ORIGINAL ARTICLE

Trade Agreements, Technical Regulations, and Standards: Competitiveness Implications for Kenyan Exporters to European Union

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Abstract

The European Union imports over 22.4% of total Kenyan exports and is market to over 51.3% of Kenya's untapped export potential. However, there is a dearth of knowledge on how trade agreements, technical regulations, and standards influence competitiveness of firms exporting to the market. This study uses customs firm-product (HS 2 digit)-destination data ranging from 2007 to 2020 to examine the competitiveness implications of trade agreements and the resultant technical regulations and standards on firms that export to the European Union. The stylized facts demonstrate that countries offering the largest preferential margin to exporting firms are the very same countries with the largest number of technical regulations and standards faced by exporters. Controlling for potential simultaneity, results from random and fixed-effects models demonstrate that higher preferential margins emanating from trade agreements are associated with increases in market power and the number of products per exporter. However, higher preferential margins emanating from trade agreements are associated with a decline in the number of exporters per product driven by internal economies of scale, specialization, product differentiation, and technological advantage among firms. Higher technical regulations are associated with improvement in market competitiveness and number of products per exporter. Higher number of standards is associated with a rise in market power, but a decline in the number of products per exporter and the number of exporters per product. The findings have policy implications to developing countries especially those within the African, Caribbean, and Pacific bloc which has an existing trading arrangement with the EU and touch on a need to strengthen domestic technical and administrative capacity to comply with existing technical regulations and standards especially among MSEs, cooperation in quality management and assurance, strengthening of institutional links for information exchange, and credit support targeting exporting MSEs which have comparative disadvantage in technology and economies of scale.

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Résumé

L'Union européenne importe plus de 22,4% du total des exportations kényanes et est un marché pour plus de 51,3% du potentiel d'exportation inexploité du Kenya. Cependant, il y a un manque de connaissances sur la façon dont les accords commerciaux, les réglementations techniques, et les normes influencent la compétitivité des entreprises exportatrices. Cette étude utilise des données douanières de destination des entreprise-produit (en anglais: « HS 2-digit ») entre 2007 à 2020 afin d'examiner les implications sur la compétitivité des accords commerciaux, et des réglementations techniques et normes qui en résultent, sur les entreprises qui exportent vers l'Union Européenne. On trouve que les pays offrant la plus grande marge préférentielle aux entreprises exportatrices sont les mêmes pays avec le plus grand nombre de réglementations techniques et de normes auxquelles sont confrontés les exportateurs. Contrôlant pour une simultanéité potentielle, les résultats des modèles à effets aléatoires et fixes démontrent que des marges préférentielles plus élevées dus aux accords commerciaux sont associées à une augmentation du pouvoir de marché et du nombre de produits par exportateur. Cependant, des marges préférentielles plus élevées dus aux accords commerciaux sont associées à une diminution du nombre d'exportateurs par produit, entraînés par des économies d'échelle internes, la spécialisation, la différenciation des produits, et l'avantage technologique parmi les entreprises. Des réglementations techniques plus élevées sont associées à une amélioration de la compétitivité du marché et du nombre de produits par exportateur. Un nombre plus élevé de normes est associé à une augmentation du pouvoir de marché, et à une diminution du nombre de produits par exportateur et du nombre d'exportateurs par produit. Les résultats ont des implications politiques pour les pays en développement, en particulier ceux de la bloc africain, caribéen et pacifique (en anglais: « ACP») qui a un arrangement commercial existant avec l'UE. Ces implications touchent à la nécessité de renforcer la capacité technique et administrative domestique pour se conformer aux réglementations techniques et normes existantes, en particulier parmi les PME, la coopération en matière de gestion et d'assurance de la qualité, le renforcement des liens institutionnels pour l'échange d'informations, et le soutien au crédit ciblant les PME exportatrices qui ont un désavantage comparatif en technologie et en économies d'échelle.

Resumen

La Unión Europea importa más del 22.4% del total de las exportaciones kenianas y es el mercado de más del 51.3% del potencial de exportación no explotado de Kenia. Sin embargo, existe una falta de conocimiento sobre cómo los acuerdos comerciales, las regulaciones técnicas y los estándares influyen en la competitividad de las empresas que exportan al mercado. Este estudio utiliza datos de aduaneros del destino de empresas-productos (HS 2 dígitos) que abarcan los años 2007-2020 para examinar las implicaciones de competitividad de los acuerdos comerciales y las consecuentes regulaciones técnicas y estándares en las empresas que exportan a la Unión Europea. El estudio demuestra que los países que ofrecen el mayor margen preferencial a las

empresas exportadoras son los mismos países con el mayor número de regulaciones técnicas y estándares a los que se enfrentan los exportadores. Controlando la simultaneidad potencial, los resultados de los modelos de efectos aleatorios y fijos demuestran que los márgenes preferenciales más altos derivados de los acuerdos comerciales se asocian con aumentos en el poder de mercado y el número de productos por exportador. Sin embargo, los márgenes preferenciales más altos derivados de los acuerdos comerciales se asocian con una disminución en el número de exportadores por producto, impulsado por las economías de escala internas, la especialización, la diferenciación de productos y la ventaja tecnológica entre las empresas. Las regulaciones técnicas más altas se asocian con una mejora en la competitividad del mercado y el número de productos por exportador. Un mayor número de estándares se asocia con un aumento en el poder de mercado, pero también con una disminución en el número de productos por exportador y el número de exportadores por producto. Los hallazgos tienen implicaciones políticas para los países en desarrollo, especialmente aquellos dentro del bloque de África, Caribe y Pacífico (en ingles: "ACP") que tienen un acuerdo comercial existente con la UE, y tocan la necesidad de fortalecer la capacidad técnica y administrativa doméstica para cumplir con las regulaciones técnicas y estándares existentes, especialmente entre las empresas de tamaño medio, la cooperación en la gestión y garantía de calidad, el fortalecimiento de los vínculos institucionales para el intercambio de información y el apoyo crediticio dirigido a las empresas de tamaño medio exportadoras que tienen una desventaja comparativa en tecnología y economías de escala.

JEL Classification F02 · F15 · F63

Introduction

Kenya's Integrated National Export Development and Promotion Strategy (Republic of Kenya 2018) aims at realizing 25% annual growth in exports. To achieve an export-led growth, there is need to enhance export competitiveness in markets where the country has the largest untapped export potential. The European Union (EU) takes up over 22.4% of total Kenyan exports and comprises of over 51.3% of Kenya's untapped export potential (Table 5 in Appendix). To unlock this potential, there is need to eradicate barriers to market access.

Despite Kenyan exports enjoying duty-reductions and quota-free access to the European Union (EU) market under the interim Economic Partnership Agreement (EPA) between the EU and the East African Community (EAC)[1] which has been in force since 2008 and the EU's Generalized Systems of Preference (GSP) that has been in force since 1971, there is a dearth of knowledge on how the trade arrangement and the resulting technical regulations and standards have affected

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[1] The EAC-EU Economic Partnership Agreement meant to operationalize the African, Caribbean, and Pacific (ACP)/Cotonou Agreement with EU within the eastern bloc of the African continent.

competitiveness of Kenyan firms exporting to the market.[2] For instance, despite the trade arrangement being in place and encouraging cooperation in the field of standardization, certification, and quality assurance to eradicate unnecessary technical barriers, Kenyan exporters still encounter difficulties in complying with labelling requirements, rules of origin, and phytosanitary controls while accessing the EU market[3] (Carbone 2018; Kareem et al. 2016). This study therefore undertakes to investigate the competitiveness implications of the preferential trade agreement between Kenya and the EU and the resultant technical regulations and standards on Kenyan exporting firms to the market using panel data that spans 14 years (2007–2020).[4]

An important stylized fact is that EU countries offering the largest preferential margin to Kenyan exporting firms through provision of the largest reduction of tariff barriers to market access are the very same countries with the largest number of technical measures regulating entry of Kenyan exporters to their markets. The implication is that despite the existence of a trade agreement which significantly reduces tariff barriers to market entry, exporting firms find it hard to access the EU market due to introduction of technical regulations on exports.

