

# Empirical Analysis on the International Competitiveness Of Shannxi Agricultural Product<sup>1</sup>

## ANALYSE EMPIRIQUE DE LA COMPETITIVITE INTERNATIONALE DU PRODUIT AGRICOLE DU SHANNXI

Zhang Genneng<sup>2</sup>Xu Lihou<sup>3</sup>Wu Ou<sup>4</sup>

**Abstract:** On the foundation of reviewing the trade status of Shannxi agricultural product, adopting Trade Competitive Index, Revealed Comparative Advantage Index and Competitive Advantage Index, this paper calculates and evaluates the international competitiveness of Shannxi agricultural product from 1997 to 2004. It is found that from TC and CA indexes, Shannxi agriculture product is in an advantage position of international competition, while from the RCA index, it doesn't have a very strong international advantage. In actual application, according to the trade situation of Shannxi agriculture product, we should consider synthetically the calculation results of these three indexes and develop the competitive advantage on the basis of comparative advantage. The conclusion supplies actual mentalities for promoting the international competitiveness of Shannxi agricultural product.

**Key words:** Empirical analysis, International competitiveness, Shannxi agricultural product

**Résumé:** Sur la base de la rétrospection du statut commercial du produit agricole du Shannxi et en adoptant l'Index compétitif du commerce, l'Index de l'avantage comparatif révélé et l'Index de l'avantage compétitif, cet essai calcule et évalue la compétitivité internationale du produit agricole du Shannxi de 1997 à 2004. On trouve que, selon le premier et le troisième index, le produit agricole du Shannxi occupe une position avantageuse dans la compétition internationale, alors que d'après le deuxième index, il ne possède pas un avantage international très solide. Dans l'application actuelle, conformément à la situation du commerce du produit agricole du Shannxi, on doit considérer synthétiquement les résultats de calcul des trois index et développer l'avantage compétitif sur la base de l'avantage comparatif. La conclusion justifie les mentalités actuelles qui insistent à promouvoir la compétitivité internationale du produit agricole du Shannxi.

**Mots-Clés:** analyse empirique, compétitivité internationale, produit agricole du Shannxi

In recent years, the import and export quantity of Shannxi agricultural product increased persistently, and the position of international trade in agriculture product rises too. To thoroughly analyze the international competitiveness tendency of Shannxi agricultural product and develop its international competitiveness by adopting positive and efficient measures could improve Shannxi agricultural product trade.

For the convenient purpose of statistics, this paper investigates agricultural product in double-digit HS

code with the use of *Moderating The Trade Name and Coding System* in 1992 version. According to *International Commodity Trade Statistics* written by Statistics Department of UN Economic and Social Affairs Department, the agricultural product are defined to 1-4 chapters products (HS01- HS24) in *Moderate System*. In terms of the trade situation of Shannxi agricultural product, this text only analyzes 12 types of agricultural products in major import and export share(their import and export value is 90% of

<sup>1</sup> Project Fund: Research Project in Soft Science of Shannxi Province(2006KR20)

<sup>2</sup> School of Business Administration, Xi'an University of Technology, Xi'an, China.

<sup>3</sup> School of Business Administration, Xi'an University of Technology, Xi'an, China.

<sup>4</sup> School of Business Administration, Xi'an University of Technology, Xi'an, China.

\*Received 2 July 2006 ; accepted 1 September 2006

total value in whole province above), the details as follows:HS01, live animals;HS04, milk、 egg、 mel and other edible animal product;HS07, edible vegetable, root and tuber;HS08, edible fruit、 nut、 muskmelon and pericarp;HS09, coffee、 tea、 Ma Dai tea and flavoring aromatic;HS10, corn; HS12, the oilseed, hulled seed ,industrial and medical plants, feedstuff;HS13, lac、 gum、 resin and other plant succus、 juice;HS15, live animal oil and plant oil、 fat、 wax、 fullyrefined edible fat and oil;HS17, sugar and confectionary product; HS20, vegetable、 fruit or other parts of plants;HS24, tobacco and the tobacco substitutes.

