THE EFFECT OF INTERNATIONAL STANDARDS ON TURKISH EXPORT FLOWS TO THE EU COUNTRIES

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Abstract

Following the substantial decrease in tariffs and quotas over time, international standards have become a major barrier to international trade flows. Unlike other barriers to trade, international standards, however, are considered to have the potential to increase these flows as well.

The present study aims at investigating the impact of international standards on Turkish export flows to the EU countries. Turkey has the unique position of holding a membership to the Customs Union Agreement with the EU without being an EU member and trades intensively with the core members of the union. International standards is of concern in that they may impede as well as enhance export flows of this emerging economy to trade partners in a more developed market. Using data of ISO 9000 certificates as a proxy for international standards, the study adopts a gravity model for the samples of EU15 countries. The study is organized as follows: Following the introduction, the first part presents an overview of ISO 9000 certification and gives a brief survey of the literature on the effects of ISO9000 standards on trade. The second part empirically investigates the relationship between the level of ISO 9000 certification and export flows from Turkey to the EU15 by making use of panel data techniques. The final section is devoted to conclusions.

Keywords: Gravity Model, ISO 9000, Panel Data Techniques, International Trade.

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1. INTRODUCTION

The General Agreement on Tariffs and Trade (GATT) allows the use of measures by governments to protect human, animal or plant life or health with the condition that these measures are not implemented for protectionist purposes. In addition, there are two major agreements within the GATT Agreement, namely, the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) and the Technical Barriers to Trade Agreement (TBT). TBT and SPS address the issues of introducing technical regulations and standards in the WTO members’ domestic markets while at the same time preventing the violation of the basic principles of the world trading system. In the language of the WTO, “Technical regulations and standards set out specific characteristics of a product — such as its size, shape, design, functions and performance, or the way it is labelled or packaged before it is put on sale.” The difference between a technical regulation and standard is that in the first one compliance is mandatory whereas in the second it is mandatory.

The diverse and complex nature of technical regulations and standards presents problems in international trade and other exchange. The International Organization for Standardization (IOS) is a network of national standards bodies and was established in 1947 to unify and harmonize national standards at the international level and develops and publishes standards. In the language of IOS, “A standard is a document that provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose.” ISO 9000 is the most widespread certification system of IOS. This system was introduced in 1987 and is currently adopted by over a million companies and public and private organizations in 175 countries.

International standards are often considered to have protectionist effects. From the point of view of an exporter, the variety and the number of technical regulations and standards in different markets raise costs and may act as a barrier to trade. An international standard certification system provides a solution to this problem. Although costly, acquiring an international standard certificate may improve the competitive position of a firm in international markets. Hence, unlike other trade barriers, standards also have the potential to enhance international trade.

This paper empirically investigates the impact of the ISO 9000 standards system on Turkey’s export flows to the EU15 countries which is by far the largest market for its exports. The EU has often been subject to criticism for

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2 http://www.wto.org/english/tratop_e/tbt_e/tbt_info_e.htm (20.07.2013)
3 http://www.iso.org/iso/home/standards.htm (30.06.2013)
4 http://www.iso.org/iso/home/standards/management-standards/iso/iso_9000.htm (30.06.2013)
implementing standards and other non-tariff barriers against imports from non-member countries. The effect of standards on Turkey’s exports has not been explored so far, and the present study aims to contribute to the related empirical literature.

The study is organized as follows. The part following the introduction is devoted to an overview of international standards and the related literature on the issue. The third part empirically investigates the relationship between standards and export flows from Turkey to the EU15 by employing panel data techniques. The final section is devoted to conclusions.

2. AN OVERVIEW OF STANDARDS AND ISO 9000

2.1. Standards: Do They Decrease or Increase Trade?

Since rich and developed market economies are the first to impose technical regulations and standards in their domestic markets, exporters from developing, emerging or any similar group of countries not implementing such high standards are likely to be adversely affected. Due to the slow reaction of developing countries to the changes in product and/or service standards of developed countries, technical standards have climbed to the top of the list of non-tariff barriers to trade.

Fischer and Serra (2000) argue that a standard may have protectionist motives which manifests itself in two ways: “in the first place, the planner may be interested in transferring rents from the foreign exporter to the national firm, and secondly, the planner may wish to shift part of the costs of raising standard onto foreign producers as she does not internalize the costs imposed by the new standard on foreign firms”.

