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Certification to Compensate Gender Prejudice – Analysis on Impact of Management System Certification On Export

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Abstract: *More than one million organisations all over the world implemented a management system and got it certified. This certificate signals that an organization meets international standards, which provides a certain confidence in the company. This confidence is in particular needed for exporting companies in developing countries and countries in transition. In the business world dominated by men, female leadership may be another reason to have less confidence in a company women-led companies may therefore benefit more from certification. This study empirically tests the impact of certification on export, and the moderating effect of female leadership. We use data from Enterprise Surveys, conducted by the World Bank in 2013 that includes 4111 firms from 25 Central and Eastern European countries in transition. We implement a recursive bivariate probit model accounting for simultaneity and endogeneity issues. Our results confirm that certification and export are positively correlated. Firms managed by females benefit more from certification based on international standards than firms managed by men. This suggests that certification compensates for the possibly negative connotations of female leadership. This finding is an innovative contribution to gender studies as well as economic literature, and, more specifically, to the body of knowledge on quality management and standardisation. Our paper is relevant for female managers in the first place: they may consider to implement a management system and get it certified, resulting in a competitive advantage in export markets.*

1 Introduction

Standards are essential for the effective functioning of the global trading system (World Trade Organization, 2005). Standards provide solutions to market failures such as imperfect information and negative externalities such as environmental degradation. They facilitate technical compatibility, which may allow network externalities. However, many companies from developing and transitional countries have problems to comply with globally accepted standards due to substantial cost (Keiichiro et al., 2015). This hinders export but also their share at the domestic market is at stake due to foreign competitors, many local producers are losing the game even on their own market. These standards may be related to products, services, software, processed materials, processes, people or management systems (De Vries, 1998). In this study we focus on management system standards.

The voluntary adoption of quality ISO 9001, environmental ISO 14001, occupational health and safety ISO 45001, information security ISO 27001 or energy ISO 50001 management systems standards, is often followed by third-party audits following the same standards and consequently by certifications. Certification bodies verify the correct application of the standards (see Blind, et al. 2018; De Vries et al. 2010). The certification signals that the company indeed meets these standards and this should provide confidence to the customer. This confidence is particular needed in cases customers perceive uncertainty. As we will show, this does not only depend on the trust in a country's institutions, it may also depend on company-specific characteristics. In several markets dominated by men, female company leadership may be such an issue: she may have to prove herself more than men in the same position. Women suffer some disadvantages from prejudicial evaluations of their leadership competences, particularly in masculine environment (Eagly and Carli 2003). Additionally, women-owned firms are disadvantaged in accessing financial markets because of gender discrimination (Chaudhuri, Sasidharan, and Raj 2018). Therefore, we argue that if certification increases confidence needed for exporting and, if woman-led firms face higher prejudices than male-led firms, than we expect that woman-led firms benefit more of Management System certification -MS certification- than man-led firms.

This paper explores influence of management system certification (MSC) on export as well as the effect of female management on this relationship such as. Empirical data stem from the World Bank's Enterprise Survey data of 25 transitional Eastern European Countries (EEC). Other studies on these data consider export as driver of certification (Hudson and Orviska, 2013; Fikru, 2014a, 2014b), or focus on productivity without explicitly modelling the possible endogeneity issue (Ferro, 2011). Additionally, our study expands the work of Goedhuys and Sleuwaegen (2016) looking at gender of management and covering both service and manufacturing firms. Certain motivation for focus of Eastern European countries is related to the availability of the data used in this study because a data provided by World Bank's Enterprise Survey are not related to developed countries.

The paper is divided into five sections. Section 2 reviews literature on MS certification and its impact on export, and the impacts of female management on exporting propensity, leading to a conceptual framework and hypotheses. The third section deals with the methodology while the fourth section reports results. Finally, the fifth section discusses the findings and provides conclusions.

2 Backgrounds and hypotheses

2.1 Impact of MS certification on export

Certification signals along the supply chain that the supplier complies with certain requirements (Dankers, 2003). Certification is "the provision by an independent body of written assurance (a certificate) that the product, service or system in question meets specific requirements" (ISO, 2009). In most cases, these specific requirements are laid down in standards. A report from the World Trade Organization (WTO) meeting in 2013 underlines that developing countries face many difficulties to meet standards and then providing confidence for trade (WTO, 2013). We focus not on the goods and services themselves but on the management systems (MSs) applied by the companies that produce these.

Export performances are positively correlated with MS certification (Clougherty and Grajek, 2014; Goedhuys and Sleuwaegen, 2013; Ferro, 2011; Masakure et al., 2009; Regis and Jiaotong, 2018, Kapri, 2019). Explanations include transaction cost reduction (Goedhuys and

Sleuwaegen, 2016) and overcoming reputation problems (Blind et al., 2018). Blind, Mangelsdorf and Wilson (2013) found quality management certifications to be positively correlated with bilateral trade; mutual recognition of certification has a positive and significant effect on trade and mutual recognition is in particular beneficial for markets access in high-income countries. In Argentina, for instance, MS certification has effectively helped firms expand their exports and the effects of certification are larger on exports to developed countries and of differentiated products (Martincus et al, 2010). The same applies to Ethiopia: companies which export a large percentage of their sales have higher chances of being certified, profitable and efficient, leading to better business performance (Fikru, 2014a). Experienced exporters already have a reputation which shapes their position on the market, while newcomers on the market need to 'get up to speed' more quickly - in this context, certification to the international standard for quality management ISO 9001 plays a key role in establishing their credibility (Masakure et al., 2009).

