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# International standards certification, institutional voids and exports from developing country firms

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*Abstract*

This paper analyses the impact of International Standards Certification (ISC) on the export participation and the scale of exports of firms based in 89 developing or transition countries. We conceptualise ISC as an endogenous institutional advantage, which bridges institutional voids in the country and helps firms to export. The empirical results show that certified firms are more likely to export, and to export on a larger scale. The impact of ISC runs through two channels: productivity and transaction cost economies. We show that certification plays an important role in bringing down transaction costs in international markets, while also maintaining and raising efficiency. This finding is reinforced by additional evidence, suggesting that ISC matters more for the export participation of domestic firms than for foreign firms and is of greater importance for firms based in countries characterised by severe institutional voids.

Keywords: certification, export performance, institutional voids, transaction costs
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## 1. Introduction

There is a strong consensus among scholars that the international competiveness of companies and nations strongly depends on supporting institutions (Peng and Meyer, 2011). Institutions constitute the 'rules of the game' that reduce uncertainty in transactions and shape economic interactions (North, 1991). Efficient institutions, which allow the measurement and enforcement of transactions at a low transaction cost, are key to superior economic performance and global competitiveness.

Recent work has pointed to 'institutional voids' in many developing, emerging and transition countries – whereby institutional arrangements that are meant to foster transactions are either weak or absent. Institutional voids typically reveal a lack of specialised intermediaries to help provide economic agents with necessary information, (human) capital and contract enforcement mechanisms (Khanna and Paneplu, 1997). They may also signal an abundance of political, social or religious institutions that are conflicting and hinder the efficiency of markets (Mair and Marti, 2009). Institutional voids raise transaction costs for multinational firms willing to set up business in institutionally weak countries (Khanna and Paneplu, 2005), but may also complicate the engagement in international activity for domestic firms. In cross-border trade, institutional voids may originate from missing dispute-settlement mechanisms and other important trade-related institutions, in addition to voids resulting from the mere differences in the cultural and institutional set-up of countries (Ricart et al., 2004).

While institutional voids hinder market functioning in general, various ways for bridging institutional voids have been documented. The international business strategy literature shows that multinational enterprises (MNEs) can internalise some of the specialised intermediaries' tasks by establishing their own supply chain and management systems and using their reputation and brand name to signal quality and reduce transaction costs (Khanna et al., 2005; Ricart et al 2004). The presence of MNEs can even directly address institutional voids, when quality products or services with a specialised intermediary function are being offered to local companies (Khanna et al., 2005).

Small and medium sized enterprises (SMEs), however, have more limited resources, and need to work around institutional voids. The voids bridging mechanisms discussed in the literature include informal business networks providing surrogate specialised services to group members (Khanna and Paneplu, 2000); clusters providing resources, information and consultancy support to cluster firms in a more formal setting (Schrammel, 2014); CSR initiatives opening access to resources (El Ghoul et al., 2017) and CSR-reporting practices helping firms to overcome 'liabilities of foreignness' (Marano et al., 2017) in a more transparent environment.

Less attention has been devoted to the role of international management standards in the context of institutional voids. Being increasingly important in international transactions, over the last few decades of globalisation, the development of international standards and the

adoption of standards by companies have steadily increased (ISO, 2014)[i]. The most widely diffused standards are ISO 9000 for quality management and ISO 14000 for environmental management. The literature on standards certification and its diffusion has shown that international management standards improve firms' managerial and operational efficiency (Sampaio, 2009) and reduce transaction costs in trading relations by signalling a firm's superior quality performance (King, Lenox, Terlaak, 2005; Terlaak and King, 2006, Potoski and Prakash, 2009). Firms can voluntarily implement standards by way of self-regulation, requiring firms to take action *beyond* what domestic government regulations and institutions stipulate. When government regulation is ineffective, standards can act as a surrogate institution, by putting firms on common ground in terms of managerial practice, business language and conflict-settling procedure, reducing the institutional distance between them. In this paper we argue that standards work as an institutional voids bridging mechanism that helps firms to be successful in foreign markets, by improving firms' efficiency and reducing transaction costs. This mechanism is more important when institutional voids are more severe.

Firms active in global markets increasingly rely on standards to control their local suppliers and to coordinate international production. They use standards to protect their corporate reputation and to shelter from the growing pressure of activist and consumer groups, and other stakeholders (Kaplinsky 2010; OECD 2015). Hence, lead firms in global value chains require local suppliers to demonstrate a commitment to quality, environmental sustainability and decent labour conditions. This commitment takes the form of a certificate that documents implementation procedures and demonstrates adherence to the appropriate internationally agreed management standards. Certification requires the firm's management system to be audited on a regular basis by an accredited certification body that issues a certificate of conformity if the standards required have been met.

The role of standards adoption and certification in international trade has been the subject of recent research using macro data. Potoski and Prakash (2009) find that ISO 9000 certification levels are associated with increases in countries' bilateral exports, particularly in the case of developing countries, which may be due to the relative severity of their quality assurance challenges. In a similar way, Clougherty and Grajek (2008) find that ISO diffusion has no effect in developed nations but enhances exports from developing countries. The authors underscore the role of certificates as a substitute institution, reducing information asymmetries and transaction costs in developing countries with uncertain business environments.

This paper takes the analysis to the micro level – the level at which certification should have its direct impact – to validate and deepen this finding. Using firm-level data from the World Bank Enterprise Survey, we study the export engagement of firms from 89 transition, developing and least developed countries in relation to firms' standards certification. About 90% of the firms are SMEs with fewer than 250 employees. The countries show varying levels of economic and institutional development but, compared to industrialised countries,

score medium to low on the World Bank Doing Business Index, indicating the existence of important institutional voids in the countries of our sample.

We make several contributions to the literature. First, we develop a conceptual model explaining how international standards certification fits within the eclectic paradigm of international business and helps to overcome institutional voids affecting the export engagement of firms based in less developed markets. In doing so, our paper contributes to three bodies of literature: international business, development studies and the literature on standards and their diffusion. Second, we disentangle the export engagement of the firms in two constituent elements: export participation or the decision to be an exporter (1) and the scale of exporting (2) and we examine the effects of certification on each of the two elements. Third, we uncover and provide evidence on the relative importance of the two channels through which certification has an impact on the export engagement: productivity gains associated with the development of dynamic capabilities (channel a); and reduction of transaction costs (channel b). Fourth, we investigate if the transaction economies from certification are of greater importance for firms in countries characterised by strong institutional voids. Fifth, we analyse if certification matters more for domestic firms than for subsidiaries of foreign firms, which tend to internalise institutional voids by developing their own internal standards and support systems.

The paper is structured as follows. Section two develops the conceptual model and associated hypotheses. Section three develops the empirical approach, and presents the data and the estimating model. Section four presents the empirical results. Section five discusses our main findings and conclusions.

