

## THE ROLE OF STANDARDS IN BILATERAL TRADE: THE IRAN EXPERIENCE

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### **Abstract**

Standards provide confidence to people and organizations that products will meet their expectations, thereby enhancing trade and welfare. In contrast, its critics claim that it is merely a barrier to market entry and a tariff on international trade. To assess the actual impact, in this paper, we empirically assess the link between the ISO9000 family of standards and Iran's trade. Our modeling strategy is to look at the impact of ISO 9000 adoptions on bilateral trade between Iran and ten countries which are its major trade partner. We estimate a gravity equation for bilateral exports using panel data over 1999-2013. Results show positive effect of adoptions of standards on increasing of trade. In general, these findings suggest that the ISO standards had indeed significant positive impact on Iran trade. This finding is consistent with the common language hypothesis, which states that ISO lowers informational asymmetry between firms and allows them to organize vertical relations more efficiently.

**Keywords:** ISO9000, Gravity Model, Bilateral Trade, Adoption of Standards

**Topic Groups:** Business strategy, International business, Production and operations management

### **INTRODUCTION**

Standards arise for numerous reasons. In principle, they are designed to facilitate production and exchange, reduce transactions costs, guarantee quality, and achieve the provision of public goods. They may also operate, by design or by circumstance, to restrain competition. ISO (International Organization for Standardization) is the world's largest developer of standards. Although ISO's principal activity is the development of technical standards, ISO standards also have important economic and social repercussions. ISO standards make a positive difference, not just to engineers and manufacturers for whom they solve basic problems in production and distribution, but to society as a whole. The main goal of ISO is to harmonize standards around the world, which, as it widely claimed, promotes trade and therefore global welfare. Examples of the works done by ISO Includes technical, environmental, and management standards. The *ISO 9000* families are among ISO's most

widely known standards ever. ISO 9000 has become an international reference for quality requirements in business. The vast majority of ISO standards are highly specific to a particular product, material, or process. However, ISO 9000 families are known as "generic management system standards". "Generic" means that the same standards can be applied to any organization, large or small, whatever its product -including whether its "product" is actually a service- in any sector of activity, and whether it is a business enterprise, a public administration, or a government department. "Management system" refers to what the organization does to manage its processes, or activities. "Generic" also signifies that no matter what the organization is or does, if it wants to establish a quality management system or an environmental management system, then such a system has a number of essential features which are spelled out in the relevant standards of the ISO 9000 families.

Critics of ISO 9000 claim, however, that it is merely a barrier to market entry and a tariff on international trade. There are valid arguments on both sides. On the one hand, ISO 9000 might be a common language, which lowers informational asymmetry between firms and allows them to organize trade more efficiently. Indeed, the standards emphasize clear and open communication with customers, as well as with suppliers. Furthermore, they provide a tool facilitating screening and performance evaluation. Consequently, learning this common language offers an alternative for establishing vertical relations based on long-term relationship and brand reputation. On the other hand, ISO 9000 has been used as a standard against which to assess performance in government procurements and in setting of minimum quality requirements for imports. This raises a concern that the standard is mainly a tool for protecting domestic markets. This paper empirically investigates the impact of ISO 9000 on Iran's trade. We estimate a gravity equation for bilateral trade incorporating ISO 9000 adoptions in Iran and its trade partner as factors affecting bilateral trade barriers. As it has been pointed out in the literature, the causality might go both ways. International trade might benefit (suffer) from standards' harmonization, as trade barriers decrease (increase); and standardization process might in turn be determined by intensity of foreign trade, which indicates openness of an economy.

The rest of the paper is organized as follows. Section 2 describes the ISO 9000 family of standards and its role in trade more in detail. Section 3 describes theoretical models of bilateral trade flows of Iran and other countries, which guide our empirical analysis. Empirical implementation of the theoretical models and discussion of the results are presented in section 4. Section 5 concludes.