## 1. THE TRADE SITUATION OF SHANNXI AGRICULTURAL PRODUCT

### 1.1 The general trade situation of Shannxi agricultural product

Tab. 1 presents the general trade situation of Shannxi agricultural product, from which we can see that:

**1.1.1** On the exportation, the proportion of agriculture export value to total export value in whole province rises during 1997-2004. The export value increases from 84.74 million dollars in 1997 to 192.21 million in 2004, which is 2.3 times of 1997. We also can

find that the value dropped a little in 1998 because of the Asian Finance Crisis, while the proportion of export value in agriculture to total dropped. And the proportion in 2001 reached the highest position, then decreased a little.

**1.1.2** On the importation, the proportion of agriculture import value to total during 1997-2004 can be divided into two stages. In the first stage during 1997-2000, agriculture import value rises in a small extent in general, and the value increased fiercely in 1998 for importing large amount of HS12 product (oil seed、 seed kernel、 plants in agriculture or industry、 feedstuff).During this time, agriculture import proportion to total displays increasing and decreasing by turns. And in the second stage during 2001-2004, both the agriculture import value and its proportion ascend in a large range, which reach the highest point in 2004.

**1.1.3** On the balance of trade, Shannxi agricultural product keeps a favorable balance during 1997-2004. Because import exploded in 1998, the export descended slightly, the favourable balance of trade is only USD60,650,000, which is the lowest level of the past 8 years. However ,because of agricultural product since 1999, the favourable balance of trade have increased year by year, especially in 2004, the agricultural product export value increases significantly, and favourable balance of trade also comes to the history apogee, which is 2.1 times of 1997.

Tab.1 The general trade situation of Shannxi agricultural product Unit: USD 10000

Index	The import and export trade of agriculture			Proportion of agriculture product export to total export product (%)	Proportion of agriculture product import to total import product (%)
	Export value	Import value	Balance of trade		
1997	8474	486	7988	6.88	0.93
1998	7179	1114	6065	6.10	1.27
1999	8035	537	7498	6.97	0.63
2000	9005	772	8233	6.87	0.93
2001	10629	390	10239	9.57	0.41
2002	10763	741	10022	7.82	0.87
2003	13920	1676	12244	8.02	1.60
2004	19221	2236	16985	8.02	1.80

Data source: *Shannxi Statistic Year Book* (1998-2005)

### 1.2 The import and export structure of Shannxi agricultural product

Tab. 2 shows the import and export structure of Shannxi agricultural product, we can see that:

**1.2.1** From the export structure : In the past 8 years, the major agriculture export products are —HS07(the edible vegetable, root and tuber),HS08(the edible fruit、 nut、 muskmelon and pericarp),HS12(oilseed, hulled seed ,industrial and the medical plants, feedstuff),HS20(vegetable、 fruit or other parts of plants)

and HS24(tobacco and the tobacco substitute)etc.In 2004, the export value of HS20 is USD122,401,000,which occupies 63.68% of total amount in the agricultural product export; The export value of the HS07 is USD23,680,000, Which accounts for 12.32% of total amount; The export value of the

HS08 is USD12,029,000, accounting for 6.26% ;The export value of HS24 is USD9,990,000, accounting for 5.20%. And the export value and proportion of HS12 have descended, only USD5, 466, 000, accounting for 2.84%

**Tab.2 The import and export structure of Shannxi agricultural product Unit: USD 10000**

index code	Average value (1997-2004)				2004			
	Export value	Proportion	Import value	Proportion	Export value	Proportion	Import value	Proportion
HS01	172.25	1.58	58.70	5.91	338.40	1.76	424.00	18.97
HS04	259.76	2.38	9.58	0.96	273.70	1.42	2.20	0.10
HS07	2367.01	21.71	11.13	1.12	2368.00	12.32	3.30	0.15
HS08	570.50	5.23	7.43	0.75	1202.90	6.26	53.40	2.39
HS09	217.84	2.00	1.84	0.19	188.80	0.98	0.00	0.00
HS10	181.99	1.67	0.19	0.02	140.10	0.73	0.00	0.00
HS12	703.93	6.46	109.31	11.00	546.60	2.84	83.30	3.73
HS13	204.09	1.87	28.51	2.87	301.00	1.57	155.30	6.95
HS15	9.73	0.09	528.81	53.21	31.00	0.16	1381.00	61.78
HS17	91.65	0.84	10.98	1.10	377.20	1.96	10.30	0.46
HS20	5075.83	46.56	16.31	1.64	12240.10	63.68	2.50	0.11
HS24	490.09	4.49	115.84	11.66	999.00	5.20	0.00	0.00
total	—	94.88	—	90.43	—	98.88	—	94.64