Although existing studies have demonstrated that trade agreements, technical regulations, and standards influence export competitiveness (Couillard and Turkina 2015; Sun and Reed 2010; Volpe et al. 2011; Rose 2007; Gil et al. 2008), few have examined the implications of the three on competitiveness of Kenyan firms exporting to the European Union. And although trade agreements improve market access for developing countries, some studies have estimated the effect to be moderate (Stender 2019) while other studies observe large variations in tariff equivalents (Nimenya et al. 2012) which mostly take the form of technical regulations and standards implemented by EU importing countries for products enjoying large preferential margins.

Where studies have strived to link transaction costs related to cross-border trade procedures—which could be linked to the number of technical regulations and standards that exporting firms should satisfy, focus has mainly been on trade volumes (Persson 2013) with little focus on competitiveness in terms of the number of products per exporter and the number of exporters per product. Among studies that have examined trade agreements, focus has been from the prism of volume and direction of exported goods, foreign direct investment (FDI) and geopolitical dimensions (Egger and Larch 2011; Capling 2008) with little focus on competitiveness. Even studies that have come close to examining the link between trade agreements and competitiveness (Arnold 2006), the focus has mainly been on labour and the development process broadly.

On technical regulations and standards, Rose (2007) and Gil et al. (2008) have demonstrated that having foreign missions in the form of embassies, consulates, and regional trade agencies in export destination countries positively influences exports.

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[2] The study considers all the 27 members of the European Union that existed by December 2020 including the United Kingdom but excluding Croatia which joined way later in 2013.

[3] See Article 19(2) (b); Article 32(2) (a); Article 42(1); Article 48(1) of the EU-EAC EPA for instance.

[4] By this period, the 27 countries considered excluding Croatia had joined the Union.

The work, however, fails to demonstrate the channel through which these foreign missions encourage export activity. The current study extends this work by arguing that foreign missions could engage governments in destination countries to reduce most of the technical regulations while disseminating information to firms back home on the quality standards required to access the foreign market. The outcome is enhanced market access and competitiveness of exporting firms.

Results from the study speak to the existing stylized facts on the competitiveness implications of trade agreements, technical regulations, and standards on Kenyan firms exporting to the European Union. First, the results indicate that higher preferential margins emanating from trade agreements are associated with increase in market power and the number of products per exporter, but a decline in the number of exporters per product. Second, the findings indicate that higher number of technical regulations is associated with improvement in market competitiveness, the number of products per exporter, and the number of exporters per product. Third, a rise in the number of standards that exporting firms should satisfy is associated with a rise in market power, but a decline in the number of products per exporter and the number of exporters per product. The policy implications of these findings are not limited to Kenyan firms exporting to the European Union,[5] they extend also to firms from other developing countries exporting to the market.

In this paper, trade agreements are examined from the prism of the preferential margin, which is the difference between the Most Favoured Nation (MFN) tariff rate that would exist in absence of a trade agreement and the effectively applied tariff in presence of a trade agreements. Technical regulations and standards comprise non-tariff measures examined by the paper, with technical regulations encompassing pre-shipment inspections, import licensing procedures and safeguards, and antidumping measures while standards touch on quality of manufactured products, adherence to environmental specifications, product and service quality management, and food and feed management systems.

The other sections of the study undertake a critical review of existing literature ("Literature Review" section), detail the data used and ensuing stylized facts ("Data and Stylized Facts" section), present the empirical methodology and results ("Empirical Methodology and Results" section), and proffers a conclusion ("Conclusion" section).

Literature Review

Studies have demonstrated contradictory influence of trade liberalization on export activity. Whereas some studies have shown positive influence of trade liberation on product diversification and trade flows (Gnangnon 2019; Shikher and Yaylaci 2014; Yang and Jesus 2022; Zhou et al. 2019; McNab and Moore 1998; Martincus and Gomez 2010; Kahouli 2016; Nguyen 2014; Egger et al. 2011; Baier and Bergstrand 2007; Santeramo and Lamonaca 2019; Santeramo and Lamonaca 2022; Mukherjee

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[5] This is so because the EU has a trade arrangement with African, Caribbean, and Pacific (ACP) countries. These are largely developing countries.

and Chanda 2019; Acharya 2010; Matovu 2012), others paint a pessimistic outlook to the influence of tariff liberalization on trade activity (Mayda and Steinberg 2009; Mujahid and Kalkuhl 2016; Udbye 2017; Sideri 1997; McKay et al. 1997). Most of these studies have used panel data at firm-level and have attempted to control for potential endogeneity. Although these studies have examined the influence of trade agreements on trade, none has explored the effect of trade agreements on competitiveness of Kenyan firms exporting to the European Union. The EU is an important market for Kenya given it takes up over 22.4% of total Kenyan exports and is market to over 51.3% of Kenya's untapped export potential. Understanding how trade agreements, technical regulations, and standards influence competitiveness of Kenyan exports creates important insights and policy recommendations on specific interventions that are needed to fully unlock the untapped potential in the market. This study strives to contribute to the existing literature by examining how trade agreements influence competitiveness of exporting firms to the European Union in a developing country context.

Bown et al. (2021) have argued that high-income countries introduce antidumping regulations on imports. Most of the European Union members are high-income countries and would be expected to introduce technical regulations and standards as antidumping measures even in presence of a trade agreement. Further, most of the trade agreements have exception provisions stating circumstances under which protective measures would be invoked to curtail imports. Under the trade agreement with which Kenya trades with the EU, protective measures in the form of higher tariff rates, technical regulations, and standards would be introduced to protect human, animal or plant life or health, public security, or national treasures of artistic, historic, or archaeological value. For Kenya, artistic products (HS code 97) face higher restrictions in accessing the EU market yet they are strategic products for the creative economy not only in Kenya but also among other developing countries.[6] Schuenemann and Kerr (2019) argue that African countries have not benefited from EU market opportunities due to introduction of regulatory requirements in the form of technical barriers. African and other developing countries face challenges in complying with these requirements (Kareem et al. 2022).

Although a large share of the literature shows technical regulations and standards to be a barrier to African exports to the European Union (Santeramo and Lamonaca 2019; Liu et al. 2019a, b; Kerr 2019; Henson and Jaffee 2007), some studies view technical regulations and standards as trade catalysts (Anders and Caswell 2009; Medin 2018). The evidence, however, shows that technical barriers and standards encourage exports among developed countries but discourage exports by developing countries (Anders and Caswell 2009; Disdier et al. 2008). This study contributes to this literature by demonstrating that, within the context of Kenyan exports[7] to EU, standards are associated with a decline in the number of products per exporter and

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[6] Especially ACP countries.

[7] Kenya is a developing country.

the number of exporters per product, but a rise in market power[8] while technical regulations are associated with increment in market competitiveness and number of products per exporter driven by technological innovations that culminate in creation of new products.[9]

Other studies have shown that removal of technical barriers has a greater effect on the intensive margin compared to removal of tariff barriers (Muchopa et al. 2019). Studies also view standards as forms of non-tariff barriers (Aisbett and Silberberge 2020). This literature, however, has largely focused on the effect of technical barriers and standards on the intensive margin of agricultural exports. The current study contributes to the literature by examining the effect of technical regulations and standards on firm competitiveness considering the universe of products at the 2-digit HS code.

