastly, only a discussion of the significant findings is captured towards the end.

4.2 Descriptive Statistics

From the World Bank Enterprise Surveys of 2013 and 2018, 301 exporting firms were considered in this research with their relevant demographics captured in Table 1. The selection involved picking any firm which had recorded a positive export share in its annual sales. Following Wooldridge, a sample size of 301 is large enough, and; hence, normality was assumed to hold. This then paved the way for using the mean (instead of the median or mode) as a measure of central tendency. Volatility was informed by standard errors, although neither the mean nor the standard deviation, on their own, could be used for comparison across the variables. This was the case since the variables were measured using different scales and different units. Sales was, for instance, measured in Kenya Shillings whereas size of the firm was given by the number of employees. Comparability could have been possible had the coefficient of variation been computed. Nevertheless, this research found firm belief to belabor over such an issue. Lastly, the range was given by the minimum and maximum, with the range being informative at the data cleaning phase as well as providing a hint on the measurement scale.

The mean suggested that at least 70% of firms considered either electricity disruption, corruption, tax rates, transportation, tax administration, and political instability as hinderances to raising output as well as to trade. Courts, licensing and business permits, and labor regulations were among the least considered obstacles. Even then, taken at face value, these obstacles cannot be ignored since 82.4% and 72.4% of export-oriented firms felt that efforts to raise production levels were stifled by these electricity and transport obstacles respectively. Institutional factors posed a major concern as 83.1% of the firms reported that export intensity declined mainly in times of political instability. In terms of ownership, no government-owned firm was export-oriented with 91.4% of export-oriented firms being private domestic against 7.64% being foreign owned. Staying abreast with technology evidenced 49.5% having a website while 62.3% of the firms had developed a new product in the previous three years.

In terms of workforce and human capital, 66.1% of the firms had a top manager who had been in the industry for at least 10years, with the average firm having 27 to 28 permanent employees. Managerial experience was further given a push by firm age with the average firm having operated for 21years. It is suspected that age of the firm as well as managerial experience could have ramifications on perception about certain obstacles. For instance, only 36.3% of the firms reported water shortages. This proportion is comparably lower than the 82.4% reported for electricity obstacle. Lastly, a paltry 19% of firm's sales were exports. At times, a firm's activities could be constrained not only by identified obstacles but also by finance. This research, for instance, observed that only 27.9% of firms accessed credit with 40.2% of firms opting for own-financing. Lastly, competition could either foster or stifle production and export trade. In Kenya, the average export-oriented firm had 4 to 5 competitors for its main product.

Table 2: Descriptive Statistics

VARIABLES	Observations	Mean	Standard deviation	Minimum	Maximum
Sales in the last financial year	301	5.506e+0	3.472e+0	250,000	5.500e+1
Obstacles:					
Electricity	301	0.824	0.382	0	1
Transport	301	0.724	0.448	0	1
Corruption	301	0.757	0.429	0	1
Courts	301	0.561	0.497	0	1
Tax rates	301	0.787	0.410	0	1
Tax administration	301	0.738	0.441	0	1
Labor regulations	301	0.625	0.485	0	1
Business licensing and permits	301	0.678	0.468	0	1
Political instability	301	0.831	0.376	0	1
Firm website	301	0.495	0.501	0	1
Ln competitors	79	1.591	0.868	0	3.912
Firm finance	296	0.402	0.491	0	1
Firm ownership:					
Private domestic	301	0.914	0.281	0	1
Private foreign	301	0.0764	0.266	0	1
Government	301	0	0	0	0
Water shortage	124	0.363	0.483	0	1
Innovation	300	0.623	0.485	0	1
Firm's age	301	21.00	15.99	0	110
Firm size	301	27.07	70.98	1	800
Ln size	301	2.269	1.248	0	6.685
Credit access	294	0.279	0.449	0	1
Managerial experience	301	0.661	0.474	0	1
Export intensity	301	0.190	0.335	0	1

4.2.1. Correlation matrix

Correlation coefficients suggested that export intensity was positively associated with electricity obstacles, transport obstacles, courts, labor regulations, domestic owned firms, medium sized firms, large firms and firm age. However, export intensity was negatively associated with corruption, tax rates, tax administration, business licensing and permits, political instability, firm website, private foreign, small sized firms, water shortage, innovation, and managerial experience. Electricity obstacle had a positive association with transport obstacle, corruption, courts, tax rates, labor regulation, business licensing and permits, political instability, water shortage, and export

intensity but a negative association with tax administration, website, private foreign, innovation, firm age, firm size and managerial experience.