Data source: *Shannxi Statistic Year Book (1998-2005)*

**1.2.2** From the import structure: In the past 8 years, the major agriculture products are—HS01(live animals),HS12,HS13(lac、 gum、 resin and other plant succus、 juice),HS15(live animal and plant oil、 fat、 wax、 fullyrefined edible fat and oil) and HS24 etc.In 2004, the import value of HS15 is USD13,810,000, accounting for 61.78% of the total ;The HS01 import value is USD4,240,000, accounting for 18.97%;The HS13 import value is USD1,553,000, accounting for 6.95%;But the HS12 import value and its proportion have descended, only USD 833,000, accounting for 3.73%; and we have no importation of HS09,HS10 and HS24.

**2. THE ANALYSIS OF INTERNATIONAL COMPETITIVENESS ABOUT SHANNXI AGRICULTURAL PRODUCT**

**2.1 The comparative analysis of international competitiveness index on Shannxi agricultural product**

Market is the stage in which agricultural product of all countries can participate in international competition,

one’s international competitiveness about agricultural product is reflected by the market achievement, so, the economists develop a series of evaluating indicators about international competitiveness on the basis of import and export data. With the characters of these evaluating indicators, and combining the actual situation of import and export about Shannxi agricultural product, the writer chooses three indexes to analyze the international competitiveness, such as the trade competitiveness index, the revealed comparative advantage index and the revealed competitive index etc.

Trade competitiveness index (TC) is the ratio of one product’s net export value to the total trade value. Its formulation is:

$$TC_{ij} = \frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}} \quad (-1 \leq TC_{ij} \leq 1) \quad (1)$$

$TC_{ij}$  is the trade competitiveness index,  $X_{ij}$  is the total export value of  $j$  product in  $i$  country.  $M_{ij}$  is the total import value of  $j$  product in  $i$  country.

If  $TC_{ij} > 0$ , it means the production efficiency of  $j$  product in  $i$  country is higher than the world level. To the world market,  $i$  country is a net export one on  $j$  product, and it has the trade competitive advantage, when the value is larger, and the advantage is more significant;

If  $TC_{ij} < 0$ , it means the production efficiency of  $j$  product in  $i$  country is lower than the world level. To the world market,  $i$  country is a net import one on  $j$  product, and it has the trade competitive disadvantage, when the absolute value is larger, the disadvantage is more significant; If  $TC_{ij} = 0$ , it means the production efficiency on  $j$  product is equal to the world level.

TC index reflects that: Relative to one kind product supplied by other countries in the world market, whether the same kind product in one country has competitive advantage on efficiency and how it is. Comparing to the total trade value, it gets rid of the influence of macroscopic sum like inflation and the economy inflation etc. Therefore, it's more realistic to compare among different countries during different periods. However, because the calculation of this index only limits to the scope of one nation, industry or product, and without considering the influence of world, so the calculation is rough.

Revealed comparative advantage index (RCA) is the ratio of proportion of one product export value to total export value in one country to proportion of this product export value to total export value in the world. Its formulation is

$$RCA_{ij} = \frac{X_{ij} / X_{it}}{X_{wj} / X_{wt}} \quad (2)$$

$RCA_{ij}$  is the revealed comparative advantage index of  $j$  product in  $i$  country.  $X_{ij}$  is the total export value of  $j$  product in  $i$  country.  $X_{it}$  is the total export value in  $i$  country.  $X_{wj}$  is the total export value of  $j$  product in the world.  $X_{wt}$  is the total export value of world product.