The effects of the management system itself have to be separated from the signaling effect of the certificate (e.g. Manders, 2014). Certification signals a certain level of proficiency and thus may help making a difference between good and bad quality (Akerlof, 1970). Certification provides the usually external stakeholders a justified confidence that the MS meets the applicable standards. Fronded et al. (2018) indicate that application of MS standards without certification does not influence companies' business performance at the same level as in the case of certified companies, confirming the findings of Siougle et al. (2018), based on a sample of Greek listed companies and Riillo (2017) for Italian firms.

Firms from less developed countries have a higher interest in certification than those from the more developed countries because concerns related to the reputation of the country itself influence market positions of producers and providers from these countries (Fura and Wang, 2017; Ferro, 2011; Masakure et al., 2009). Lack of institutional support (e.g. efficient market institutions and supportive specialised intermediaries) in developing and transitional countries makes companies operating domestically perceive certification as a surrogate institutional mechanism which helps them to export (Goedhuys and Sleuwaegen, 2016). Developing countries increasingly use MS certifications granted by recognized certification bodies to overcome reputation problems to enter international markets (Blind et al. 2018). Oya et al. (2018) reviewed 179 studies on effects of certification in agriculture in low income countries and found that certification positively impacts incomes from sales. However, companies in less developed countries also face the barrier of the level of the requirements so these countries still lag behind in terms of adoption (Clougherty and Grajek, 2014). Exporting companies from developing countries may need multiple certifications whereas foreign imports to developing countries are far less conditioned by certification (Xie et al, 2011). However, certification can be important for any firm – in a study on foreign companies operating in China, Zhang et al. (2018) found that certification is effective in increasing legitimacy of foreign firms.

To conclude: *Management system certification based on international standards (MSC) positively increases the chances of firms to engage in direct exporting*

2.2 Impact of female managers on export and certification

Do companies led by women perform better or worse than companies led by men in term of export propensity? Empirical literature on the link between gender and export is rather limited (Chen, et al 2016) but the vast majority of empirical studies show that female led firms (owned or managed) have lower propensity to export than firms led by men (e.g. Orser et al., 2010, Marques, 2015) or no statistical significant correlation (Ramón-Llorens, et al. 2017). Based on social and liberal feminist theory female owners are less encouraged to enter in foreign

market (Orser et al., 2010). Using World Bank data, Marques (2015) notes that the gender influences exports propensity essentially through other drivers of export propensity. World Bank data show that companies in South Asia with female managed firms are not more likely to engage in export activities (Kapri,2019)¹.

Therefore, we expect that female managed firm are less likely to engage in export activities than certified male managed firms.

Certification signals that the system meets international standards, which provides confidence in the company. In the business world dominated by men, female leadership may be another reason to have less confidence in a company. As international certification alleviates reputation gap, women-led companies that suffers of the prejudices, may therefore benefit more from certification.

This brings us to the second hypothesis: *certified female managed firm that are certified have higher chances to engage in export activities than certified male managed firms.*

Figure below offers a graphical representation of our hypotheses.

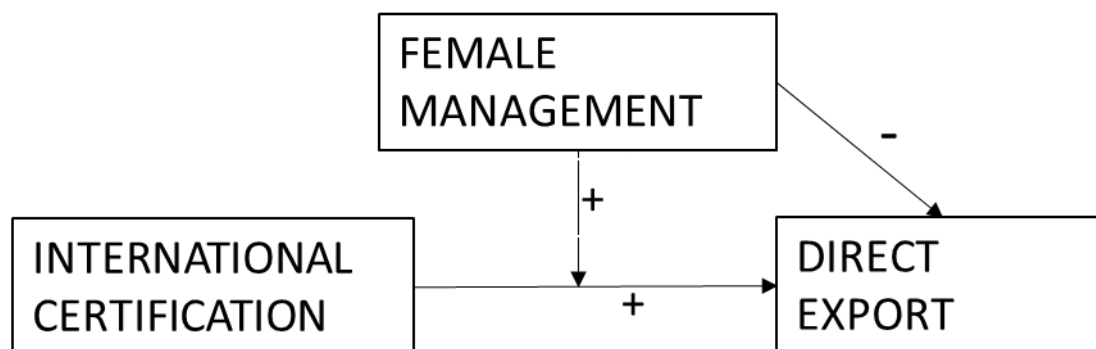


Figure 1 Conceptual Framework

3 Methodology - Data collection and analysis

To answer our research questions, we need company level data about MS certification, CEO gender and direct export from less developed countries. Because of data availability, we investigate firms in transition economies in Central and Eastern Europe and the former Soviet Union.

