The Impact of Trade Liberalization on Persian Rugs: A Policy Analysis Matrix Approach

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Persian rugs are woven in different parts of the Islamic Republic of Iran. However, the rugs woven in Eastern Azerbaijan, Esfahan, and Qum have a worldwide reputation. A Policy Analysis Matrix (PAM) is used to study the rug industry in these provinces. Our analysis is concentrated on the most-exported hand-woven rug—named 65-Radj Cheleh Abrishami Silk Flower—using 2006 data. The results indicate that the export competitive indexes for the three provinces are 0.81, 0.88, and 0.93, respectively. Based on these indices the 65-Radj Cheleh Abrishami Silk Flower rug can compete in the world markets. The comparative advantage indices for the three provinces are 0.83, 0.79 and 0.84, respectively. These numbers show that the provinces have a comparative advantage in the production of the rug in question.

In order to expand non-oil exports and play an active role in international markets, the Islamic Republic of Iran (IRI) has been trying to join the World Trade Organization (WTO) for some time. Since Persian rugs are a major non-oil export of the IRI, it is important to study and analyze the level of competitiveness of this industry. This study uses a Policy Analysis Matrix (PAM) to estimate certain indices to evaluate the ability of the Persian rug industry to compete internationally before and after joining the WTO. In this method the revenue and the costs of said industry will form a 3×4 matrix through which the impact of different government policies on a certain type of Persian rug can be evaluated. This study covers the provinces of Eastern Azerbaijani, Esfahan, and Qum.

Methodology

Since the topic of comparative advantage plays an important role in the field of international trade, several indices have emerged to quantify this concept. Some of these measures are Domestic Resource Costs (DRC), Revealed Comparative Advantage (RCA), Net Present Value (NPV), Profitability Index (PI) and Social Benefit Cost Ratio (SBCR).

However, these indices have been criticized on certain grounds, including that these indices, applied individually, only cover part of the comparative advantage phenomenon. To overcome this shortcoming we have used the Policy Analysis Matrix (PAM) approach to study the competitiveness of the Persian rug industry. PAM provides a framework through which we can compute the comparative advantage index, the protection coefficients, and the cost competitiveness index simultaneously. These measures can be used to assess the impact of economic freedom on economic units. The PAM matrix also can be used to analyze the economic policies of the government and offer ways to improve them.

Table 1 represents a PAM matrix as first presented by Monk and Pearson (1989). The first row shows the revenue of a firm (A), the cost of tradable inputs (B), the cost of the non-tradable inputs (C) and the domestic profitability matrices (D). The second row consists of the same entries as the first row but computed using shadow prices for both the products and inputs. The third row is obtained by subtracting the elements of the second row from the first row; this row is used to analyze the government policies.

Determining the Shadow (Social) Prices

As is evident from the elements of the matrix in Table 1, we need to compute the shadow prices of three main groups: the non-tradable inputs, the tradable inputs, and the exchange rates. Shadow prices reflect the real social cost of the resources used in producing a product. This is important because in many developing countries resource prices are distorted by government interventions.

Table 1. Policy Analysis Matrix.

	Cost			
	Revenue	Tradable resources	Non-tradable resources	Profit
Private prices	A	B	C	D
Social prices	E	F	G	H
Effects of divergences	I	J	K	L

The Shadow Price of Non-Tradable Resources: In the rug industry there are factors which are of domestic nature and as such are not imported. For example, the process of natural coloring or Cheleh Keshi is a domestic factor. The shadow price of such factors was approximated by their opportunity costs. The shadow wage rate in the rug industry was considered to be the highest wage paid to such workers in the rest of the economy. We used the Jorgensen approach for the shadow price of capital (Branson 1979).

The Shadow Price of Tradable Resources: Tradable inputs are produced internally, and if not used domestically can be exported. In the rug industry such inputs are silk cream, silk thread, wool, and cotton thread. Therefore we can use the free-on-board price of such inputs as their shadow prices. We used a formulation developed by Londero and Cervini (2003) to compute the exchange rate shadow price. The real exchange rate was computed using Dehghani's (2003) formulation.

Setting up the Policy Analysis Matrix (PAM)

To set up the policy analysis matrix we need the individual costs items for the rugs in questions. These items were obtained from Iran Carpet Company (n.d.). Tables 2 through 4 present the PAM matrices for the three provinces.

As explained before, based on the elements in the above matrices we can analyze the government policies and their impacts on the rug producers. We now proceed by explaining the elements of PAM as presented in Table1. I is the difference between the revenue at private (market) and at social prices of the product, and is positive in all provinces. In other words, the revenue generated from the sale of one square meter of rug in question is I rials more than the revenue generated if the shadow (social) prices had been used. K is the difference between the costs of the non-tradable inputs for weaving one square meter of the rug in question at market prices and at shadow prices. K > 0 implies that the domestic prices of such inputs are higher for the producers than are the shadow prices. In other words, the producers face negative protection. The opposite holds if K < 0.

J is the difference between the costs of the tradable inputs for weaving one square meter of the rug at market prices and at shadow prices. If J > 0, the domestic producer pays more for these inputs than their international prices. But if J < 0 the domestic producers pay less. This implies that the producers enjoy governmental protection. D shows whether or not this type of rug is profitable at private prices. D is positive in all of the provinces studied, which means the production of the rug is profitable. H shows the profitability of the same rug at shadow prices. The results indicate that H is positive in all three provinces, too. H > 0 implies that the production of the rug will be profitable if Iran is accepted to the WTO (the situation in which the private prices are replaced by the shadow prices). L shows the difference in profitability between producing the rug using private prices versus shadow prices. The results show that L is positive for all provinces.