## 2. International standards and export performance: conceptual model and hypotheses

The decision to export and resulting performance in international markets is typically studied in the International Business literature within the evolutionary framework of the eclectic paradigm which centres around three key constructs: ownership (O), location (L) and internalisation (I) advantages. The framework emphasises the heterogeneity of firms in the way they develop and combine the three advantages. Exports are taken as the outcome where firms combine ownership advantages (most often measured by the demonstrated productivity of the firm), with home country location advantages – provided export transaction costs are not too high (Cantwell, 2015). *Ownership* advantages refer to the technological and company specific advantages which enable the firm to overcome the cost of entering foreign markets and to compete successfully in international markets (Dunning, 2000). More recently, Dunning and Lundan (2010) emphasised institutional advantages as being part of the ownership advantages. Institutional advantages cover the range of formal and informal institutions that govern the value-added processes within firms. The origin of these advantages is partly exogenous and partly endogenous to the firm. The exogenous origin derives from the degree to which the informal (and formal) institutions in the firm's home

country have impacted the way in which incentives are set within the firm. The endogenous origin is the result of entrepreneurial or managerial activity, including mission setting, culture or, as we argue in this paper, the adoption of international standards within the organisation. *Location* advantages reflect differences in raw materials endowments, wages, special taxes or tariffs. For firms based in the group of transition and developing countries, location advantages typically relate to lower wages and natural resources (Lall, 2000). *Internalisation* advantages refer to advantages of own production over producing through a partnership or contractual arrangement in the market, and are contingent on high transaction costs and the existence of institutional voids in (foreign) markets. MNEs typically internalise transactions by establishing own production and management systems abroad to overcome transaction costs, allowing them to do business in complex foreign markets.

While Dunning and Lundan (2010) concentrate on the development and diffusion of organisational routines within MNEs, their insights apply equally well to firms starting to internationalise, with great relevance for those based in countries characterised by an 'incomplete institutional framework' (Meyer, 2001). We consider international standard certification as an endogenous institutional device that works on two fronts of the OLI framework, and generates two major channels through which standards affect export performance: through (a) providing incentives, coordination and control to develop superior organisational routines as *ownership* advantage and (b) lowering transaction costs by setting standards, allowing transactions to take place based on contractual arrangement with external partners. High transaction costs tend to preclude export transactions. This is most relevant for SMEs, especially those based in developing which tend to face strong 'liabilities of foreignness' in dealing with potential foreign buyers (e.g. Marano, 2017). Different from larger companies, most SMEs also lack the resources to set up foreign affiliates and internalise transactions in imperfect markets where institutional voids are present.

Regarding the first channel, the ownership advantage manifests itself most clearly in the productivity of the firm in relation to its export performance. Only the more productive firms are able to overcome the risk and sunk costs associated with entering foreign markets. There is indeed mounting evidence that firms wishing to export not only face variable costs linked to transport and tariffs but also significant fixed costs that do not vary with export volume (Das, Roberts, and Tybout, 2007). These include costs to convince foreign buyers about the efficacy of the product, to research the foreign regulatory environment and adapt the product to foreign standards, to set up trade relationships and distribution channels in the foreign country, and to conform to all shipping regulations specified by the foreign customs agency. Although some of these costs cannot be avoided, others are often manipulated by governments in order to erect non-tariff barriers to trade (Melitz, 2003; Helpman et al., 2008) and thus differ from country to country. Given the (sunk) costs of exporting, theoretical models contend that only the more productive firms self-select into becoming exporters (Melitz, 2003; Bernard and Jensen, 2004; Helpman et al., 2008), a statement largely supported by empirical evidence (Aw et al., 2000; Arnold and Hussinger, 2005; Damijan and Kostevc 2006, Wagner, 2007).

Some empirical studies deepen this productivity-export relationship and stress the heterogeneity in firms' ability to produce quality as a factor in explaining differences in export performance (Hallak, 2006; Brooks, 2006; Verhoogen, 2008; Hallak and Sivadasan, 2013). However, climbing up the quality ladder poses greater challenges for firms based in developing countries (Sutton, 2012). Developing country firms are challenged to improve both 'process productivity' and 'product productivity' as a necessary condition to operate in international markets (Brooks 2006; Hallak and Sividasan, 2013).

To raise productivity and the quality of production, firms increasingly follow the requirements and specificities spelled out in internationally accepted standards and engage in the procedures necessary to obtain certification. Various studies indicate that firms experience cost reductions resulting from better managed and codified production procedures, and improved quality of their products, meeting the standards and requirements that global markets require (see eg. Sampaio et al., 2009 for an overview). Hence, the certification process provides the participating firms with an important learning instrument to raise productivity and adhere to international standards, which enables them to reduce the uncertainty associated with entering foreign markets.

Recent research also made the link between productivity and the scale and scope of international operations of firms, showing that the more productive firms are able to enter more countries, including those distant from the home country, and to attain larger market shares in these countries (Yeaple, 2009). With the following hypotheses we formally test if the productivity enhancing impact of certification translates into a higher likelihood of exporting and a better export performance.

> *Hypothesis 1A: The productivity advantage of certified firms raises the probability of export participation;*
> *Hypothesis 1B: The productivity advantage of certified firms increases the scale of exports.*

Regarding the second channel, the use of standards to enable transactions between potential buyers in international markets, several authors stress that a standards certificate is often used as a credible 'signal' to external parties that the firm is a high performer on product and process quality management issues, reinforcing its credentials in the marketplace. Signalling and disciplined behaviour become important when information asymmetries exist between sellers and buyers in vertical relationships or when important characteristics of the firm or product are not directly observable. Especially in international transactions, the information problems that raise uncertainty and transaction costs may be substantial, since spatial, cultural and linguistic barriers complicate the buyers' ability to acquire information and assess product quality (King, Lenox and Terlaak, 2005; Potoski and Prakash, 2009).

To reduce uncertainty in transactions and avoid opportunistic behaviour, institutions serve as the important 'rules of the game' that shape economic interactions (North, 1991). Institutions can be either formal institutions – including laws, regulations, and property rights – or

informal rules, such as norms and values, habits and practices, social conventions, reputations and trust. It is within this vein that international standards certification should be seen as a decentralised institution, making the certificate a low-cost instrument to reduce transaction costs and to signal a firm's superior but unobserved quality performance (King, Lenox, Terlaak, 2005; Terlaak and King, 2006, Potoski and Prakash, 2009). In a study of international trade, Clougherty and Grajek (2008) elaborate on the institutional characteristics of ISO 9000. They argue that the widespread use of ISO 9000 'helps standardise practices and terminology, mobilise resources, and structure efforts across organisations'. They point to three important properties of certification: a certificate signals quality; it establishes a common-language to communicate the nature of the internal management systems to buyers and provide cross-organisational procedural language in business-to-business dealings; and it has important conflict-settling properties that "reduce trade barriers between businesses from different nations by setting reasonable working procedures that smooth inter-firm relations and reduce instances of conflictual hold-up" (Clougherty, Grajec, 2008, p. 617). This standardised information flow and organisational procedures of certified companies naturally reduce information asymmetries between firms, thus lowering transaction and search costs linked to business relations across borders. Because of these virtuous properties, an increasing number of foreign buyers request certification of their foreign suppliers.