Although the WTO (SPS and TBT Agreements) recommends that its members harmonize their standards with international standards, the agreements also allow countries to apply more stringent measures. In most cases these standards include health, sanitary measures, safety and environmental regulations as well as packaging regulations. For example, “countries with areas prone to earthquakes might have stricter requirements for building products or facing serious air-pollution problems might want to impose lower tolerable levels of automobile emissions” 5 From the point of view of developing countries, these standards may prove to be major impediments to trade in agricultural products and/or low-tech goods. Otsuki et al. (2001) argue that “the implementation of the new aflatoxin standard in the European Union will have a negative impact on African exports of cereals, dried fruits and nuts to Europe” 6 The study

5 http://www.wto.org/english/tratop_e/zh_tst_e/tst_info_e.htm (27.07.2013)
calculates that the cost of the new standards the African exporters will reach US$ 670 million to African exports.

The diverse nature of technical regulations and standards makes it very hard to quantify and limits empirical work. The ISO 9000 standard certification system provides harmonized international data on standards and the number of certificates obtained by exporting and importing countries is widely used by empirical researchers. Research based on ISO 9000 certificates reveals that standards are not typical non-tariff barriers in that they can also enhance exports by various channels.

ISO 9000 certification is an internationally accepted standard and can serve as a signal of quality for products and services in international markets. In the process of certification, documented information and statistics are required for each procedure and step of production. ISO 9000 standards claim to provide guidance and tools for companies and organizations in improving quality. Although obtaining an ISO 9000 certificate is not mandatory for an exporter, there several reasons why firms are willing to comply with these standards. Standardized products or services are likely to serve as a trademark for verifying quality and hence provide prestige and marketing assistance for organizations or firms in competitive markets. Certification helps to standardize applications, practices and terminology. By producing a common language among establishments, certifications can lower costs emanating from asymmetric information. The diffusion of ISO 9000 lowers information asymmetries and search costs for foreign buyers in the sense that buyers can pick the best sellers with a low transaction cost.

Clougherty and Grajek (2012), for instance, find strong evidence that ISO 9000 diffusion in exporting countries promote export flows to foreign markets. Similarly, Blind and Mangelsdorf (2012) report that ISO 9000 certification levels of countries seem to be associated with increases in their exports. Furthermore, Potoski and Prakash (2009) find that ISO 9000 certifications lead to an increase in countries’ bilateral exports, especially for developing countries by signaling quality and lowering information asymmetries. Clougherty and Grajek (2008), similarly report that ISO 9000 diffusion in developing countries enhances trade. According to, Baker (1996), Brown & van der Wiele (1995), Osman (1994), Terziovski et al. (1997), external strategic advantage is the main reason for companies to adopt ISO 9000 certification.

The diffusion of standards in an importing country can also create export opportunities for foreign firms by providing explicit information on local conditions of a certain market (Moenius 2004, 2006). For instance, Moenius (2006) finds that national and international standardization promotes trade flows in electricity-dependent products.

\[\text{http://www.iso.org/iso/iso_9000 (30.07.2013)}\]
2.2. The Diffusion of ISO 9000 Certification System

In the past fifteen years the number of ISO 9000 certification has grown rapidly due to the benefits observed by exporters. As presented in Table 1., the number of ISO 9000 certifications was around 127 thousands at the beginning of the 1990’s and this figure increased to over 1 million in 2011. As for the geographical distribution of certifications, Europe clearly had the highest share by 72.7 % in 1995. However in 2011 Europe’s share in the total declined to 44.3 % while that of East Asia and Pacific increased to 44.2 %

Table 2 presents the distribution of certifications in the EU15 countries and in Turkey. The table reveals that UK, Germany, France and, as of the 2000’s, Italy and Spain are the countries with the highest number of certificates. Italy exhibited a dramatic increase in certifications after the 2000’s and since then became the country with the highest number of ISO 9000 certificates in Europe. During 2000-2005, the number of certifications obtained by Turkey increase significantly. As of 2011, the number of ISO 9000 certificates exceeds that of many other European countries.
Table 1. Number of ISO 9001 Certifications by Geographical Region

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<td>457833</td>
<td>773843</td>
<td>1111698</td>
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Table 2. Number of ISO 9000 Certifications Held by EU15 Countries and Turkey

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<td>Austria</td>
<td>1133</td>
<td>4000</td>
<td>3368</td>
<td>4138</td>
</tr>
<tr>
<td>Belgium</td>
<td>1716</td>
<td>4670</td>
<td>4810</td>
<td>3207</td>
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<td>Denmark</td>
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<td>2163</td>
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<td>772</td>
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<td>1914</td>
<td>2265</td>
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<td>France</td>
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<td>20919</td>
<td>21700</td>
<td>29215</td>
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<td>41629</td>
<td>39816</td>
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<td>Netherlands</td>
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<td>12745</td>
<td>9160</td>
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<td>4638</td>
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<td>17749</td>
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<td>53057</td>
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<td>Sweden</td>
<td>1095</td>
<td>4652</td>
<td>4744</td>
<td>4901</td>
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<tr>
<td>United Kingdom</td>
<td>52595</td>
<td>66760</td>
<td>45612</td>
<td>43564</td>
</tr>
<tr>
<td>Turkey</td>
<td>434</td>
<td>2949</td>
<td>10929</td>
<td>9446</td>
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3. ESTIMATING THE IMPACT OF ISO 9000 DIFFUSION ON TURKISH EXPORTS

