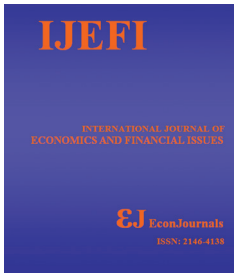

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Factors Affecting Market Share of Iranian Hand-woven Carpet in Singapore#

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ABSTRACT

The problems created by single product economy have made the promotion of non-oil exports for Iran inevitable. In this context, the empowerment of the Iranian hand-woven carpet rank in target export markets is of considerable importance. Accordingly, using gravity model this paper examines the factors affecting the market share of the Iranian hand-woven carpet in Singapore during 1989-2015. In this regard, a modified gravity model is constructed in terms of characteristics of Singapore market. The estimation results show that decrease in export price of Iranian hand-woven carpet with respect to average carpet prices in Singapore, increase in financial support of Iranian hand-woven carpet exports, increase in real exchange rate, decrease in structural difference between Iran and Singapore economies lead to increase in Iranian market share in Singapore. In addition, increase in Singaporean per capita income with respect to Iran, and increase in employment share of population of Iran with respect to rivals have positive effects on Iranian hand-woven carpet share, while ever-changing exchange rate regimes over 1993-2002, and exchange rate unification policy from 2002 onwards in Iran influence negatively the Iranian hand-woven market share in Singapore.

Keywords: Iranian Hand-woven Carpet, Gravity Model, Market Share
JEL Classifications: F14, F19, F31

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1. INTRODUCTION

In recent decades, one of the most important challenges of the Iranian economy has been its overreliance on oil revenues. According to the official data of Central Bank of Iran[1], on average, 80-90% of export earnings, 40-50% of annual government budget and 20% of total gross domestic product (GDP) originated from oil exports over 1973-2013 period. Accordingly, the promotion of non-oil exports is an inevitable strategy for Iran in global markets.

Iranian hand-woven carpet having prominent cultural and artistic characteristics has been recorded as a noticeable commodity in Iran's non-oil export basket since past four decades; so that this industry has accounted for more than 25% of the value of non-oil exports (Astaneh et al., 2008).

1 Time series database. Available from: http://tsd.cbi.ir/

As a result, during the sequential periods, the first source of foreign exchange earnings among non-oil exports has belonged to the hand-woven carpet industry. In addition, about 7% of total employment and subsistence of several million people is dependent on this the industry (Sanayee and Alavishad, 2004).

The historical trend of Iran's share in global hand-woven carpet market, diversity and uniqueness of Iranian hand-woven carpet, and its world brand are the other reasons that confirm the comparative advantage of Iranian hand-woven carpet in export markets.

Until the 1970s, Iran with an export share of more than 50% of the global hand-woven carpet market has been the monopoly power of carpet market. Gradually, some large and low-income countries (such as India, Pakistan, China and Nepal) due to the abundance of cheap labor, copying Iranian carpet patterns, planning for

production and marketing and so forth reduced Iran's share in world hand-woven carpet market in favor of themselves (Irani Kermani et al., 2009). The latest data of exports of hand-woven carpet to Singapore is given in Table 1 show during 2006-2013, Iran's exports of hand-woven carpet to Singapore has declined from 577,000 US dollar in 2006 to 359,000 US dollar in 2013. In this carpet exports market, Iran with a market share of order 11.2%, on average, ranks the fifth followed by China, India, Pakistan and USA.

The persistence of such situation results in permanent recession in the domestic hand-woven carpet industry in the long-run, which in turn leads to flight and shift out of labor from carpet industry to the other businesses and finally to fade comparative advantage of the Iranian hand-woven carpet in export markets.

As a result, the adoption of appropriate policies is essential with regard to shape trade arrangements between Iran and its target export markets, focusing on hand-made carpet. It will be possible only if the determinants of trade arrangements related to Iranian carpet exports are evaluated carefully in each target market according to market characteristics and competitors.

Singapore is of special business conditions and facilities such as commercial ports, special and free zones, ease of re-exporting, strong tourism industry, and the trade agreements with its partners. Consequently, this country can be considered as one of the most important target export markets for Iranian hand-woven carpet industry.