We expect that the effect of standards will not only enable the firm to participate in international markets. It will also impact on the volume of trade, through the virtuous cycle it creates in helping firms penetrate more foreign markets and reach more buyers there. The effect is similar to the transaction cost reducing effect of trade liberalisation and its impact on the export volumes of productive firms (e.g. Harrigan et al., 2014). We therefore posit the following related hypotheses concerning the transaction cost reducing effect of ISC on export performance:

> *Hypothesis 2A: Certified firms face lower transaction costs in international markets and, consequently, are more likely to be exporter;*
> *Hypothesis 2B: Certified firms export on a larger scale.*

The transaction cost reducing properties of international standards are important for all firms willing to operate in global markets, but we contend that they are especially important for firms based in countries where more severe institutional voids occur and essential institutions to support international transactions are lacking. We here follow the argument of Montiel et al. (2012) that more corrupt institutional environments increase the signalling value of standards certification.

In developing countries, contract law may be weak or less enforceable in settling conflict situations; rules and regulations may be lacking or less respected; and red tape and corruption, poor physical infrastructure, financial market failures and a lack of intermediaries to provide information on foreign markets may further complicate trade relations (Kaufmann et al., 2009). Foreign buyers may fear problems of adverse selection and moral hazard, and they may be reluctant to engage in deep trading relationships with firms in countries

characterised by such strong institutional voids. Here, for domestic firms in developing countries, the cost of convincing trading partners about reliability and trustworthiness in respecting formal and informal contractual agreements will be higher than for firms in countries where a well-developed legal system guarantees contractual rights and protects property rights. To bridge the institutional voids, an international quality certificate may be instrumental in reducing such cost, mitigating the negative reputation effects of their country's institutional set-up.

Firms based in least developed countries also face negative reputation effects with respect to product quality. Hudson and Jones (2003) explain that consumers evaluate product quality from information signals, such as brand name, giving an advantage to established firms over others when new products are introduced. Another signal is 'country of origin'. Since high-income countries focus more heavily on higher-quality goods, there is a tendency for consumers to associate lower levels of development in a country with lesser quality of the products originating from there (Bilkey and Nes, 1982). This creates an extra liability for firms based in less developed countries to enter export markets. International standards certification may help firms distance themselves from the stereotypes about their home countries. Therefore, from the above arguments, we posit the following hypothesis:

> *Hypothesis 3: The impact of quality certification on the probability of export participation and on export sales is stronger in countries characterised by severe institutional voids.*

Not all firms in developing and transition countries are expected to equally benefit from certification. Ricart et al. (2004) argue that multinational firms internalise some of the tasks of specialised intermediaries designed to support efficient transactions and develop internal procedures to guarantee quality and property right protection. Hence, subsidiaries of foreign-based multinational firms benefit from the technologies and management practices transferred from the parent and are disciplined through various internal-control and integrating mechanisms within the organisation of the group (Hill, 2014). Most foreign subsidiaries are also integrated within the supply chain of the multinational firm and benefit from the reputation and legitimation of the parent firm (Delmas, 2003). Again, while certification may still be a useful instrument for an effective implementation of good practices, the signalling and transactional effect is expected to be less important than for domestic firms.

> *Hypothesis 4: Certification will have a smaller transaction cost effect on export participation and export sales for subsidiaries of multinational companies.*

## 3. Empirical approach

### 3.1. Data sources and sample

We use cross-section firm-level data from the World Bank Enterprise Surveys (WBES) from 89 developing and transition countries. The WBES database is the most important source of harmonised firm-level survey data comparable across countries, covering the factors that affect the performance of firms in developing countries. It contains key information on indicators of firm performance, including export performance and certification status. We selected the surveys conducted over the period 2006 to 2013. The firms are formal firms, sampled from national business registers following a stratified random-sampling procedure based on location, size and industry (for more details on the methodology see: http://www.enterprisesurveys.org/Methodology). The exclusion of firms with incomplete data resulted in a sample of more than 18,000 firms mainly active in manufacturing[ii].

Table A1 in the appendix provides information on the sample composition by country and the incidence of certification[iii]. A particular issue concerning the data is the lack of balance across countries, since some countries have few firms in the sample, particularly those with a small manufacturing sector. The unequal coverage in part reflects the degree of industrialisation in the countries selected.

On average, 28% of the sampled firms have an internationally accepted quality certificate. There are, however, large differences across countries, ranging from as high as 72% in the Czech Republic, 71% in China and 64% in Hungary to a low of 3% to 7% in Guinea Bissau, Burundi and conflict-affected states such as Iraq and Côte d'Ivoire. Table 1 presents descriptive statistics about certified firms and their export participation. From the total sample, approximately one third of firms are actually exporting. For the subgroup of firms without an ISC, this proportion is reduced to 23.7%. By contrast, for the group of firms possessing an ISC, more than half of the firms (56.9%) are exporting.

In Table 1, firms are further subdivided into two groups following the 'institutional quality' of the country where they are based. 'Institutional quality' refers to the degree to which institutions such as contract law, regulations and taxation systems support private business development. A measure capturing institutional quality that follows this approach is the World Bank's 'Ease of Doing Business' (EDB) indicator, published yearly and available for 189 countries in 2014. The EDB index measures the regulations that directly affect businesses and is a composite index based on the average of 10 sub-indices[iv] (for more details, see World Bank, 2015). We use the EDB index that corresponds to the respective year of the survey. The countries in the sample are further subdivided into two sets, one composed of countries that belong to the "upper half" of the (sample) country distribution following the EDB index and "lower half" or weak countries characterised by the most severe institutional voids.

Table 1: Number and percentage of exporting firms

| | *Non-exporting* | *Exporting* | *Total* |
|---|---|---|---|
| Full sample | 12,352 (67.12%) | 6,052 (32.88%) | 18,404 |
| Firms with ISC | 2,207 (43.13%) | 2,910 (56.87%) | 5,117 |
| Firms without ISC | 10,145 (76.35%) | 3,142 (23.65%) | 13,287 |
| *Lower half 'Weak' countries* | | | |
| Full sample | 7,997 (72.77%) | 2,993 (27.23%) | 10,990 |
| Firms with ISC | 902 (42.43%) | 1,224 (57.57%) | 2,126 |
| Firms without ISC | 7,095 (80.04%) | 1,769 (19.96%) | 8,864 |
| *Upper half countries* | 4,355 (58.74%) | 3,059 (41.26%) | 7,414 |
| Firms with ISC | 1,305 (43.63%) | 1,686 (56.37%) | 2,991 |
| Firms without ISC | 3,050 (68.96%) | 1,373 (31.04%) | 4,423 |

Table 1 shows that, in the weaker countries, the proportion of exporting firms is smaller, at 27%, but it is interesting to note that, for firms holding an ISC in these countries, the proportion of exporting firms approaches – and even slightly exceeds – the proportion of exporting firms observed for the 'upper half countries'.