Table 3: Correlation matrix

```
. correlate intensity electricity transport corruption courts taxrates taxadministration laborregulations blicencingpermits politicalinstability
> mwebsite privateforeign privatedomestic small medium large watershortage innovation firmage b7
(obs=102)
```

	intensity	electricity	transport	corruption	courts	taxrates	taxadm-n	laborr-s	blicen-s	politi-y	firmwe-e	privat-n	privat-c	small
intensity	1.0000													
electricity	0.1563	1.0000												
transport	0.1785	0.2566	1.0000											
corruption	-0.0504	0.1590	0.3780	1.0000										
courts	0.0992	0.0997	0.2102	0.2102	1.0000									
taxrates	-0.0421	0.0867	0.1767	0.3092	0.3951	1.0000								
taxadminis~n	-0.1575	-0.0364	0.1915	0.4402	0.3620	0.6405	1.0000							
laborregul~s	0.0843	0.1371	0.3318	0.3841	0.3692	0.1860	0.2794	1.0000						
blicencing~s	-0.0645	-0.0164	0.2515	0.3579	0.3657	0.3780	0.6240	0.4183	1.0000					
politicali~y	-0.1141	0.1063	0.0738	0.4922	0.1201	0.1857	0.2830	0.1762	0.2562	1.0000				
firmwebsite	-0.1834	-0.1681	-0.0010	0.1479	0.0388	0.0705	0.0983	0.0279	0.1940	0.0131	1.0000			
privatefor~n	-0.0698	-0.2620	-0.2029	-0.2029	-0.0183	-0.0816	0.0271	-0.0000	-0.0154	-0.1061	0.2086	1.0000		
privatedom~c	0.1092	0.2298	0.1618	0.2336	0.0881	0.1274	0.0183	0.0201	0.0373	0.0757	-0.1897	-0.9155	1.0000	
small	-0.1217	0.1063	0.0041	-0.1353	-0.1634	-0.1114	-0.1353	-0.2349	-0.1614	-0.0161	-0.2651	-0.2780	0.2366	1.0000
medium	0.0460	-0.0969	0.0185	0.0185	0.0301	0.1118	0.1235	0.0884	0.1690	-0.1315	0.2266	0.1674	-0.1425	-0.6021
large	0.1138	-0.0523	-0.0205	0.1536	0.1791	0.0464	0.0666	0.2200	0.0613	0.1292	0.1430	0.2083	-0.1773	-0.7492
watershort~e	-0.0928	0.1097	-0.0175	-0.0698	-0.1136	0.2046	0.0873	0.0147	0.1195	-0.0000	0.0557	0.0645	-0.0201	0.1762
innovation	-0.0992	-0.1145	-0.1489	0.1112	-0.0307	0.0092	0.1112	-0.0730	0.1344	0.1080	0.2165	0.0716	0.0118	-0.1835
firmage	0.2464	0.0326	-0.0777	-0.1007	0.0743	0.1288	-0.0251	-0.0055	-0.0326	-0.0031	0.0342	0.0546	0.0042	-0.1082
b7	-0.1420	-0.0709	-0.1297	-0.1596	0.0378	0.1988	0.0129	-0.0575	-0.0248	-0.1026	-0.1026	-0.0843	0.0815	-0.0407

	medium	large	waters~e	innova~n	firmage	b7
medium	1.0000					
large	-0.0778	1.0000				
watershort~e	0.0000	-0.2200	1.0000			
innovation	0.1807	0.0792	0.0292	1.0000		
firmage	0.1595	0.0028	-0.1523	0.0593	1.0000	
b7	0.0393	0.0183	-0.0045	0.0727	0.2250	1.0000

Just to mention, the correlation matrix indicated that 100% increase in the transport obstacle is associated with 17.85% increase in export intensity while 100% increase in obstacles associated with tax administration reduced is associated with 15.75% reduction in exports. The association cuts across all variables.

