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## Do Russian Firms Need ISO Certification for Exporting?

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## **Do Russian Firms need ISO Certification for Exporting?**

### **Abstract**

*We present some preliminary empirical results on impact of international certification on export behavior of Russian manufacturing firms. Our research is motivated, first, by the fact that little is known about the impact of ISO certification on the performance of Russian firms and, second, by unclear role of ISO certificate in weak local institutional environment (where some firms simply buy these certificates without real audit and modernization of business processes). Russian medium and large enterprises in manufacturing are lagging far behind European peers both in terms of exporting activity and ISO certification level. We are trying to estimate the impact of international certification on the probability of a firm to be involved in foreign trade. We follow the general logic and methodology proposed in papers of Clougherty and Grajek (2008, 2013), Otsuki (2011), Martincus et al. (2010), Masacure et al. (2009), Potoski and Prakash (2009), Cao and Prakash (2011), Berliner and Prakash (2013).*

*Empirical data comes from two rounds of nation-wide survey on the competitiveness of Russian manufacturing enterprises conducted in 2005 and 2009. We use a panel data from two rounds on approximately 500 firms in eight manufacturing industries. This gives us a unique opportunity to track the history of both availability of ISO certificate and exporting status of the firm. We use several different empirical models to examine the effect of certification on export activity and to control for possible endogeneity by estimating systems of simultaneous equations.*

*We find evidence that ISO certification has a significant positive impact on probability of export if we control for self-selection effect for both export and ISO certification. Firms self-select for ISO by size and productivity as well as by being a supplier of a foreign-owned company in Russia. Then we compared two effects on export performance – networking with foreign partners and ISO certification. We found out that while there is a direct positive impact of networking with foreign partners and certification on propensity to export, we were unable to find any significant impact of ISO certification on networking with foreign partners as a signal of “common language” that facilitate establishing partnership relations. We conclude that in the period analyzed these two institutions, both being important facilitators of exporting, worked individually.*

**Key words:** ISO certification, export, manufacturing firms, Russia

**JEL:** F14 L14 P23

### **Introduction**

International trade scholars share an opinion of insufficient empirical evidence on relationship between ISO certification and trade on country and firm level (Clougherty and Grajek, 2012; Otsuki, 2011; Blind 2004; Mascus et al 2000; Moenius 2006). This is especially relevant for developing countries and transitions economies. In his systematic review of 111 papers on the impacts of ISO certification on organizational effectiveness, including export performance, Boiral (Boiral, 2012) found that only 8 of them were devoted to developing countries (mainly to China and, to be more precise – to Hong Kong) and none of them to Russia and former USSR republics. Filling this geographical “gap” with new empirical evidence on could contribute, first, to cross-country comparisons and deepening of our knowledge on the strategies that firms in transition economies choose to raise their competitiveness on the global market.

Another reason to study ISO certification effects is motivated by the reason that in weak institutional environment of some transition countries and lack of consumers’ trust to the quality of their products some institutions - like ISO certification or adoption of Corporate Governance Code are often used only as a marketing tool, i.e. this is a paper to be presented to external agents which is not corresponding to the real improvements in corporate management and governance. This means that a lot of efforts should be made in order to separate “true” and “fake” certifications in order to provide a correct evidence of their effects on firm performance.

The signaling effect of ISO certification could promote exporting not only directly, but and indirectly as well - by facilitating establishment of new foreign strategic partnerships. This work represents an attempt to measure both these effects and thus add some value to existing stock of knowledge on the mechanisms promoting international trade.

## **ISO certification in Russia**

The speed of ISO certification process in Russia (calculated as number of issued certificates per mln. inhabitants) is much less than in the majority of transition countries (table 1), especially new-EU members.