Data and Stylized Facts

The paper uses a 14-wave panel data covering the period from 2007 to 2020 from the Exporter Dynamics Database by World Bank (Fernandes et al. 2016)[10] with reinforcement from CEPII,[11] World Development Indicators (WDI),[12] and International Trade Centre (ITC).[13] The data provides details of exporting firms in terms of the country of origin, destination country, year of export, and exported products in 2-digit HS classification. Since this is a very broadly defined class of products, the examined variations reveal cross-sector differences largely driven by technology and internal economies of scale.[14]

The study considers 27 members of the European Union (EU) that existed up to December 2020 including the United Kingdom but excluding Croatia which joined the Union way later in 2013. In particular, the EU countries considered include Austria (AUT), Belgium (BEL), Bulgaria (BGR), Cyprus (CYP), Czech Republic (CZE), Germany (DEU), Denmark (DNK), Spain (ESP), Estonia (EST), Finland

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[8] The rise in market power makes export activity attractive mainly among large firms which enjoy internal economies of scale.

[9] Technological innovations are a key component of internal economies of scale and are dominant among large firms.

[10] Appreciation to Ana Fernandes and Bishakha Barman from World Bank for sharing the current Exporter Dynamics Dataset spanning 2006–2020. The transaction-level customs data was collected by the Trade and Integration Unit of the World Bank Research Department, as part of their efforts to build the Exporter Dynamics Database described in Fernandes et al. (2016). Variables used from the data obtained from World Bank include HHI, number of exporters per product, and the number of products per exporter.

[11] Weighted distance is obtained from CEPII.

[12] Data on per capita GDP and population is obtained from WDI.

[13] Variables obtained from ITC relate to preferential margin, technical regulations, and standards. ITC updates the data from time to time to reflect emerging information. The variables can be obtained from https://standardsmap.org/en/identify and https://www.macmap.org/en/query/compare-product?reporter=276&partner=404&product=All&level=2

[14] Internal economies of scale give large firms a cost advantage over small firms and lead to an imperfectly competitive market structure.

(FIN), France (FRA), United Kingdom (GBR), Greece (GRC), Hungary (HUN), Ireland (IRL), Italy (ITA), Lithuania (LTU), Luxembourg (LUX), Latvia (LVA), Malta (MLT), Netherlands (NLD), Poland (POL), Portugal (PRT), Romania (ROM), Slovakia (SVK), Slovenia (SVN), and Sweden (SWE).

Moreover, the data reveals that despite the Union having made huge progress towards harmonization of tariff and non-tariff measures (technical regulations and standards), there exist noticeable variations in effectively applied tariff rates and enforced non-tariff measures across individual member countries and across specific products.[15] The EAC-EU EPA anticipates variations in effectively applied tariff rates by providing that "The basic customs duty to which the successive reductions are to be applied shall be that specified in each party's tariff schedule for each product.[16]" Existing literature corroborates this observation by noting that the EU cannot be considered a single Unit pertaining to non-tariff measures (Tudela-Marco et al. 2016) and that there are variations in effectively applied tariffs across specific products and among individual EU members (Daly and Kuwahara 1998). The implication for Kenya and other developing countries is that these variations are likely to make specific EU countries attractive export destinations for specific products and specific type of firms.[17]

Countries offering the largest average preferential margin to Kenyan exports to the market include Bulgaria (8.75%), Slovenia (8.49%), Luxembourg (7.20%), Romania (6.96%), Poland (6.62%), Slovakia (6.53%), Latvia (6.32%), Lithuania (6.31%), Netherlands (6.23%), Ireland (6.16%), Cyprus (6.10%), and Estonia (6.07%) (Table 6 in Appendix). Although these countries would conventionally be considered more attractive to Kenyan exports given that they boast of the largest reduction of tariff barriers, they have the largest number of non-tariff barriers (technical regulations and standards). Given that non-tariff measures are highly opaque and more trade-prohibiting compared to tariff measures which are more transparent and quantifiable, it could mean these markets are attractive to large firms which enjoy competitive edge emanating from technology and economies of scale, but unattractive to Micro and Small Enterprises (MSEs). Czech Republic (4.10%), Finland (4.61%), and United Kingdom[18] (4.89%) had the lowest preferential margin to Kenyan exporters. Although these markets have retained tariff measures relatively high, they could possibly be attractive to both MSEs and large firms because they have relatively lower number of non-tariff measures.

Larger preferential margins indicate larger export incentives to exporting firms. The incentives are realized through lower market entry barriers. The preferential margins arise from variations in the effectively applied tariff rates among individual EU countries and across specific product lines. Moreover, the variation in the

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[15] See Tables 6 and 7 in Appendix.

[16] Article 6 on customs duty.

[17] As such, heterogeneity across sectors and firms is expected to manifest. The results in Table 3 and 4 confirm presence of sectoral and within firms heterogeneity which has been controlled for.

[18] The United Kingdom emerges as the only country with almost no technical regulations on Kenyan exports.

observed preferential margin is large across specific products compared to individual EU countries. Within the scope of this study, the implication is that observed variations emanate not only from slight differences[19] in the effectively applied tariff rates and the accompanying technical regulations and standards among EU members, but also from larger variations[20] across specific products.

In terms of non-tariff barriers to entry into the European Union market, majority of the countries (16) have an average of 13 broad technical regulations faced by Kenyan exporting firms. Seven countries have the largest average number of technical regulations faced by exporting firms from Kenya. They include Latvia (15.95), Bulgaria (15.77), Estonia (15.53), Slovakia (15.12), Lithuania (15.11), Luxembourg (14.73), and Poland (14.11). An important stylized fact emanating from Table 6 in Appendix is that countries offering the largest preferential margin to Kenyan exporting firms are the very same countries with the largest number of non-tariff measures regulating market access by Kenyan exporters. Existing studies observe reduction of tariff barriers with trade liberalization has seen a surge in non-tariff barriers in the form of technical regulations and standards to trade in goods (Daly and Kuwahara 1998; Aisbett and Silberberge 2020; Maria 2010). Concerns rise that such barriers may vitiate expected benefits from tariff liberations. The implication is that despite the existence of a trade agreement which significantly reduces tariff barriers to market entry, exporting firms find it hard to access the European Union market due to introduction of non-tariff measures on exports in the form of standards and technical requirements. All the European Union members have at least 4 broad standards that Kenyan firms exporting to the market should satisfy except Malta which has just 3 broad standards faced by exporting firms from Kenya.

Next, the study examines the average *preferential margin, technical regulations,* and *standards* faced by the products exported by Kenyan firms to the European Union.[21] During the period covered by the study, it is noted that Kenyan firms did not export mineral fuels, mineral oils and products of their distillation, bituminous substances, and mineral waxes (HS code 27), and Cork and articles of Cork (HS code 45). These two product codes are left out in Table 7 in Appendix.

Fourteen products benefiting the most from the trade arrangement with the European Union in terms of higher preferential margin include sugars and sugar confectionary (32.28%), dairy produce, birds' eggs, natural honey, and edible products of animal origin (30.89%), preparations of meat, of fish or of crustaceans, molluscs or other aquatic invertebrates (28.41), meat and edible meat offal (28.36%), tobacco and manufactured tobacco substitutes (28.03%), preparations of vegetables, fruit, nuts, or other parts of plants (23.19%), products of the milling industry, malt,

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[19] The differences in the effectively applied tariff rates among individual EU countries are small, indicating a move towards convergence in the common external tariff for EU. The small differences are, however, adequate to drive variations in export attractiveness of individual EU countries for Kenyan exporters.