4.2.2 Fixed effects

```
xtreg intensity electricity transport corruption courts taxrates taxadministration
laborregulations blicencingpermits politicalinstability firmwebsite privateforeign
privatedomestic small medium large watershortage innovation firmage managerial experience,
fe
```

note: privatedomestic omitted because of collinearity

note: large omitted because of collinearity

```
Fixed-effects (within) regression      Number of obs   =      102
Group variable: panelid                Number of groups =       79
```

```
R-sq:                                Obs per group:
    within = 0.9079                    min =          1
    between = 0.0310                   avg  =         1.3
    overall = 0.0035                    max  =          2
```

```
F(17,6) = 3.48
```

```
corr(u_i, Xb) = -0.6892                Prob > F = 0.0651
```

Table 4:Fixed Effects

intensity	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
electricity	-5.213452	37.45461	-0.14	0.894	-96.86157	86.43467
transport	33.6792	14.96018	2.25	0.065	-2.927036	70.28543
corruption	-55.63842	53.23756	-1.05	0.336	-185.906	74.6292
courts	-20.35969	12.8973	-1.58	0.166	-51.91826	11.19887
taxrates	-50.92185	25.08432	-2.03	0.089	-112.301	10.45727
taxadministration	24.12852	41.54482	0.58	0.583	-77.52798	125.785
laborregulations	11.47338	10.8141	1.06	0.330	-14.98778	37.93453
blicencingpermits	-7.747627	29.08674	-0.27	0.799	-78.92031	63.42506
politicalinstability	26.57724	39.10187	0.68	0.522	-69.10159	122.2561
firmwebsite	.049153	10.1782	0.00	0.996	-24.85601	24.95431
privateforeign	23.04068	21.41649	1.08	0.323	-29.36358	75.44494
privatedomestic	0	(omitted)				
small	3.726769	18.96662	0.20	0.851	-42.68289	50.13642
medium	5.834008	14.15836	0.41	0.695	-28.81026	40.47828
large	0	(omitted)				
watershortage	-15.96743	9.555782	-1.67	0.146	-39.34958	7.414731
innovation	-8.484626	11.34944	-0.75	0.483	-36.2557	19.28645
firmage	-.5672007	.6041644	-0.94	0.384	-2.045538	.9111364
managerial experience	.9915286	.6461086	1.53	0.176	-.5894421	2.572499
_cons	60.72712	48.81959	1.24	0.260	-58.73012	180.1844
sigma_u	53.310814					
sigma_e	13.931863					
rho	.93607119	(fraction of variance due to u_i)				
F test that all u_i=0: F(78, 6) = 6.52				Prob > F = 0.0121		

Fixed effects discussion

$\text{corr}(u_i, Xb) = -0.6892$:the errors u_i are correlated with the regressors in the fixed effects model

$\text{Prob} > F = 0.0651$: $0.0651 < 0.05$ shows that the model is not okay. This is an F test to

see whether all the coefficients in the model are different than zero

$\rho = 0.93607119$: 93.6% of the variance is due to differences across panels.

4.2.3 Random effects

xtreg intensity electricity transport corruption courts taxrates taxadministration
laborregulations blicencingpermits politicalinstability firmwebsite privateforeign
privatedomestic small medium large watershortage innovation firmage managerial experience,
re

note: large omitted because of collinearity

Random-effects GLS regression

Number of obs = 102

Group variable: panelid

Number of groups = 79

R-sq:

within = 0.6728

between = 0.1886

overall = 0.2108

Obs per group:

min = 1

avg = 1.3

max = 2

$\text{corr}(u_i, X) = 0$ (assumed)

