

台灣 WTO 入會對運動工業衝擊之研究

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中文摘要

本文主旨在評估台灣加入世界貿易組織（WTO）後對當地運動商品製造業與運動服務業的衝擊。經過調查與統計分析，我們發現台灣對 WTO 的市場開放承諾並不會對當地運動業造成太嚴重的影響。但是，值得建議的是，台灣的運動業者應設計更顧客化、更具附加價值的產品以迎接 WTO 入會後的挑戰。與中國大陸以及其他 WTO 會員國協商簽訂雙邊投資協定將有助改善生產地點的彈性以及鞏固台灣世界

運動器材製造基地的地位。

至於面臨外國運動服務業的競爭，台灣當地的相關業者應採取策略聯盟、購併或合營等適切的策略改善競爭力。政府亦應更加努力制訂促進運動工業的規範。最後，就 WTO 的協商架構而言，吾人當充分利用此一多邊機制來積極回應 WTO 入會所帶來的機會與挑戰。



The Study of the Impact of Taiwan's WTO Accession on its Sporting Industries

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I. Introduction

Taiwan joined the World Trade Organization(WTO) at the beginning of 2002 as the 144th member of this important international organization and formally returned to the world trading system to play its part on the arena.

Accession to the WTO brought opportunities as well as challenges to Taiwan. On the one hand, this country would enjoy fairer opportunities to deal with other trading countries in the world. On the other hand, as a member of this rule-based system, Taiwan has to comply with obligations in all aspects of liberalization which will expose local markets to powerful foreign competitors and surely will have impact on local industries, at least in the short term.

During the past decades, Taiwan has developed successfully its sporting goods industry. Manufacturers in sporting equipment, clothing, shoes, bicycles and other sport-related products have written many successful stories and contributed a lot to the national income. In recent years, with the improvement of living quality, people in Taiwan became more aware of personal health. Such awareness created much bigger needs for sporting services as well as sporting goods. It is therefore very sensible to evaluate the WTO accession's implications for the booming sporting industry in Taiwan.

This paper was intended to evaluate the impact of Taiwan's WTO accession on two major sectors of its sporting industry: sporting goods manufacturing sector and sporting services sector. Upon the WTO accession, Taiwan would be obliged to fulfill its commitments in liberalizing protective measures such as import tariffs, import regulations, area-specific import restrictions, and the Aggregate Measurement Support (AMS).

First of all, through careful investigation and statistical analysis, we realized: (1) economic structure and current business situation of Taiwan's sporting goods manufacturing sector and sporting services sector; (2) the concerned sectors' understanding on the commitments (such as horizontal commitments or specific commitments in individual sectors) in tariff reductions and market access; (3) the advantages and disadvantages to the concerned sectors brought by the accession; (4) the coping strategies for the concerned sectors and the government might be able to take.

Second, we established a Computable General Equilibrium (CGE) model based on the data obtained in the previous stage. Using the CGE model and considering the reduction or elimination of trade barriers (including horizontal and specific commitments in sporting service sector) after Taiwan's WTO accession, we evaluated the impact of Taiwan's WTO accession on its macroeconomics, industrial structure of the concerned sectors, sporting goods manufacturing and sporting service, and estimated the possible change about the business opportunities in sporting industry.

The we compare our findings with recent findings made by other institutions concerning the impact of WTO accession on different sectors in hope of producing a better evaluation report. Finally, proposed coping strategies, according to the findings in our model evaluation and analysis, for the concerned sectors to take in the future. Our suggestions might also be useful to the government in its policy making and law amending.

II. Characteristics and Current Situation of Sporting Industry in Taiwan

Sporting industry(or sport industry) is composed of all markets supplying products related to health, sport, leisure, recreation (Pitts, Fielding and Miller,1994) . This industry can be generally divided into two categories: sporting goods and sporting services. In recent years, sporting industry has grown significantly in Japan (Oga and Mitzutani, 1997) , USA(Meek, 1997) and many other countries. Taiwan has been a leading manufacturing base of sporting goods and the significance of sporting services has developed rapidly due to improvement in personal income and available leisure time.