**Table 1. Number of issued ISO certifications in 2012 in selected transition countries, per mln. inhabitants**

Czech Republic	1016,10
Romania	916,43
Bulgaria	833,57
Slovak Republic	792,04
Slovenia	784,58

Hungary	732,43
Estonia	664,14
Croatia	612,53
Lithuania	389,92
Latvia	388,83
Bosnia and Hercegovina	323,17
Poland	262,35
China	247,30
Russia	87,24
South Africa	74,95
Moldova	36,80
Kazakhstan	33,59
Ukraine	23,93
India	23,77
Azerbaijan	19,79
Belarus	17,96
Georgia	17,59
Armenia	8,76
Tadjikistan	0,37

Source: ISO survey of certifications (2012) and World Bank's WDI

The same conclusion is proved by the analysis of empirical surveys' data on availability of ISO certificates among manufacturing firms. We compare EFIGE (Altomonte et al, 2012) and HSE survey data for relevant group of manufacturing firms with more than 100 employees. In seven European countries only one of six or seven firms in 2009 has no ISO quality certificate while in Russia we count more than half of them (table 2):

**Table 2. Share of manufacturing firms with more than 100 employees which had gone through any form of quality certification, %**

	Firm with an actual quality certification	Non-certified firms
Austria	74,7	15,3
France	71,0	19,0
Germany	84,3	15,7
Hungary	86,1	13,9
Italy	85,3	14,7
Spain	92,1	7,9
UK	85,2	14,8
Total EFIGE sample	85,0	15,0
Russia	48,8	51,2

Source: EFIGE survey data, HSE survey data

So, lagging behind their European peers in terms of availability of ISO certificate a significant population of Russian firms loose the opportunity to meet buyers' requirements and expectations in the demanding global markets with high level of competition.

### **Relevant literature and hypotheses**

Information asymmetries between buyers and sellers is of great importance in international trade due to spatial, cultural and institutional distance between the trading partners (ref – см ссылку в статье по партнерствам) . Firms from transition and developing countries that have an intention to enter global market still suffer not only from “liability of foreignness” (Zaheer, 1995; Elango, 2009; Yildiz and Fey, 2012) but from path-dependency perceptions of their inability to sustain the proper quality of products, meet the requirements of customers and deliver orders in time (Hudson and Orviska, 2013). From New New Institutional Economics perspective ISO certificate has an important signaling role for external partners. It could contribute to reduction of information asymmetry by providing buyers (both private firms or state authorities) with some sort of assurance about the quality of management and, correspondingly, about the quality and safety of products. The benefits derived from certification include access to state and private firms’ orders providing more sustainable position of the firm on different markets. An overview of the studies on the ISO benefits for the firm could be found in (Sampaio et al, 2009).

On the country level empirical research based on large panel data provide an evidence that ISO certification in home country promotes international trade (Potoski and Prakash, 2009; Clougherty and Grajek, 2013). More nuanced analysis provided by Clougherty and Grajek (Clougherty and Grajek, 2013) found that the level of host-country ISO certification in bilateral trade is also should be taken into consideration as the average elasticity of exports for half of the nations (mainly transition and developing countries with Russia among them) is negative. This means that they are harmed by the diffusion of certification in host countries.

A systematic review of 111 papers on the effects of ISO certification on organizational effectiveness (Boiral, 2012) include 17 publications (15% of total number explored) where the impact of standards on the export performance is studied. In general, the positive impact was discovered in majority of them. Still, consistent with existing research, we expect that ISO certification increases the probability of exporting and elaborate the following hypothesis:

***Hypothesis 1. Firms with ISO quality certification are more likely to be exporters.***

Acquiring of ISO certification is not the only means to overcome “liability of foreignness” on the global market . Another possibility is to establish direct partnership relations with foreign partners. Our previous research (Golikova and Kuznetsov, 2012) provided an evidence that this factor is an important channel assisting firms in reducing information barriers and costs of economic transactions and thus pushing export decisions of the firm. We presume

that the opportunities of foreign networks and partnerships create valuable stock of knowledge how to operate on the global market. Thus, our second hypothesis is formulated as follows:

***Hypothesis 2. Foreign partnerships have significant positive impact on export decisions of firms.***

Both ISO certification and establishment of foreign partnerships are subjects of self-selection mechanisms driven by partly overlapping factors. What motivates firms to join ISO? Both external and internal factors matters. Berliner and Prakash (Berliner and Prakash, 2013) showed that on the country level bilateral exports and bilateral investment pressures motivate firms to join ISO 14001 only when firms are located in countries with poor regulatory governance as measured by corruption levels. Cao and Prakash (Cao and Prakash, 2011) found that trade competition as measured by ISO 9000 adoption by firms located in countries that are “structurally equivalent” trade competitors has a significant positive effect.