Wald chi2(18) = 51.72

Prob > chi2 = 0.0000

Table 5:Random Effects

intensity	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
electricity	11.64753	12.13371	0.96	0.337	-12.1341	35.42917
transport	19.16464	8.810444	2.18	0.030	1.896486	36.43279
corruption	-12.278	11.5987	-1.06	0.290	-35.01103	10.45503
courts	-6.643933	7.605927	-0.87	0.382	-21.55128	8.26341
taxrates	3.143563	11.87589	0.26	0.791	-20.13275	26.41988
taxadministration	-23.31057	13.31313	-1.75	0.080	-49.40382	2.782683
laborregulations	9.141914	7.487171	1.22	0.222	-5.532671	23.8165
blicencingpermits	4.430997	9.889084	0.45	0.654	-14.95125	23.81325
politicalinstability	-10.06471	9.488779	-1.06	0.289	-28.66237	8.532958
firmwebsite	-11.60824	6.235469	-1.86	0.063	-23.82954	.6130514
privateforeign	41.23311	29.6917	1.39	0.165	-16.96154	99.42777
privatedomestic	40.00504	27.76306	1.44	0.150	-14.40957	94.41964
small	-15.15676	10.22686	-1.48	0.138	-35.20103	4.887519
medium	-1.307275	12.46068	-0.10	0.916	-25.72976	23.11521
large	0	(omitted)				
watershortage	-7.797631	6.48004	-1.20	0.229	-20.49828	4.903015
innovation	-5.18378	6.537521	-0.79	0.428	-17.99708	7.629525
firmage	.5581483	.2598556	2.15	0.032	.0488408	1.067456
managerial experience	-.1748684	.3133121	-0.56	0.577	-.7889489	.439212
_cons	7.111407	33.04236	0.22	0.830	-57.65043	71.87324
sigma_u	31.206487					
sigma_e	13.931863					
rho	.83381293	(fraction of variance due to u_i)				

$\text{corr}(u_i, X) = 0$ (assumed) : differences across units are uncorrelated with the regressors

$\text{Prob} > \text{chi2} = 0.0000$.

4.2.4 Hausman test

In decision making whether to use random effects or the fixed effects model, we run the Hausman test

Table 6: Hausman Test

hausman fixed, sigmamore

	---- Coefficients ----			
	(b)	(B)	(b-B)	sqrt(diag(V_b-V_B))
	fixed	.	Difference	S.E.
electricity	-5.213452	11.64753	-16.86098	38.24449
transport	33.6792	19.16464	14.51456	13.38695
corruption	-55.63842	-12.278	-43.36042	55.83871
courts	-20.35969	-6.643933	-13.71576	11.53418
taxrates	-50.92185	3.143563	-54.06541	24.10481
taxadminis~n	24.12852	-23.31057	47.43909	42.46689
laborregul~s	11.47338	9.141914	2.331461	8.839956
blicencing~s	-7.747627	4.430997	-12.17862	29.54819
politicaliy	26.57724	-10.06471	36.64194	40.7989
firmwebsite	.049153	-11.60824	11.6574	8.944411
privatefor~n	23.04068	41.23311	-18.19243	.
small	3.726769	-15.15676	18.88352	17.55649
medium	5.834008	-1.307275	7.141283	8.64713
watershort~e	-15.96743	-7.797631	-8.169795	7.924472
innovation	-8.484626	-5.18378	-3.300847	10.25082
firmage	-.5672007	.5581483	-1.125349	.5927525
managerial exl	.9915286	-.1748684	1.166397	.6171681

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(17) = (b-B)'[(V_b-V_B)^(-1)](b-B)
 = 25.32
 Prob>chi2 = 0.0877
 (V_b-V_B is not positive definite)

Decision rule.

If $(\text{Prob}>\chi^2) < 0.05$ i.e significant, we use the fixed effect. However, $\text{Prob}>\chi^2 = 0.0877$ is greater than 0.05 thus random effect model applies.

Why random effects?

The change between entities is thought to be random and unrelated to the predictor or the independent variables in the model, in contrast to the fixed effects model. In addition, compared to fixed effects, where these variables are absorbed by the intercept, in this model you can include time

invariant factors like ownership of the firm. Because the error term for the entity is assumed in this model not to be correlated with the predictors, the time invariant can serve as an explanatory variable.