Generally speaking, if  $RCA_{ij} \geq 1$ , it means  $j$  product in  $i$  country has the revealed comparative advantage, when the value is larger, the advantage is more significant;

If  $RCA_{ij} < 1$  it means  $j$  product in  $i$  country has no revealed comparative advantage, when the absolute value is larger, the disadvantage is more clear. Some scholars analyze it more in details, they point out that when the RCA index is larger than 2.5, this type of product has the strongest international competitiveness; The RCA index number lies in 1.25-2.25, it means to have a stronger international competitiveness; When it lies in 0.8-1.25 it has a medium international competitiveness; When it's less than 0.8, it means a weaker international competitiveness.

The RCA index reflects the comparative level of a certain product export in one country to the average export value of world. It preferably reflects the product comparative advantage without the fluctuant influence of nation and world total value. But, if there are both export and import in an industry, taking no account of influence in import, the conclusion is unlikely to reflect the true situation accurately.

Revealed competitive advantage index is the value with deducting one product's import competitive

advantage from export competitive advantage in one country. Its formulation is:

$$CA_{ij} = RCA_{ij} - \frac{M_{ij} / M_{it}}{M_{wj} / M_{wt}} \quad (3)$$

$CA_{ij}$  is the revealed competitive advantage index of  $j$  product in  $i$  country.  $RCA_{ij}$  is the revealed comparative advantage index of  $j$  product in  $i$  country.  $M_{ij}$  is the total import value of  $j$  product in  $i$  country.  $M_{it}$  is the total import value in  $i$  country.  $M_{wj}$  is the total import value of  $j$  product in the world.  $M_{wt}$  is the total import value of all world products.

If  $CA_{ij} \geq 0$ , it means  $j$  product in  $i$  country has the revealed competitive advantage, when the value is larger, the advantage is more significant;

If  $CA_{ij} < 0$  it means  $j$  product in  $i$  country has no revealed competitive advantage, when the absolute value is larger, the disadvantage is more clear.

The CA index not only considers the influence of the world level, but also brings the import influence into it; in some sense, it makes up the defects of other two indexes above. Accordingly, on the theory, it could measure the international competitiveness more physically. However, because one country's export always be restricted by other country's tariff and quota...etc., and these restrictions are different in different countries and different times, which makes the index has certain incomparability in the different nations and periods.

## 2.2 The empirical analysis of international competitiveness about Shannxi agriculture product

### 2.2.1 The analysis of trade competitiveness index about Shannxi agriculture product

Tab. 3 is the trade competitiveness index about Shannxi agriculture product. From the average value in the table, we can see that except HS15, during 1997-2004 in Shannxi, the average trade competitiveness indexes of other agricultural products are positive, which indicates that Shannxi is a net import place of these agricultural products, and it has the trade competition advantage position. To speak of, in 11 kinds of agricultural products with advantage, there are 6 kinds of agricultural products (HS04, HS07, HS08, HS09, HS10 and HS20) have a very strong international competitiveness, another 4 kinds (HS01, HS12, HS13 and HS24) also have a strong international competitiveness, this means that the superior position of Shannxi agriculture product is quite evident in international competition.

**Tab.3 The trade competitiveness index about Shannxi agriculture product (TC)**

	1997	1998	1999	2000	2001	2002	2003	2004	Average
HS01	1.000	0.530	1.000	1.000	1.000	1.000	1.000	-0.112	0.802
<b>HS04</b>	0.996	0.999	1.000	0.839	1.000	0.851	0.847	0.984	0.940
<b>HS07</b>	1.000	1.000	0.990	0.975	0.974	0.991	0.997	0.997	0.991
<b>HS08</b>	1.000	1.000	1.000	1.000	1.000	0.982	1.000	0.915	0.987
<b>HS09</b>	1.000	1.000	1.000	1.000	1.000	0.998	0.876	1.000	0.984
<b>HS10</b>	1.000	1.000	1.000	0.993	0.987	1.000	1.000	1.000	0.998
<b>HS12</b>	1.000	0.340	0.754	0.745	0.688	0.881	0.860	0.736	0.751
<b>HS13</b>	0.992	0.929	0.998	0.961	0.987	0.965	0.539	0.319	0.836
<b>HS15</b>	-0.942	-0.999	-0.983	-0.977	-0.574	-0.946	-0.977	-0.956	-0.919
<b>HS17</b>	-0.872	-0.650	-0.545	0.625	0.154	0.323	0.891	0.947	0.109
<b>HS20</b>	0.989	0.999	0.997	0.999	0.982	0.975	0.999	1.000	0.993
<b>HS24</b>	1.000	1.000	1.000	1.000	0.898	0.659	0.057	1.000	0.827