## **ISO AND ITS ROLE IN TRADE**

The history of ISO 9000 started in 1987 with publication of the ISO 9000 Quality Assurance Standards by a Technical Committee (TC176) of the International Organization for Standardization (ISO). By the end of 2001, the number of ISO 9000 certificates exceeded half a million in 161 countries around the world, contributing to its reputation as an international reference for quality requirements in business-to-business dealings. We treat ISO 9000 as a uniform standard although it consists of a series of nested standards, which evolved over time. The core members of the original family with which firms could actually be certified were ISO 9001, ISO 9002, and ISO 9003. They differed in terms of the quality system elements they covered. The nested nature of these standards allowed firms to accommodate differences in the scope of their operations. The 2000 edition of the ISO 9000 family replaced these three standards with a single one labeled ISO 9001: 2000. As supplementary standards, the 2000

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**October 14–16, 2015, Rome, Italy**

edition included ISO 9000: 2000, which describes fundamentals and specifies vocabulary for a quality management system, and ISO 9004: 2000, which provides guidelines for performance improvements. Both of them were developed on the basis of previous standards, which they replaced. Given that the core members of the ISO 9000 family were finally replaced by a single one, our simplifying assumption treating ISO 9000 as a uniform standard seems justified.

ISO 9000 adoption is a sovereign decision of each firm; however, they can seek certification only in their home countries. Each country has one government-designed accrediting agency that certifies the competence of third party registrars to conduct ISO 9000 quality audits. The registrars are also charged with the issuing of certificates. In general, motivations behind the implementation of ISO 9000 could be divided into three main categories: i) compliance with government regulations, ii) ability to enter new forms of vertical relations due to use of a common language, and iii) internal efficiency gains.

The first category stems from the fact that ISO 9000 has been used as a standard against which to assess performance in government procurements and in setting of minimum quality requirements for products that affect public safety. This raises the concern that ISO 9000 can be a barrier to market entry and a tariff on international trade. The second category of motivations is the focus of this study. As noted by Benezech et al.(2001), “the ISO 9000 series can be viewed as a code, a language used by firms to extend their industrial relationship”. This naturally lowers informational asymmetries between firms. ISO 9000 leads to lower transaction and search costs in vertical relations between firms. To realize the benefits of ISO 9000, however, both contracting parties should have adopted (i.e. learned) it in the first place. Learning this common language could be viewed as an alternative for establishing vertical relations based on long term relationship and trust reputation. This explains the potential of ISO 9000 for reducing barriers to market entry and non-tariff barriers to trade. Finally, firms seek ISO 9000 certification to realize efficiency gains. The discipline of documentation and organizational procedures could reduce waste, lower costs, and improve productivity.

## **METHODOLOGY**

With the information described, it will be possible to engage in substantive empirical inquiry. In this study a gravity model is used to analyze the effect of Iso9000 standards on bilateral trade flow. A gravity model is a widely used method to explain trade patterns between country`s using each country`s measures of "mass" and geographical distance between countries to assess changes in trade flows. It relates bilateral trade flows to GDP, distance and other factors that affect trade barriers. This model, also, has been used to infer trade flow effects of institutions such as customs unions, exchange rate mechanisms, ethnic ties, linguistic identity and international borders. A gravity model was first developed by Tinbergen (1962) and Poyhonen (1963) to explain bilateral trade flows by trading partners` GNP and geographical distance between countries. This model became popular as gravity model. Bilateral trade flow in their model is proportional to the GNPs of the countries and inversely proportional to the distance between countries. This simple model was further extended by Linnemann(1966) when he added a population variable to the model. The gravity model has been developed further to include additional variables to examine the effect of trade promoting and trade limiting factors.

We examine in this analysis, bilateral trade between Iran and twenty countries ( United Arab Emirates, Germany, Japan, China, Switzerland, India, Azerbaijan, Italy, Saudi Arabia, Singapore, Turkey, Russia, France, Malaysia, United Kingdom, Netherlands, United State, Spain, Indonesia, Australia) which are Iran's major trade partners. Trade with these countries made 49.3 percent of foreign trade of Iran. (Iran's Custom).

The equation used, is similar in all studies and has the following general specification:

$$X_{ij} = \alpha_0 (Y_i)^{\alpha_1} (Y_j)^{\alpha_2} (N_i)^{\alpha_3} (N_j)^{\alpha_4} (D_{ij})^{\alpha_5} (A_{ij})^{\alpha_6} U_{ij} \quad (1)$$

Where  $X_{ij}$  is the value of the trade flow from country  $i$  to country  $j$ ;  $Y_i$  and  $Y_j$  are the values of the nominal GDP in  $i$  and  $j$ ;  $N_i$  and  $N_j$  are the size of population in both countries;  $D_{ij}$  is the physical distance from the economic center of country  $i$  to that of country  $j$ ;  $A_{ij}$  is any other factor either aiding or hindering trade among  $i$  and  $j$ ; and  $U$  is a log-normally distributed error term with  $E(\ln U_{ij})$ .