Computing the Indices for PAM

Comparative Advantage Indices

The Domestic Resource Costs (DRC) = G/(E – F). This index shows the ratio of the domestic costs to the value added in the rug producing plant. If

Table 2. PAM for One Square Meter of 65 Raj Hand-Woven Rug in Eastern Azarbayjan Province in 2006 (Rials).*

	Revenue	Cost		Profit
		Tradable resources	Non-tradable resources	
Private prices	15000000	864267	7784667	6351066
Social prices	10576800	470520	8378530	1727750
Effects of divergences	4423200	393747	−593863	4623316

* US$1 = approximately 10,000 Iranian rials.

Table 3. PAM for One Square Meter of 65 Raj Hand-Woven Rug in Qum Province in 2006 (Rials).

	Revenue	Cost		Profit
		Tradable resources	Non-tradable resources	
Private prices	14000000	808767	7683007	5508226
Social prices	9107800	468581	7222754	1416465
Effects of divergences	4892200	340186	460253	4091761

Table 4. PAM for One Square Meter of 65 Raj Hand-Woven Rug in Esfahan Province in 2006 (Rials).

	Revenue	Cost		Profit
		Tradable resources	Non-tradable resources	
Private prices	12000000	947934	6810501	4241565
Social prices	8814000	528692	6485668	1799640
Effects of divergences	3186000	419242	324833	2441925

DRC < 1, the producer has a comparative advantage in the production of the product.

The Comparative Advantage Based on Unit Cost: (UCs) = (F + G)/E. This index shows the cost of producing the product when all price distortions are omitted. If UCs < 1, the producer has a comparative advantage in the production of the rug.

The Net Social Profit: (NSP) = E − (F + G). This index computes profit using input and output prices in terms of shadow (social) prices. If NSP > 0, the production of the product is socially profitable.

Table 5 shows the value of each of the above three indices for the three provinces under study for one square meter of the rug in question. The DRC and the UCs indices for all provinces are less than one. This implies the existence of comparative advantage of the carpets in all cases. The fact that NSP is positive indicates that the production of this type of rug is socially profitable.

The Protection Coefficients

These coefficients show the degree of protection awarded to the production of this type of rug.

The Nominal Protection Coefficient of Output (NPCO) = A/E. If NPCO > 1, the domestic price of the output is more than its shadow price and hence the product has received production subsidy.

The Nominal Protection Coefficient of Input (NPCI) = B/F. If NPCI > 1, the cost of tradable inputs is higher with domestic prices than with shadow prices. This implies that producers are paying indirect taxes.

The Effective Protection Coefficient (EPC) = (A − B)/(E − F). This index gives a measure of the ratio of the value added due to production at domestic prices to the value added due to production at shadow prices. By computing this index we can evaluate the impact of government intervention policies in the input market and in the product market simultaneously. EPC > 1 implies that the government favors the production of the rug.

Table 6 shows the above three protection coefficients for the three provinces studied. Since the NPCO is greater than one in all provinces, we can conclude that the price of the product, based on the domestic or internal prices, is greater than the product price based on the shadow prices. In other words the product enjoys government protection. The NPCI index is larger than one in all three provinces. The value of EPC is greater than one in all three provinces as well. This indicates that as a whole the government policies favor the production of the rug.

The Cost Competitiveness Criteria

These criteria can tell if the product can compete in domestic and international markets.

The Unit Cost (Domestic) UCd = (B + C)/A. This index shows if a producer can compete domestically based on current market prices. An index less than one implies that a producer can compete.

The Unit Cost (Export) UCx = (B + C)/E. This index shows whether a producer can compete internationally based on current market prices. An index less than one implies that a producer can compete.

Table 7 shows the above two indices for the three provinces. Since the indices for all provinces are less than one, we can conclude that the producers of the rug can compete both domestically and internationally.

Conclusions

Based on the results found for the DRC & UCs indices, the provinces studied all have a comparative advantage in producing the Cheleh Abrishami Silk Flower hand-woven rug**.** If Iran joins the WTO these regions will have the ability to compete freely (without any governmental protection). Based on the initial results, setting up more local weaving shops, especially in the rural areas with high unemployment rates, is suggested. The economic conditions in Iran and the market facts call for such a move. Because Iran has a comfortable comparative advantage in rug production, its joining the WTO should benefit rug weavers. Also, since rugs are produced in provinces where people on average earn less than the rest of the population, the expansion of rug weaving shops should reduce poverty, especially since rug production is labor intensive and does not require any sophisticated or advanced technology.

References

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Table 5. Comparative Advantage Indices of Producing One Square Meter of Hand-Woven Rug in Eastern Azarbayjan, Qum, and Esfahan Provinces.

Comparative advantage indices	Abbreviation	Eastern Azerbaijan	Qum	Esfahan
Based on domestic factors	DRC	0.82	0.83	0.78
Based on unit costs	UCs	0.83	0.84	0.79
Net social profit	NSP	1727750	1416465	1799640

Table 6. Protection Coefficient Indices in Producing One Square Meter of Hand-Woven Rug in Eastern Azarbayjan, Qum, and Esfahan Provinces.

Protection coefficients	Abbreviation	Eastern Azarbayjan	Qum	Esfahan
Nominal protection coefficient of output	NPCO	1.41	1.53	1.36
Nominal protection coefficient of input	NPCI	1.83	1.72	1.79
Effective protection coefficient	EPC	1.39	1.52	1.33

Table 7. The Cost Competitiveness Criteria of Producing One Square Meter of Hand-Woven Rug in Eastern Azarbayjan, Qum, and Esfahan Provinces.

	Abbreviation	Eastern Azarbayjan	Qum	Esfahan
Unit cost (domestic)	UCd	0.57	0.6	0.64
Unit cost (export)	UCx	0.81	0.93	0.88

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