3.1 Country characteristics

The transition economies and countries studied in this paper have a common experience with state socialism. Since the 1917 in the Soviet Union and since the Second World War in Central and East European countries, socialist societies were based on a high degree of ideology and a dominant role of communist parties. Fundamental features of state socialism, as opposed to marked economies, were central or state planning and bureaucratic control (Peng, 2000, pp.17). Company decisions had to meet political legitimating criteria prior to

¹ The study reports that exporting female-managed firms have larger export share than exporting male managed firms. This result is not necessarily contradicting the gender reputation gaps argument: if female managers face higher prejudice barriers to engage in export, only female mangers offering more competitive products to overcome the prejudice barrier and once they start exporting, and the prejudice reduces, female managed firm export more than male managed firms(a kind of survivorship bias).

economic logic (Mijatovic, et al., 2015). In the 1980s, socialist countries including China had almost one third of the world population but accounted for only 10% of global export and 3% of global innovations (Peng, 2000, pp. 21). In the late 1980s and early 1990s, following the ‘revolutions’ in many countries of the former Soviet Union and Central and Eastern Europe, transition of socialistic political and economic systems started. Elements of these transitions included stimulating the private sector and financial market, privatisation and restructuring of state-owned enterprises, and liberalisation of international trade (Hillman, 1994). Export to western countries was hindered by low product quality (Acharyya, 2005; Hilman, 1994), however, in general, the literature is not consistent if high quality is a prerequisite for export (Racine, 2011, pp. 16), cheap products of an acceptable level of quality may be successful as well.

Mandatory standardization was an essential element of the standardization system of any socialist country, in contrast to voluntary standardization in European Union (EU) member states and OECD countries (Organisation for Economic Co-operation and Development) (Racine, 2011). Trade between socialist countries was based on (mostly) bilateral state agreements. Enterprises were quite isolated from international markets so they did not need the protectionist instruments common as those markets such as tariffs, quantitative restrictions, and technical-standards discrimination (Hilman, 1994). Meanwhile all Central and Eastern Europe countries have adopted the system of voluntary standards and standardization that is common in EU and EFTA member states, and former Soviet Union countries have moved in this direction as well.

Socialist countries put emphasis on female equality in the labor market. As a result, participation of females in the overall workforce was and still is higher than in others countries. The echo of socialist experiences is still visible today business and management. Reynaud et al., (2007) confirmed some differences between managers from founding EU countries and Eastern European EU member states and indicate that economic development is crucial for convergence in values. Labour market deregulation enlarges gender inequality (Perugini and Selezneva, 2015), and further liberalization of the markets will challenge capacities of institutions (e.g. trade unions, see Pulignano, 2017) who might deal with gender gap.

3.2 Data set

The Enterprise Survey Data of the World Bank is the main source for firm level data of firms in less-developed countries. The survey collects information about firms’ characteristics and its markets, including international-recognized quality certification and exports activities. These data were used in the studies by Ferro (2011) and Goedhuys and Sleuwaegen (2013) mentioned before. The data we use are all from the same year, 2013. The data are cross-sectional and include 4947 small, medium-sized and large manufacturing and service firms of 16 small and medium-sized Central and Eastern European and 9 former Soviet Union countries that are covered by the 2013 wave of the World Bank Enterprise Survey. The surveys address a representative sample of non-agricultural firms. The population is consistently defined in all countries and includes the entire manufacturing sector, the services sector, and the transportation and construction sectors. Public utilities, government services, health care, and financial services sectors are excluded. The uniform sampling and methodology allow comparability across countries.

The dependent variable is the export behaviour: does the firm have direct exports (sales of goods or services abroad without an intermediary company)? Engaging in export activities (also known as extensive margin) is the first and difficult step for a firm to access international market (Helpman et al., 2007). The independent variable is certification. The

wording of the question is: “Does this establishment have an internationally-recognized quality certification? (Interviewer: if there is need for clarification, some examples are: ISO 9000 or 14000, or HAPC)”. This fits with our concept of Management System Certification (MSC). An earlier paper based on the same data set used the term International Standards Certification (ISC) (Goedhuys and Sleuwaegen, 2013) but that term would suggest that the standard instead of the management system gets certified. The other main variable is top manager gender.

Additional to the common control variables Number of employees and Age of the firm, we used some other control variables that may be related to the confidence external stakeholders, in particular customers, have in the company, see Table 1. In this choice we follow Goedhuys and Sleuwaegen (2016): Being part of a company in foreign ownership is another way to reduce the reputation gap in the perception of customers, especially in low income countries (i.e. Skoda being part of Volkswagen group) and provides knowledge that can facilitate export and possibly decrease the costs of certification. International certification matters more for the export participation of domestic firms than for plants of foreign firms (Goedhuys and Sleuwaegen, 2016). In line with previous studies, tax controls (a measures of the number of times per year a firms receive fiscal controls) and the use of licensed foreign technologies are used as instrumental variables (Goedhuys and Sleuwaegen, 2013). *“The rationale for including these instruments is that firms that use licenses are often forced by the licensors to implement ISC, while firms that are subject to greater controls from tax authorities have a self-interest in being transparent and in following codified procedures about the way they organize their activities and transactions. An MSC serves this purpose well and, hence, we expect firms subject to control from external private partners or public authorities to adopt ISC”* (Goedhuys and Sleuwaegen, 2013, p. 92).