On the firm level Lafuente et al (Lafuente et al, 2010) found that ownership structure and especially the presence of the multinational firm as a largest share holder matters. Hudson and Orviska Hudson and Orviska, 2013) on BEEPS 2009 data for countries in Asia and Eastern Europe found that for firms in manufacturing the significant factors are location of firm, size, manager’s experience and cost pressures from domestic and foreign competition. Gorodnichenko et al on BEEPS data for 2002 and 2005 found that new accreditation is associated with share of sales to MNEs and export share. Goedhuys and Sleuwaegen (Goedhuys and Sleuwaegen, 2013) using World Bank ICS survey data on 7 320 manufacturing firms in 59 countries, including Russia, found that firms that obtain ISO are larger, older and technologically more advanced. For the purpose of our research it is important to stress that motivation for ISO could also be driven by the requirements in state procurement documents or by key manufacturer in supply chain.

We hypothesize that the signaling effect of ISO certification works in exporting directly and indirectly – being one of the factors that may facilitate establishment of strategic partnerships with foreign partners being an attribute of “common language”. Still it is not clear enough whether foreign partners rely on ISO certificates issued in Russia (where accreditation by the international firms with established reputation – members of IAF is not a common practice). Still, consistent with weak institutional environment in Russia and general high level of distrust of foreign businessmen towards local business culture we expect that ISO certification play a

modest (if any) signaling role in establishment of partnerships relations with foreign partners. We expect that, on average,

***Hypothesis 3 Signaling effect of ISO certification has rather direct than indirect mechanism of export promotion.***

### **Methodological issues in empirical surveys of ISO certification' effects**

An important issue in empirical research of ISO effects on performance is an endogeneity problem which was realized at the beginning of 2000s, but become being taken into account only recently (Clougherty, J. and Grajek, M. , 2013; Otsuki, 2011; Gorodnichenko et al, 2010; Lafuente et al, 2010; Dick et al, 2008; Goedhuys and Sleuwaegen, 2013). Cross-section models as it was shown by Otsuki (Otsuki, 2011) underestimate ISO effects and shouldn't be used. A number of research found out "self-selection" effect in the intention of firms to become certified, i.e. firms seek certification in order to become suppliers of MNEs or start exporting (Gorodnichenko et al, 2010). To deal with endogeneity problem researchers use Heckman-style selection models control function approach (Otsuki, 2011), rare events models (Lafuente et al, 2009), matching difference-in-difference method (Martincus et al, 2010), lagged explanatory and instrumental variables (Gorodnichenko et al, 2010) to explain the propensity of firms to become certified.

Another difficulty in measuring effects of ISO certification in transition economies arises from "noisy" data on the number of certified firms in empirical surveys. A set of certified firms includes not only those who have well-organized and documented process of management aimed to constant quality improvements but also companies with "paper certificate" which serves only as marketing tool (Martinez-Costa, M. and Mortinez-Lorente, 2007). Both Russian and Chinese practice provide an evidence that it is very easy and not very expensive simply to buy a certificate (see, for example, Media exposes corruption..., 2014) while estimated costs of "true" certification are considered to be rather high. So, for some firms operating in institutionally weak environment ISO certification is the production of distrust by means of producing trust" as Walgenbach called the phenomena (Walgenbach, 2001). Hence, before estimation of ISO certification effects we need a procedure of cleaning the data and building a more homogenous group of "true" certificate holders. To deal with this problem panel data provide an opportunity to split the group of certified firms into several categories: "new certified", "not renewed certification", "never certified" and "renewed certification" (table 3). The very similar approach was undertaken in (Dick et al, 2008).

