

**ENTRY INTO EXPORT MARKETS AND QUALITY CERTIFICATIONS:
EVIDENCE FROM DEVELOPING COUNTRIES**

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Abstract

This paper investigates whether internationally recognized quality certifications can facilitate firms in developing countries to penetrate the export markets, a typical challenge owing mainly to information asymmetries on product quality. Applying a multi-level regression approach that controls for endogeneity to the 2006-2013 firm-level and national-level data for 111 developing countries primarily from the World Bank Enterprise Survey, results indicated that adopting ISO certifications enable firms in developing nations to enter foreign markets. This underscores the importance of policymakers in developing countries to encourage their domestic firms to acquire internationally recognized certificates for both the firm's and the nation's growth.

Keywords: quality certifications, export decision, developing countries, multilevel modelling, ISO certifications

JEL Classification: C25, D21, D82

1. Introduction

The New Institutional Economics (NIE) literature asserts that countries' institutions govern the performance of firms (Coase, 1998). This is particularly so when the firm conducts business with another firm where the cost of transactions/exchanges depend on such institutions. Recently, in a bid to curb market failures, NIE aligned institutions with external problems of transaction costs and information asymmetries. Within this context, internationally recognized quality certifications (such as ISO certifications) can be viewed as a regulatory institution¹, a constitution, or a code of conduct which minimizes the uncertainties or asymmetries surrounding trade (Clougherty and Grajek, 2008).

By and large, international trade is a classic example of information asymmetry as the consumer of the import good and/or service has little or no information regarding the production process employed by the manufacturer as well as the product quality. If customers cannot differentiate between 'good' and 'bad' products, the good products will be driven out of the market (since customers are not willing to pay more due to lack of information) resulting in a smaller market with both buyer and seller adversely affected (Akerlof, 1970). Therefore, for markets to function properly, buyers and sellers are in constant search of screening mechanism to assess product quality (Cao and Prakash, 2010).

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¹ North (1991) defines institutions as humanly devised constraints that structure economic interaction and constitutes both formal and informal rules (for example sanctions, customs, taboos, tradition and codes of conduct) to create order uncertainty in exchange.

Several manufacturing firms have used ISO certifications as proxy to signal quality. It serves to mitigate/reduce the problem of uncertainty associated with asymmetric information and ultimately market failure. The ISO certification signals a firm's commitment to quality diminishes trade barriers and provides a competitive advantage in foreign markets given its positive impact on firm performance (Kawthar and Vinesh, 2011). The ISO certification further culminated into an effective unique industrial standard firms can adhere to and evade the multiple industrial standards (or technical norms) set by each importing country (Clougherty and Grajek, 2008; Casper and Hancke, 1999). Firms have typically avoided exporting to such demanding countries in an effort to minimize compliance costs (Chen, Otsuki and Wilson, 2006). The advent of ISO certifications has reduced such costs which concurrently lessen trade barriers (Kawthar and Vinesh, 2011). Ultimately, export markets are expanded which boost sales and enhances the firm's growth/profits. With such potential benefits, firms are expected to adopt the ISO certification in order to break through the export market, especially firms in developing countries.

Firms in developing countries may suffer discrimination from developed importing nations due to association of quality to a country (Chiang and Masson, 1988). This raises an interesting question: *How can developing countries overcome the product quality problem in order to export to the international community?* The international trade theory of Flam and Helpman's (1987) offers some perspectives. The theoretical approach outlined in the paper suggests that the evolution of trade patterns between the North and the South were a consequent of product qualities differences. The North's comparative advantage is in producing high quality, high cost varieties while the South is in producing low quality, low cost varieties. Each region/country exports the product for which it has a comparative advantage. One scenario highlighted the role of technological progress in determining the patterns of trade and economic growth. Technological progress is increasing in both regions albeit the south advancing at a faster rate. This leads to a rise in southern productivity and southern prices of differentiated quality products decline, bringing about a demand shift toward southern varieties. Through the catching up-effect, the theory predicts that trade flows are reversed in the long run. Thus, the South ultimately does what North did and the North does what South did. In this context, we can consider ISO certification as a form of technological progress. The more firms adopt certification in developing countries (the South), the faster technological progress is improving. This means they will eventually export high quality products as the structure of trade shift in favour of developing countries. This provides a substantive argument for developing countries to diffuse quality certifications in their countries across firms. Whether the data concur with this, is the question this paper attempts to answer. Specifically, does ISO certification(s) contribute to the likelihood of a firm in developing countries to export?