The presence of Iran in this market not only makes supply of Iranian hand-made carpet in Singapore possible, but also facilitates the re-exports of carpets to other countries, and makes other markets accessible. Because of Singapore's robust tourism industry, the global advertising of Iranian hand-woven carpets is the other advantage of Iran's presence in Singapore market. Given these conditions, the need for efficient use of existing opportunities in the Singapore market in order to stabilize and to develop the Iranian market share in global carpet markets is essential for Iran.

There are various models for evaluating trade arrangements; but because of its flexibility, the gravity model is used in most empirical studies. This study examines the factors affecting market share of Iranian hand-made carpet in Singapore over the 1989-2015, using gravity model.

In the following, section 2 presents the literature review including theoretical basics and research background. Section 3 devotes to methodology. Section 4 deals with findings from estimation of model. And section 5 concludes.

2. LITERATURE REVIEW

According to "natural trading partners" theory, the high trade volume between two or more countries is determined by the lowest geographical distance. Wonnacott and Mark (1989) and Summers (2005) argue that preferential trade agreements with natural trading partners have more "trade creation" effects than "trade diversion" ones. In addition, Krugman (1991) believes even though trade is shaped in terms of comparative advantage, it is influenced by geographical factors. As a result, the decrease in geographical distance reduces transportation costs, and results in minimal "trade diversion." Trade arrangements have considerable benefits such as trade promotion, welfare gain, economic cooperation and high bargaining power. Most of empirical studies apply theories related to bilateral trade arrangements, and use widely gravity model.

The gravity model is a framework for study of trade arrangements, which economists frequently use it to investigate feasibility of new arrangements and trade potentials, and to measure effects of "trade creation" and "trade dispersion." According to gravity model, if sizes of two economies are large and/or distance between them is low, then the flow of trade, labor (migration) and information will be high. The gravity model has developed over time through adding GDP per capita, regional agreements, and cultural and religious occasions. This model is used to explain the flow of bilateral trade.

Trade barriers and/or incentives are included in this model as dummy variables (Harris and Matyas, 1998). In its simple form, Tinbergen (1962) proposed gravity model as follows:

Table 1: Exports of hand-woven carpet to Singapore (in thousand US$)

Year	2006	2007	2008	2009	2010	2011	2012	2013	Sum of exports	Market share (%)
Country										
China	349	392	3135	1597	1895	2950	2809	2620	15746	24.3
India	1047	1919	1415	871	1537	1676	1344	1521	11329	17.5
Pakistan	1393	1763	699	1113	795	756	551	684	7754	12.0
USA	1151	1012	1459	853	666	1066	836	519	7562	11.7
Iran	577	655	284	203	417	4496	243	359	7233	11.2
Thailand	57	371	684	554	1096	260	62	95	3180	4.9
UK	53	203	339	26	218	102	1360	259	2560	4.0
Malaysia	656	497	361	83	50	101	151	90	1989	3.1
Turkey	242	64	152	57	102	360	438	370	1786	2.8
Egypt	n.a.	0	391	402	453	311	n.a.	n.a.	1557	2.4
Germany	239	17	42	105	51	277	227	318	1276	2.0
Nepal	71	86	132	71	132	40	233	207	971	1.5
UAE	108	91	77	51	269	178	87	83	944	1.5
Other Asian countries	n.a.	41	243	7	68	288	9	194	850	1.3
Sum									64737	100

Source: United Nations Comtrade Database (https://comtrade.un.org/data). n.a.: Not available

$$X_{ij}=\alpha_0 GDP_i^{\alpha_1} GDP_j^{\alpha_2} POP_i^{\alpha_3} POP_j^{\alpha_4} D_{ij}^{\alpha_5} \quad (1)$$

Where X_{ij} denotes exports (imports) of country i to (from) country j, GDP and POP denote GDP and population, respectively. D_{ij} is dummy variable for distance between two countries.