**Table 3. ISO certification status of manufacturing firms in 2005-2009, % of respondents (N=493)**

“Never certified”	41,0
“New certified”	18,3
“Not renewed certification”	9,7
“Renewed certification”	31,0
<b>Total</b>	100,0

Source: HSE survey data 2005, 2009

Russian manufacturing firms with more than 100 employees are much less certified than their European peers. Half of the firms in 2009 was not certified: the share of never certified firms in 2009 was 41% and 9,7% didn't renew their certificate. Empirical data of EFIGE survey data for 7 European countries provide an evidence of only 15% of firms of the same size group being not certified in 2010.

#### **Data and Descriptive Statistics**

We use data from two rounds of surveys of manufacturing firms conducted by the Higher School of Economics in 2005 and 2009. The data were collected using “face-to-face” interviews with companies' CEOs. The first round covered 1002 enterprises and the second 957 in eight manufacturing industries in Russia. The sample covers medium and large sized enterprises that employ 100-10,000 persons. The surveyed firms were located in 48 Russian regions. We use the panel part of the surveys, i.e. firms which were surveyed in both rounds. There 499 of firms in a panel. In general, the panel adequately represents both the whole sample and the total population of the manufacturing industries. The questionnaires in both rounds of monitoring are similar. They employed the same core questions about company goals, performance and behavior (exporting, importing, investment, innovation, training). Firm characteristics include 2-digit industry codes, number of employees, ownership structure.

As we are interested in the impact of ISO certification and partnership networking on export activity the summary statistics (Table 4) are given by group of exporting and non-exporting firms. Summary statistics include also the data on factors we will use for controlling results. In particular, on self selection indicators for export – size of a firm prior to the analyzed period, and labor productivity level. We also control for foreign direct investment (in the presence of a foreign owner in the ownership structure).



**Table 4. Summary Statistics (N=493)**

	Total sample	Exporting firms in 2009	Non-exporting firms in 2009
Share of exporting firms in 2005	50.8%	77.2%	19.0%
Share of firms with ISO certificate in 2009	48.9%	60.5%	33.5%
Share of firms with ISO certificate in 2005	40.3%	50.1%	28.9%
Share of firms acquiring new foreign strategic partners in 2005-2008	20.4%	34.2%	4.0%
Labor productivity in 2005 thous. RUR, mean	206 (288)	251 (366)	154 (137)
Size (number of employees) 2005, mean	616.3 (904)	844.8 (1111)	342.4 (426.7)
Foreign shareholder in 2005	5.8%	8.5%	2.6%
Share of firms supplying foreign companies in Russia in 2005	15.4%	23.5%	5.7%
Share of firms conducting marketing research in 2005	35.7%	40.8%	29.5%
Share of firms participating in state procurement	39.9%	41.5%	37.9%
Share of firms located in cities with large companies	8.8%	7.7%	10.1%
Share of firms regular benchmarking to foreign competitors in 2005	44.3%	55.9%	30.4%
Investments to sales ratio	7.2%	9.0%	5.1%
Share of sales in the same region in 2005	28.4%	18.5%	40.5%

Source: HSE survey data 2005, 2009

Descriptive statistics shows that while there is a significant difference between exporters and non-exporters in the acquiring new foreign strategic partners, there seems to be little difference in terms of ISO certification. All the difference in other indicators are more or less expected ones: exporters are more productive and larger, more often have foreign stockholders, they are more active in supplying foreign multinational companies. There are no difference in the probability of exporters and non-exporters in participation in state procurement though.