Increasing export market penetration for firms in developing countries not only aids in the process of catching-up, but can improve the standards of living through providing access to decent work and absorbing the surplus labour present in many of these countries (Tyler, 1976; Jenkins, 2004; Jamal, 2010). Further, developing countries' small-sized economies severely restrict domestic markets such that any infiltration into foreign markets is crucial for both firms and the nation's growth (Boermans, 2013; Bangwayo-Skeete and Skeete, 2007). International certifications can assist firms in developing countries access export markets through two channels. First,

since these certifications are known to importers worldwide, they immediately reduce any barriers in relation to the perception of poor production techniques. Second, they indicate to the importer that the firm has made an investment in product quality by pursuing these certifications.

Microeconomic empirical evidence has shown that ISO quality certifications enhance a firm's financial performance (Lee, 1998; Sharma, 2005; Ullah, Wei and Xie, 2014), raise its share price (Nicolau and Sellers, 2002); improve its productivity and lead to efficiency gains (Sharma, 2005). Other studies demonstrated the ISO certification's macroeconomic benefits of boosting trade (Clougherty and Grajek, 2008; Prakash and Potoski, 2006) particularly for developing countries, yet no effect in developed countries. Though important, the macro-studies tend to limit their usefulness at firm level. For instance, they do not shed light into whether ISO certification facilitates a firm into participating in international markets. We, therefore, complement these studies through uniquely investigating the effect of ISO certification on the firm's decision. Our research also contributes to the literature investigating determinants of firm's propensity to export which omitted the potential influence of ISO certifications (see e.g. Faruq, 2012; Gourlay and Seaton, 2004; Moore, 2006). We provide a cross-country perspective at firm-level. Thus, applying multilevel modelling while accounting for endogeneity to primarily 80,499 firms from the 2006-2013 World Bank Enterprise Survey for 111 developing countries, we uniquely investigate the effect of ISO certifications on the firm's propensity to export. The multi-level modelling, generalized linear latent and mixed models – GLLAMM, is superior in capturing the multi-level or hierarchical phenomenon of export status involving both micro-level (firm-level) and macro-level (country-level) attributes.

The rest of the study proceeds as follows: the next section discusses the econometric framework employed. Section 3 presents the empirical analysis which displays and discusses the results while section 4 concludes.

2. Econometric Method: The Multi-level Approach

Our econometric framework employs the GLLAMM procedure developed by Rabe-Hesketh and Skrondal (2012). The model has two levels: the firm-level representing level 1 and the national-level representing level 2. Such stepwise nature of the data renders the GLLAMM approach superior over standard probit model for various reasons. First, it enables a systematic analysis of the effects of various covariates measured on different levels on the dependent variable. Second, it accounts for the multi-level structure which can yield more reliable variable estimators. Third, the procedure provides unbiased standard errors as it accounts for clusters, and finally the total variation of export status can be decomposed as the sum of firm-level and country-level variances (Guo and Zhao, 2000, p.444).

The GLLAMM method utilizes Naylor and Smith's adaptive quadrature in the maximum likelihood estimation of random effects models as well as the Newton–Raphson algorithm to maximize the likelihood function over the set of parameters (Gould, Pitblado and Poi, 2010). In our model the dependent variable *export decision* is measured at the individual firm-level (level 1). It is a dichotomous response variable taking the value one if the firm exports and zero otherwise. The dependent variable is

formulated from the survey question d3c in the World Bank Enterprise Survey which reads:

In fiscal year [insert last completed fiscal year], what percent of this establishment's sales were direct exports?

This question was recoded such that if a firm indicated any positive percentage of sales directly exported, we infer the enterprise already made a decision to export therefore will take the value of one. Whenever the enterprise exported zero proportion of its sales, the firm takes the value of zero indicating no decision to export was made. Our outcome (firm-level) variable *export decision* denoted Y is dependent on both firm-level explanatory characteristics X and national-level explanatory characteristics Z . However, in order to capture the effect of the macroeconomic environment Z , we first set up a pooled probability regression equation to predict the binary outcome variable Y using the firm-level explanatory variables X only. Next we introduce national-level variables to capture the effect of the macro environment on the outcome variable, Y .