Data source: *Shannxi Statistic Year Book* (1998-2005)

See from each year's TC index in the table, we find that during 1997-2004, the international competitiveness about Shannxi agricultural product didn't change a lot basically. The HS04, HS07, HS08, HS09, HS10 and HS20 always have very strong international competitiveness; The HS01, HS12 and HS24 also have strong international competitiveness except some years; since 2000, the TC index of HS17 has turned from negative to positive, and presents the trend of persistent ascension, which indicates the international competitiveness about this kind product has turned from bad situation to good; the international competitiveness of HS13 presents to keep on descending in last few years; But HS15 has a bad competition situation.

### 2.2.2 The analysis of revealed comparative advantage index about Shannxi agriculture product

Tab.4 is the revealed comparative advantage index about Shannxi agriculture product. From the average value in the table during 1997-2004, we can see that: HS07, HS12, HS13, HS20 and HS24 have the revealed comparative advantage while other agricultural products don't. Moreover, according to division in more detail, we can also conclude that HS07, HS13 and HS20 have very strong export competitiveness in this period, and HS12 have superior export competitiveness; The HS01, HS08 and HS24 have middle export competitiveness; While the export competitiveness of other several agricultural products is weak.

**Tab.4 The revealed comparative advantage index about some major Shannxi agriculture product**

	1997	1998	1999	2000	2001	2002	2003	2004	Average
<b>HS01</b>	0.587	0.789	0.794	0.719	1.047	0.665	0.946	1.294	0.854
<b>HS04</b>	0.214	0.222	0.197	0.412	1.005	0.574	0.398	0.269	0.411
<b>HS07</b>	7.123	5.109	4.968	4.517	7.492	4.397	3.890	3.167	5.083
<b>HS08</b>	0.405	0.471	0.500	0.787	1.083	1.029	1.042	1.188	0.854
<b>HS09</b>	1.680	0.620	0.393	0.250	0.677	0.453	0.780	0.539	0.674
<b>HS10</b>	0.332	0.121	0.244	0.351	0.182	0.236	0.320	0.137	0.240
<b>HS12</b>	2.830	2.206	1.692	1.472	1.139	1.210	1.046	0.734	1.542
<b>HS13</b>	2.731	2.883	6.427	7.726	4.804	3.167	3.222	4.088	4.386
<b>HS15</b>	0.018	0.001	0.005	0.010	0.021	0.018	0.011	0.031	0.014
<b>HS17</b>	0.003	0.010	0.010	0.010	0.042	0.375	0.558	0.841	0.231
<b>HS20</b>	2.868	5.157	9.015	9.775	13.120	11.817	12.886	17.468	10.273
<b>HS24</b>	0.002	0.000	0.153	1.585	1.320	2.064	1.711	1.737	1.072

Data source: *Shannxi Statistic Year Book* (1998-2005), UNCD, <http://www.wto.org>

From each year's RCA index in the table, during 1997-2004, the revealed comparative advantage of each kind of agricultural product in Shannxi changes a lot. In the table, RCA index of HS01, HS08, HS17, HS20 and HS24 presents up-trend, and the revealed comparative advantage of these several agricultural products

increase, especially HS08 and HS24 which have changed from originally comparative disadvantage to comparative advantage; The index of HS09 rises after firstly descending, but the value at the end (2004) descend about 60% comparing to the beginning (1997); HS10 and HS15 don't change a lot; HS04 and HS13

present the trend of descension after ascension, the value of HS04 is basically the same in the end and beginning, the value of HS13 in the end is a little higher than the beginning; But the RCA indexes of HS07 and HS12 which have strong export competitiveness are descending steadily, and HS12, presenting a comparative disadvantage, has already lost revealed comparative advantage in 2004.