## 3.2. Variables

*Dependent variables*

The empirical model relates a firm's export performance to its holding of an ISC, while controlling for a set of other explanatory variables. Performance is measured through two dependent variables: EXPORT, a binary variable measuring a firm's participation in export markets, either directly or indirectly through an intermediary organisation; and LEXPORTS, its export scale, measured as total export sales, in log.

*Focal independent variable: ISC*

The main variable of interest relates to the possession of an International Standards Certificate (ISC). Firms were asked in the survey if they 'possess an internationally recognised quality certificate (some examples are ISO 9000, 9002, ISO 14000, HACCP (for food) and AATCC (for textiles)'. We construct a binary variable ISC, equal to one if the firm

possesses one of these quality certificates. Conform the arguments of section 2, we expect ISC to have an impact on the firm's export running through two channels, as depicted below in Figure 1.

Figure 1: ISC channels of impact on export


Of the two mediator variables, productivity can be observed and measured. Transaction costs - the variable of the second channel - is a latent variable, which we cannot observe. However, its role as mediator variable in the ISC – export relationship can be measured as the remaining effect which is obtained from netting out the effect of productivity on export. If not all the impact of ISC runs through the productivity channel, the additional impact of ISC on export is taken to measure the impact of international standards on promoting export through reducing transaction costs. In our model, we test and measure the latter effect by including both PRODUCTIVITY and ISC as explanatory variables. If all the impact from certification runs through the productivity channel, we expect no extra effect from the variable ISC, in which case the coefficient of ISC would not be statistically different from zero. In other words, by including both ISC and productivity in the same equation, we can test if the role of ISC is fully encompassed by productivity.

Lacking data on value added, PRODUCTIVITY is measured as sales per employee, normalised for each country-industry set by a min-max procedure to lie between zero (the least productive firm in the industry and country) and one (the most productive firm in the industry and country). To measure the productivity advantage of certified firms, we estimate an ISC treatment model that measures the extra productivity of ISC-treated firms. The ISC-treatment effect is estimated by means of a propensity score matching method (Heckman, Ishimura Todd, 1997, Becker and Ichino, 2002). This method compares the productivity of certificate-holding firms (treated firms) with the productivity of non-holding (control) firms that are similar with respect to all other observable characteristics (relevant to holding a certificate). Both groups of firms have a similar likelihood of holding a certificate, measured

by their propensity score. In matching the treated and control firms on the basis of their propensity scores, we use kernel matching and nearest neighbour matching, two commonly applied methods[v].

The results shown in Table 2 indicate a statistically significant treatment effect for our normalised productivity variable of 0.025 and 0.024 for kernel and nearest neighbour matching, respectively.

Table 2: Results of the propensity score matching, estimating the effect of ISC (treatment) on productivity (outcome).

| | *Kernel matching:* | *Nearest neighbour matching:* |
|---|---|---|
| ATT | 0.025 (5.374) | 0.024 (3.168) |
| Standard errors | 0.005 | 0.008 |
| Number of treated observations | 5091 | 5091 |
| Mean productivity treated | 0.135 | 0.135 |
| Number of controls | 12880 | 2501 |
| Mean productivity controls | 0.110 | 0.111 |

Note: ATT stands for Average Treatment effect on the Treated; *t*-Statistic in parentheses; Balancing property is satisfied; Common support imposed.

Relative to the average productivity of non-treated firms, equal to 0.110 in Kernel matching, the 0.025 difference corresponds to a 23% higher productivity in ISC holding firms. Hence, certified firms are more efficient and, as a result, should be more likely to participate in exporting, and/or export on a larger scale than non-certified firms.

*Control variables*

We control for sunk-cost complementarity arising from importing from abroad. Sunk-cost complementarity is a mechanism through which previous importing experience positively impacts the probability of becoming an exporter. If the sunk cost associated with importing and exporting to the same market is shared, having importing activity can increase the likelihood of a firm being a two-way trader (e.g. Muuls and Pisu, 2009; Kasahara and Lapham, 2013). Through imports, companies can gain knowledge about foreign markets, increase their productivity by having access to cheaper inputs, and reach the productivity threshold necessary to become exporters (Foster-McGregor et al., 2014). Moreover, for an increasing number of firms, importing reflects their participation in global value chains, making exports part of the continuous flow of activities organised across country boundaries (OECD, 2007). Thus, we include IMPORTS, the percentage of foreign inputs, as a control

variable to measure the possible effect of sunk-cost complementarity and global value chain participation.

In previous research, large firms were found to more easily incur and overcome the large sunk costs associated with exporting (Bernard and Jensen, 2004). Hence, the control variable, LSIZE, measures the (logarithm of) capital assets held by the firm. Exporting assumes specific competencies at the level of the firm. Having a highly skilled workforce appears to be a necessary condition in developing such competencies (Brooks, 2006). We control for this by including SKILL, a human capital variable measuring the share of skilled production workers in the total of all production workers (skilled and unskilled). Moreover, if substantial barriers to entering foreign markets are present, the exports of those firms that surmounted these barriers tend to increase rapidly over time, as a result of experiential learning (Das et al., 2007). Firms acquire specific knowledge and skills about the export markets in which they are present. In the export sales equation, we model these dynamic effects by including the variable EXPERIENCE, measured as the number of years since the firm started exporting, as well as its quadratic term to allow the effect to depreciate over time, as found by Bernard and Wagner (2001).

In line with the arguments developed in section 2, we expect exports to be easier for subsidiaries of foreign-based firms. From sharing market access and the technologies developed at the parent or group level, foreign subsidiaries can be expected to enjoy stronger advantages from the network than domestic firms. To capture the latter effect, we include a dummy variable FOREIGN, equal to one if the firm is foreign owned.

Good communication facilities are essential in establishing relationships with foreign buyers. Especially in countries where traditional communication infrastructure is deficient, internet access appears as a necessary condition for participation in international markets (Yoshino, 2008). We include in the participation equation INTERNET, an internet usage variable, equal to one if the firms use a website to communicate with clients and suppliers.

We additionally control for differences in the business supporting institutional context of the countries by including INST, an indicator variable which equals one, if the country belongs to the upper half of the distribution of countries in our sample following the Ease of Doing Business indicator of the World Bank (cfr. supra) where institutions are more developed.

Besides the above variables, we control for other less systematic country-specific effects[vi] and industry-specific effects by including country and industry dummy variables.

The variables used in the estimations are defined, and their summary statistics are presented in Table 3.