We adopt the random intercept model where the intercept coefficients vary across countries. Further the disturbance term is presumed normally distributed such that the indicator function can be written as:

$$I = P(Y_{ij} = 1 | X_{ij}) = \Phi^{-1}(P_{ij}) = \beta_{0j} + \beta_1 X_{ij}, \quad (1)$$

where I represents the indicator function, β_{0j} denotes the intercept, β_1 signifies the vector of coefficients to be estimated and Φ indicates the cumulative distribution function of the disturbance term. $i = 1, \dots, 80,499$ stands for firm i while $j = 1, \dots, 111$ refers to the country where the surveyed firm is located. Typically, a nation with a higher intercept is predicted to have higher probability of exporting than a nation with low value for the intercept. Across all nations, the intercepts β_{0j} have a distribution with a mean and variance. The second step in the two-level regression model is to explain the variation of the intercepts β_{0j} through introducing explanatory variables at the national level as follows:

$$\beta_{0j} = \alpha_{00} + \alpha_{01} Z_j + \varepsilon_{0j}. \quad (2)$$

Equation (2) predicts the average likelihood of a firm exporting in a country is influenced by country's variables Z . Thus, if α_{01} is positive, the average propensity to export is higher in countries with higher Z . Conversely, if α_{01} is negative, the average propensity to export is lower in countries with higher Z . ε_{0j} is a random residual error assumed to be identical and independently distributed. It is presumed that the α coefficients do not vary across countries so hence are referred to as fixed coefficients.

If equation (2) is substituted into equation (1), the firm and country-level explanatory variables can be represented as one equation:

$$\Phi^{-1}(P_{ij}) = \alpha_{00} + \beta_1 X_{ij} + \alpha_{01} Z_j + \varepsilon_{0j}. \quad (3)$$

In order to estimate the intra-country correlation, we estimate equation (3) without any explanatory variables dubbed the 'intercept-only' model. The intercept-

only model decomposes the variance into two independent components: σ_1^2 which is the variance of the errors at the low level (level 1) and σ_2^2 , which is the variance of the errors at the high-level (level 2). This result in the intra-country dependence ρ obtained from the correlation formula:

$$\rho = \frac{\sigma_2^2}{\sigma_2^2 + \sigma_1^2}. \quad (4)$$

The intra-country correlation ρ , thus, is the share of group level variance relative to the total variance or alternatively interpreted as the expected correlation between two randomly chosen units that are in the same group. In fact it signifies the proportion of the variance explained by the grouping structure in the population.

3. Empirical Framework

3.1 Data, Descriptive Statistics and Variable Justification

We utilize firm-level data from the 2006-2013 World Bank Enterprise Survey (World Bank, 2013) and the country-level data from the World Development Indicators (World Bank, 2014). The sample consists of 111 developing countries² (according to the World Bank's classification) with firms totalling 80,499. Table 1 provides descriptive and summary statistics of the variables used in our empirical analysis. The variables are based on empirical and theoretical literature on export decision (see for example: Moore 2006, Bernard and Jensen 2004; Roberts and Tybout 1997).

The dependent variable: *export decision* shows that 16% of the firms surveyed in developing nations have access to foreign markets. Turning to explanatory variables: *ISO* is the variable of interest capturing possession of an internationally recognized quality certification(s). 20% of the sampled firms have at least one type of ISO certification (that is ISO 9000, 9002 and 14000). We anticipate a positive relationship for the reasons stated earlier. Dummy variables *small*, *medium* and *large* proxy the size of the firm. *Small* constitutes firms which employ 5-19 persons, *medium* 20-99 persons employed and *large* constitutes firms that employ at least 100 persons.

² The 111 developing countries utilized are as follows: Afghanistan, Albania, Angola, Antigua and Barbuda, Argentina, Armenia, Azerbaijan, Bangladesh, Belarus, Belize, Benin, Bhutan, Bolivia, Bosnia, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Chile, China, Colombia, Congo, Costa Rica, Cote D'Ivoire, Democratic Republic of Congo, Djibouti, Dominica, Dominican Republic, Ecuador, El Salvador, Eritrea, Ethiopia, Fiji, FYR, Gabon, Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea, Guinea Bissau, Guyana, Honduras, Indonesia, Iraq, Jamaica, Kazakhstan, Kenya, Kosovo, Kyrgyz, Lao PDR, Latvia, Lesotho, Liberia, Lithuania, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Mongolia, Montenegro, Mozambique, Namibia, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Panama, Paraguay, Peru, Philippines, Romania, Russia, Rwanda, Samoa, Senegal, Serbia, Sierra, South Africa, Sri Lanka, St Lucia, St Vincent and Grenadines, Suriname, Swaziland, Tajikistan, Tanzania, Timor, Togo, Tonga, Turkey, Uganda, Ukraine, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe.