[20] These sectoral variations make certain products exported by Kenyan firms competitive in certain EU countries and drive specialization.

[21] In this study, technical regulations and standards are components of non-tariff measures which have been disaggregated for purposes of examining their individual effects on export competitiveness of Kenyan firms exporting to the European Union.

starches, inulin, and wheat gluten (20.38%), live animals (15.39%), edible vegetables and certain roots and tubers (15.08%), cereals (13.74%), articles of apparel and clothing accessories, knitted or crocheted (11.79%), footwear and gaiters (10.69%), other made-up textile articles, sets, worn clothing and worn textile articles, and rags (10.38%), edible fruit and nuts, peel of citrus fruits or melons (10.23%), and fish and crustaceans, molluscs and other aquatic invertebrates (10.17%).[22]

Products benefiting the least from the trade agreement in terms of having the lowest preferential margin include vegetable plaiting materials and vegetable products not elsewhere specified (0.00%), ores, slag and ash (0.00%), pharmaceutical products (0.00%), explosives, pyrotechnic products, matches, pyrophoric alloys, certain combustible preparations (0.00%), pulp of wood or of other fibrous cellulosic material, recovered waste and scrap paper or paperboard (0.00%), paper and paperboard and articles of paper pulp (0.00%), printed books, newspapers, pictures and other products of the printing industry, manuscripts, typescripts and plans (0.00%), tin and articles thereof (0.00%), arms and ammunition, parts and accessories thereof (0.00%), and works of art, collectors' pieces and antiques (0.00%). Some products like printed books, newspapers, pictures, and other products of the printing industry, manuscripts, typescripts, and plans (HS code 49) and works of art, collector's pieces, and antiques (HS code 97) that face higher tariff barriers to access the EU market, are strategic products in not only unlocking the potential of the creative economy sector in Kenya, but also among other developing countries.[23] Products with zero preferential margin face the Most Favoured Nation (MFN) tariff rate that would exist even in absence of a trade agreement. These are highly protected products within the EU.

Products exported by Kenyan firms are required to comply with 3 to 4 broad standards to secure access to the EU market. Further, the facts show that the products enjoying the largest trade preferential margin—and thus having the least tariff barriers to access the EU market, largely face more non-tariff barriers (technical regulations and standards) which may discourage access to the EU market and thus dilute benefits created by tariff reductions emanating from the trade arrangement. Products facing the largest number of technical regulations include oil seeds and oleaginous fruits, miscellaneous grains, seeds and fruit, industrial or medicinal plants, straw and fodder (26), albuminoidal substances, modified starches, glues, and enzymes (24), salt, sulphur, earths and stone, plastering materials, lime and cement (24), edible vegetables and certain roots and tubers (23), animal or vegetable fats and oils and their cleavage products, prepared edible fats, animal or vegetable waxes (23), inorganic chemicals, organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or isotopes (23), coffee, tea, mate, and spices (22), edible fruit and nuts, peel or citrus fruits or melons (22), miscellaneous edible preparations (21), fish and crustaceans, molluscs and other aquatic invertebrates (21), sugars and sugar confectionery (20), miscellaneous chemical products (19), and cereals (18).[24]

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[22] The 2-digit HS codes for these products are 17, 04, 16, 02, 34, 20, 11, 01, 07, 10, 61, 64, 63, 08, and 03, respectively.

[23] The 2-digit HS codes for these products are 14, 26, 30, 36, 47, 48, 49, 80, 93, and 97, respectively.

[24] The 2-digit HS codes for these products are 12, 35, 25, 07, 15, 28, 09, 08, 21, 03, 17, 38, and 10 respectively.

Table 1 Descriptive statistics

Variable	Obs	Mean	Std. Dev	Min	Max
Herfindahl–Hirschman Index	5450	0.596	0.264	0.019	1
Number of products per exporter	5450	1.298	0.555	1	10.5
Number of exporters per product	5450	2.851	4.488	1	67.714
Per Capita GDP	5450	41,448.645	11,929.094	7653.07	112,244.31
Preferential margin	5450	0.056	0.06	0	0.328
Number of regulations	5450	11.874	8.331	0	30
Number of standards	5450	3.995	0.068	3	4
Weighted distance	5450	6384.962	599.6	4067.625	7302.636
Population (Million)	5450	40.494	28.831	0.44	81.91
Unit price	5450	382.098	5191.84	0.001	326,784.4
Firm size					
Micro	5450	0.458	0.498	0	1
Small	5450	0.303	0.46	0	1
Large	5450	0.239	0.426	0	1

[a]United Kingdom has the least non-tariff barriers to Kenyan exports. This could mean the country is more attractive to Kenyan exports compared to other European Union countries

The study identifies variables measuring trade agreements, technical regulations, and standards. These variables are obtained from International Trade Centre (ITC). The variable named *trade agreements* is measured using the preferential margin which indicates the strength of a trade agreement. It is calculated by obtaining the difference between the Most Favoured Nation (MFN) rate[25] and the preferential tariff that is effectively applied.[26] This variable is measured on a ratio scale and quantifies the size of tariff barriers to market access eliminated by a trade arrangement. Fugazza and McLaren (2014) used preferential margin as a measure of market access. The summary statistics indicate that Kenyan firms exporting to the European Union enjoy an average preferential margin of 5.60% with the minimum and maximum preferential margin enjoyed being 0.00% and 32.80%, respectively. On *standards*, the study undertakes a broad examination of standards touching on quality of manufactured products, adherence to environmental specifications, product and service quality management, and food and feed management systems. The data shows that Kenyan firms exporting to the European Union face an average of 3 broad standards with the maximum number being 4. *Technical regulations* are measured using the number of broad technical measures imposed by each of the European Union countries to products exported by Kenyan firms. Examples of technical regulations include pre-shipment inspections, import licensing procedures and safeguards, and antidumping measures.

Evidence has shown that having foreign missions in the form of embassies, consulates, and regional trade agencies in export destination countries positively

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[25] Tariff rate that would exist in absence of a free trade agreement (FTA).
[26] Tariff rate that would exist in presence of a free trade agreement (FTA).

influences exports (Rose 2007; Gil et al. 2008). The work, however, fails to demonstrate the channel through which these foreign missions encourage export activity. The current study extends this work by arguing that foreign missions could engage governments in destination countries to reduce most of the technical regulations while disseminating information to firms back home on the specific standards required to access the foreign market. Articles 16, 24, 31, 61, 62, and 73 of the Economic Partnership Agreement provide for institutional cooperation in reducing the possibility of technical regulations and standards inhibiting trade competitiveness. The effectiveness of the institutional cooperation would be reflected in technical regulations and standards that are measured and examined in the study. The outcome is enhanced market access and competitiveness of the exporting countries. The data demonstrates that on average, Kenyan firms exporting to the European Union face an average of 11 broad technical regulations with the minimum and maximum number of regulations being 0 and 30, respectively (Table 1).