1. Current Situation of Sporting Goods Industry

Taiwan began to export its sporting goods in 1970s. Nowadays, more than 90% of local products are for export. Many manufacturers started their businesses in the way of OEM for internationally renowned brands. Taiwan's export value of sporting goods in 1989 exceeded \$1.8 billion and ranked the leading manufacturing base in the world. After 1990, however, manufacturers began to move low-ends items outward to China and Southeast Asia to cope with the hiking costs in labor, land, and exchange rates.

In 2001, there are about 290 major sporting goods manufacturers in Taiwan, mostly small or middle in size. The employees are about 24,000 in

total.

In the same year, the total product value of Taiwan's sporting goods amounted to NT \$55.2 billion (Table1), with the USA as the single biggest market. While the imported goods amounted to NT\$ 4.1 billion (Table3), with China as the major source, outrunning the previous leader-Japan.

It is noteworthy that Taiwan's sporting goods value might have been underestimated in some statistics. According to local codes, sporting shoes and bicycles are categorized into shoes and vehicles respectively.



Table1. Major Exporting Countries of Taiwan's Sporting Goods

Unit: million US\$

country	1997	1998	1999	2000	2001	Market share (%)
US	611	482	401	330	538	34.6
JAPAN	413	368	309	267	254	16.3
GERMANY	85	72	54	59	88	5.7
UK	63	57	53	47	70	4.5
CANADA	37	33	28	24	30	1.9
AUSTRALIA	60	46	31	24	28	1.8
ITALY	15	14	14	17	21	1.4
FRANCE	28	30	25	24	19	1.3
SWEDEN	14	18	17	15	14	0.9
OTHERS	578	585	443	426	490	31.6
TOTAL	1,908	1,709	1,380	1,236	1,555	100.0

SOURCE: Customs Authority Statistics , R.O.C.



Table2. Taiwan's Sporting Goods :Exporting Items and Value
Unit: million US\$

ITEMS	1997	1998	1999	2000	2001
Equipment not in specific category	625	601	489	439	709
Gym Equipment	323	278	248	259	351
Golf Equipment	469	475	385	327	318
Sailboard, surfingboard and other watersports Equipment	44	35	28	330	41
others	402	282	199	143	92
total	1,908	1,709	1,380	1,236	1,555

SOURCE: id. Table1.



Table3. Taiwan's Sporting Goods :Major Importing Countries

Unit: thousand NT\$

country	1997	1998	1999	2000	2001	Market
						share(%)
China	782,968	813,495	1,033,528	1,198,921	1,528,799	36.9
Japan	1,592,980	1,728,961	1,350,029	1,161,581	1,101,736	26.6
USA	1,689,756	1,127,136	880,137	737,810	927,720	22.4
HK	192,446	160,160	52,569	23,552	58,753	1.4
Italy	12,602	43,189	58,038	40,107	32,270	0.8
France	33,342	32,260	23,306	29,406	20,077	0.5
Germany	73,518	79,531	37,541	25,828	19,620	0.5
Holland	2,262	1,085	8,227	4,106	12,408	0.3
Australia	43,809	42,797	45,107	25,984	10,651	0.2
UK	18,858	9,475	17,266	11,495	9,550	0.2
others	767,807	648,568	632,647	510,778	419,091	10.2
total	5,210,348	4,686,657	4,138,395	3,769,568	4,140,675	100.0

SOURCES: id. Table1.



Table4. Taiwan's Sporting Goods : Major Imported Items

Unit: thousand NT\$

Items	1997	1998	1999	2000	2001
Golf Equipment	2,234,880	2,192,354	1,812,813	1,675,896	2,021,737
Equipment not in specific category (including mini-swimming pool, bow)	329,227	355,977	341,999	273,823	380,755
Fishing rods, hooks	573,474	531,624	417,388	381,838	344,203
Other fishing Equipment	288,538	268,525	370,616	330,469	299,362
Gym Equipment	234,379	206,261	200,565	209,449	296,834
others	1,549,850	4,686,657	4,138,395	3,769,568	4,140,675
total	5,210,348	4,686,657	4,138,395	3,769,568	4,140,675

SOURCES: id. Table1.