Table 3: Definition of variables and summary statistics

| *Variable* | *Definition* | *Min* | *Max* | *Mean (STD) All firms (N=18,404)* | *Mean (STD) Exporters (N=6,052)* |
|---|---|---|---|---|---|
| EXPORT | Dummy variable equal to one if the firm exports (in the last fiscal year prior to the survey) | 0 | 1 | 0.33 | - |
| L(EXPORTS) | Export sales in log. (N=6052) | 7.09 | 32.64 | - | 17.12 (3.53) |
| PRODUCTIVITY | Productivity, measured by sales per employee, in the last fiscal year prior to the survey, normalised, using the country-industry specific range. | 0 | 1 | 0.10 (0.19) | 0.14 (0.23) |
| ISC | =1 if firm has Internationally-recognised Standards Certification | 0 | 1 | 0.28 | 0.48 |
| LSIZE | Net book value of the capital stock, in log. | 0 | 32.55 | 16.02 (3.38) | 17.02 (3.45) |
| FOREIGN | =1 if the firm is foreign owned | 0 | 1 | 0.12 | 0.23 |
| INST | =1 if the firm is active in a country of the upper half of the country-EDB distribution | 0 | 1 | 0.40 | 0.51 |
| SKILL | Proportion of skilled production workers in total production workers | 0 | 1 | 0.49 (0.27) | 0.48 (0.27) |
| IMPORTS | Percentage of inputs of foreign origin | 0 | 100 | 28.54 (35.08) | 39.83 (35.72) |
| EXPERIENCE | Number of years since firm started exporting | 0 | 124 | - | 12.22 (11.38) |
| INTERNET | =1 if the firm uses a website to communicate with clients and suppliers | 0 | 1 | 0.49 | 0.73 |

### 3.3. Model specification

The export participation is modelled following a probit model of the following form:
$\text{Prob}(Y=1|Z) = \Phi(Z'\gamma)$ (cdf of normal distribution with mean=0, SD= 1)

where Z stands for the vector of explanatory variables outlined in the previous section, including our focal variables and control variables, and $\gamma$ is the vector of coefficients that describes how these variables relate to the probability that a firm is an exporter.

Since we only observe positive export values for firms that are actually exporting, the equation explaining export sales is estimated following a Heckman selection model (Heckman, 1979). If unobservable factors exist that affect both selection (export participation) and the outcome of the regression equation (export sales), standard regression techniques applied to the regression equation yield biased results. Hence, the use of the Heckman Full Information Maximum Likelihood estimation approach, which provides consistent, asymptotically efficient estimates of the parameters. The model assumes that a regression relationship exists between an outcome variable, in our case the (logarithmic value of) export sales, and a set of explanatory variables, but corrects for the bias which results from only selecting the active exporters, and not including the non-exporters.
Formally, $y_j = \beta x_j + u_{1j}$ (outcome equation)
where u1 ~ N(0;σ) and x is a set of explanatory variables.

The outcome variable for observation j is observed, if firms select into exporting, following the participation model, such that:
$y_j > 0$ if $\gamma z_j + u_{2j} > 0$ , otherwise $y_j = 0$ (selection equation)
where $u_2 \sim N(0;1)$ and corr $(u_1; u_2) = \rho$

z is the set of explanatory variables partially overlapping with x. The variance-covariance matrix corresponding to the parameter estimates is estimated allowing for intra-country correlation of the observations.

## 4. Results

### 4.1. Export participation

In Table 4, column (1), we present the results for the export participation model estimated by a standard probit model. However, we cannot rule out the possibility that the decision to acquire a certificate and the decision to export may be endogenously determined. We therefore present in column (2) the results of an instrumental variable (IV) probit estimation[vii]. Two additional variables are used for explaining certification: whether the firm had a formal status at start and whether its accounting records are being audited by an external party, both variables relating to the firms propensity to financial and administrative transparency. A Sargan test for over-identifying restrictions with a score of 0.04 supports the validity of these instruments.

The estimation results indicate that productive firms are more likely to be exporters. Calculation of the marginal probability effects from the estimated coefficients indicates that at a productivity level that is one standard deviation higher than the average productivity, the probability of export increases by 1.4% [viii]. This effect is rather limited in magnitude.

Hence, having established (in the previous section) that the ISC-treated firm, on average, scores higher on productivity, there is an impact of ISC on export probability through the productivity channel, in line with Hypothesis 1A. However, since the average treatment effect is also relatively small, the indirect effect of ISC on export participation remains very limited, below a 0.2% probability increase.

By contrast, the transaction cost effect of holding an ISC, measured by the ISC coefficient, is more important, and provides strong support for Hypothesis 2A. Controlling for productivity, the possession of a quality certificate raises the export probability by 13% (calculated from the coefficients in Column 1), and by 47% following the instrumental variable estimation (Column 2). This sharp increase in the IV estimation raises the coefficient of ISC to about the same magnitude as the coefficient for INST, i.e. the effect of being based in a country with less institutional voids. The probability increase for a firm where INST equals one is respectively 40% and 32% for the IV estimation. These effects are high and suggest that institutions, including the endogenous institution of international certification, are key instruments in reducing transaction costs in international markets.

All the other controls have the expected effects. We find a FOREIGN firm to have a higher probability of being an exporter. The positive and large effect of LSIZE reflects the fact that large firms can more easily incur and overcome the large sunk costs associated with exporting. The effects of having a skilled workforce and being internet-connected are important conditions for participating in export markets, as expected. Being a foreign firm, or sourcing of goods from abroad reflect the insertion of the firms in global value chains and raises the probability that the firm exports part of its production to international related or non-related buyers.

Table 4: Estimation results for export participation, P(EXPORT) and export scale L(EXPORTS)

| VARIABLES | (1) P(EXPORT) | (2) P(EXPORT) | (3) L(EXPORTS) | (4) L(EXPORTS) |
|---|---|---|---|---|
| PRODUCTIVITY | 0.226*** | 0.247*** | 2.305*** | 2.273*** |
| | (0.087) | (0.054) | (0.151) | (0.156) |
| ISC | 0.440*** | 1.474*** | 0.397*** | 0.558*** |
| | (0.050) | (0.041) | (0.138) | (0.097) |
| FOREIGN | 0.625*** | 0.361*** | 0.492*** | 0.353*** |
| | (0.058) | (0.036) | (0.122) | (0.107) |
| INST | 1.591*** | 1.249*** | -0.588 | -1.038 |
| | (0.178) | (0.097) | (1.508) | (1.605) |
| LSIZE | 0.122*** | 0.074*** | 0.388*** | 0.347*** |
| | (0.010) | (0.005) | (0.033) | (0.031) |
| SKILL | 0.163** | 0.116*** | 0.236** | 0.219** |
| | (0.072) | (0.042) | (0.116) | (0.111) |
| IMPORTS | 0.005*** | 0.004*** | -0.001 | -0.002* |
| | (0.001) | (0.000) | (0.001) | (0.001) |
| INTERNET | 0.450*** | 0.185*** | | |
| | (0.041) | (0.027) | | |
| EXPERIENCE | | | 0.040*** | 0.039*** |
| | | | (0.006) | (0.006) |
| EXPERIENCE² | | | -0.000*** | -0.000*** |
| | | | (0.000) | (0.000) |
| Constant | -3.821*** | -3.079*** | 9.157*** | 10.344*** |
| | (0.253) | (0.115) | (1.711) | (1.718) |
| Rho | | | -0.480*** | -0.686*** |
| | | | (0.159) | (0.129) |
| Sigma | | | 0.545*** | 0.597*** |
| | | | (0.042) | (0.040) |
| Observations | 18,404 | 18,404 | 18,404 | 18,404 |
| Uncensored obs. | | | 6052 | 6052 |
| Log likelihood | | -16037 | -20158 | -20224 |
| Pseudo $R^2$ | 0.257 | | | |

*** p<0.01, ** p<0.05; Robust standard errors in parentheses; Industry and Country dummies included in all estimations; Models (2) and (4) with instrumented ISC.