**2.2.3** The analysis of revealed competitive advantage index about Shannxi agricultural product

Tab.5 is the revealed competitive advantage index about Shannxi agriculture product. From the average

value in Tab.5, we can see that: During 1997-2004, except HS15, the average revealed competitive advantage indexes of Shannxi agriculture product are all larger than 0, which means, with considering the influence of import, these kinds of agriculture products have some competitive advantages in world market. From which we also can see that: The index of HS20 has a very strong competitive advantage; HS07, HS12 and HS13 also have the superior competitive advantage, moreover, the other 7 kinds products present the competitive advantage in some extent.

**Tab.5 The index of revealed competitive advantage about Shannxi agriculture product (CA)**

	1997	1998	1999	2000	2001	2002	2003	2004	Average
HS01	0.587	0.449	0.794	0.719	1.047	0.655	0.946	-2.181	0.377
HS04	0.213	0.222	0.197	-0.168	1.005	0.493	0.339	0.264	0.321
HS07	7.123	5.109	4.935	4.431	7.381	4.365	3.878	3.159	5.048
HS08	0.405	0.791	0.500	0.787	1.087	1.105	1.042	1.100	0.841
HS09	1.680	0.620	0.393	0.250	0.680	0.452	0.669	0.539	0.664
HS10	0.332	0.121	0.244	0.349	0.181	0.236	0.320	0.137	0.240
HS12	2.830	0.773	1.386	1.142	0.906	1.084	0.918	0.533	1.197
HS13	2.709	2.763	6.445	7.529	4.786	3.078	1.693	0.216	3.652
HS15	-1.747	-1.293	-0.833	-1.792	-0.072	-1.154	-1.569	-2.758	-1.402
HS17	-0.116	-0.050	-0.032	0.006	0.006	0.307	0.504	0.798	0.178
HS20	2.828	5.154	9.040	9.767	13.016	11.574	12.870	17.461	10.214
HS24	0.002	0.000	0.153	1.585	1.231	1.388	-0.711	1.737	0.673

Data source: *Shannxi Statistic Year Book* (1998-2005)、UNCD、<http://www.wto.org>

See from each year's CA index in table, the results are same with the RCA index, and during 1997-2004 the revealed competitive advantage of each agricultural product in Shannxi changes a lot. Among them, the indexes of HS08, HS17 and HS20 present trend of persistent ascension; the change of the HS10 is small, while HS07 keeps on descending. In addition, the CA indexes of the rest several agricultural products change in no disciplines, with ascension and descension alternative emerging. However, they still keep a certain revealed competitive advantage as a whole.

### 3. CONCLUSIONS

**3.1** From the results of international competitiveness above, we can see that: According to the TC index during 1997-2004, the international competitiveness of Shannxi agricultural product are totally at an advantage-position; But from the RCA index, we can see that the revealed comparative advantage of Shannxi agricultural product doesn't appear obvious, which reflects that Shannxi agricultural product doesn't have a very strong international advantage from the view of comparative advantage. Comparing with that, however, CA index shows Shannxi agricultural product have a strong revealed competitive advantage, and in a advantage-position of the international competition.

**3.2** To judge scientifically whether the international

competitiveness of Shannxi agriculture product are strong, we should investigate the actual import and export situation of these products, but not depending only on the above three indexes. For example, the calculation of TC index in text is resulted mainly from the fast growth of agricultural product export in the last few years but without considering the world total amount. In addition, due to the importation of some products (such as HS01, HS08, HS09 and HS10) is small, even zero continuously for several years, which shows that these kinds of agricultural products have export competitiveness according to CA index. As a matter of fact, with the influence of other factors such as price, the export value of HS09 and HS10 are very small, these two types of products at international market have no competitiveness, it means that CA index doesn't reflect the real competitiveness of these products, even considering the influence of import. Therefore, to analyze the international competitiveness from the empirical angle, we need to combine the actual situation of products and to consider these three indexes synthetically.