Table 1 Variables' definition

Variables of Interest	
Certification	=1 if a firm has an internationally recognized quality certification
Female Manager	= 1 if a firm's top manager is female
Dependent variable	
Direct Exports	= 1 if a firm registers some direct exports (meaning that firm sales goods and services abroad with no intermediary company)
Firm characteristics	
Ln Employees	Natural logarithm of the total number of full-time equivalent employees
Ln Age	Natural logarithm of the number of years since firm began operations
Website communication	= 1 if firms use their website for business-related activities, i.e. sales, product promotion etc.
Reputation variable	
Foreign Ownership	=1 if 10% of a firm is owned by foreign individuals, companies or organizations (World Bank threshold)
Financial Auditors	=1 if an external auditor reviewed its annual financial statement
Instrumental Variables	
Foreign Technology	=1 if a firm uses technology licensed from a foreign-owned company, excluding office software
Number of tax controls	Number of controls by tax authorities during the last 12 months

4 Results

4.1 Descriptive statistics

Table 2 presents the distribution of variables. The first column reports the distribution of the variables among firms that have an international certification, the second columns among non-certified firms and the third column the distribution of variables in the whole sample.

First, we note that 25.6% of our sample has MSC and direct export is more common among MSC (29.2%) than among the non-MSC (11%). Looking at the other characteristic of the firms, the certified firms are larger, older, more likely to use web communication, to be international (foreign ownership and use of foreign technology) and more supervised (both by financial auditors and by tax authorities). Interestingly, the proportion of female management is lower among non-MSC (11%) than among MSC (29.2%).

Table 2. Descriptive statistics by MSC (Management System Certification)

	(1) MSC Mean or proportion	(2) Non-MSC Mean or proportion	(3) Total Mean or proportion
Variables of Interest			
International Standards Certification (MSC)			0.256
Female top manager	0.155	0.217	0.201
Dependent variable			
Direct Exports	0.292	0.110	0.156
Firm characteristics			
Ln Employees	3.618 (1.366)	2.860 (1.136)	3.054 (1.244)
Ln Age	2.658 (0.627)	2.501 (0.615)	2.542 (0.622)
Website communication	0.768	0.507	0.574
<i>Reputation variable</i>			
Foreign Ownership	0.129	0.051	0.071
Financial Auditors	0.523	0.363	0.404
Instrumental Variables			
Foreign Technology	0.263	0.110	0.149
Number of tax controls	2.618 (2.637)	2.395 (2.303)	2.451 (2.395)

Notes: Standard deviations of continuous variables are reported in parenthesis.

Distribution of certification by country and industries are reported in Table 7 and Table 8. The proportion of certification in the available data, both weighted and unweighted, turns out to be considerably higher than in register data in countries with a longer tradition of certification such as Italy (e.g. Franceschini et al 2008; Riillo, 2014). We suspect that certified firms have been more likely to participate in the survey limiting capacity of the survey sample to represent certification behaviour of associated firms' population². For example, according to

²The ISO Survey 2013 reports 7186 Hungarian firms to be ISO-9001-certified, 1955 had a certified environmental management system based on the international standard ISO 14001, and 472 a certificate based

survey nearly 60% of sampled Hungarian firm (both weighted and unweighted) have an internationally recognized quality certification, i.e. ISO 9001 or ISO 14001. This proportion is much higher than nearly 3% estimates computed combining data from the ISO survey data 2013 and Eurostat data. The enterprise survey methodology assures that survey results, when calculated with sampling weights, are representative of the associated populations only in terms of business sector, location, and firm size. However, the intended level of precision is not guaranteed for indicator values that since the global sampling methodology does not stratify by other features such as gender of the top manager, exporter status, or ownership. (World Bank 2014, pag.9). For this reason, in the rest of the analysis we use unweighted data and interpret the results as valid only *within* the context of our analysis without necessarily claiming that the results can be generalized to the whole firms' population.

4.2 Econometric model

The econometric analysis allows investigating the relationship between MSC and exports considering all features simultaneously. In particular, we are interested to estimate whether MSC increases the likelihood of exporting. We implement a recursive bivariate model with instrumental variables to account for endogeneity of MSC and export. Other studies on these data do not explicitly model the possible endogeneity of certification and export while focusing on productivity in manufacturing sector (Ferro, 2011).

We proceed in two steps. First, export and certification are investigated as separated events in the frame of the probit model (e.g. Greene, 2003). This model is appropriate because both export and MSC are both dichotomous. Second, suspecting that the MSC and exports are related activities and unobserved factors (e.g. management culture) could affect the results of the first step, MSC and export are jointly investigated in the frame of the recursive bivariate probit model (Greene, 2003). In this model, the errors of the equation explaining the MSC are correlated with the errors of the equation explaining the export. The MSC is included in the right-hand side of export equation.

In formula:

$$\begin{aligned} y_1^* &= \mathbf{x}_1' \boldsymbol{\beta}_1 + \gamma y_2 + \varepsilon_1, & y_1 &= 1 \text{ if } y_1^* > 0, & 0 \text{ otherwise} \\ y_2^* &= \mathbf{x}_2' \boldsymbol{\beta}_2 + \varepsilon_2, & y_2 &= 1 \text{ if } y_2^* > 0, & 0 \text{ otherwise} \\ E[\varepsilon_1 | \mathbf{x}_1, \mathbf{x}_2] &= E[\varepsilon_2 | \mathbf{x}_1, \mathbf{x}_2] = 0 \\ \text{Var}[\varepsilon_1 | \mathbf{x}_1, \mathbf{x}_2] &= \text{Var}[\varepsilon_2 | \mathbf{x}_1, \mathbf{x}_2] = 1 \\ \text{Cov}[\varepsilon_1, \varepsilon_2 | \mathbf{x}_1, \mathbf{x}_2] &= \rho \end{aligned}$$

Where $y_1 = 1$ if the firm directly exports, $y_2 = 1$ if the firm serves national market only, \mathbf{x}_2' are control variables of equation explaining certification and \mathbf{x}_1' are control variables of equation explaining export. Finally, we extend the bivariate probit including variables that

on the ISO standard for information security management ISO 27001 certified

<https://isotc.iso.org/livelink/livelink?func=ll&objId=20719433&objAction=browse&viewType=1>

In 2013, 349 587 firms were active in Hungary (bd_9fh_sz_cl_r2. Employer business demography by size class (from 2004 onwards, NACE Rev. 2)

are associated with the reputation of the firm: foreign ownership and external financial auditors.