## Model

Our independent variable is the fact of a firm exporting in 2009. The factors we are mostly interested in are ISO certification and participation in international networks. The last we are measuring by the fact that a firm reported appearance of new foreign partners in between rounds of the survey. We also control for self-selection factors, namely size, productivity and foreign ownership, as well as for 2-digit industry. Thus, our main equation looks as following:

$$P(\text{Exp\_status}^{2009} = 1) = F(\text{ISO}^{2009}, \text{NewStratPartnership}^{2009}, \text{Exp\_status}^{2005}, \text{Size}^{2005}, \text{LaborProductivity}^{2005}, \text{ForeignOwnership}^{2005}, \text{Industry dummies}), \quad (1)$$

While the straightforward probit estimation (Table 2, Model 1) provide good results (almost 90% of right predictions), we definitely have a grave problem with partnership and ISO being probably endogenous.

For estimating the model with binary dependent variable  $Y_1$  and endogenous binary variables  $Y_2$  and  $Y_3$  for getting unbiased estimations we should estimate the system of bivariate probit models:

$$\begin{cases} Y_1^* = X_1\beta_1 + \alpha Y_2 + \varepsilon_1 \\ Y_2^* = X_2\beta_2 + \varepsilon_2 \\ Y_3^* = X_3\beta_3 + \varepsilon_3 \end{cases} \quad (2)$$

For the second and the third equations (modeling ISO variable and New Strategic Partner variable) we use factors which on one hand serve as a prerequisites (or facilitate) getting ISO certificate but on the other hand are assumed not to be endogenous to NSP. Our system looks as follows.

$$\left\{ \begin{aligned} \text{Exp\_status}_i^T &= a_1 * \text{Exp\_status}^T + a_2 * \text{Size}_i^{T-1} + a_3 * \text{LPI}^{T-1} + a_4 * \text{Foreign}_i^{T-1} + a_5 * \text{ISO}_i^T + \\ &+ a_6 * \text{NSP}_i^T + \sum_{j=7}^{j=14} a_{14-j} * \text{Ind}_{j-6} + e_i \end{aligned} \right.$$

$$\begin{aligned}
ISO_i^T &= b_1 * ISO_i^{T-1} + a_2 * ForFirmsSuppl_i^{T-1} + a_3 * Size^{T-1} + a_4 * Marketing_i^{T-1} + a_5 * StateProcure_i^T \\
&+ a_6 * City\_large\_firm_i^T e_i \\
NSP_i^T &= a_1 * ISO_i^{T-1} + a_2 * ForFirmSuppl_i^{T-1} + a_3 * Benchmark_i^{T-1} + a_4 * Foreign_i^{T-1} + a_5 * Size_i^{T-1} + \\
&+ a_6 * Invest_i^T + a_7 * Sales\_Reg\_share_i^{T-1} + a_8 * Job\_destruction_i^T + e_i
\end{aligned}$$

Where

**Exp\_status<sup>T</sup>** - binary variable equals 1 if a firm was exporting in period T;

**Size<sup>T-1</sup>** – logarithm of the number of employees in period T-1 as a proxy for size of a firm;

**LP<sup>T-1</sup>** – labor productivity level in period T-1;

**Foreign<sup>T-1</sup>** – binary variable equals 1 if there were foreigners among owners in period T-1;

**ISO<sup>T</sup>** – binary variable equals 1 if firm reported to have ISO certificate in period T;

**NSP<sup>T</sup>** – binary variable equals 1 if a firm reported acquiring new foreign strategic partner in between T-1 and T;

**Ind<sub>j</sub>** – industry dummy variable;

**ForFirmSuppl<sup>T-1</sup>** – binary variable equals 1 if a firm reported to be a supplier for foreign owned firms (inside Russia) in period T-1;

**Marketing<sup>T-1</sup>** – binary variable equals 1 if a firm was conducting marketing research for concerned with new products/ new technology in period T-1;

**StateProcure<sup>T</sup>** – binary variable equals 1 if a firm participated in State procurement in period T;

**Reg\_large\_firm<sup>T</sup>** – binary variable equals 1 if a firm is located in a region city where the activity of large Russian corporations are concentrated;

**Benchmark<sup>T-1</sup>** – binary variable equals 1 if a firm reported to regularly conduct benchmarking of its competitiveness comparing to foreign competitors;

**Invest<sup>T</sup>** – the average ratio of investments into fixed assets to sales in between T-1 and T;

**Sales\_Reg\_share<sup>T</sup>** – the share of sales inside the region where a firm is located;

**Job\_destruction<sup>T</sup>** – binary variable equals 1 if a firm was actively cutting down jobs (for more than 10%) in between T-1 and T.