4.3 Model Estimation

A sample of 301 export-oriented firms was used. This sample was large enough according to Wooldridge, and; hence, it was not necessary executing the normal data test. Accordingly, this research proceeded to model estimation. Model estimation involved the employment of both the fixed effects model and the random effects model, followed by execution of the Hausman test. The Hausman test revealed that the random effects model was appropriate. This was supported by the decision rule ($\text{Prob} > \chi^2 = 0.0877$ is greater than 0.05 and; hence, this research, thus, analyzed the random effects model. Export intensity was measured by the fraction of a firm's total sales which were exported. Thus, export intensity was a percentage ranging from 0 to 100. This research adopted 10% significance level.

Table 7:FE and RE

```
estimates table fe re mfx
```

Variable	fe	re	mfx
electricity	-5.2134517	11.64753	11.64753
transport	33.679199	19.164639	19.164639
corruption	-55.638422	-12.278002	-12.278002
courts	-20.359693	-6.6439329	-6.6439329
taxrates	-50.921846	3.1435634	3.1435634
taxadminis~n	24.128522	-23.310569	-23.310569
laborregul~s	11.473375	9.1419143	9.1419143
blicencing~s	-7.7476271	4.430997	4.430997
politicali~y	26.577236	-10.064708	-10.064708
firmwebsite	.04915301	-11.608244	-11.608244
privatefor~n	23.040684	41.233114	41.233114
privatedom~c	(omitted)	40.005039	40.005039
small	3.7267687	-15.156755	-15.156755
medium	5.8340082	-1.3072751	-1.3072751
large	(omitted)	(omitted)	(omitted)
watershort~e	-15.967426	-7.7976307	-7.7976307
innovation	-8.4846265	-5.1837796	-5.1837796
firmage	-.56720069	.55814834	.55814834
b7	.99152863	-.17486845	-.17486845
_cons	60.727119	7.1114068	7.1114068

4.3.1 Interpretation of the Results

In econometrics, 1%, 5%, and 10% significant levels are the conventional significance levels, and the choice of either is solely up to the researcher's discretion. This research, thus, used 10% significance level, although 1% and 5% significance levels would have also been used. The fixed effects model suggested that only transport obstacle was statistically significant at 10%. However, the random effects model suggested that transport obstacle (5%), tax administration (10%), firm website (10%) and firm age (5%) were statistically significant. Next, interpretation for the magnitude of the effect was done only for significant variables.

This analysis established that transport obstacle, tax administration, website ownership and firm age were statistically significant in the random effects' estimation. Transport obstacle and the age of the firm had positive coefficients while firm website and tax administration had negative coefficients. The coefficient of transport obstacle was 19.16 suggesting that a firm facing transport obstacle had an export intensity of 19.16 points higher than a counterpart which didn't. The coefficient of tax administration was -23.31 suggesting that a firm facing tax administration obstacle had export intensity which was 23.31 points lower than a counterpart which did not face tax administration obstacle. The coefficient of website ownership was -11.61 suggesting that export intensity in a firm which owned a website was 11.61 points lower than a counterpart which did not own a website. The coefficient of firm age was 0.558 suggesting that export intensity rose 0.558 points for an additional year of firm operation.

4.3.2 Diagnostic Tests

4.3.2.1 Testing for random effects: Breusch-Pagan Lagrange multiplier (LM)

The LM test allows one to select between a random effect and a simple OLS regression. The null hypothesis of the LM test is that variances among entities are zero. There is no observable difference between the various units in this.

4.3.2.2. Cross sectional dependence

Macro panels for long time series have an issue with this. Cross sectional dependence is a problem with macro panels with long time series of 20–30 years, according to Baltagi. If the panel is a macro panel, the BP-LM test or the Pasaran CD test can be performed to assess whether residuals are related across entities. For tiny panels, according to our statistics, this is not a problem (few years and many cases). However, this test will not be applied to our two-period panel.