4.2.1 Propensity of Management System Certification

Coefficients of a nonlinear model are not easily interpretable in terms of probability. Therefore, Table 3, Table 4 and Table 5 report the Average Marginal Effects (AME) that is the *average* change in probability of exporting or certification when a particular explanatory variable increases by one unit. The complete regressions' coefficients are reported Table 6 in the Annex

As we are simultaneously modelling certification and export, first we shortly discuss the propensity to be certified (Table 3), then we move to the impact of certification on export (Table 4). Before commenting the results, we look at the appropriateness of the model and note that the correlation coefficient of the error terms of certification and export equations is negative and statistically significant at 10%. This means that the bivariate Probit that simultaneously model certification and export is more appropriate than two separated probit models (eq. 1 in Table 3 and eq. 4 in Table 4). We note also that adding the variables related to reputation of the firm (foreign ownership and external financial auditors) (eq. 3 in Table 3 and eq. 6 in Table 4) considerably reduces magnitude and statistical significance of the rho. We interpret these results as evidence that, *ceteris paribus*, unobserved firms' reputation that facilitates export is negatively associated with certification.

Table 3 Equation 1 reports the probit estimation, Equation 2 is the bivariate probit and (3) bivariate probit with reputation variables. Aside country and industry fix effects, in line with previous literature, all models show that certification positively correlates with size (number of employees) and communicating by website. Both instrumental variables, use of technology licensed from a foreign-owned company, and control from the tax authorities are correlated to certification. Equation (3) shows that also reputation variables such as foreign ownership and financial revision by external auditors are positively related to certification. Interestingly, firms with female top management are not more likely to be certified³ (Table 3).

Table 3. Propensity of Management System Certification APE

	(1) Probit	(2) Biprobit	(3) Biprobit with reputation variable
Female Manager	-0.00804 (0.017)	-0.00840 (0.017)	-0.00776 (0.017)
Firm characteristics			
Ln Employees	0.0598*** (0.005)	0.0595*** (0.005)	0.0522*** (0.005)
Ln Age	0.0169 (0.010)	0.0171 (0.010)	0.0191* (0.010)
Web Communication	0.103*** (0.014)	0.102*** (0.014)	0.0983*** (0.014)

³To the best of our knowledge, no study investigated whether female managers are more likely to get MS and certification. The only two studies that use gender (as control variable) while investigating certification determinants show that female ownership is not statistically associated with certification (Fikru 2014b) or firms with female owned firms are less likely to adopt certification (Fikru ,2014a).

IV			
Foreign Technology	0.141*** (0.020)	0.146*** (0.019)	0.132*** (0.020)
Tax controls	0.00556** (0.003)	0.00635** (0.002)	0.00555** (0.002)
Reputation			
Foreign Ownership			0.0734*** (0.026)
External Auditors			0.0488*** (0.014)
Industry dummies	Yes	Yes	Yes
Countries dummies	Yes	Yes	Yes
RHO		-0.410	-0.276
P-value RHO		0.00315	0.0979
observations	4111	4111	4111

Robust Standard errors clustered by size, industry and countries in parentheses.

Notes:

* p<.10, ** p<.05, *** p<.01

4.2.2 Propensity of direct exports

Table 4 show the impact of MSC on export activity. Certification positively affects the exports in all models. The magnitude of the impact is 6.06% in equation (4), 21.7% in equation (5) and 15.2% in equation (6). It is interesting to note that the impact is lowest in equation (4) when the model is considering certification as exogenous. When modelling certification as endogenous, its impact on export is much stronger.

Looking at eq. 6, we note that average marginal effect of foreign ownership on export is considerable (10.4%) and statistically significant. The impact of certification decreases from 21.7% to 15.2% reducing also statistical significance. This result is consistent with the argument that **certification is an effective tool to promote export especially in case the firm faces reputation gap.**

Table 4 .Propensity of direct exports APE

	(4) Probit	(5) Biprobit	(6) Biprobit with reputation variable
ICS	0.0606*** (0.012)	0.217*** (0.058)	0.152** (0.064)
Female Manager	-0.00542 (0.013)	0.000941 (0.013)	0.000936 (0.013)
Firm characteristics			
Ln Employees	0.0381*** (0.004)	0.0273*** (0.005)	0.0265*** (0.006)
Ln Age	-0.00415 (0.008)	-0.00540 (0.008)	-0.000249 (0.008)
Web Communication	0.0822*** (0.012)	0.0665*** (0.012)	0.0698*** (0.013)
Reputation			
Foreign Ownership			0.104*** (0.022)

External Auditors			0.00269 (0.011)
Industry dummies	Yes	Yes	Yes
Countries dummies	Yes	Yes	Yes
RHO		-0.410	-0.276
P-value RHO		0.00315	0.0979
Obs.	4111	4111	4111

Standard errors in parentheses

Notes:

* p<.10, ** p<.05, *** p<.01

4.3 Gender, certification and export

We may observe additional indirect evidence of the interplay between reputation and certification analyzing the impact of MSC on export engagement by gender of the management. Assuming that female managers suffer from reputation gaps more than male managers because of persisting prejudices, we argue that firm managed by females are suffering higher reputation gaps. Therefore, if a female-led firm obtains certification it should be more likely to export than certified firms that are managed by men.