An average of 48%, 33% and 18% of firms surveyed were small, medium and large firms respectively. The firm size variable is included to capture the human resource effect on exports. A higher level of employment for a firm suggests a larger human resource base and thus a greater ability to export (Moore, 2006). We, therefore, anticipate a negative relationship with *small* firms and positive relation with *large* firms relative to the reference group *medium* firms. Larger firms may also have lower average of marginal costs through economies of scale which raises their likelihood of exporting (Bernard and Jensen, 2004).

Table 1 Variable Definition and Descriptive Statistics

Variable	Description	Mean	SD
Dependent variable.	export decision: 1 if a firm export, 0 otherwise	0.16	0.36
Explanatory Variables			
<i>Firm-level variables:</i>			
ISO	1 if a firm is ISO certified	0.20	0.40
small	1 if a firm is small, 0 otherwise	0.48	0.50
medium	1 if a firm is medium, 0 otherwise; the reference variable	0.33	0.47
large	1 if a firm is large, 0 otherwise	0.18	0.39
shareholding	1 for shareholding company, 0 otherwise	0.54	0.50
sole proprietor	1 for sole proprietorship company, 0 otherwise	0.32	0.47
firm age	Numbers of years since the firm's establishment	17.48	15.95
experience	total managers years of experience	17.05	11.05
subsidiary	1 if a firm is part of a larger firm, 0 otherwise	0.15	0.35
foreign	1 if a firm has a component of foreign ownership, 0 otherwise	0.11	0.31
capital	1 if a firm is located in the capital city	0.23	0.42
manufacturing	1 if firm is in the manufacturing industry, 0 otherwise	0.50	0.50
services	1 if firm is in services industry, 0 otherwise	0.20	0.40
core	1 if firm is in core industry	0.23	0.42
ownership concentration	The percentage owned by largest owner(s)	76.58	26.96
website	1 if firm has a website, 0 otherwise	0.43	0.50
infrastructure	Constructed using principle component index on infrastructure	0.00	0.79
institutions	Constructed using principle component index on institutions	0.00	0.62
<i>Country-level variables:</i>			
rer	real exchange rate	1,158	4,231
GDP per capita	GDP per capita using 2005 constant prices (US\$)	3,152	2,560

Source: The firm-level data is from World Bank Enterprise Survey and the country-level data was obtained from the World Development Indicators. Note: SD = Standard Deviation.

Roberts and Tybout (2007) found empirical evidence supporting the theory that firms which are corporations are more likely to export. Following this reasoning, we include dummies representing the firm's legal status: *sole proprietor*, *shareholding* and *partnership* as explanatory variables. 32% of the responses are sole proprietorships, 54% are shareholding firms and 14% are partnership corporations.

Relative to partnership firms, sole proprietorships are expected to have lesser capacity to export (hence a negative coefficient is anticipated) and shareholding corporations a positive effect. The explanatory variable *age* is used to proxy for differences in past performance of the firm (Roberts and Tybout, 1997; Aitken, Hanson and Harrison, 1997). It is postulated that older firms have more time to: streamline processes, improve productivity and introduce new technology, among other things. Similarly, firms which are older may have better experience with international trade and technology making them more probable to export (Chen, Otsuki and Wilson, 2006). The data surveyed indicate that on average, firms have been established for about 18 years with ages ranging between zero to 340 years. Also, the large standard deviation of 15.59 indicates that there is a relatively high level of heterogeneity within the sample age data.

Previous research suggests that there is a positive relationship between an experienced management team and strategic change (Wiersema and Bantel, 1992). Treating the export status as a strategic change, the variable *experience* capturing the total years of managers experience at the company should have a positive effect. The mean combined number of all managers' experience in a firm is 17 years with the standard deviation of 11.05 indicating a skewed sample. Managers in the sample had experience ranging from zero to 231 years. We also took into account whether the firm was a *subsidiary*, expecting such a firm may have adequate access to resources (such as capital, labour, expertise) which would enable it to gain entry into foreign markets. Approximately 15% of firms surveyed were characterized with this structure.

Foreign market exposure is expected for firms with some foreign individuals in their ownership. This was captured by the dummy variable *foreign*, indicating that 11% of the firms have some foreign ownership. The firms interviewed have a diverse sectorial composition and were partitioned into two industries: manufacturing taking the values one and 'services and residual/core industries' confined to zero. This allows us to check whether exporting strategic decision is confined to a particular industry.