4.3.2.3. Heterogeneity test

In panel regression, major econometric concerns focus on heterogeneity and the decomposition of the idiosyncratic error, although there are many other issues which would have been addressed. Panel regression, however, renders some of these issues inapplicable. For instance, testing for multicollinearity is almost impossible. One aspect which is relevant with regard to the error term is related to time-invariant firm-specific differences which were tested earlier in the Hausman test. The other aspect is heterogeneity. Heterogeneity test was based on the Breusch and Pagan Lagrangian multiplier procedure which involved first estimating the random effects model, and; thereafter, testing that heterogeneity arising from firm-specific characteristics is non-existent. That is, testing that the variance of the time-invariant error is zero.

Table 8:Breusch Pagan Lagrangian multiplier test

```
. xttest0
Breusch and Pagan Lagrangian multiplier test for random effects

intensity[panelid,t] = Xb + u[panelid] + e[panelid,t]

Estimated results:
-----+-----
intensity |          Var          sd = sqrt(Var)
          |-----+-----
          |          1357.697      36.84694
          |          194.0968     13.93186
          |          973.8448     31.20649
-----+-----

Test:   Var(u) = 0
        chibar2(01) =      8.23
        Prob > chibar2 =    0.0021

We fail to reject the null hypothesis in this case thus
H0: firm specific characteristics is non-existent
H1: firm specific characteristics is existent
```

Following the Breusch and Pagan Lagrangian multiplier test for random effects we fail to reject the null hypothesis thus absence of heterogeneity

4.4 Discussion of results

This paper sought to analyze how export intensity is affected by infrastructure and institutional quality in Kenya. Export intensity, measured as a fraction of a firm's total sales which were exported, was the explained variable and it was explained by many variables, including infrastructure and institutional quality. Infrastructure was categorized into three groups, namely; transportation, telecommunication, and energy/water. Transportation infrastructure was considered as either an obstacle to production and trade or not. Energy/water infrastructure was given by electricity supply as an obstacle as well as water shortage challenges while telecommunications infrastructure was based on ownership of a website by a firm. Institutional quality was captured by various dummy variables which captured obstacles, including: political instability, corruption, courts, labor regulation, business licensing, tax administration, and tax rate. Other factors considered included: firm age, ownership, innovation, managerial experience, firm size (small, medium and large), and competition.

Two waves of the World Bank Enterprise Survey were utilized. The two waves were for the year 2013 and year 2018, with each wave involving 1001 firms. Non-exporting firms were, however, excluded from the analyses. As a result, only 301 export-oriented firms were investigated. Descriptive analysis included an overview of the reported averages. The mean suggested that, in the interval 0 to 1 (where 0=no obstacle, and 1=minor/moderate/major/severe obstacle), the average obstacle score was above 0.7 with regard to either electricity disruption, corruption, high tax rates, transportation, tax administration, and political instability as hinderances to raising output as well as to trade. Courts, licensing and business permits, and labor regulations were among the least considered obstacles.

Among the export-oriented firms, none was government-owned while more than 9 out of 10 firms were private domestic. Lastly, 19% of total sales went towards export trade with 3 out of 5 firms having innovated in the previous three-year period. That is export intensity was 19%.

Estimation of the panel regression employed both the fixed effects and the random effects model. Upon application of the Hausman test, the random effects model was chosen over the fixed effects model. The random effects estimates suggested that exports rose significantly in transportation obstacle and the age of the firm. Exports, however, significantly declined in ownership of a website by a firm and tax administration. Electricity obstacle, corruption obstacle, tax rates, managerial experience, private domestic ownership, private foreign ownership, water shortages, innovation. Courts, labor regulations, political instability, and business licensing, nevertheless, were not significant predictors of exports.

Nazia and Normaz (2019), Olukunle (2020), Rahman et al (2020), and Rehman et al (2020) indicated that exports rose significantly in infrastructural development. This paper, therefore, disagreed with the aforementioned four studies since exports were found to rise in transportation obstacles (+19.16). Rahman et al (2020) random effects estimates argued that transport infrastructure reduces trade costs while Rehman et al (2020) in the Pooled Mean Group argued that transport development enhanced market accessibility which in turn boosted exports. This research, however, argues that firms facing transportation challenges opted for export trade due to the high export price relative to prevailing prices in the domestic markets. In arguing thus, this research assumes that transportation obstacles did not erode all the extra benefits accrued from export trade.