Based on the estimates in Table 6, Table 5 reports the average marginal effects of MSC on export by management gender. Looking at column (6a) we see in the upper panel that certified firms with male managers have more chances (13.9 percentage points) to engage in exports than non-certified firms. Female managed certified firms have 20.2 percentage points more than non-certified firms. The lower panel at column (3) shows the difference between female and male managed firms and the associated statistical significance. Looking at column (6a) we see that female managed firms export more (20.2%) than male managed firms (13.8%) and this difference (6.43) is statistically significant. A similar pattern can be observed for eq. 4a and 5a.

As certified female managed firms have higher chances to direct export than certified man managed firms, we can conclude that in terms of export, firms managed by females benefit more from international standards certification than firms managed by men.

Table 5 Influence of MSC certification on Export by gender of management

	(4a) Probit	(5a) Biprobit	(6a) Biprobit with reputation variable
No ICS	ref.	ref.	ref.
ICS with Male Manager	0.0503*** (0.013)	0.204*** (0.057)	0.139** (0.063)
ICS with Female Manager	0.101*** (0.028)	0.270*** (0.073)	0.203*** (0.078)
ICS for Female man. - ICS for Male man.	0.0509*	0.0668*	0.0644*
Standard err.	(0.0302)	(0.0402)	(0.0368)
Obs.	4111	4111	4111

Standard errors in parentheses

* p<.10, ** p<.05, *** p<.01

5 Discussion and Conclusions

The main intention in this paper is to explore whether international certification may help to compensate the gender prejudice and therefore increases the likelihood of female managed firm to engage in exporting activities. We argue that international certification signals that the management system meets international standards, which provides confidence in the company. This confidence is in particular need for firms based in developing and in transition countries and without alternatives source of credibility. In the business world dominated by men, female leadership may be another reason to have less confidence in a company.

This empirically tests whether certification increases exporting propensity and under which conditions. In particular, we look at the mediating effect of female management on the relationship between certification and export.

The empirical analysis is based on data from Enterprise Surveys, conducted by the World Bank in 2013 that includes 4111 medium-sized and large manufacturing and service firms from 25 Central and Eastern European countries in transition. We implement a recursive bivariate model with instrumental variables to mitigate endogeneity of certification and export.

In line with previous literature, we document that Management System certification -MS certification- is positively associated with export propensity (e.g. Goedhuys and Sleuwaegen 2013). Our findings show that the impact of certification on export propensity decreases in magnitude when other sources of reputation are available such as foreign ownership. The most innovative outcome of our research is that, certified female managed firms have higher export potential than certified man managed firms. We can conclude that in terms of export, firms managed by females benefit more from international standards certification than firms managed by men. This result is consisted with the view that certification is an effective tool to increases legitimacy of firms in transition economies (Zhang et al., 2018) and Xie et al. (2011). Credible certifications not only alleviate reputation gap due to absence of institutional support (Goedhuys and Sleuwaegen, 2016, Perugini and Selezneva, 2015) but also compensate gender prejudice.

This research opens many venues of research. Even if showed that MS certification increases the chances of export, because of data limitation we are not able to disentangle the effects of the management system itself from the signaling effect of the certificate.

The econometric model hinges on the external validity of the instruments to mitigate concerns of endogeneity and simultaneity issues, future research may use panel data to better asses this issue. Ideally, future data should assure external validity of the results and include both developing and developed countries. Future work may investigate the relationship between gender, MS certification and export explicitly incorporating also the productivity of firms. From an econometric point of view, our model considers the certification as endogenous but the female management is taken as an exogenous variable. That means that the drivers and the conditions that influence the female leadership not considered. Further investigation is needed to deep our understating on the drivers and the conditions that conduct female to led a company.

Current work focused on female managed firms and it could be enhanced looking at female owned firms. Even if in most small business the manger and the owner are the same, we expect that the gender prejudice being more severe in the case of the female managers rather than the case when the owner is a woman and the manager is a man. Additionally, our research focused on the propensity to engage in export activities (also known as extensive margin) neglecting the share of export (also known intensive margin) because reputation gap

and female prejudice should be stronger when a firm start exporting. However, future research should investigate whether and how gender prejudice and certification effect change after starting to export. In other words, building on the work of Kapri, (2019), future research could investigate whether after starting to export, have certified female-led firm higher export share than male managed firms. All these interesting questions are left for the future.