The agency theory postulates that firms with either higher levels of ownership concentration or a large corporate shareholder benefit from better monitoring which leads to superior financial results relative to those with more dispersed ownership structure. In line with the theory, Lafuente, Bayo-Moriones and Garcia-Cestona (2009) found that firm ownership structure impacts its ISO adoption policy. Owners in highly concentrated firms, make strategic decisions quickly and decisively. We, therefore, controlled for *ownership concentration*, measured as the proportion of the shares owned by the largest shareholder. For an average firm in our sample, 77% of the firm shares belong to the largest owner.

Empirical studies also demonstrated that factors characterizing the economic environment such as property rights, legal institutions and labour market institutions affect economic growth (Acemoglu and Johnson, 2005; Nickell and Layard, 1999), trade (Rodrik, Subramanian and Trebbi, 2004) and the firm performance (Commander and Svejnar, 2011; Dollar, Hallward-Driemeier and Mengistae, 2005). Thus, our variable *institutions* seek to capture institutional obstacles which hinder the business environment to establish whether they inhibit penetration into foreign markets. The variable is constructed using the principal component analysis (PCA) of businesses whose current operations are faced with obstacles to: customs and trade regulations,

tax rates, tax administration, business licensing and permits, political instability, corruption, courts and labour regulations. The PCA is employed in order to utilize all the available information without losing too many degrees of freedom. It analyses several inter-correlated variables to extract the important information from the data which is expressed as a set of new orthogonal variables called principal components. Few principal components often account for a large share of the variation (the generalized variance) in the data, therefore, the large number of possibly highly correlated explanatory variables in a regression is replaced by fewer uncorrelated principal components (see for example Jolliffe, 2002 for more details on PCA).

Similarly, PCA is also used to construct an aggregate indicator of the firm's physical *infrastructure* from correlated obstacles encountered by each firm: electricity, transportation of goods, supplies and inputs as well as access to land. The explanatory variable attempts to gauge whether problems with domestic physical infrastructure adversely affects business decisions to enter foreign markets.

Regarding the country-specific variables, the average GDP per capita is around US\$3,152 at 2005 constant prices. Income per capita is of interest as it proxy the size of the domestic market. The larger the average domestic incomes the more market is available for the local firms lessening the need for export venture. The real exchange rate variable was constructed as the ratio of world prices to domestic prices multiplied by the nominal exchange rate of US dollars per domestic currency. The inclusion of real exchange rate variable was constructed to provide a unique opportunity to estimate the supply response of exporters to price shocks (Bernard and Jensen, 2004). Conventionally, one would expect that as a country's currency depreciates the more probable its firms are to export since domestic goods have become relatively cheaper hence induces larger exports. Furthermore, consistent with the law of demand, cheaper goods are more demanded internationally, leading us to expect a negative coefficient suggesting that currency depreciation spurs export activity.

3.2 Results & Discussion

Table 2 displays results from GLLAMM probit random effects estimation regression. Two models are reported: the first is an intercept-only model and the second is a random intercept model containing both firm-level and country-level variables. The intercept-only models show an intra-country correlation of 17% ($\rho = 0.2/(0.2+1)$) percent indicating that 17% percent of the variance of the probability to export is attributed to grouping of firms at the national level. This corroborates the use of multi-level modelling approach whose results are here forth discussed.

The effect on ISO certification and export decision can be bi-directional. Firms obtain the ISO certification in order to infiltrate foreign markets. Alternatively, the firm's decision to export influences the idea of acquiring the ISO certification. This subjects both ISO and export status to self-selection problem causing endogeneity effects between the two. As a remedy and to ensure correct estimates, we use instrumental variables and instrument for ISO with 'website' dummy.

The dummy takes the value one when a firm has a website and zero otherwise. Firms use websites to advertise their international standards status regarding their products. The website marketing of ISO certifications enables the company to reach global appeal. Hence, firms with websites are more likely to have ISO certifications which they proudly display on their websites for marketability. As expected

internationally recognized quality certifications, ISO in our case; positively influences the decision to export after controlling all relevant factors. This is consistent with Cao and Prakash (2011) who argue that suppliers seek to signal quality through ISO 9000 certification as a means of acquiring or maintaining access to a buyer's market. In addition, the problem of asymmetric information is minimized. It is important to note that the coefficient of the ISO variable is robust to the inclusion or exclusion of control variables. We, therefore, proceed to discuss the reduced-form model presented in table 2.