The study then focuses on variables measuring competitiveness of Kenyan exports to the European Union. Data on these variables is obtained from World Bank. The first measure of competitiveness used is the Herfindahl–Hirschman Index (HHI) (Fernandes et al. 2016).[27] The index applies to the European Union market. Previous studies have used the index as a measure of market competitiveness as it is derived from sum of squares of market shares (Akio et al. 2012; Owen and Owen 2020; Tripe et al. 2021; Kang and Park 2018). Usually, an increase in the value of the Herfindahl–Hirschman Index means a decrease in competitiveness and a rise in market power usually associated with monopolies and imperfectly competitive market structures (Akio et al. 2012). The stylized facts reveal an average HHI of 0.596 with the minimum and maximum values being 0.019 and 1.000 respectively. This means the EU market is highly concentrated[28] and thus is more attractive to large firms which enjoy internal economies of scale and have a cost advantage compared to MSEs. These firms influence prices, making it endogenously determined (Tirole 1988). Larger firms are also likely to perform better than micro and small firms in terms of technological innovations and product differentiation which is critical in creating new products and increasing the number of products per exporter. Evidence shows that high-income countries, like most of the EU members, invoke antidumping measures on imports in the form of technical regulations and standards (Bown et al. 2021). The antidumping measures are mostly likely to be complied with by larger firms, a condition that could highly likely lead to the observed market power.

The *number of products per exporter* and *the number of exporters per product* are similarly used as measures of competitiveness. The reasoning is that number of products per exporter can only increase if firms innovating to develop new products or differentiate the existing ones. Firms that innovate to develop new products or differentiate existing ones are competitive. The number of exporters per product can also only increase if firms gain internal economies of scale and there is significant reduction in market access barriers especially those related to reduction in tariff barriers, technical regulations, and standards. Li and Qian (2005) observe

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[27] Fernandes et al. (2016) provide the comprehensive methodology on the construction of the HHI.

[28] When a market is highly concentrated, market power is high and anti-competitive concerns arise.

that diversification enhances firm performance but fails to indicate the channel through which diversification enhances performance. Can and Gozgor (2017) have argued that diversification enhances quality of exported goods and services. This study extends the existing knowledge by arguing that export quality is possible due to enhanced competitiveness. Evidence shows that export promotion actions increase the number of exporters per product (Volpe and Carballo 2012; Sorensen 2014; Mwatu 2022). The study argues that trade agreements are an example of an export promotion policy which would be expected to not only increase the number of exporters per product, but also the number of products per exporter. Persson (2013) has also shown that transaction costs related to cross-border trade procedures affect export trade. The current study extends this knowledge by arguing that technical regulations and standards that exporters must comply with could raise transaction costs and affect competitiveness of exports to the European Union. This effect would be larger among MSEs for which compliance to the technical regulations and standards implies rise in transaction costs compared to large firms which experience lower transaction costs due to specialization, technology, and economies of scale. On average, each exporting firm sends 1 product to the European Union with the maximum number of products per exporter being 10. Similarly, the average number of exporters per product is 2 with the maximum number of exporters handling the same product being 67 (Table 1).

The study uses the weighted distance between Kenya and each of the European Union destination countries to control for transport costs. Inmaculada and Felicitas (2007) also used weighted distance as a measure of transport costs. Evidence shows that high transport costs deter trade activity (Martinez-Zarzoso and Suarez-Burguet 2007; Xiaohua and Qiu 2010; Davies et al. 2019; Martinez-Zarzoso et al. 2011; Borgatti 2008; Friedt and Wilson 2020; Jorge and Barbero 2022). In concentrated markets like the EU, transport costs are however, highly likely to deter trade activity among MSEs for which longer distance means higher transport costs. For large firms, however, longer distance may not necessarily discourage trade activity since they already enjoy cost advantage emanating from economies of scale, integration into the global value chains, technology, and specialization. This means for highly concentrated markets which are attractive to large firms, increase in distance could encourage export competitiveness.

The average distance between Kenya and a random EU country is 6385 km with the shortest and longest distance being 4068 and 7303 km, respectively. The population of each of the EU member countries over the study period is included in the analysis as a measure of market size. Previous studies have used population as a measure of market size (Lianos et al. 2022; Mundle 2007; Zhou 2009). The average population of a random EU country is 40.49 million with the lowest and highest population being 0.44 million and 81.91 million, respectively.

Per capita GDP of each of the EU countries is used as a measure of purchasing power. Existing research has similarly used per capita GDP as a measure of purchasing power (Happich and Geppert 2010; Bassino and Pierre 2019). The average per capita GDP of a random EU country was USD 41,448.65 with the lowest and highest per capita GDP for the bloc being USD 7,653.07 and USD 112,244.31, respectively. The unit price (USD) per exporter influences competitiveness, the number of

exporters per product, and the number of products per exporter. The stylized facts show that the average price is USD 382.09 with the lowest and highest price being USD 0.001 and USD 326,784.44, respectively. Evidence has shown that prices are set by rational and forward-looking firms (Thorarinn 1998; Wohlgenant 1985) especially in monopolistically competitive market structures. This insight points that price could potentially be endogenous especially if exporting firms have influence on the unit price for their exports. Further, from the stylized facts coming from Table 1, the EU market is highly concentrated. The high market power means the market is attractive to a few but large firms which have power to endogenously influence prices (Tirole 1988; Krugman et al. 2017). Moreover, the large variations in the effectively applied tariff rates across products in the EU filters into prices, implying the observed export prices are affected by trade policy.

Given that firms respond to trade agreements, technical regulations, and standards differently depending on whether they have internal economies of scale or not, firm size is also considered in the analysis. The classification of firms into either micro, small, or large firms is guided by Kenya's MSE Act 2012. The data reveals that majority of Kenyan firms exporting to the EU are micro (45.8%), followed by those under the classification of small (30.3%) and those classified as large (23.9%). Other datasets like the 2018 World Bank Enterprise Survey also reveal that smaller firms in the country tend to be more (41.16%) than medium (38.06%) and large (20.78%) firms. Despite the micro and smaller firms being the majority, they may not exploit the market opportunities emanating from trade liberalization because they have disadvantages in internal economies of scale. This could leave the few and large firms which enjoy internal economies of scale to exploit market opportunities created by tariff liberalization. The micro and smaller firms may also be unable to meet costs related to compliance with technical regulations and standards that arise in presence of tariff liberalization. In the next section, an attempt is made to control for potential simultaneity.

Empirical Methodology and Results

Empirical Methodology

Since the identification problem precedes the one on estimation, the study embraces the Hausman simultaneity test to detect potential simultaneity and thus control for potential endogeneity (Gujarati 2003). In absence of simultaneity, OLS estimators yield consistent and efficient estimates (Gujarati 2003; Holly 2006; Zegeye 2006; Winegarden 1978). The study embraces the conventional inclusion (Eq. 1) and exclusion (Eqs. 2, 3, 4) approach to addressing potential simultaneity. The per capita GDP in each of the EU members is used as instrument for the unit price per exporter—which is suspected to be endogenous. Its use as an instrument is guided by the reasoning that per capita GDP is not only highly correlated with the price EU buyers would be willing to pay for goods exported by Kenyan firms, but also by the understanding that Kenyan exporters would hardly influence it—making it exogenous.