Rehman et al (2020) indicated that development of energy infrastructure improved export trade. Falentina and Resosudarmo (2019) revealed that export declined in electricity blackouts. Javed et al (2022) showed that exports decline in energy crisis. On the contrary, this study's findings, however shows that electricity obstacle did not negatively affect the share of exports, therefore

contradicting with Rehman et al (2020) PMG estimates, Falentina and Resosudarmo (2019) fixed effects, and Javed et al (2022) OLS estimates. According to Falentina and Resosudarmo (2019), blackouts reduced firm productivity. When productivity is low, a firm has less commodities to trade. Thus, export intensity declines. An assumption in this study is that although electricity was perceived as an obstacle, over the years, firms have invested in alternative power sources such as generators, either owned by the firm or jointly shared between firms.

Falentina and Resosudarmo (2019) established that export trade was positively influenced by website usage. Nordas (2020), however, indicated increments in export trade with telecommunications infrastructural development. This results however, contradicts Falentina and Resosudarmo (2019) and Nordas (2020). The results in this paper suggested that website usage affected the export trade but with a negative effect. A firm owning a website in this case might have received poor ratings of its product in the international market affecting the demand of the product in the export market. In addition to increased openness, this paper argues that website usage might hinder export trade as a result of product misinformation being spread all over the internet which in turn damages the market demand of the product. Websites posing a negative effect to the export intensity can be accrued to the emergence and prevalence of the social media platforms such as WhatsApp and Instagram that is taking up the market space. A suggestion for this could be most firm should make effort and actively market their products through this platform to increase their export sales.

Bahri et al (2020) argued that corruption reduces export trade by eroding incentives to trade. Olney (2016) indicated an increase in export intensity as corruption rose. Simiyu and Mbinya (2022) indicated a negative effect of corruption on export intensity. Ruzekova et al (2020) suggested that export performance rises when corruption declines. This paper supports the findings by Bahri et al (2020) partial least square, Ruzekova et al (2020) and Simiyu and Mbinya (2022) where corruption

obstacles sink exports. On the contrary, however this paper contradicts the Pooled Ordinary Least Square by Olney (2016) who argued that corruption incentivized firms to move away from domestic markets while focusing on export trade thus increasing their exports. This was hypothesized to be realized through the use of intermediaries which came at an expense lower than that incurred in bribing authorities. However, these results support Martins et al (2020) argument that corruption has a 'sanding effect' such that it disincentivizes trade.

According to Zhang et al. (2019), tax administration influences an individual's desire to function in any environment with transaction expenses. If taxes are excessive, businesses will cease operations, whereas nations with low taxes or greater tax advantages will attract more enterprises. This paper supports the authors finding as the effect of tax administration obstacles causes a reduction in exports shown by the negative coefficient. Adu-Gyamfi (2020) however indicated that tax breaks are a motivation to increased output by firms which leads to increased export intensity.

Kapri (2021) argues that courts are detrimental to export trade when justice is delayed, This is through the expensive costs incurred while resolving conflicts. These results show a negative effect on the export intensity caused by court obstacles indicating how much harm this causes to trade. Kapri (2021) argued out that the expensive costs resulted from the bribes given to the courts to fast move the justice process. The negative coefficient of the random fixed estimates in this study indicated that firms faced with water shortage faced a decline in the export intensity. This analysis agreed with Deutschmann et al. (2021) who established that water shortages led to low output level thus decreased exports.

Maria and Ganau (2014) finds that innovation of a new commodity increases the export intensity. However, this analysis established that although a firm made efforts to introduce a new product into the market, it did not increase its export sales. This can be argued that the product introduced in the market was not competitive enough to allow for increased demand thus sales. To

solve this, firms have to invest heavily in research in order to produce competitive products into the market. According to Correa et al. (2010) firms showed a positive response exports despite perceiving labor regulations as obstacles. Correa et al. (2010) argued out that since exporting firms are in formal business, they had no choice but to adhere to the labor regulations put in place in order to keep them in business. This study supported this as the random effects estimates indicated a positive coefficient in the labor regulation obstacles affecting exports. The analysis shows that exports rise despite the labor regulations in place.