3.1. Data and Empirical Model

We empirically investigate the impact of ISO 9000 diffusion in both Turkey and major EU countries on Turkey’s exports flows by using the gravity model. The standard empirical gravity model of trade which is developed by Tinbergen (1962) and Linnemann (1966) proposes that bilateral trade flows are an increasing function of the economic size of the trade partners and a decreasing function of the trade barriers such as distance. Since its success from an empirical point of view, the gravity framework is expanded explain various determinants of bilateral trade flows such as currency unions, national borders, and regional trading agreements.

For our purpose, we estimate a specific gravity equation of the following form

\[
\ln \text{Exp}_{jt} = \alpha + \beta_1 \ln \text{GDP}_{TR} + \beta_2 \ln \text{GDPEU}_{jt} + \beta_3 \ln \text{ISO}_{TR} + \beta_4 \ln \text{ISO}_{EU} + \beta_5 \ln \text{Infra}_{TR} + \beta_6 \ln \text{Infra}_{EU} + \lambda_t + u_{jt}
\]  

(1)

Equation 1 includes the standard gravity variables where \(\text{Exp}_{jt}\) denotes the exports and \(\text{GDP}_{TR}\) and \(\text{GDPEU}_{jt}\) represent gross domestic product for Turkey and country \(j\) respectively. \(\text{ISO}_{TR}\) and \(\text{ISO}_{EU}\) which are the main variables of our principal interest show the number of ISO 9000 certifications per million capita for Turkey and country \(j\). Dividing the number of ISO certifications by nation’s population as in Clougherty and Grajek (2012) allows cross country comparisons of ISO levels.\(^8\)

The model also contains the infrastructure variable which is formed as a simple average of air passengers per capita, telephone lines per capita and internet users per 100 people. As stated by Clougherty and Grajek (2012), omitting physical infrastructural development of trading partners likely bias the estimated ISO coefficients since they are likely to be positively correlated with each other. Also and no less importantly, the infrastructure variable serves as a proxy for trade costs among trading countries as in Carrère (2006). We also control for time-specific effects -\(\lambda_t\)—by including year dummies which capture the impact of common economic shocks and/or world income trends within countries. Finally \(u_{jt}\) stands for error term.\(^9\)

The panel data covers 15 EU countries which are the major trade partners of Turkey with the time period of 1993-2011. Time span is set to the period

\(^8\) Using GDP instead of population as a denominator of ISO certifications does not change our main results.

\(^9\) Note that the dummy for Custom Union is not included in the model, since Turkey was CU member during the sixteen of the total nineteen years that the study covers.
over which the data for ISO 9000 is available. Accordingly, the trade data are obtained from UN Comtrade Database and the data for GDP are provided by the World Bank’s World Development Indicators (WDI) which are all measured in current U.S. dollars. In many studies, both the trade and GDP data are deflated back to a base year using various US price indices, because satisfactory price indices for trade flows often do not exist for each nation. However, in their influential paper on the common errors in the gravity literature Baldwin and Taglioni (2006) document that this approach can introduce important biases in the estimates of model parameters. To avoid the problem of incorrectly deflated data, we use nominal trade and GDP figures in our regressions and include time dummies in the models as Baldwin and Taglioni (2006) suggest. Data on the number ISO 9000 certifications are obtained from the ISO Survey of Certifications (2011) published on an annual basis by ISO Central Secretariat. Finally, the infrastructure index as a simple average of air passengers per capita, telephone lines per capita and internet users per 100 people is formed using the WDI database.

We consider two major impacts of ISO 9000 adoption on trade in the case of Turkey and EU15 trade relations. First, the diffusion of ISO 9000 in Turkey is expected to lead to an increase in Turkey’s export flows to the EU15 countries by signaling higher quality. Secondly, in line with the theoretical expectations stated above, diffusion of ISO 9000 standards in the EU 15 countries can either promote or impede Turkish exports to the European market depending on whether trade impeding or promoting effect of standards dominate.