In the real world however, trade is impeded due to transportation costs, tariffs and other non-tariff barriers to trade. Anderson and Wincoop (2003) derive a particularly elegant gravity equation for bilateral exports with trade barriers. Their work falls under the stream of research that – in contrast to the classical Heckscher-Ohlin framework – assumes product differentiation by the place of origin. The key result of Anderson and Wincoop (2003) is that the distance between countries in (1) ( $D_{ij}$ ) is determined by *relative* trade barriers. That is, it directly depends on bilateral trade barriers between  $i$  and  $j$  and indirectly on bilateral trade barriers between every other pair of countries. A particular ingredient of the trade barriers we consider are search and transaction costs. Our modeling is based on this hypothesis that ISO 9000 can be understood as a common language, adoption of which allows firms to lower the transaction and search costs. We will assume that, by lowering these costs, adoptions of the standard in both country  $i$  and country  $j$  will decrease their bilateral trade barriers.

Unilateral adoptions of ISO 9000 affect average trade barriers only marginally. Bilateral adoptions multiply this effect, as follows from our interpretation of ISO 9000 as a common language. Then, the specification of the gravity model in double logs is as follow:

$$\ln X_{ijt} = \alpha + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln N_{it} + \beta_4 \ln N_{jt} + \gamma_1 \ln ISO_{it} + \gamma_2 \ln ISO_{jt} + U_{ij} \quad (2)$$

There are two possibilities for measuring the size of a trade flow: at the point of export or at the point of import. Apart from the well known differences in valuation, exports are valued at free-on-board prices, and imports usually at cost insurance freight prices, and apart from minor differences due to the time lags between the recording of exports by the exporting country and the recording of the same flows as an import by the importing country, these two measurements should produce the same results (Kalbasi 2001). So,  $X_{ijt}$  denotes exports from country  $i$  to country  $j$  in year  $t$ . The GDP of the exporting country measures the productive capacity, while that of the importing country measures the absorptive capacity. These two variables are expected to be positively related to trade. Population is used as a measure of country size, and since larger countries have more diversified production and tend to be more self-sufficient, it is normally expected to be negatively related to trade. In equation (2),  $ISO_i$

is number of country  $i$ 's ISO 9000 adopters and  $ISO_j$  is number of country  $j$ 's ISO 9000 adopters.

In our empirical implementation of gravity equation, we apply panel data techniques, which have the advantage over cross-section estimations that they can capture all time invariant trade determinants by means of country-pair specific effects. Data ranges over 1999-2013 form the basis for our empirical work. Data on ISO 9000 adoptions comes from ISO. Bilateral exports are taken from the United Nations Statistical Office. GDP come from the UN Commodity Trade Statistics Database (COM trade), and population figures come from the World Development Indicators of the World Bank.

## EMPIRICAL RESULTS

This section examines the estimated gravity model. In particular, it examines whether the factors indicated in the gravity equation make a significant contribution to an explanation of the Iran's trade flow or not. We estimate equation (2) by fixed effects (FE). A fixed-effect model is estimated assuming that country-specific effects vary systematically among the exporting countries. Moenius (2000) employed a fixed-effects model to control for unobserved characteristics specific to importing and exporting countries as well as industries.

**Table 1:** Gravity equation for exports: Fixed-effects estimation results  
Dependent variable: Exports

Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\ln Y_{it}$	1.08* (2.1)	1.71* (2.81)	0.96* (2.84)	0.52* (1.91)	1.06** (3.45)	0.96** (3.41)	0.81 (1.07)	2.31* (2.45)
$\ln Y_{jt}$	1.06** (4.1)	0.17* (2.05)	1.06 (1.77)	1.13** (4.04)	0.45* (2.23)	0.793** (4.12)	1.41** (3.11)	1.127 (1.76)
$\ln N_{it}$		-0.11 (-1.52)		-0.07 (-1.03)		0.982* (2.31)		-1.23** (-3.06)
$\ln N_{jt}$		-0.26* (-2.14)		-0.62* (-2.23)		2.14* (1.71)		1.31** (3.44)
$\ln ISO_{it}$			1.12* (2.75)	0.09** (3.87)			2.35* (1.92)	-0.145* (-2.32)
$\ln ISO_{jt}$			0.082* (1.98)	0.13** (3.37)			5.22* (2.02)	2.03** (3.72)
Const	2.69* (1.8)	5.31** (4.1)	3.44*** (5.11)	8.1** (4.23)	4.05** (4.61)	-7.12* (2.31)	2.78** (3.09)	6.11** (2.77)
$\ln Y_{i(t+1)}$					-0.91 (1.09)	0.087* (1.95)	0.716** (2.76)	0.108 (1.426)
$\ln Y_{j(t+1)}$					1.02 (1.45)	2.33** (3.71)	-1.19* (-2.91)	-0.13 (-1.31)
$\ln N_{i(t+1)}$						-0.982 (-1.47)		3.01* (2.41)
$\ln N_{j(t+1)}$						1.72 (1.29)		-0.334 (-0.235)