Anderson (1979), and Anderson and Van Wincoop (2003) and Bergstrand (1985; 1989) developed the theoretical foundation of the gravity model. In addition, several researchers have applied gravity model in general (Peridy, 2005; Carrere, 2006; Zubaidi et al., 2007; Olper and Raimondi, 2008; Marimoutou and Feissolle, 2009; Kaur and Nanda, 2010; Roy and Rayhan, 2011; Gani and Al Mawali, 2013). In particular, some studies have used gravity model in hand-woven carpet industry. Using co-integration method and error correction model, Cameron and Uz-Zaman (2006) estimated exports function of Pakistan carpet industry during 1994-2002. The results indicated no significant effect of GDP on carpet exports; however, effects of exchange rates and relative prices were statistically significant. Nessabian et al. (2009) examined factors affecting Iran's market share in world hand-woven carpet market using panel data over the period 1980-2005. They used relative price of Iranian carpet exports to India and Pakistan, value of Iranian Rial to Indian and Pakistani Rupees, exchange rate volatility, and trend variables as regressors. They found that Iran's share in world carpet market is highly influenced by changes in relative prices and exchange rate volatility.

Some researchers has used different approach to study world carpet market. For instance, Hosseini and Permeh (2004) and Hosseini and Seyyedi (2011) have examined international trade of hand-woven carpet with using concentration ratios.

3. METHODOLOGY

In order to determine factors affecting market share of the Iranian hand-woven carpet in Singapore market, we introduce the modified gravity model as follows.

$$MS_{ijt}=\beta_0 EP_{ijt}^{\beta_1} REX_{ijt}^{\beta_2} V_{ijt}^{\beta_3} y_{ijt}^{\beta_4} z_{ijt}^{\beta_5} q_{ijt}^{\beta_6} e^{\beta_7 PR_{ijt-1}} e^{ijt} \quad (2)$$

Where MS is market share of the Iranian hand-woven carpet in Singapore, EP is the ratio of export price index of Iran to consumer price index (CPI) in Singapore, REX is the real exchange rate (Singaporean Dollar per Iranian Rial), RPX = $EX.cpi_j/cpi_i$, V is the ratio of volatility of CPI in Singapore to validity of export price index in Iran. The volatility is calculated using an EGARCH[2] model, proposed by Nelson (1991), during 1985-2015. y is ratio of Singapore GDP per capita to Iran GDP per capita, z is the ratio of Singapore's population to Iran's labor force, q denotes similarity between Iran and Singapore, (absolute value of differences in GDP per labor force in two countries. if this variable is high, then the similarity will be low). PR is protection rate (in percent) of the Iranian hand-made carpet exports. It is measured as a percent of value of exports in accordance to the non-oil export support decrees book, published annually by trade promotion organization (TPO) of Iran.

The 1-year lag indicates a 1-year delay in paying export awards in Iran. U is disturbance term, which is assumed normally distributed.

In equation (2), subscripts i, j and t denote Iran, Singapore, and time (year), respectively. And e is the base of natural logarithm, (e = 2.718281…).

Taking logarithm from equation (2), we have:

$$LMS_{ijt}=\beta_0+\beta_1 LEP_{ijt}+\beta_2 LREX_{ijt}+\beta_3 LV_{ijt}+\beta_4 Ly_{ijt} +\beta_5 Lz_{ijt}+\beta_6 Lq_{ijt}+\beta_7 PR_{ijt}+U_{ijt} \quad (3)$$

Here, operator L denotes natural logarithm. According to theoretical basics of gravity models, coefficients β_2, β_4, β_5, and β_7 will be positive. Also, β_1 and β_3 will be negative. In fact, an increase in real exchange rate of target country in terms of currency of exporting country, per capita income in host country relative to per capita income in exporting country, population of target market relative to employees of exporting country, and export incentives in exporting country result in increasing exports to target market. However, an increase in ratio of export price index in exporting country to CPI in target market, and an increase in ratio of volatility of CPI in host country to volatility of export price index in exporting country have opposite effects on export promotion. The sign of β_6 should be negative based on Linder hypothesis. Linder (1961) believed that similar countries, in terms of demand structures, tend to increase trade among themselves. It means that if the gap between economic structures of two countries increases, then trade flow will drop. This implies that international trade will decrease between two countries having different preferences and factor endowments.