Table 2 GLLAMM probit random effects estimation of the decision to export

	Intercept-only model		Full model	
Variable	Coefficient	Robust SE	Coefficient	Robust SE
constant	-1.168	0.044	0.268**	0.023
<i>Firm-level variables</i>				
ISO			0.800***	0.031
sole proprietor			-0.071	0.035
shareholding			0.079***	0.023
large			0.171***	0.025
small			-0.099***	0.023
firm age			-0.003***	0.001
firm age squared			0.00001	0.00001
infrastructure			-0.047***	0.010
institutions			0.008	0.001
subsidiary			-0.254***	0.04
ownership concentration			-0.001**	0.000
foreign			0.134***	0.025
experience			0.004**	0.001
manufacturing			0.536***	0.017
<i>Country-level variables</i>				
ln(GDP per capita)			-0.076**	0.006
lnrer			0.0005	0.004
Log likelihood	-32,502		-17,295	
<i>Variances of level effects</i>				
level 1	1		1	
level 2	0.2	0.029	0.072	0.008

Note: **, * denote significant at 1% and 5% respectively.

While sole proprietorships firms are not statistically different from partnerships; shareholding firms, whether publicly listed or privately held limited liability, are more likely to export compared to partnerships. The shareholding corporation effect corroborates with finding of Roberts and Tybout (2007) on Columbia enterprises. It could be that corporations firms have more resources to overcome the fixed/suck cost required for export market entry. The need for a huge fixed investment cost to exploit business opportunities in foreign markets has been well documented (see Greenaway and Kneller, 2007 and Wagner, 2007 for a review of the

literature) and can be explained by a fixed investment required to establish an export link.

We also find that the firm's size strongly predicts its export status. Relative to medium firms, small firms are less likely to export while larger firms have higher probability to participate in the international markets. This is consistent with the argument that larger firms may have lower average or marginal costs through economies of scale, thus increasing the probability of exporting (Bernard and Jensen, 2004) and may also possibly be due to large firms having greater financial resources, among other resources, and greater incentive to explore abroad and expand their businesses to increase profits. Similar reasoning might be associated with the fact that large firms have potential to operate at their minimum efficient scale of production. This result aligns with the findings of Faruq (2012); Bigsten and Gebreeyesus (2009); Moore (2006), Roberts and Tybout (1997) and Aitken, Hanson and Harrison (1997).

Contrary to previous findings (Bigsten and Gebreeyesus, 2009; Moore, 2006; Roberts and Tybout, 1997; Aitken, Hanson and Harrison, 1997), age has a negative effect on export participation in developing countries. Young firms are more probable to penetrate export markets than older firms. Increases in age reduce the probability of exporting. One might argue that older firms have already been long established and gained a larger market share in domestic markets. Consequently young firms may have limited room for expansion in local markets and, for survival, naturally enters foreign markets.

Firms challenges with physical infrastructure matters for foreign market participation status of enterprises. The greater the obstacles a firm faces on physical infrastructure the less probable a firm exports. More precisely, difficulties encountered with electricity supply, transportation operations or restricted land access more likely deters an enterprise from entering the exporting business. This result is in line with Francois and Manchin (2007) who found that infrastructure quality significantly determinants the levels of exports as they serve to facilitate trade. Chang, Kaltani and Loayza (2005) also present evidence that infrastructure, among others, plays a crucial role in trade. Hence, lower trade barriers in the form of better physical infrastructure stimulate greater export activity since it becomes easier for firms to seek markets abroad.

Surprisingly, subsidiary firms negatively influenced export decision. One could surmise that subsidiary firms are formed to service that particular country since the parent company serves the global or its domestic market. This result, however, is contradicts the findings of Bernard and Jensen (2004) who found no statistically significant relationship between multi-plant firms and the export decision.

In developing countries', ownership structure matters for a firm's strategic decision to enter international markets. Existence of some foreign ownership in business has positive effect. Foreign owners have natural opportunities of foreign networks, that is social capital, that creates valuable stock of knowledge on how to operate on the global market. However, dominant shareholders have adverse effects on the export status. Firms with higher ownership concentration are unlikely to provide their services outside of their home market. Moreover, manufacturing firms (including food, textiles, garments, chemicals, electronics, plastics and rubber, basic metals and non-mineral products, fabricated metal products and machinery and equipment) are more probable to export than services (retail industry) or residual/core industries

(wholesale, IT, hotel and restaurants, services of motor vehicles, construction and transport).