## 4.2. Export scale

Columns (3) and (4) of Table 4 show the Heckman estimation results for export sales, using a similar format as for export participation. Column (3) shows the results of the model where ISC is not instrumented. Column (4) presents the results of a Heckman outcome equation that is estimated replacing ISC by its instruments in the selection equation. We interpret the latter results hereafter.

When we calibrate productivity at the level of the ISC-treated firm, the effect of ISC on export scale, through productivity, results in an increase of export sales of 6%, compared to a non-ISC-treated firm. This result supports Hypothesis 1B. However, the effect is again limited compared to the effect of ISC on export scale, measuring the transaction cost effects.

In addition to the productivity advantage, certified firms have an export scale that is 75% larger than non-certified firms. The result points again to the important role of ISC in stimulating exports by bringing down transaction costs.

With respect to the controls, the results show a less than proportional increase in exports with size, as measured by the effects of LSIZE. Similar to the export participation results, the SKILL intensity raises the export scale of the firm. This also holds for being part of a multinational firm (FOREIGN) and for sourcing from abroad (IMPORTS). Doubling EXPERIENCE from 12 years for the average firm to 24 years increases the export scale by approximately 34%. Different from its effect on the likelihood of exporting, INST appears to have no significant extra effects on the scale of exports.

Next we test hypothesis 3 following the IV estimation method. Since international standards certification are assumed to bridge institutional voids, we expect the effect on exporting to be stronger for firms based in institutionally weak countries. The signal from holding an ISC in such environments may be more important and underscore the commitment of the exporting firm to quality and its trustworthiness as a partner in a 'less-reliable' institutional context. To measure the possible moderating impact from a weak institutional environment, we interact the ISC variable with INST and test if the coefficient differs from zero. Results are presented in Table 5, column (1) and (2). The export participation probit results support hypothesis 3. For export sales we find no significant effect. Controlling for other factors, holding an ISC proves to be more important for export participation of firms based in countries with severe institutional voids, as implied by the negative coefficient of the ISC*INST variable. However, the differential effect in probability terms is rather limited in magnitude, about 1% of difference in export probability.

Finally, for hypothesis 4 we test, again using the IV estimation method, if the ISC impact on export is the same for foreign and domestic firms. We add an interaction term of ISC and FOREIGN and test if the coefficient of the interaction term differs significantly from zero. The results are displayed in columns (3) and (4) of Table 5. In support of hypothesis 4, the certification effect is larger for domestic firms, both in the export participation and export scale equation. In the export participation equation the certification effect for domestic firms in export participation raises the probability of exporting by 47%, against 44% for foreign firms. For export scale the results are more marked, where for the domestic firms the export scale goes up by 86% against only by 38% for foreign firms.

Table 5: Results of effect of ISC, in strong versus weak countries and foreign vs domestic firms for export participation, P(EXPORT) and export scale L(EXPORTS)

| VARIABLES | (1) P(EXPORT) | (2) L(EXPORTS) | (3) P(EXPORT) | (4) L(EXPORTS) |
|---|---|---|---|---|
| PRODUCTIVITY | 0.250*** | 2.272*** | 0.248*** | 2.279*** |
| | (0.054) | (0.156) | (0.054) | (0.155) |
| ISC | 1.551*** | 0.527*** | 1.498*** | 0.620*** |
| | (0.049) | (0.165) | (0.042) | (0.112) |
| INST | 1.299*** | -1.074 | 1.241*** | -1.015 |
| | (0.099) | (1.598) | (0.097) | (1.589) |
| ISC*INST | -0.127*** | 0.062 | | |
| | (0.044) | (0.181) | | |
| FOREIGN | 0.354*** | 0.354*** | 0.427*** | 0.528*** |
| | (0.036) | (0.107) | (0.045) | (0.155) |
| ISC*FOREIGN | | | -0.144** | -0.286** |
| | | | (0.060) | (0.136) |
| LSIZE | 0.073*** | 0.346*** | 0.074*** | 0.349*** |
| | (0.005) | (0.031) | (0.005) | (0.032) |
| SKILL | 0.113*** | 0.221** | 0.117*** | 0.225** |
| | (0.042) | (0.111) | (0.042) | (0.110) |
| IMPORTS | 0.004*** | -0.002 | 0.004*** | -0.002 |
| | (0.000) | (0.001) | (0.000) | (0.001) |
| INTERNET | 0.179*** | | 0.185*** | |
| | (0.027) | | (0.026) | |
| EXPERIENCE | | 0.039*** | | 0.039*** |
| | | (0.006) | | (0.006) |
| EXPERIENCE² | | -0.000*** | | -0.000*** |
| | | (0.000) | | (0.000) |
| Constant | -3.087 | 10.365*** | -3.078*** | 10.240*** |
| | (0.115) | (1.715) | (0.115) | (1.717) |
| Rho | | -0.687*** | | -0.673*** |
| | | (0.129) | | (0.134) |
| Sigma | | 0.597*** | | 0.593*** |
| | | (0.040) | | (0.041) |
| Observations | 18404 | 18404 | 18404 | 18404 |
| Uncensored obs. | | 6052 | | 6052 |
| Log likelihood | -16032 | -20224 | -16034 | -20221 |

Notes: *** p<0.01, ** p<0.05; Robust standards errors in parenthesis; Industry and Country dummies included in all estimations; ISC is instrumented in all equations.

## 5. Discussion and concluding remarks

In our paper we contribute to three bodies of literature: international business, development studies, and the literature on standards and their diffusion. Efficient institutions are the major driver of well-functioning markets and a source of ownership advantages that determines the firm's international engagement (Dunning and Landon, 2010). Unfortunately, in developing and transition countries, efficient market institutions and supportive specialised intermediaries are often absent, creating important institutional voids. Hence, firms from developing countries engaging in international markets address institutional voids using a

variety of formal or informal market and non-market mechanisms and surrogate institutions. We conceptualise ISC as an endogenous institutional mechanism that helps firms to bridge institutional voids and helps them to export from countries characterised by weak institutions. The voids derive from the lack of supporting trade institutions, peculiar institutional set-ups and adverse country reputation effects. We add to the literature on international standards and their diffusion by analysing the context in which certification gains importance and bring the institutional voids bridging mechanism in the discussion, as a driver for the motivation of obtaining certification.