Filatov et al. (2008) indicated that foreign ownership increased export intensity. Both domestic and foreign owned firms increased exports. However, exports by a foreign owned firm were slightly higher than that of the counterpart. The findings in the analysis suggest that foreign firms are likely to export more than the domestic firms although the small margin. Small and medium firms reduced the exports of a firm. Although they both reduced the exports, small firms had a much-worsened effect on exports compared to the medium firms. Söderbom and Teal (2001) suggested that the size of a firm was key to increasing exports. A suggestion in this is that firms could consider uptake of extra human capital to increase their exports.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND POLICY IMPLICATIONS

4.1 Introduction

This chapter presents a summary of findings, conclusions and discusses policy implications. A summary of the research, conclusions drawn from the findings, and directions for policy consideration are captured here. These are followed by the research's limitations which then informs suggested areas for future research.

4.2 Summary of the Results

Predicting export intensity in Kenya using infrastructural development and institutional quality was at the heart of this research. Export intensity was defined as the fraction of a firm's total sales which were exported as reported by firms in a year prior to the World Bank Enterprise Surveys of 2013 and 2018. This was then explained by transport, electricity, courts, corruption, tax rate, tax administration, business licensing, labor regulations, political instability obstacles, and water shortages alongside other factors. These other factors were innovation, managerial experience, website ownership, ownership of the firm, firm age, small firms, medium firms, large firms and competitors.

Focusing on only export-oriented firms led to the utilization of a sub-dataset containing 301 firms from which it was evident that 19% of sales were exports. Analyses involved descriptive analysis which informed the variables to be included in regression analysis. From the descriptive analysis, for instance, no export-oriented firm was government-owned. As a result, the dummy for government-owned was dropped from the model. The summary statistic of interest was the mean although the range (particularly, the minimum) was helpful during the data coding and cleaning phase. The mean suggested that at least 70% of firms considered either electricity disruption (82.4%), corruption (75.7%), high tax rates (78.7%), transportation (72.4%), tax administration (73.8%), and

political instability (83.1%) as hinderances to raising output as well as to trade. Firm website (49.5%), Courts (56.1%), licensing and business permits (67.8%), and labor regulations (62.5%) were among the least considered obstacles.

At the model estimation phase, the Hausman test led to the adoption of the random effects model. This analysis established that, using the random effects model transport obstacle, tax administration, firm website and age of the firm were statistically significant. The coefficient of tax administration was negative suggesting export intensity reduced for every point rise in tax administration. The coefficient of firm age was positive suggesting that the older the firm, the larger the amount of exports. The coefficient of transport obstacle was positive suggesting that export intensity of a firm rose despite the transport challenges faced. Lastly, corruption, courts, political instability, small firms, medium firms, water shortage, had a negative impact on exports while firm ownership had positive impact on the exports.

4.3 Conclusions

In line with the findings, this paper concluded that when faced with obstacles related to transportation a firm's export intensity rises. However, tax administration obstacle suggested that firms facing this obstacle experienced a decline in their exports. The results show its negative impact on exports. Although political instability, courts, corruption obstacles, innovation, water shortage reduced the share of export sales by a firm, It was also concluded that both foreign and domestic ownership had a positive relationship to the exports. However, website ownership was reported to reduce the export intensity. Moreover, older firms exported more commodities than did newer ones. Lastly, this paper concluded that in the first 4 to 5 years, export intensity declines; thereafter, it rises.

4.4 Policy Implications

The conclusions made led to drawing the following suggestions for policy initiative. The coefficient of tax administration was negative implying that export intensity declined when firms

faced tax administration obstacles. This paper recommends streamlining tax administration as a first step towards increasing export intensity. Streamlining tax administration could be realized through, for example through reducing “unnecessary” paperwork, reducing compliance checks, and making the tax policy as simple as possible to understand. To control corruption, crackdown on corruption individuals by setting up of punitive measures against corrupt government officials. Lastly, to address the negative effect of certain infrastructural factors on exports such as water shortage public-private partnerships ought to be pursued in addressing water shortage problems such as drilling of boreholes and the construction of dams that would serve as a long-term solution.

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