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ANNEX

Table 6 Models estimates

	(1) Probit -Dep. ISC- International quality certification	(2) Probit -Dep. Export- Direct Exports	(3) biprobit - dep. ISC- International quality certification	Direct Exports	(4) biprobit - Dep. export- International quality certification	Direct Exports
ICS		0.267*** (3.97)		0.930*** (4.42)		0.681** (2.56)
Female Manager	-0.0311 (-0.48)	-0.168* (-1.82)	-0.0324 (-0.50)	-0.171* (-1.91)	-0.0303 (-0.47)	-0.171* (-1.87)
MSC with Female Manager		0.337** (2.10)		0.372** (2.41)		0.390** (2.47)
Firm characteristics						
Ln Employees	0.224*** (10.95)	0.221*** (9.21)	0.223*** (10.88)	0.158*** (4.95)	0.197*** (9.22)	0.156*** (4.59)
Ln Age	0.0651* (1.65)	-0.0241 (-0.50)	0.0657* (1.67)	-0.0308 (-0.66)	0.0737* (1.86)	-0.00123 (-0.03)
Yes	0.391*** (7.53)	0.477*** (7.09)	0.388*** (7.47)	0.384*** (5.23)	0.375*** (7.20)	0.411*** (5.39)
IV						
Foreign Technology	0.483*** (7.74)		0.496*** (8.14)		0.455*** (7.29)	
ln tax controls	0.0829** (2.40)		0.0915*** (2.69)		0.0832** (2.41)	
Reputation Foreign Ownership					0.263*** (2.98)	0.525*** (5.31)
External Auditors					0.181*** (3.56)	0.0161 (0.25)
Industries : Textile	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Leather	-0.0455 (-0.14)	-1.758*** (-3.60)	-0.0394 (-0.12)	-1.665*** (-3.49)	-0.00210 (-0.01)	-1.768*** (-3.74)
Garments	0.145 (0.67)	-0.315 (-1.62)	0.137 (0.64)	-0.324* (-1.67)	0.146 (0.66)	-0.332* (-1.69)
Food	0.468** (2.18)	-0.923*** (-4.66)	0.442** (2.08)	-0.987*** (-4.95)	0.462** (2.07)	-0.971*** (-4.80)
Metals and machinery	0.441** (2.02)	-0.377* (-1.89)	0.409* (1.89)	-0.461** (-2.28)	0.424* (1.87)	-0.442** (-2.15)
Electronics	0.382 (1.38)	-0.389 (-1.48)	0.354 (1.28)	-0.472* (-1.80)	0.366 (1.30)	-0.474* (-1.81)
Chemicals and pharmaceuticals	0.610** (2.25)	-0.359 (-1.34)	0.576** (2.16)	-0.487* (-1.81)	0.542* (1.95)	-0.516* (-1.94)
Wood and furniture	-0.171 (-0.71)	-0.487** (-2.28)	-0.182 (-0.76)	-0.433** (-2.00)	-0.161 (-0.65)	-0.446** (-2.02)
Non-metallic and plastic materials	0.361 (1.61)	-0.495** (-2.42)	0.329 (1.49)	-0.556*** (-2.70)	0.344 (1.49)	-0.541*** (-2.59)
Other	0.223	-0.666***	0.190	-0.686***	0.199	-0.707***