Table 2 Regression results—inclusion approach to addressing simultaneity

Variable	Model without firm size	Model with firm size
	Log price	Log price
Log per capita GDP	0.643***	0.661***
	(7.51)	(7.88)
Log preferential margin	− 10.504***	− 9.658***
	(− 22.12)	(− 19.76)
Log technical regulations	0.016	0.038
	(0.58)	(1.46)
Log standards	− 2.101	− 1.87
	(− 1.49)	(− 1.36)
Log distance	0.003	0.084
	(0.01)	(0.26)
Log population	0.128***	0.137***
	(5.07)	(5.55)
Firm size—small		0.731***
		(12.29)
Firm size—large		− 0.269***
		(− 3.98)
Constant	− 1.251	− 2.756
	(− 0.44)	(− 0.99)
Model Wald χ^2	621.23	886.39
Model p value	0.0000	0.0000

***$p<0.01$, **$p<0.05$, *$p<0.1$

$$LogPrice_{it} = \beta_0 + \beta_1 LogPreferentialmarhgin_{it} + \beta_2 LogTechnicalregulations_{it} + \beta_3 LogStandards_{it}$$
$$+ \beta_4 LogDistance_{it} + \beta_5 LogPopulation_{it} + \beta_6 LogpercapitaGDP_{it} + \beta_7 FirmSize_{it} + \varepsilon_{it} \quad (1)$$

$$LogHHI_{it} = \beta_0 + \beta_1 LogPreferentialmargin_{it} + \beta_2 LogTechnicalregulations_{it} + \beta_3 LogStandards_{it}$$
$$+ \beta_4 LogDistance_{it} + \beta_5 LogPopulation_{it} + \beta_6 LogPrice_{it} + \beta_7 FirmSize_{it} + \beta_8 Residuals_{it} + \beta_9 Interaction_{it} + \varepsilon_{it} \quad (2)$$

$$LogProducts_{it} = \beta_0 + \beta_1 LogPreferentialmargin_{it} + \beta_2 LogTechnicalregulations_{it} + \beta_3 LogStandards_{it}$$
$$+ \beta_4 LogDistance_{it} + \beta_5 LogPopulation_{it} + \beta_6 LogPrice_{it} + \beta_7 FirmSize_{it} + \beta_8 Residuals_{it} + \beta_9 Interaction_{it} + \varepsilon_{it} \quad (3)$$

$$LogExporters_{it} = \beta_0 + \beta_1 LogPreferentialmargin_{it} + \beta_2 LogTechnicalregulations_{it} + \beta_3 LogStandards_{it}$$
$$+ \beta_4 LogDistance_{it} + \beta_5 LogPopulation_{it} + \beta_6 LogPrice_{it} + \beta_7 FirmSize_{it} + \beta_8 Residuals_{it} + \beta_9 Interaction_{it} + \varepsilon_{it} \quad (4)$$

In Eq. (1), the unit price per exporter is regressed against measures of trade agreements, technical regulations, standards, distance, population, Firm Size, and per capita GDP which is introduced as an instrument (Table 2). The residuals from estimation of Eq. (1) and the interaction term between the residuals and unit price per exporter are then obtained and included in Eqs. (2–4)—all of which are structural equations. Since the study uses panel data, the Hausman specification test is carried

Table 3 Models without firm size

Variable	Random effects		
	Log HHI	Log number of exporters per product	Log number of products per exporter
Log unit price per exporter	0.063***	0.063**	−0.046***
	(2.95)	(2.45)	(−4.35)
Log preferential margin	0.896*	−1.988***	0.971***
	(1.95)	(−3.61)	(4.25)
Log technical regulations	−0.02**	0.01	0.021***
	(−2.36)	(1.00)	(5.15)
Log standards	0.451	−1.474***	−0.5**
	(1.01)	(−2.75)	(−2.25)
Log distance	−0.17	0.504***	0.067
	(−1.63)	(4.05)	(1.30)
Log population	−0.038***	0.048***	0.002
	(−4.03)	(4.25)	(0.39)
Residuals	0.062	−0.083	−0.039*
	(1.43)	(−1.60)	(−1.82)
Interaction	−0.013*	−0.046***	0.024***
	(−1.70)	(−5.07)	(6.50)
Constant	0.098	−1.414	0.254
	(0.11)	(−1.32)	(0.57)
Model Wald χ^2	66.13	223.58	296.34
Model p value	0.0000	0.0000	0.0000

***$p<0.01$, **$p<0.05$, *$p<0.1$

out to determine whether the Random-Effects or the Fixed-Effects model should be employed in estimation of Eqs. (2–4). For robustness check, Eqs. (1–4) are estimated twice—in the first instance without the variable on firm size and then introducing firm size in the second instance. This aims at controlling for firm size and to anchor the argument on internal economies of scale which depend on the size of the firm. In the first instance without firm size, the test indicated that the Random-Effects Model was appropriate in Eqs. (2–4), while in the second instance with firm size, the test indicated that Fixed-Effects Model was appropriate in estimating Eq. 3 where the dependent variable is the number of products per exporter but the Random-Effects Model was appropriate in estimating Eqs. (2) and (4).

In Table 2, per capital GDP was a relevant and strong instrument in both the model with firm size and that without. The coefficient for large firms indicates that these firms are able to influence prices in the destination markets and they can be able to sell more by lowering prices since they enjoy internal economies of scale. This is likely to discourage micro and smaller firms from participating in such a market which is imperfectly competitive as they don't have price advantage that can help recoup costs associated with complying with technical regulations and standards. Increase in per capita GDP raises demand and consequently, raises prices. Rise

Table 4 Models controlling for firm size

Variable	Random effects		Fixed effects
	Log HHI	Log number of exporters per product	Log number of products per exporter
Log unit price per exporter	0.06***	0.042**	− 0.022***
	(3.59)	(2.14)	(− 2.60)
Log preferential margin	1.364***	− 0.26***	0.803***
	(3.31)	(− 5.40)	(3.93)
Log technical regulations	− 0.009	− 0.005	0.017***
	(− 1.07)	(− 0.48)	(4.04)
Log standards	0.342	− 1.061**	− 0.426*
	(0.78)	(− 2.07)	(− 1.95)
Log distance	− 0.062	0.273**	0.023
	(− 0.56)	(2.23)	(0.44)
Log population	− 0.028***	0.03***	− 0.003
	(− 2.94)	(2.71)	(− 0.60)
Firm size—small	− 0.002	0.332***	0.037**
	(− 0.05)	(8.30)	(2.22)
Firm size—large	− 0.25***	0.501***	0.113***
	(− 10.45)	(17.91)	(9.47)
Residuals	0.06	− 0.063	− 0.015
	(1.47)	(− 1.31)	(− 0.72)
Interaction	− 0.014**	− 0.036***	0.015***
	(− 2.47)	(− 5.44)	(5.39)
Constant	− 0.691	− 0.117	0.473
	(− 0.77)	(− 0.11)	(1.05)
Model Wald χ^2	259.61	697.84	
Model F statistic			41.51
Model p value	0.0000	0.0000	0.0000

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

in preferential margin decreases the unit price per exporter and this indicates reduction of costs associated with custom tariffs.

In Tables 3 and 4, the residuals from the estimated models were insignificant at 5% level of significance. This meant simultaneity was absent and OLS estimators could thus be used. The interaction terms in the same tables were all significant. The interaction terms control for unobserved firm characteristics in line with Wooldridge (2010) who observes that heterogeneity is about features or characteristics that are constant over time and unobservable. The significance of the interaction terms means firm and sector heterogeneity was detected, and resolved (Mwabu 2008; Heckman and Robb 1985; Wooldridge 2015).