Statistical data are extracted from different sources. Data on value of exports of handmade carpets to Singapore by country, in US dollars, is collected from United Nations Comtrade Database. Export price index, CPI, official exchange rate (local currency unit per US$, period average), GDP per capita, labor force and total population are derived from World Bank national accounts data. Except for two latter variables, all other variables are expressed in real terms, based on 2010 base year. The final variable, i.e., protection rate, is taken from TPO of Iran.

4. FINDINGS

Since the research model is based on time-series data, it can be estimated by using ordinary least squares (OLS), if it has no spurious regression features. Consequently, we first test variables under study against unit root. In the case of lack of unit root, they will be stationary, and statistical inferences will be valid. There are various methods to test for stationary of time series (Augmented Dickey-Fuller [1979] and Phillips-Perron [1988] tests, Elliot, Rothenberg, and Stock [RRS, 1996] test, Kwiatkowski et al. [KPSS, 1992] and Ng and Perron [NP, 2001] tests). Table 2

2 Exponential Generalized Autoregressive Conditional Heteroskedastic (EGARCH).

reports the KPSS approach to unit root testing. The results indicate stationary over time, since all series are integrated of degree zero, i.e., I(0). These results are not surprising, because we used them in the form of ratios, or relative forms.

As variables have no unit root, we can estimate model 3 by using OLS method. Table 3 shows the estimation results. The results demonstrate that explanatory variables explain more than 82% of variations in the dependent variable. By F-statistic, the regression is wholly significant. In addition, Durbin–Watson (D.W.) statistic is very close to 2, which indicates no autocorrelation among successive residuals.

According to coefficients, for an increase in ratio of CPIs in Iran and Singapore, the market share of Iranian hand-woven carpet will decrease by 0.51%.

In fact, the high cost of the Iranian hand-woven carpet compared to the average carpet prices in the Singapore market is an important factor in reducing market share of Iranian carpet market. The coefficient of the real exchange rate Singaporean Dollar/Iranian Rial) is significant at 1% level of significance, which means that one percent increase in the real exchange rate leads to increase in share of Iranian hand-woven carpet in the Singapore market by about 0.06%.

The competitive power of countries in international trade is summarized in prices ratio (the ratio of prices in foreign markets at the expense of the domestic market' prices), and fluctuations in this ratio imply that profit margins from exporting goods to foreign markets are changed. If it increases (decreases), then profit margins will increase (decrease). Accordingly, some efforts are made to fix or increase the ratio of foreign to domestic prices. In countries like Iran, which general level of prices grows at a rate more than the global averages, this ratio tends to create trade deficit.

To avoid continuous trade deficits, economic policymakers have to compensate a part of increase in domestic prices beyond the global averages through increasing the nominal exchange rate. In other words, because of diminishing profit margins, exporters are compensated by converting exchange earnings with a higher nominal exchange. If amount of compensation is exactly equal to the trade loss, then the real exchange rate will fix, but if total compensation is more (less) than trade loss, then the real exchange rate will increase (decrease). Accordingly, the real exchange rate appreciation would result in improvement of the market share of Iranian hand-woven carpet in Singapore.

The higher per capita income in target market than that of exporting country implies that exporting country can take a part of per capita income in host market through exports of goods and services. Meanwhile, if per capita income in the target market is more than that of the exporting country, the amount of earnings could be larger with respect to per capita income in the exporting country. As a result, higher per capita income in target market compared to exporting country is a main factor in trade creation.

Based on the model estimation, the market share of Iranian hand-woven carpet in Singapore will increase by 3.38% for one percent increase in relative per capita income, i.e. ratio of per capita incomes in Iran and Singapore).

From another perspective, the Iranian hand-woven carpet is considered as a luxury or artistic good in the Singapore market. Consequently, with an increase (or decrease) in per capita income of Singaporeans, the demand for Iranian carpet sharply will increase (or decrease).