2. Current Situation of Sporting Services Industry

In Taiwan, "Fitness Club" is the most important type of sporting services. The first "Fitness Club" in Taiwan was established in 1970. Today, there are 129 such clubs in total. There are five broad types of managing styles:

- Multifunctional type
- Community type
- Business club type
- Professional fitness center type
- Hotel affix type

There are about forty facilities in the "Fitness Club", including various "rooms" or "areas" Most of the clubs in Taiwan charge in membership basis. In the past three or four years, the business of "Fitness Club" appeared to be booming because of foreign investors' joining the market. Local people's awareness in health also facilitate the development of this industry.

III. Liberalization Commitments in Sporting Industry under the WTO Framework

1. Tariffs reduction in Sporting Goods

Because Taiwan joined the WTO as a developed country, it has to comply with norms and rules for developed countries. The average nominal rate of duty is 8.20%(Table 5), about the same level as most of the advanced countries in the world. However, nominal rate of many products, especially agriculture products, are over 20%. At Taiwan's accession to the WTO in 2002, 4,491 items are in the tariff concession list, including 3,470 of industrial goods and 1,021 items of agriculture goods. Total reduction rate is 32.44%, 31.18% for industrial goods and 35.56% for agriculture goods.

Table5. The Nominal Tariff Rate Schedule before and after Taiwan's WTO Accession

Tariff item	2001 rate of duty (%)	Accession Bound rate of duty (%)	Final Bound rate of duty (%)	Reduction (%)	Reduced items
Total	8.20	7.08	5.53	32.56	4,491
Industrial products	6.03	5.78	4.15	31.18	3,470
Sporting clothing and textile	12.50	12.50	12.00	4.00	19
Sporting shoes	5.00 ~10.00	5.00 ~10.00	5.00 ~10.00	-	-
Sporting (Fitness) equipment	4.00 ~5.00	4.00 ~5.00	0 ~3.40	-	16
Agriculture products	20.02	14.01	12.86	35.76	1,021

SOURCE : BOFT, Ministry of Economic Affairs

Current rate of duty in sporting goods is about 5%, we promised to reduce the tariffs further by 1.6% to 2% in 2006, including 19 items of sporting clothing and textile and 16 items of sporting equipment.

2. Liberalization Commitments in Sporting Services

A. Taiwan

Taiwan finalized its schedule of commitment in services in September 2001. Basically, Taiwan maintained its previous level of limitations on market access. However, it made no commitments on market access, unless that being specified in the schedule of horizontal commitments, regarding

the mode four of services supply due to social security and employment stability considerations.

TAIWAN: Recreational, Cultural and Sporting Services - Sporting and Other Recreational Services

Modes of Supply: 1) Cross-border, 2) Consumption Abroad, 3) Commercial Presence, 4) Presence of Natural Persons

Sector or subsector: 9641 sporting services

(96411 Sports event promotion services; 96412 Sports event organization services; 96419 Other sporting services)

Limitations on Market Access	Limitations on National Treatment
1) None 2) None 3) None 4) Unbound except as indicated in HORIZONTAL COMMITMENTS	1) None 2) None 3) None except as indicated in HORIZONTAL COMMITMENTS 4) Unbound except as indicated in HORIZONTAL COMMITMENTS

Foreign businesses and natural persons are allowed to stay in Taiwan according to the schedule of horizontal commitments on **mode four** as below:

Limitations on Market Access	Limitations on National Treatment
Unbound, except for measures concerning the entry and temporary stay of natural	Unbound except for measures concerning the categories of natural persons referred to in the

<p>persons in the following categories:</p> <p>(a) <u>Business visitors</u> may enter and stay for an initial period of no more than 90 days.</p> <p>Business visitor being a natural person who stays in Chinese Taipei without receiving remuneration from within Chinese Taipei and is not engaged in making direct sales to the general public, for the purpose of participating in business meetings, business negotiations, the preparation for establishing a commercial presence or other similar activities.</p> <p>(b) <u>Intra-corporate Transferees</u> may enter and stay in Chinese Taipei for three-year initial period that may be renewed for one-year periods indefinitely.</p> <p><u>Intra-corporate transferee</u> being a natural person who has been employed by a juridical person of another member for a period of not less than 1 year and who seeks</p>	market access column.
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temporary entry to provide services as a responsible person, a senior manager or a specialist through a branch, subsidiary or affiliate established in Chinese Taipei.