Results

Robustness Features

The results in Table 4 are used for robustness check of the results in Table 3. Key features of the results from the two tables include that for the results from estimation of Eq. (2), those variables that are statistically significant in Table 3 are also statistically significant in Table 4 and that coefficients for same variables in Tables 3 and 4 have the same signs. For the results from estimation of Eq. (3), variables that are significant in Table 3 are also significant in Table 4 and that coefficients for same variables in the two tables have same signs except for population. The positive coefficient for population in Table 3 could mean that increase in population could increase the number of products per exporter partly driven by enlargement of the market and partly by growth in demand for a broad range of product variety. The negative coefficient for population in Table 4 could mean that increase in population may not necessarily translate to an increase in demand for a broad range of products especially if the rise in population is not accompanied by commensurate growth in purchasing power. In the two tables, this variable is however, not significant and may not have tangible policy value. For the results from estimation of Eq. (4), variables that are significant in Table 3 are also significant in Table 4 and coefficients for same variables have the same signs in the two tables except technical regulations which have positive sign in Table 3 but a negative sign in Table 4. In both cases, the variable is, however, not significant. The positive coefficient could mean technical regulations raise the number of exporters per product and this is possible if the regulations encourage consumer confidence and trust and sustain demand. The negative coefficient for the model controlling for firm size, could mean technical regulations decrease the number of exporters per product and this is possible especially if they impose prohibitive costs on firms.

Herfindahl–Hirschman Index (HHI)

The results indicate that a 1% increase in unit prices increases market power by 0.063% and 0.06% after controlling for firm size. Hernandez and Toreo (2013) also observe that prices are higher in concentrated markets. Efficiency losses associated with price increases explain the rise in market power. A 1% increase in preferential margin would increase market power by 0.896% and 1.364% after controlling for firm size. This means that larger preferential margins are likely to create incentives to larger firms to export to the European Union market. The Herfindahl–Hirschman Index has been used as a proxy for the level of competition in a market and demonstrates how close a market is either to perfect competition or to a monopoly (Naldi and Flamini 2018). Hasan et al. (2021) hold that a higher HHI indicates that a market is shared by a few large firms an in effect, competition is weak. Within the Kenyan context and that of other developing countries, the rise in market power with rise in the preferential margin created by trade agreements may be explained as a strategic action by firms to consolidate operations to meet technical regulations and standards for accessing the

European Union market. This explanation is in line with the stylized fact that within the European Union, larger preferential margins are associated with higher number of technical regulations that exporters and exported products must satisfy to access the market. Yang and Jesus (2022) demonstrate that trade liberalization erodes market power and promotes market competitiveness among emerging and developing economies. The current study extends this work by demonstrating that trade liberalization, in contrast, promotes market power and erodes market competitiveness if the destination country is a developed economy.

The results also indicate that a 1% increase in technical regulations increases market competitiveness by 0.02%. Eckhardt and Wang (2019) have argued that trade agreements oblige exporters to satisfy a set of non-tariff rules that leave little room for violation. To successfully enforce trade agreements, countries have undertaken to strengthen their non-tariff measures. Naldi and Flamini (2018) intimate regulations may encourage competition through eroding the sales and market share of the largest firms existing before the trade agreement. Medin (2018) also holds that non-tariff barriers may encourage trade through creation of certainty among consumers about quality and safety of imported goods thus enhancing demand. Within the context of Kenyan exporters to the European Union, we argue that technical regulations enhance competitiveness by breaking monopoly power in specific areas like price setting, domination of export sales, and by supporting consumer demand once certainty on the safety and quality of imported goods is guaranteed. If population increases by 1%, then market competitiveness increases by 0.038% and 0.028% after controlling for firm size. This study argues that higher population enhances market competitiveness by supporting demand and product diversification. Moreover, market competitiveness is 25.0% higher among larger firms compared to micro firms. The increase in competitiveness is larger and significant among large firms which enjoy internal economies of scale. Markets like Bulgaria, Slovenia, Luxembourg, Romania, Poland, Slovakia, Latvia, Lithuania, Netherlands, Ireland, Cyprus, and Estonia are more attractive to larger firms which enjoy internal economies of scale since they have the largest non-tariff measures (technical regulations and standards) which are more opaque and trade prohibiting. Markets like Finland, United Kingdom, and Czech Republic would be more attractive to MSEs since they have relatively lower number of technical regulations and standards.

Number of Exporters Per Product

The results indicate that a 1% increase in unit price is associated with 0.063% increase in the number of exporters per product and by 0.042% after controlling for firm size. This finding agrees with theory that a rise in price would incentivize more firms to supply goods to the market and translate to a rise in the number of exporters per product. A 1% increase preferential margin reduces the number of exporters per product by 1.988% and by 0.26% after controlling for firm size. This could be driven by a move among firms to consolidate into larger entities in a bid to build internal economies of scale and better comply with the technical regulations and standards arising with tariff liberalization. A 1% rise in the number of standards reduces the

number of exporters per product by 1.474% and by 1.061% after controlling for firm size. Cali et al. (2022) also arrive at a similar finding in that firms that face non-tariff measures experience a much large drip in export values compared to those facing no tariff measures. Standards impose additional costs to exporters and this discourages some firms from accessing the market especially the micro-enterprises. A 1% increase in distance raises the number of exporters per product by 0.504% and by 0.273% after controlling for firm size. The number of exporters per product may increase with increase in distance especially among large firms that enjoy cost advantage emanating from economies of scale, integration into the global value chains, technology, and specialization. A 1% increase in population increases the number of exporters per product by 0.048% and by 0.03% after controlling for firm size. Population is a measure of market size and growth in population could indicate the market that needs to be served is expanding. As such, demand for goods and in effect market size would rise with growth in population. The results also reveal that the number of exporters per product is likely to be 50.1% higher among larger firms compared to micro firms and 33.2% higher among smaller firms compared to micro firms. This finding supports the argument that larger firms are more likely to export to the EU since they enjoy internal scale of economies.

Number of Products Per Exporter

A 1% rise in unit price reduces the number of products per exporter by 0.046% and by 0.022% after controlling for firm size. An increase in price would lead to a decline in the number of products per exporter as firms undertake to specialize and concentrate on only a few products that they can consistently and reliably supply to the market while building economies of scale. A 1% rise in preferential margin increases the number of products per exporter by 0.971% and by 0.803% after controlling for firm size. Higher preferential margin could also increase the number of products per exporter by supporting technology and knowledge transfers among large firms and from large firms to smaller ones. Technology and knowledge transfers are key in support product innovations that culminate in new products that are of high quality. This study argues that the rise in the number of products per exporter is explained by the fact that trade agreements not only open-up market for products that previously had no access to the EU market because of high tariff barriers, but also because trade agreements encourage product innovation and diversification. Further, the results show that a 1% rise in technical regulations raises the number of products per exporter by 0.021% and by 0.017% after controlling for firm size. Contrary to existing knowledge that technical barriers impede exports (Liu et al. 2019a, b), some studies have also shown that technical regulations could enhance trade especially through improvement in product quality and creation of consumer confidence and trust that sustains demand (Kareem 2019). Moreover, the results show that a 1% increase in the number of standards translates to a 0.50% decrease in the number of products per exporter and by 0.426% after controlling for firm size. The cost associated with complying with existing standards for every new product introduced in the market could discourage creation of new products and contribute to a decline in the number of products per exporter. The desire to comply with existing standards and

develop quality products may reduce the number of products per exporter as firms undertake to specialize in only a few products for which they sustain the required standards and supply consistently. Existing evidence has shown that EU market access conditions in the form of standards constitute a barrier to African exports to the bloc (Kareem et al. 2016). Swinnen (2017) has argued that although conventionally standards could be used for reasons like guaranteeing health and safety of consumers, they could also be used to achieve protectionist goals. This study argues that when standards are used for protectionist motive, they raise marginal cost of exporting and in effect make certain products uncompetitive in certain markets. The number of products per exporter to the European Union is 11.3% higher among large firms compared to micro firms and 3.7% higher among smaller firms compared to micro firms. Larger firms have economies of scale emanating from technological innovations that are key in developing new products more cost-effectively.