3.2. Empirical Methodology

As stated in many studies, the gravity models of trade have a potential for endogeneity issues due to unobserved heterogeneity and simultaneity problems. With this issue in mind, we take various measures to address endogeneity problems. First, we estimate our baseline gravity model using fixed effects to control for unobserved heterogeneity. Fixed effects model is based on the assumption of endogeneity of the explanatory variables with time invariant individual effects. This assumption makes sense for the gravity models since most of the right hand side variables of the gravity equations are possibly related with certain cultural, historical and geographical characteristics of the cross-section units. Another rational behind fixed effects model stems from the fact that the gravity models are mostly used to investigate determinants of bilateral trade flows between a predetermined selection of countries instead of between a randomly drawn sample of countries (Egger, 2000).10 With these concerns in mind,

10 Fixed effects model has been widely used in the gravity models as a common way to treat unobserved heterogeneity problem. See, among many others, Mátyás, 1997; Bayoumi and Eichengreen, 1997; Egger, 2000 and Millimet and Osang, 2007. See also, Cheng and Wall (2005) for a discussion of proper use of fixed effects in the gravity models.
we account for time-invariant country specific variables such as distance, culture and in some extent institutions which affect trade but are difficult to observe and therefore, address the endogeneity bias caused by omitted variables.\textsuperscript{11}

Furthermore, as another source of the endogeneity problem, one can expect a reverse causation between ISO 9000 adoptions and the export volumes in the sense that countries trading more intensively are likely to be more willing to adopt international standards. In fact, Guler et al. (2002), Freitas (2009), and Moenius (2004) document the evidence that ISO 9000 adoption is enhanced with the access to international markets. Freitas (2009) for instance, more specifically finds that trading especially with Germany and with the UK provide strong incentives for certification with ISO 9000. To tackle this potential reverse causation problem and to account for the lagged effect of standards on trade, we also include ISO 9000 variables into the regressions with their one-year lagged values in addition to their actual values\textsuperscript{12}

3.3. Estimation Results

Table 3 documents the regression results for the baseline gravity model. The results show that in all specifications, the estimated coefficients on GDP\_EU-elasticity of exports with respect to GDP of the EU15 countries-are positive and highly significant indicating that economic size of Turkey’s trade partners matters for Turkey’s exports. This finding is consistent with earlier findings in the empirical trade literature. The coefficient estimates for the GDP\_TR however, are negative and not significant at conventional levels in most specifications. The negative sign on the GDP\_TR might imply that the relationship of national income with domestic demand may be stronger than with exports.

Column 1 of Table 3 reports that ISO 9000 diffusion in the Turkish economy has a significant and positive effect on exports, supporting to view of quality signaling impact of standardization. On the contrary, ISO9000 diffusion in the European trade partners of Turkey has no statistically significant impact on Turkey’s exports, implying at least that they do not act as a barrier to trade. Column 2 shows the regression results when INFRA, the variable indicating infrastructure development is included in the analysis. After controlling for infrastructure variables, the results show that although the estimated coefficient on the ISO\_TR variable is still positive and statistically significant, its impact

\textsuperscript{11}The main disadvantage of fixed-effects models is that they cannot be used to investigate those time-invariant causes of trade.

\textsuperscript{12}Another common practice in dealing with the endogeneity problem is to use instrumental variable (IV) techniques. However appropriate instruments for the ISO 9000 variable that are correlated with the ISO variable itself but uncorrelated with the error term is something we have not been able to identify so far.
Table 3. Panel Regression Results for the Impact of ISO9000 Diffusion on Turkey’s Exports.

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<th>VARIABLES</th>
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<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
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<td>GDP_TR</td>
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<td>-0.31**</td>
<td>-0.03</td>
<td>-0.18</td>
<td>0.00</td>
<td>-0.13</td>
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<td></td>
<td>(0.115)</td>
<td>(0.107)</td>
<td>(0.220)</td>
<td>(0.206)</td>
<td>(0.229)</td>
<td>(0.222)</td>
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<tr>
<td>GDP_EU</td>
<td>1.42***</td>
<td>1.53***</td>
<td>1.35***</td>
<td>1.61***</td>
<td>1.33***</td>
<td>1.58***</td>
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<tr>
<td></td>
<td>(0.166)</td>
<td>(0.134)</td>
<td>(0.350)</td>
<td>(0.307)</td>
<td>(0.361)</td>
<td>(0.328)</td>
</tr>
<tr>
<td>ISO_TR</td>
<td>0.25***</td>
<td>0.08**</td>
<td>0.21***</td>
<td>0.35***</td>
<td>0.18***</td>
<td>0.29***</td>
</tr>
<tr>
<td></td>
<td>(0.032)</td>
<td>(0.030)</td>
<td>(0.038)</td>
<td>(0.072)</td>
<td>(0.036)</td>
<td>(0.067)</td>
</tr>
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<td>ISO_EU</td>
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<td>0.06*</td>
<td>0.05</td>
<td>0.07*</td>
<td>0.03</td>
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<tr>
<td></td>
<td>(0.037)</td>
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<td></td>
<td>(0.079)</td>
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<td>INFRA_EU</td>
<td>-0.24**</td>
<td></td>
<td>-0.33**</td>
<td></td>
<td>-0.31*</td>
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<td></td>
<td>(0.139)</td>
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<td>(0.148)</td>
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<tr>
<td>Constant</td>
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<td>-10.97***</td>
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<td>(2.321)</td>
<td>(4.479)</td>
<td>(3.386)</td>
<td>(4.531)</td>
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Observations: 247 240 247 240 247 240
R-squared: 0.93 0.94 0.95 0.96 0.95 0.96
Time-specific effects: - Included Included Included Included