The sign and statistical significance of similarity coefficient confirms Linder hypothesis in trade between Iran and Singapore at 1% level of significance. This means that even though high per capita income in Singapore with respect to Iran is a strengthening factor of Iranian carpet market share in Singapore, however wider gap between labor incomes in Iran and Singapore leads to low trade volume. In other words, when the per capita income gap widens, Iranian products will not match the tastes and preferences of Singaporean workers, who are customers for Iranian hand-woven carpets. However, based on international trade theories, economies of trade partners are converged in terms of labor incomes in the long-run.

The increasing number of consumers in target market with respect to number of labor forces in exporting country is an indicator to measure the market size growth for a given product in the exportsortarget market. In fact, in such situation, exporters face fixed production costs (due to constant labor force). However, if the increasing population experiences no reduction in per capita income, then a new demand for exporting product will be created.

The negative sign of Lz implies that the GDP per capita of Singapore decreases with an increase in Singapore's population.

Table 2: Results of unit root test, KPSS approach

Variable	Coefficient	t-statistic
LMS	0.137**	I(0)
LEP	0.100**	I(0)
LREX	0.111**	I(0)
LV	0.117**	I(0)
Ly	0.092**	I(0)
Lz	0.138**	I(0)
Lq	0.085**	I(0)
PR	0.102**	I(0)

Variable and KPSS-stat are abbreviations for variable Kwiatkowski et al. (1992) statistic.
**Statistical significance at 5%

Table 3: Estimation results (dependent variable: LMS)

Variables	Coefficient	t-statistic
Intercept	10.391	3.008*
LEP	−0.513	−4.946*
LREX	0.059	2.833*
LV	−0.007	−1.087
Ly	3.387	5.655*
Ly	−2.251	−5.312*
Lz	−3.564	−12.834*
PR	0.031	1.384***
R^2=0.837		F=63.705*
R^{-2} = 0.824		D.W.=2.137

* and *** statistical significant at 1% and 10%, respectively.

As a result, demand for Iran's hand-woven carpet will decrease in the Singapore market, since Iranian carpet is a luxury good in this market. Regarding magnitude of this coefficient, the share of Iranian hand-woven carpet in Singapore market will decrease by 3.56% for 1% increase in the ratio of population of Singapore to labor force of Iran.

The exports' incentives are provided to encourage the exporters. The results of the model show that the one percent increase in protection rate of exporters results in increasing share of the Iranian hand-woven carpets in Singapore market by 0.03%.

Our findings show that the ratio of volatility of CPI in Singapore to volatility of the Iranian export prices has no significant effect on the share of the Iranian hand-woven carpet in the Singapore market.

5. CONCLUSION

This study dealt with the factors affecting market share of the Iranian hand-woven carpet in Singapore by using a modified gravity model during 1989-2015. The estimation of empirical model by OLS method indicated that about 82% of variations in market share of Iran in Singapore are explained with explanatory variables. According to the results, the ratio of export price of Iranian hand-woven carpet to average price of hand-woven carpets in Singapore market, the structural difference between Iran and Singapore, and ratio of Singapore's population to Iran's labor force have significant and negative effects on market share of Iranian hand-woven carpet in Singapore. On the contrary, real exchange rate (Singaporean Dollar per Iranian Rial), ratio of per capita incomes in Singapore and Iran, and rate of export incentives (%) have positive and meaningful effects on this share.

Based on findings, it is recommended that:

1. Effective policies should be made to increase the revenues of carpet weavers, and to reduce the cost of production and exports of Iranian hand-woven carpet. Profit sharing, low-interest granting to production chain, and facilitating of exporting process are of these policies;
2. The on-time financial support should be provided by government;
3. A fraction of exports value should be paid in cash to exporters in order to cover exchange rate risk; and
4. Preparations should be made to enhance skills and expertise of labor in the carpet industry.

This policy package provides diversity and quality in hand-woven carpets in line with tastes of customers in target markets. In this case, carpet exports may increase, which in turn will increase employment level in carpet industry.

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