Conclusion

The study investigated the competitiveness implications of the preferential trade agreement between Kenya and the European Union and the resultant technical regulations and standards on Kenyan firms exporting to the market over a 14-year period. The findings demonstrate that higher preferential margins are associated with a rise in market power and the number of products per exporter but associated with a decline in the number of exporters per product driven by internal economies of scale, specialization, product differentiation, and technological advantage among firms. Technical regulations were found to raise market competitiveness and the number of products per exporter. Standards were associated with a rise in market power and a decline in both the number of products per exporter and the number of exporters per product.

The policy implications of the findings are not limited to Kenya given that EU extends the same trading agreement to other developing countries constituting the African, Caribbean, and Pacific (ACP) states. The results point to a need to strengthen domestic technical and administrative capacity to comply with existing technical regulations and standards especially among MSEs, cooperation in quality management and assurance, strengthening of institutional links for information exchange, and credit support targeting exporting MSEs which have comparative disadvantage in technology and economies of scale. Moreover, negotiations for fair trade, strategic investments, and economic partnership frameworks should include provisions on NTMs.

Appendix

See Tables 5, 6, and 7.

Table 5 Kenya's untapped export potential in EU

| Country | Export potential in World ("000"USD): 4,300,000 | EU Share in World: 51.3% |
	Export potential in EU ("000"USD): 2,207,700	
Netherlands	911,000,000	21.20
United Kingdom	471,000,000	11.00
Austria	10,000,000	0.20
Belgium	89,000,000	2.10
Bulgaria	732,000	0.00
Cyprus	5,200,000	0.10
Czech Republic	6,800,000	0.20
Germany	182,000,000	4.20
Denmark	19,000,000	0.40
Spain	71,000,000	1.70
Estonia	1,200,000	0.00
Finland	24,000,000	0.60
France	200,000,000	4.70
Greece	7,800,000	0.20
Croatia	352,000	0.00
Hungary	922,000	0.00
Ireland	32,000,000	0.70
Italy	48,000,000	1.10
Lithuania	1,300,000	0.00
Luxembourg	2,700,000	0.10
Latvia	1,500,000	0.00
Malta	594,000	0.00
Poland	50,000,000	1.20
Portugal	13,000,000	0.30
Romania	13,000,000	0.30
Slovakia	2,300,000	0.10
Slovenia	2,300,000	0.10
Sweden	41,000,000	1.00

Source Analysis based on data from International Trade Centre (ITC)

Table 6 Preferential margin, technical regulations, and standards faced by Kenyan exporters to the EU

Country	Trade agreements	Non-tariff measures (NTMs)	
	Preferential margin (%)	Technical regulations	Standards
Austria	5.20	13.13	4
Belgium	5.28	13.38	4
Bulgaria	8.75	15.77	4
Cyprus	6.10	13.67	4
Czech Republic	4.10	13.25	4
Germany	5.82	13.43	4
Denmark	5.86	13.23	4
Spain	5.48	13.05	4
Estonia	6.07	15.53	4
Finland	4.61	12.18	4
France	5.65	13.47	4
United Kingdom	4.89	0.25[a]	4
Greece	5.39	12.7	4
Hungary	5.70	13.34	4
Ireland	6.16	13.62	4
Italy	5.55	12.99	4
Lithuania	6.31	15.11	4
Luxembourg	7.20	14.73	4
Latvia	6.32	15.95	4
Malta	5.30	13.48	**3**
Netherlands	6.23	13.86	4
Poland	6.62	14.11	4
Portugal	5.88	12.76	4
Romania	6.96	13.57	4
Slovakia	6.53	15.12	4
Slovenia	8.49	13.61	4
Sweden	5.82	13.51	4

Source Analysis based on data from ITC

Croatia has been excluded from this list because she joined EU way later in 2013

Table 7 Average preferential margin, technical regulations, and standards for each exported product

2 HS product code	Preferential margin (%)	Technical regulations	Standards
01	15.39	12.08	3.98
02	28.36	10.38	4.00
03	10.17	21.80	3.95
04	30.89	12.92	4.00
05	0.16	11.83	4.00
06	7.03	9.62	3.98
07	15.08	23.57	3.98
08	10.23	22.33	4.00
09	2.00	22.91	3.97
10	13.74	18.79	4.00
11	20.38	15.65	4.00
12	0.34	26.76	4.00
13	1.91	18.35	4.00
14	0.00	17.09	4.00
15	9.00	23.11	4.00
16	28.41	16.00	4.00
17	32.28	20.43	4.00
18	3.48	11.12	4.00
19	8.28	17.71	4.00
20	23.19	18.07	3.95
21	6.78	21.93	4.00
22	4.40	15.87	4.00
23	5.71	15.85	4.00
24	28.03	6.44	4.00
25	0.39	24.67	4.00
26	0.00	6.72	4.00
28	3.56	23.06	3.98
29	3.48	10.75	4.00
30	0.00	18.31	3.97
31	4.04	12.73	4.00
32	5.73	8.84	3.94
33	1.53	4.45	4.00
34	2.94	12.02	4.00
35	6.40	24.81	3.88
2 HS product code	Preferential margin (%)	Technical regulations	Standards
36	0.00	0.00	4.00
37	2.42	9.79	4.00
38	4.74	19.46	4.00
39	6.00	15.76	3.98
40	2.39	12.36	3.98
41	2.95	9.04	4.00
42	4.74	14.85	3.98

Table 7 (continued)

2 HS product code	Preferential margin (%)	Technical regulations	Standards
43	1.01	7.43	4.00
44	2.01	12.38	3.97
46	3.40	3.75	3.99
47	0.00	1.56	4.00
48	0.00	12.86	3.95
49	0.00	0.00	3.94
50	5.92	1.60	4.00
51	2.74	5.25	4.00
52	4.18	5.52	3.96
53	3.68	3.63	4.00
54	4.88	3.41	3.82
55	4.86	1.72	4.00
56	4.82	5.75	3.97
57	7.55	1.69	4.00
58	7.07	4.08	3.97
59	6.24	1.41	4.00
60	7.92	1.25	4.00
61	11.79	7.34	4.00
62	11.52	7.41	4.00
63	10.38	9.42	3.98
64	10.69	4.63	3.98
65	2.92	5.00	3.98
66	4.33	4.85	3.96
67	3.08	1.70	3.98
68	1.04	4.96	3.99
69	5.58	5.60	3.98
70	4.55	6.41	3.98
71	0.36	11.28	4.00
72	0.22	6.97	3.95
73	1.64	10.24	3.97
74	1.16	8.47	4.00
75	0.19	5.45	4.00
76	5.30	12.63	3.97
78	0.45	3.25	4.00
79	2.55	10.96	4.00
80	0.00	8.00	4.00
2 HS product code	Preferential margin (%)	Technical regulations	Standards
81	1.40	0.00	4.00
82	2.85	4.57	3.99
83	2.07	6.29	3.97
84	1.20	15.19	3.95
85	1.16	15.95	3.97

Table 7 (continued)

2 HS product code	Preferential margin (%)	Technical regulations	Standards
86	1.45	6.33	4.00
87	8.11	10.00	3.99
88	0.75	3.51	3.98
89	0.74	4.39	4.00
90	0.74	13.03	3.97
91	0.80	8.67	4.00
92	3.13	9.00	3.98
93	0.00	2.08	4.00
94	1.43	16.89	3.97
95	1.33	15.88	3.99
96	3.50	14.72	3.97
97	0.00	8.49	3.98

Source Analysis based on data from ITC

Declarations

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