Notes:
1. Cluster-robust standard errors are in parentheses.
2. Column 5 and 6 include one-year lagged values of the ISO variables.
3. *** Significant at 1 per cent
   ** Significant at 5 per cent
   * Significant at 10 per cent

On exports is much smaller. On the other hand, ISO_EU variable now becomes
significant with a small positive coefficient (.06), again supporting the view that
ISO diffusion in EU15 countries does not constitute a trade barrier against the
exports of Turkish products. Additionally, note that while the INFRA_TR
variable has a positive and significant coefficient as expected, the sign of the
estimated coefficient on the INFRA_EU variable is found to be negative. One
possible reason for this may be that the EU15 countries may substitute other
countries for Turkey in trade relations when their transport and communication
facilities increase.

Columns 3 and 4 of Table 3 contain the regression results including time-spe-
cific effects in addition to the individual specific effects. Including the time-spe-
cific effects into the regression captures global income trends and price shocks.
As is apparent from the related Columns, the results significantly coincide with
our previous findings. ISO 9000 diffusion in Turkey has a positive association
with Turkey’s exports while ISO 9000 diffusion in EU15 countries seems to be
not restrictive for Turkey’s exports. Additionally, note that the estimated co-
efficient on ISO_TR is still about 0.3, not changing much with the inclusion of infrastructure variables. Similar to our earlier findings, when the infrastructure variables are included in the regression, the estimated coefficient on ISO_EU becomes positive and significant only at %10 level. However, note that the magnitude of the coefficient is very small (.07) implying that the relationship between ISO 9000 certification in EU15 countries and EU15 imports from Turkey is quite weak.

As stated in the causal relationship between ISO 9000 certification and exports may in fact be reciprocal in the sense that trade may also determine standardization. Omitting this possible reverse causation would result in biased estimates of ISO9000 variables. Moreover, one might expect that the quality signaling impact of ISO certification likely takes time to work through. Hence, to address this potential simultaneity bias, and to account for delayed impact of ISO9000 diffusion on exports, the Column 5 and 6 report the regression estimates that use one-year lagged values of ISO9000 variables, instead of their actual values. The results show that the inclusion of lagged values of ISO variables does not change the basic pattern of the results, that is ISO certification in Turkey stimulates EU15 imports for its products. Moreover, the results indicate that the point estimates of the ISO_TR vary between 0.2 and 0.3 which are very similar to those obtained under their actual values. What is slightly different from the earlier findings is that the coefficient on ISO_EU now becomes insignificant for all specifications when the infrastructure variable enters into the regression. These results once again imply that ISO diffusion in EU15 trade partners of Turkey has no visible effect on Turkey’s exports.

CONCLUSION

Our findings suggest that ISO 9000 adoption in Turkey promotes its exports to its European trade partners which may be indicative of signaling higher product quality. This finding confirms the view that ISO 9000 diffusion in domestic firms is likely to lower information asymmetries and search costs for foreign buyers and therefore enhances exports. Secondly, although EU15 countries are often criticized for implementing non-tariff barriers such as standards against imports from non-member countries, our results do not support this criticism. More specifically, the regression results show that in most specifications, ISO 9000 diffusion in the EU15 trade partners of Turkey has no statistically significant effect on Turkish exports implying at least that it does not constitute a restriction to trade. This result is not surprising since Turkey is a customs union with the EU and has a long tradition of trade relations with this market.

Finally, our findings are robust when we control for the infrastructural developments of the sample countries or include lagged values of the ISO 9000 variables into the regressions instead of their actual values.
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http://www.etsg.org/ETSG2012/Programme/Papers/168.pdf