manufacturing	(0.98)	(-3.20)	(0.84)	(-3.26)	(0.84)	(-3.30)
Retail and wholesale trade	-0.0547	-1.508***	-0.0823	-1.434***	-0.0764	-1.482***
Hotels and restaurants	(-0.26)	(-8.00)	(-0.40)	(-7.30)	(-0.35)	(-7.41)
	-0.0423	-1.871***	-0.0609	-1.774***	-0.0458	-1.842***
Other Services	(-0.19)	(-7.47)	(-0.27)	(-6.96)	(-0.20)	(-7.07)
	0.137	-0.799***	0.105	-0.803***	0.111	-0.818***
Other: construction, transportation, etc	(0.64)	(-4.04)	(0.49)	(-4.00)	(0.49)	(-4.00)
	0.222	-1.939***	0.194	-1.907***	0.220	-1.903***
Countries:	(1.03)	(-8.57)	(0.90)	(-8.23)	(0.98)	(-8.11)
	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Uzbekistan						
Albania	0.824***	0.577**	0.783***	0.385*	0.848***	0.481*
	(4.27)	(2.49)	(4.06)	(1.67)	(4.34)	(1.94)
Armenia	0.646***	0.512**	0.622***	0.377*	0.679***	0.453**
	(3.57)	(2.32)	(3.45)	(1.76)	(3.71)	(1.97)
Azerbaijan	0.193	-0.433	0.176	-0.459	0.205	-0.365
	(1.03)	(-1.39)	(0.95)	(-1.54)	(1.09)	(-1.18)
Belarus	0.467*	0.493*	0.413	0.400	0.371	0.408
	(1.75)	(1.81)	(1.54)	(1.54)	(1.35)	(1.49)
Bosnia and Herzegovina	1.038***	1.165***	1.017***	0.919***	0.980***	1.030***
	(5.72)	(5.47)	(5.64)	(4.20)	(5.37)	(4.38)
Bulgaria	0.817***	1.090***	0.802***	0.896***	0.812***	0.992***
	(4.30)	(4.91)	(4.26)	(4.04)	(4.26)	(4.15)
Croatia	0.649***	1.199***	0.625***	1.039***	0.634***	1.134***
	(3.09)	(5.03)	(2.99)	(4.41)	(3.00)	(4.54)
Estonia	0.632**	1.477***	0.593**	1.297***	0.594**	1.394***
	(2.37)	(5.01)	(2.23)	(4.39)	(2.20)	(4.50)
Fyr Macedonia	1.116***	1.288***	1.096***	1.026***	1.142***	1.146***
	(5.95)	(5.88)	(5.89)	(4.52)	(6.05)	(4.64)
Georgia	0.532**	0.395	0.514**	0.273	0.529**	0.360
	(2.33)	(1.30)	(2.28)	(0.95)	(2.33)	(1.19)
Hungary	1.766***	0.659***	1.751***	0.283	1.769***	0.464*
	(8.95)	(2.73)	(8.92)	(1.11)	(8.96)	(1.66)
Kazakhstan	0.739***	0.0660	0.724***	-0.0556	0.776***	0.0668
	(3.73)	(0.24)	(3.69)	(-0.21)	(3.90)	(0.24)
Kosovo*	0.852***	0.846***	0.819***	0.628***	0.903***	0.797***
	(4.41)	(3.65)	(4.26)	(2.74)	(4.63)	(3.23)
Kirgyz Republic	0.659***	0.391*	0.637***	0.281	0.641***	0.283
	(3.51)	(1.69)	(3.41)	(1.25)	(3.39)	(1.18)
Latvia	0.593**	1.445***	0.589***	1.283***	0.567**	1.355***
	(2.57)	(6.00)	(2.59)	(5.37)	(2.45)	(5.38)
Lithuania	0.417*	1.439***	0.408*	1.290***	0.434**	1.398***
	(1.90)	(5.98)	(1.87)	(5.46)	(1.98)	(5.63)
Moldova	0.315	0.239	0.284	0.172	0.317	0.210
	(1.59)	(0.90)	(1.44)	(0.68)	(1.59)	(0.79)
Montenegro	0.779***	0.216	0.744***	0.0438	0.751***	0.120
	(3.45)	(0.60)	(3.29)	(0.12)	(3.31)	(0.32)
Poland	0.941***	0.751***	0.911***	0.546**	0.978***	0.659***
	(4.87)	(3.22)	(4.70)	(2.36)	(4.98)	(2.65)
Romania	1.035***	0.998***	1.008***	0.763***	1.021***	0.850***
	(5.84)	(4.76)	(5.71)	(3.55)	(5.72)	(3.66)
Serbia	1.012***	1.284***	0.988***	1.043***	1.004***	1.173***

	(5.39)	(5.92)	(5.27)	(4.66)	(5.29)	(4.86)
Slovak Republic	1.318***	0.953***	1.283***	0.638**	1.291***	0.788***
	(6.03)	(3.79)	(5.86)	(2.42)	(5.85)	(2.79)
Slovenia	0.502*	1.964***	0.495*	1.794***	0.490*	1.863***
	(1.76)	(6.97)	(1.73)	(6.48)	(1.67)	(6.37)
Ukraine	0.250	0.227	0.241	0.183	0.293*	0.261
	(1.42)	(1.10)	(1.38)	(0.92)	(1.66)	(1.24)
_cons	-2.779***	-1.825***	-2.732***	-1.543***	-2.787***	-1.711***
	(-9.32)	(-6.30)	(-9.15)	(-5.27)	(-9.00)	(-5.47)
RHO			-0.406		-0.273	
pRHO			0.00345		0.0999	
F			8.565		2.709	
df			1		1	
df_r			4039		4039	
obs	4111	4111	4111		4111	

t statistics in parentheses

* p<.10, ** p<.05, *** p<.01

Table 7 Proportion of MSC firms by countries

	Unweighted ISC	Weighted ISC
Albania	22.4	16.1
Armenia	26.0	24.0
Azerbaijan	11.4	11.4
Belarus	17.7	15.7
Bosnia and Herzegovina	34.9	36.7
Bulgaria	28.3	27.6
Croatia	23.9	21.3
Estonia	25.6	33.1
North Macedonia	32.1	33.4
Georgia	20.5	10.5
Hungary	60.3	59.2
Kazakhstan	24.2	25.8
Kosovo*	32.2	30.2
Kirgyz Republic	23.9	26.4
Latvia	15.8	14.5
Lithuania	20.5	14.9
Moldova	13.3	10.8
Montenegro	22.2	19.2
Poland	38.3	37.5
Romania	34.8	35.7
Serbia	35.6	19.4
Slovak Republic	48.8	45.3
Slovenia	23.3	22.6
Ukraine	16.3	13.9
Uzbekistan	10.1	2.3
Total	25.6	29.7
Unweighted Observations	4111	

Table 8 Proportion of MSC firms by industries

	Unweighted	Weighted
Textiles	26.3	20.5
Leather	11.6	10.7
Garments	21.9	31.8
Food	36.1	46.5
Metals and machinery	40.3	49.6
Electronics	42.6	41.0
Chemicals and pharmaceuticals	44.7	34.8
Wood and furniture	21.2	21.1
Non-metallic and plastic materials	30.8	43.7
Other manufacturing	32.6	37.2
Retail and wholesale trade	19.2	20.3
Hotels and restaurants	17.8	23.3
Other Services	27.5	32.3
Other: construction, transportation, etc	31.6	36.2
Total	25.6	29.7
<i>N</i>	4111	