**3.3** When the TC or the CA index of one agriculture product descends at a certain point, it may be the result of one country's own consuming-demand increasing, rather than the problem of international competitiveness decreasing. For example, on the situation of none import continuously for 5 years, the import value of HS01 in Shannxi is up to USD4,240,000 in 2004, which causes the negative value of HS01 TC and CA index in that year, and the result doesn't reflect the actual situation of international competitiveness.

3.4 Considering the results of these indexes completely, we should develop the international competitiveness and competitive advantage of Shanxi agricultural product on the foundation of comparative advantage. Although both the TC and CA index can present that most agricultural product in Shanxi have a certain international competitiveness, the RCA index shows some agricultural products (the HS04, HS09, HS15 and HS17) still haven't got the export

competitiveness. To increase the allocative efficiency of agriculture resources and promote the exportation of agricultural product, we should concentrate on developing the agricultural product with comparative advantage in Shanxi, and optimize the import and export structure of Shanxi agriculture product on the basis of comparative advantage, promote the quality of export product, then improve its competitiveness in international market substantially.

## REFERENCES

- Abbas J.Ali. (1998). *How to manage for international competitiveness*. New York: International business press, pp.130.
- Cai Hualin, Wen Xiaoxia. (2005). 'Analysis on agriculture competitiveness for Shanxi in the background of WTO'. *Chinese agriculture science bulletin*, Vol.21, No.3, pp.350-353.
- Cheng Weiping. (2005). *The international competitiveness of China agriculture—theories, methods and empirical analysis*. China Renmin university press, pp.117-121, Beijing.
- Feng Mingfang. (2005.10). *The main measures to expand the exportation of labor-intensive agriculture product in Shanxi, Market modernization*, pp.21-22.
- Liu Chunxiang, Song Yuhua. (2004). 'On the comparative advantage and competitiveness of China agriculture'. *Journal of China agriculture university, Social sciences edition*, No.4, pp.8-12.
- Tian Yuan, Song Weiming, Cheng Bao Dong. (2005). *Comparative analysis on the international competitiveness of China's plywood, the problem of international trade*, No.9, pp.22-27.
- Wang Zhengbing. (2003). *The situations and measures of external trade about Shanxi agriculture product*, <http://www.uast.com.cn>.
- Wu Jingyuan. (2002). 'Exploring and analysis on the thinking of comparative advantages strategy for Shanxi province'. *Journal of Shanxi administration school and Shanxi economic management school*, Vol.16, No.4, pp.36-40.
- Wu Jingyuan. (2003). 'Exploring and analysis on the thinking of comparative advantages strategy for Shanxi province(continuation)'. *Journal of Shanxi administration school and Shanxi economic management school*, Vol.17, No.1, pp.43-46.
- Yan Guoqing, Cheng li Jin, Liu Cun Xiang. (2004). The empirical analysis of comparative advantage and competitiveness about internal agriculture product. *The problem of international trade*, No. 4, pp.17-22.
- Zhang Jingchang. (2002). *The theories and methods of international competitiveness evaluation*. Beijing: The economic science press, pp.117-125.

## THE AUTHORS

**Zhang Genneng**(1962-), Female, Shanxi, Associate Professor, Master's Degree. School of Business Administration, Xi'an University of Technology, Xi'an, Shanxi, 710054, P.R.China.

E-mail: zgnxaut@163.com

**Xu Liqiu**(1981-), Female, Liaoning, Postgraduate, Bachelor's Degree. School of Business Administration, Xi'an University of Technology, Xi'an, Shanxi, 710054, P.R.China.

E-mail: xlq\_8755@163.com

**Wu Ou**(1983-), Female, Guizhou, Postgraduate, Bachelor's Degree. School of Business Administration, Xi'an University of Technology, Xi'an, Shanxi, 710054, P.R.China.