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$\ln ISO_{i(t+1)}$					1.45**	0.371**		
					(4.1)	(3.601)		
$\ln ISO_{j(t+1)}$					0.071*	-1.221*		
					(1.98)	(-2.92)		
Wald test( $\chi^2$ )	-	-	-	-	38.02***	67.11***	68.12***	68.12***
R2	0.85	0.72	0.82	0.69	0.52	0.73	0.76	0.77

\*\*\*denotes significance at 1% level, \*\* at 5% level, \* at 10% level; *t*-statistics in parentheses.

Source: Author's calculations

The results of estimation are presented in table 1. The first three columns of this table contain results of the regressions, in which some of the explanatory variables are exclude and column (4) contain full set of variables. According to these columns, we see that the estimated variables not vary much across these columns. So, we find that the coefficient on own GDP (Income), and the coefficient on partner's income, lie about 0.52 and 1.13, respectively. Moreover, the coefficients on population, 0.07 and 0.62, tend to be with the reversed signs as GDP coefficients. Both GDP and population coefficients are statistically significant which is correspond to the findings of cross-sectional studies. The next four columns of this table augment the first four regressions by inclusion of the leading explanatory variables in other to test strict ergogeneity assumption. Without strict ergogeneity, the FE estimators become inconsistent, so the estimates of the gravity equation coefficients can be misleading. The null hypothesis of the Wald test in table 1 is that coefficients on the leading explanatory variables equal zero. We see that the Wald test rejects the null hypothesis in all three cases at high significant. Now we turn to the impact of ISO9000 adoptions` variables on trade flow. The estimated coefficient of the ISO variables are significant at 5% level and on country and partner`s adoptions are equal 0.09 and 1.12, respectively. This means that a 10% increase in the number of firms awarded with ISO 9000 certificates in a country leads on average 0.9% increase in trade flow of that country. These results provide an empirical evidence for the role ISO 9000 plays in country`s trade. The common language hypothesis, as we stated it, suggests that bilateral trade flows should rise with both, exporter's and importer's, adoptions, since they both contribute to the number of potentially more efficient business links. This line of argument, however, does not take into account the possibility of substitution between suppliers, i.e. exporters in this case. In fact, the positive effect of domestic ISO 9000 adoptions on exports, that we found, could be explained by increasing access to the regulated markets. Grajek (2004) argue along the same lines interpreting his findings on impact of the ISO9000 on International trade.

## CONCLUSIONS

In this paper, we empirically assess the link between the ISO 9000 family of standards and Iran`s trade. According to the vision of its developers, ISO 9000 should provide confidence to people and organizations that products will meet their expectations, thereby enhancing trade and global welfare. In contrast, its critics claim that it is merely a barrier to market entry and a tariff on international trade. Our modeling strategy was to look at the impact of ISO 9000 adoptions on bilateral trade flows between Iran and its major trade partners. We estimate a gravity equation for bilateral exports using data 1999-2013. Using the full sample, we find that domestic adoptions are positively related to both bilateral exports and imports. In other

word, domestic ISO 9000 adoptions spur bilateral exports and imports. In general, these findings suggest that the ISO 9000 standards have indeed significant positive impact on Iran trade. The estimated standard coefficients are less than unity. This implies that a change in trade flows associated with a change in the standard is smaller for a higher level of standards. These findings are consistent with the common language hypothesis, which states that ISO 9000 lowers informational asymmetry between firms and allows them to organize vertical relations more efficiently. The hypothesis that ISO 9000, as a tool for introducing import restrictions, is a barrier to international trade is not able to explain our empirical findings, although we cannot reject it. So, ISO 9000 standards represent a reservoir of technology. Developing countries in particular, with their scarce resources, stand to gain from this wealth of knowledge. For them, ISO standards are an important means both of acquiring technological know-how that is backed by international consensus as the state of the art, and of raising their capability to export and compete on global markets.

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