Macroeconomic variables are crucial predictors of firms export market participation. The lower the country's income per person, the more likely the firms are involved in international markets. Low income per person signals weak domestic demand inducing firms in developing countries to participate in export markets in search of higher sales or market share. Limitations of domestic demand, not surprisingly, spur export activities in developing economies.

4. Conclusion

Information asymmetries and unfavourable reputation effects are prevalent among firms in developing countries which usually encounter limited domestic markets. Not surprising, firms in developing countries have also been adopting international recognized standards as means to overcome asymmetric information in industrial production and distribution of products. Consequently, we employed a multi-level modelling approach – which utilized data on firm-level and country-level – while controlling for endogeneity, to test whether the possession of ISO quality certification facilitates firms in 111 developing countries (from 2006-2013) in accessing export markets. The ability to access global trade markets and its success are crucial to the creation of jobs and alleviation of poverty in developing nations.

After controlling for other potential drivers influencing the export decision, our results provide new insights in that adopting an internationally recognized quality certification increases the likelihood of firms exporting. The certificate thus opens up international markets and growth perspectives, improves the marketability of the product and raises the competitiveness of the firm. Hence, when faced with large information asymmetries, large geographical or cultural distance between buyer and sellers, or in industries with technological and product complexity, the possession of an internationally recognized quality certificate can generate important external benefits. More importantly, given the intense trade competition on the world trade markets, it may be beneficial for developing countries' exporters to signal superior product quality through acquiring an internationally recognized quality certification, particularly the ISO certifications, in order to attract foreign customers. Policymakers, in response, should advocate for improved competitiveness for domestic firms through adopting ISO certifications to facilitate their venture into global markets, which promotes trade flows or attracts new trade partners thereby improving economic growth.

Our finding also informs trade theory in that the South could catch-up with the North through adopting technological progress in the form of possessing globally recognized quality certifications as the companies self-regulate.

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APPENDIX TABLES

Table A1: ISO status of EXPORTING firms by country

Country	Firms without ISO certification	Firms with either ISO 9000, 9002 or 14000	Total Exporting Firms
Afghanistan	8	4	12
Albania	57	30	87
Angola	11	3	14
Antigua & Barbuda	30	2	32
Argentina	434	427	861
Armenia	48	35	83
Azerbaijan	9	16	25
Bangladesh	413	259	672
Belarus	94	36	130
Belize	31	4	35
Benin	8	4	12
Bhutan	32	10	42
Bolivia	87	42	129
Bosnia	99	93	192
Botswana	39	13	52
Brazil	142	118	260
Bulgaria	246	192	438
Burkina Faso	13	7	20
Burundi	3	1	4
Cote D'Ivoire	16	9	25
Cameroon	14	23	37
Cape Verde	5	0	5
Central African Republic	6	13	19
Chad	3	13	16
Chile	204	280	484
China	88	319	407
Colombia	228	205	433
Congo	3	5	8
Costa Rica	71	55	126
Democratic Republic of Congo	27	23	50
Djibouti	26	14	40
Dominica	41	2	43
Dominican Republic	32	17	49
Ecuador	91	66	157
El Salvador	218	75	293
Eritrea	6	5	11
Ethiopia	23	24	47
Fiji	18	12	30

FYR	121	84	205
Gabon	6	8	14
Gambia	5	6	11
Georgia	37	24	61
Ghana	21	8	29
Grenada	5	10	15
Guatemala	211	75	286
Guinea	15	2	17
Guinea Bissau	5	1	6
Guyana	27	21	48
Honduras	60	33	93
Indonesia	96	89	185
Iraq	15	1	16
Jamaica	24	19	43
Kazakhstan	15	22	37
Kenya	207	133	340
Kosovo	37	19	56
Kyrgyz	30	21	51
LaoPDR	64	19	83
Latvia	48	37	85
Lesotho	9	20	29
Lithuania	60	32	92
Madagascar	57	13	70
Malawi	9	8	17
Mali	31	16	47
Mauritania	10	4	14
Mauritius	42	21	63
Mexico	204	267	471
Micronesia	6	1	7
Moldova	54	42	96
Mongolia	25	18	43
Montenegro	21	12	33
Mozambique	16	10	26
Namibia	22	15	37
Nepal	58	12	70
Nicaragua	42	40	82
Niger	13	7	20
Nigeria	8	14	22
Pakistan	44	78	122
Panama	73	30	103
Paraguay	97	39	136
Peru	272	205	477
Philippines	120	148	268
Romania	82	96	178
Russia	239	162	401
Rwanda	19	15	34
Samoa	10	7	17
Senegal	43	11	54