The results of estimations for simple probit regressions for all the three endogenous variables and for the system are given in Table 2.

**Table 2. Estimation results**

	Model 1	Model 2	Model 3	Model 4
<b>Dependant var.</b>	<b>Exp_status<sup>2009</sup></b>	<b>ISO<sup>2009</sup></b>	<b>NSP<sup>2009</sup></b>	<b>Exp_status (system)</b>
ISO <sup>2009</sup>	0.208			1.476**
NSP <sup>2009</sup>	1.138***			0.516***
Exp_status <sup>2005</sup>	1.259***			1.191***
Size <sup>2005</sup>	0.370***			0.293***
LP2005	0.106***			0.001***
Foreign <sup>2005</sup>	0.308			0.200**
_cons	-3.583***			-3.350***
				Eq.2
ISO <sup>2005</sup>		1.062***		0.996***
ForFirmSuppl <sup>2005</sup>		0.407**		0.407**
Size <sup>2005</sup>		0.322***		0.351***
Marketing <sup>2005</sup>		0.381***		0.349***
StateProcurement <sup>2009</sup>		0.252**		0.196
Reg_large_firm		0.691***		0.555***
_cons		-2.671***		-2.733***
				Eq. 3
ISO <sup>2005</sup>			-0.091	-0.162
ForFirmSuppl <sup>2005</sup>			0.369**	0.420**
Benchmark <sup>2005</sup>			0.416***	0.441***
Foreign <sup>2005</sup>			0.554**	0.617***
Size <sup>2005</sup>			0.187**	0.197**
Invest <sup>2005</sup>			0.173	0.282***
Reg_large_firm			-0.005**	-0.005**
Job_destruction <sup>2009</sup>			-0.37***	-0.477***
_cons			-1.92***	-1.930***
N_observations	472	499	486	463
Pseudo R2	0.42	0.23	0.11	
Lroc	0.9	0.81	0.72	

The checks on robustness by including additional variables and estimating the model on randomly truncated sample) showed results to be sustainable.

## Discussion and Conclusions

As has been expected we found a very strong self-selection bias for export. Firms seem to self-select both by size and by productivity. For enhancement of partnerships network and for acquiring ISO certification productivity is not significant. Though propensity for both ISO and partnerships positively depends on the size of a firm.

We got support to our hypothesis of positive impact of ISO certification on propensity of a firm to export. It should be stressed that the effect of partnerships are much stronger, while for ISO certification results are somewhat more ambiguous. We got statistically significant influence of ISO on export only when estimating the system of equations. The checks on possible complementary effect of ISO and partnerships showed that ISO certification and partnership are not interlinked and seem to be working independently. I.e. for new foreign partners it seems not being important if Russian firm has ISO certificate or not. Nevertheless ISO accreditation seems to be important for consumers: propensity of acquiring ISO accreditation depends on a firm being built in the different supply chains: with large Russian corporations, with multinationals (MNE), involvement in state procurement. Also not surprisingly the acquirement of ISO accreditation is associated with firm's activity in marketing new products.

Factors of propensity for ISO certification and acquirement of new foreign partners partly overlaps (size, inclusion in MNE supply chain) but mostly different. New partnerships are more demanding and acquiring a new foreign strategic partner implies a firm to be not only a large one but growing (or at least not diminishing in size) and selling most of the products outside of firm's own region on the all-national market.

For future research it would be worthwhile to control for the geographical destination of export as export to CIS countries may be less demanding on ISO certification than to the outside CIS. The number of geographical markets and the enhancement of geography of export also may be significant factors. Also for future work we believe it appropriate to try to use different measures of export activity other than binary variable (for example, the share of export in sales to catch up probable influence of the extensive margin).

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