Extending the work of Dunning and Lundan (2010), we argue that standards certification act on two fronts of the OLI framework: (a) by helping firms create ownership advantages and raise their productivity, and (b) through providing standards that enable efficient transactions between incompletely informed parties. In support of our arguments, we provide original evidence with firm-level data on how international standards affect the export performance of certified firms in developing and transition countries. We examine the impact of the two distinct channels mentioned above: productivity improvement and transactional efficiency.

Firms implement internationally accepted standards to improve the efficiency of their operations and the quality of their products and services, factors that are instrumental in improving their export performance. Equally important, a certificate of conformity with international standards lowers transaction costs by respecting internationally agreed norms and procedures in the production and delivery process, and signals to international buyers a commitment to quality and reliability in commercial transactions. In this capacity standards help to reduce both variable and fixed transaction costs, which tend to be high for transnational operations. Cultural, institutional and economic distances between countries give rise to substantial uncertainty and asymmetric information between the transacting parties. Global standards, including the widely used ISO 9000, are therefore seen as transaction-supporting institutions, helping to reduce or overcome information problems by using and respecting common norms and procedures.

The uncertainty and information problems are typically more important for transactions involving firms based in the developing countries, where business-supporting institutions are less developed, and offer scope for opportunistic behaviour in commercial transactions. Moreover, firms based in developing countries often face the difficulty that consumers in global markets, confronted with information asymmetry, tend to associate transaction quality with the generally poor reputation of the country of origin, reinforcing the 'liability of foreignness' for those firms (Clougherty and Grajek, 2008; Hudson and Jones, 2003; Marano et al., 2017). In such environments, producers have a greater incentive to use international standards as a way to mitigate information asymmetries and so expand their sales in international markets.

Our empirical model covering a large dataset of manufacturing firms operating in 89 developing and transition countries supports the above arguments. The results support the importance of quality certification for both participation in the export market and the level of

export sales by individual firms. More importantly, we show that the main channel of impact on exports comes from transaction economies and, only in a limited way, from the higher productivity of certified firms. These results enrich and deepen earlier findings where the link between export intensity and the diffusion of ISC across firms was established at the industry and country levels (Potoski, Prakash, 2009). The large set of countries covered by this study also refines and generalises earlier results that were based on smaller samples or case studies, which did not disentangle the transaction economy effect from the productivity effect (Gebreeyesus, 2014; Fikru, 2014).

Our findings have important bearings on export strategies of firms and the associated process models of export. Many of the process models make the link between experiential learning and commitment to foreign markets (Johanson and Martín, 2015). Moreover, lacking the knowledge about foreign markets, firms first expand domestically and are only late in their existence pushed to expand to foreign markets (Ellis and Williams, 1995). Facing the uncertainty of being able to stand up against foreign competition, they typically postpone the decision to export and, if the need and opportunity arises, will only gradually commit resources depending on the foreign market reaction. Our findings suggest that ISC can make a difference here and speed up the decision to expand abroad. Acquiring an ISC allows the firm to benchmark its performance against international standards and to learn ex ante how to reduce this uncertainty. For firms where markets and competition are global, this ex ante learning become extremely important and helps the firm to export early in its life cycle and to several countries in a short span of time (Sleuwaegen and Onkelinx, 2014). Beyond the learning approach, the transaction cost approach to international business strategy emphasises the costs of drafting and negotiating enforceable contractual agreements. These costs tend to be high under information asymmetry and when cultural distance, communication problems or a lack of measurable outputs complicate monitoring and contract enforcement (Hill, 1990). Firms will only choose to enter foreign markets by exports, if transaction costs do not prevent this. This is particularly important if alternative entry options, including the set-up of a local subsidiary or teaming up with a foreign partner in a joint venture, turn out to be costly or to cause the loss of strategic autonomy and flexibility (Kim and Hwang, 1992). By signalling quality, certification helps to get quicker acceptance and legitimation in the foreign market, which, in turn, reduces transaction costs and helps the firm to export to institutionally and culturally distant markets and, in case of indirect exporting, increase the efficiency of local intermediaries (Peng and Ilinitch, 1998).

From a managerial perspective, our results provide support for the effectiveness of international standards as elements of a governance system to facilitate the participation and improved performance in international markets. As our results indicate, this virtuous effect is more important for domestic firms than for subsidiaries of foreign-based companies in developing countries. ISC may partially act as a disciplining mechanism, substituting for the lack of discipline and information spillovers between firms in less developed market environments. By going through the process of certification, firms are exposed to new organisational frameworks and are forced to quickly absorb new techniques. At the same the collective effort involving the participation by all employees helps to develop a common

language to streamline and co-ordinate operations and to implement improved procedures, helping the firm to prepare for exporting. For external stakeholders, the certificate signals the firm's commitment to quality and is instrumental for conflict resolution, which helps to reduce transaction costs that tend to be high for international exchanges.

Our findings also have policy implications. First, in those countries where the ISC could play such a remedying role, most often the availability of testing and registration facilities is limited and the cost of obtaining an ISC remains prohibitively high for most local firms. Firms in developing countries increasingly apply for international standards certification despite the considerable financial investment required to fulfil the application procedure (Maskus et al., 2005). Moreover, the above beneficial effects from certification will only materialise if firms fully implement the new standards and certification agencies use strict procedures and rules in granting the certificates. Without such strict procedures and a proper implementation of the standards, not only will firms forego the standards' intended performance outcomes, the system will also lose credibility and become useless in signalling quality to the stakeholders (Aravind and Christmann, 2011). As a result, the incentive to obtain certification will also disappear. There is evidence that in some countries important deviations occur (Yeung and Mok, 2005; Christman and Taylor, 2006). Clearly, the global standards setting organisations should ensure that any deviations are promptly sanctioned before they spread on a wider scale.

*Limitations and suggestions for further research*

Our study suffers from some limitations. First, we are unable to differentiate among the various existing management standards certificates in testing their effect on export performance. Nevertheless, there appears to be considerable overlap in the drivers behind the various certificates and their diffusion pattern. The strong similarities in terms of motives, benefits (Pan, 2003; Poksinska et al., 2003,) and international diffusion patterns (Corbett and Kirsch, 2001, Clougherty and Grajek, 2009) of the various types of management certification sustain their aggregation into the single measure that we use in this study.

Second, data limitation forced us to adopt a cross-section approach. The cross-sectional approach allows us to examine the performance effects of variations in ISC adoption across firms, assuming that the underlying processes do not differ too much across firms. If longitudinal data were to become available, effects could be tracked over time, taking due account of firm-specific differences.