Serbia	155	102	257
Sierra	2	2	4
South Africa	57	120	177
Sri Lanka	32	23	55
St Lucia	52	2	54
St Vincent & Grenadines	13	18	31
Suriname	16	8	24
Swaziland	20	17	37
Tajikistan	15	7	22
Tanzania	50	26	76
Timor	1	0	1
Togo	21	7	28
Tonga	3	10	13
Turkey	180	294	474
Uganda	51	45	96
Ukraine	145	119	264
Uruguay	192	98	290
Uzbekistan	16	10	26
Vanuatu	3	1	4
Venezuela	14	15	29
Vietnam	166	130	296
Yemen	14	12	26
Zambia	62	39	101
Zimbabwe	19	29	48
Total Firms	6,958	5,565	12,523

Table A2: ISO status of NON-EXPORTING firms by country

Country	Firms without ISO certification	Firms with either ISO 9000, 9002 or 14000	Total Non-Exporting Firms
Afghanistan	478	41	519
Albania	411	117	528
Angola	660	90	750
Antigua & Barbuda	115	3	118
Argentina	1,052	186	1,238
Armenia	501	144	645
Azerbaijan	622	112	734
Bangladesh	2,003	259	2,262
Belarus	446	47	493
Belize	115	0	115
Benin	115	14	129
Bhutan	194	11	205
Bolivia	680	156	836
Bosnia	394	130	524
Botswana	460	92	552
Brazil	1,312	218	1,530
Bulgaria	857	283	1,140
Burkina Faso	302	55	357

Burundi	250	16	266
Cote D'Ivoire	475	17	492
Cameroon	264	58	322
Cape Verde	115	26	141
Central African Republic	86	40	126
Chad	83	49	132
Chile	1,246	302	1,548
China	928	1,333	2,261
Colombia	1,310	193	1,503
Congo	90	23	113
Costa Rica	373	28	401
Democratic Republic of Congo	1,033	109	1,142
Djibouti	176	28	204
Dominica	106	1	107
Dominican Republic	256	48	304
Ecuador	721	142	863
El Salvador	661	94	755
Eritrea	144	22	166
Ethiopia	526	67	593
Fiji	95	22	117
FYR	393	124	517
Gabon	117	29	146
Gambia	131	32	163
Georgia	579	87	666
Ghana	450	15	465
Grenada	91	36	127
Guatemala	717	96	813
Guinea	189	10	199
Guinea Bissau	141	11	152
Guyana	88	26	114
Honduras	579	115	694
Indonesia	1,155	75	1,230
Iraq	715	17	732
Jamaica	244	60	304
Kazakhstan	903	180	1,083
Kenya	856	141	997
Kosovo	332	79	411
Kyrgyz	353	94	447
Lao PDR	463	69	532
Latvia	147	35	182
Lesotho	81	23	104
Liberia	143	7	150
Lithuania	151	30	181
Madagascar	340	33	373
Malawi	98	32	130
Mali	653	111	764
Mauritania	211	11	222
Mauritius	294	27	321

Mexico	1,995	439	2,434
Micronesia	12	0	12
Moldova	543	61	604
Mongolia	585	88	673
Montenegro	183	39	222
Mozambique	367	86	453
Namibia	235	55	290
Nepal	699	75	774
Nicaragua	618	106	724
Niger	119	6	125
Nigeria	1,652	123	1,775
Pakistan	650	65	715
Panama	703	127	830
Paraguay	779	56	835
Peru	1,021	131	1,152
Philippines	830	208	1,038
Romania	555	308	863
Russia	4,192	545	4,737
Rwanda	375	39	414
Samoa	59	23	82
Senegal	430	22	452
Serbia	352	129	481
Sierra	122	24	146
South Africa	584	176	760
Sri Lanka	475	75	550
St Lucia	96	0	96
St Vincent & Grenadines	99	13	112
Suriname	108	20	128
Swaziland	218	52	270
Tajikistan	288	46	334
Tanzania	780	144	924
Timor	141	3	144
Togo	104	13	117
Tonga	114	11	125
Turkey	443	217	660
Uganda	940	136	1,076
Ukraine	1,348	174	1,522
Uruguay	855	73	928
Uzbekistan	319	21	340
Vanuatu	6	2	8
Venezuela	642	130	772
Vietnam	643	108	751
Yemen	394	55	449
Zambia	918	162	1,080
Zimbabwe	433	116	549
Total	57,293	10,683	67,976