Third, our study uses data from a wide set of countries across which the quality of certification-granting procedures and the effective implementation of the standards by firms may substantially differ (Christmann and Taylor, 2006). While such effects may to a large extent be picked up by the country controls, systematic indications of malpractice differences across countries could help to strengthen and refine our results.

Despite the above limitations, we believe that the robustness of our results and their consistency with the conceptual underpinnings, especially in relation to the institutional environment of the country, make an important contribution to the literature. If more fine-grained and longitudinal data were to become available, further research along the lines set out in this paper should provide additional evidence to refine our findings.

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Appendix

Table A1: Composition of the sample and incidence of certification, by country

| *Country survey* | *N* | *%ISC* | *Country survey* | *N* | *%ISC* |
|---|---|---|---|---|---|
| Afghanistan2014 | 17 | 0.47 | LaoPDR2012 | 36 | 0.19 |
| Albania2007 | 45 | 0.33 | Latvia2009 | 60 | 0.38 |
| Angola2010 | 115 | 0.27 | Lithuania2009 | 63 | 0.22 |
| Argentina2010 | 577 | 0.37 | Madagascar2009 | 142 | 0.10 |
| Armenia2009 | 62 | 0.35 | Mali2010 | 16 | 0.06 |
| Azerbaijan2013 | 8 | 0.00 | Mauritania2006 | 73 | 0.08 |
| Bangladesh2013 | 1,088 | 0.22 | Mauritius2009 | 69 | 0.17 |
| Belarus2013 | 57 | 0.16 | Mexico2010 | 1,015 | 0.23 |
| Bolivia2010 | 38 | 0.21 | Moldova2013 | 36 | 0.22 |
| Bosnia and Herzegov. | 73 | 0.44 | Mongolia2009 | 126 | 0.19 |
| Botswana2010 | 53 | 0.21 | Montenegro2009 | 19 | 0.11 |
| Brazil2009 | 975 | 0.18 | Mozambique2007 | 263 | 0.14 |
| Bulgaria2007 | 379 | 0.37 | Namibia2006 | 95 | 0.28 |
| BurkinaFaso2009 | 34 | 0.24 | Nepal2013 | 181 | 0.16 |
| Burundi2006 | 88 | 0.05 | Nicaragua2010 | 23 | 0.39 |
| Cameroon2009 | 81 | 0.27 | Nigeria2007 | 870 | 0.09 |
| Chile2010 | 602 | 0.36 | Pakistan2007 | 118 | 0.45 |
| China2012 | 1,381 | 0.71 | Panama2010 | 13 | 0.31 |
| Colombia2010 | 572 | 0.33 | Paraguay2010 | 69 | 0.25 |
| Costarica2010 | 202 | 0.19 | Peru2010 | 504 | 0.27 |
| Croatia2007 | 230 | 0.37 | Philippines2009 | 463 | 0.33 |
| Czech Republic2009 | 54 | 0.72 | Poland2009 | 67 | 0.28 |
| DRC2010 | 72 | 0.13 | Romania2009 | 69 | 0.42 |
| DominicanRepublic2010 | 80 | 0.24 | Russia2012 | 439 | 0.17 |
| Ecuador2010 | 92 | 0.33 | Senegal2007 | 214 | 0.07 |
| Elsalvador2010 | 80 | 0.23 | Serbia2013 | 69 | 0.54 |
| Estonia2009 | 71 | 0.46 | Slovak Republic2009 | 46 | 0.43 |
| Ethiopia2011 | 106 | 0.18 | Slovenia2009 | 71 | 0.52 |
| Fyr Macedonia2009 | 91 | 0.36 | SouthAfrica2007 | 652 | 0.37 |
| Gambia2006 | 27 | 0.19 | SriLanka2011 | 237 | 0.14 |
| Georgia2013 | 48 | 0.21 | Swaziland2006 | 61 | 0.26 |
| Ghana2007 | 269 | 0.07 | Tajikistan2008 | 67 | 0.18 |
| Guatemala2010 | 202 | 0.14 | Tanzania2013 | 49 | 0.20 |
| Guinea2006 | 96 | 0.06 | TrinidadandTobago2010 | 73 | 0.26 |
| GuineaBissau2006 | 42 | 0.05 | Turkey2008 | 465 | 0.51 |
| Honduras2010 | 44 | 0.32 | Uganda2013 | 63 | 0.22 |
| Hungary2009 | 81 | 0.64 | Ukraine2008 | 201 | 0.20 |
| Indonesia2009 | 619 | 0.11 | Uruguay2010 | 168 | 0.25 |
| Iraq2011 | 471 | 0.03 | Uzbekistan2008 | 116 | 0.21 |
| Ivory Coast2009 | 110 | 0.06 | Venezuela2010 | 44 | 0.18 |

| | | | | | |
|---|---|---|---|---|---|
| Jamaica2010 | 75 | 0.27 | Vietnam2009 | 635 | 0.28 |
| Kazakhstan2013 | 46 | 0.26 | Yemen2010 | 112 | 0.09 |
| Kenya2013 | 190 | 0.31 | Zambia2013 | 135 | 0.19 |
| Kosovo2009 | 62 | 0.10 | Zimbabwe2011 | 348 | 0.32 |
| Krygyz Republic2013 | 44 | 0.18 | | | |
| | | | TOTAL | 18,404 | 0.28 |

Source: sampled from World Bank Enterprise Surveys (WBES)

[i] This is reflected in the continuous rise in the numbers of ISO management certificates issued worldwide, with a 4% increase in 2013 alone (ISO, 2014).

[ii] The sector distribution is the following: food processing and beverages (20%), machinery and metal (16%), garments (13%), non-metallic and plastic materials (11%), textiles (8%), chemicals (8%), wood and furniture (4%) , electronics (2%), auto components (1%), other (13%).

[iii] A particular issue is the lack of balance in the data across countries, since some countries have few firms in the sample, especially countries with a small manufacturing sector. The unequal coverage reflects, in part, the degree of industrialisation of these countries. We aimed to study the largest sample possible, taking all relevant surveys conducted in the 2006-14 period, including those of smaller countries or weaker coverage.

[iv] These include starting a business; dealing with construction permits; employing workers; registering property; obtaining credit; protecting investors; paying taxes; international trading; contract enforcement; closing a business.

[v] The balancing hypothesis is satisfied and the common support restriction applied.

[vi] The country dummies also capture exchange rate differences and the influence of local currencies on some of the measures in monetary units.

[vii] This model is estimated simultaneously by Maximum Likelihood, using the Conditional Mixed Process programme (CMP) for STATA developed by Roodman (2009). This command is suitable to deal with endogenous binary variables in probit models.

[viii] Predictive margins were calculated, with the MARGINS command in STATA, estimating the average probability of being an exporter, fixing productivity at various productivity levels, while integrating over the remaining covariates.

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