A responsible person means a board director, the general manager, a branch manager or a department head appointed by the board with the authority to sign for the employing entity.

A senior manager means a head or a supervisor who has the authority to appoint or remove the personnel or to make such recommendation, and has the power to make decisions over the day-to-day operation.

A specialist means a natural person within an organisation who possesses knowledge at an advanced level of expertise and who possesses proprietary knowledge of the organisation's services, research equipment, techniques, or management. (Specialists may include, but

are not limited to, members of licensed professions.)

(c) A natural person employed by business entities in Chinese Taipei, may enter and stay for a period of no more than 3 years.

(d) Persons who are employees of an enterprise outside Chinese Taipei not having commercial presence in Chinese Taipei may enter and stay in Chinese Taipei with the following requirements:

i. The enterprise outside Chinese Taipei has concluded a service contract with an enterprise engaged in business operation in Chinese Taipei;

ii. These persons should have been employed by the enterprise outside Chinese Taipei for a period of no less than one year and have met the requirements prescribed for "specialist" above;

iii. The persons may not engage in other employment while in Chinese Taipei;

<p>iv. The commitment relates only to the service activity which is the subject of the contract. It does not confer entitlement to practice generally as a licensed professional in Chinese Taipei.</p> <p>Each temporary stay may be for a period of no more than 90 days or for the duration of the contract, whichever is less.</p> <p>Such entry permit may be valid for a twelve month period.</p> <p>Such persons may be permitted multiple entries within the twelve month period.</p>	
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B. China

China did not make specific commitment in sporting services. However, its horizontal commitments in services is relevant in matters concerning the establishment of foreign services, including the sporting services in China. Basically, foreign firms are allowed to establish representative offices, China was not committed to the establishment of foreign enterprises branches in China. Since land in China is owned by the state, all foreign services industries, including sporting services, are subject to the 50-year

maximum limitation of land leasing. China made horizontal commitments on mode three and mode four services supply as below:

Limitations on market access	Limitation on national treatment
<p>(3) In China, foreign invested enterprises include foreign capital enterprises (also referred to as wholly foreign-owned enterprises) and joint venture enterprises and there are two types of joint venture enterprises: equity joint ventures and contractual joint ventures.</p> <p>The proportion of foreign investment in an equity joint venture shall be no less than 25 per cent of the registered capital of the joint venture.</p> <p>Establishment of branches by foreign enterprises is unbound, unless otherwise indicated in specific sub-sectors, as the laws and regulations on branches of foreign enterprises are under formulation. Representative offices of foreign enterprises are permitted to be established in China, but they shall not engage in any profit-making activities except for the representative offices under CPC 861, 862, 863, 865 in the sectoral specific commitments.</p>	<p>(3) Unbound for all the existing subsidies to domestic services suppliers in the sectors of audio-visual, aviation and medical services.</p>

The conditions of ownership, operation and scope of activities, as set out in the respective contractual or shareholder agreement or in a licence establishing or authorizing the operation or supply of services by an existing foreign service supplier, will not be made more restrictive than they exist as of the date of China's accession to the WTO.

The land in the People's Republic of China is State-owned. Use of land by enterprises and individuals is subject to the following maximum term limitations:

- (a) 70 years for residential purposes;
- (b) 50 years for industrial purposes;
- (c) 50 years for the purpose of education, science, culture, public health and physical education;
- (d) 40 years for commercial, tourist and recreational purposes;
- (e) 50 years for comprehensive utilization or other purposes.



<p>(4) Unbound except for measures concerning the entry and temporary stay of natural persons who fall into one of the following categories:</p>	<p>(4) Unbound except for the measures concerning the entry and temporary stay of natural persons who fall into the categories referred to in the market access column.</p>
<p>(a) Managers, executives and specialists defined as senior employees of a corporation of a WTO Member that has established a representative office, branch or subsidiary in the territory of the People's Republic of China, temporarily moving as intra-corporate transferees, shall be permitted entry for an initial stay of three years;</p> <p>(b) Managers, executives and specialists defined as senior employees of a corporation of WTO Members, being engaged in the foreign invested enterprises in the territory of the People's Republic of China for conducting business, shall be granted a long-term stay permit as stipulated in the terms of contracts concerned or an initial stay of three years, whichever is shorter;</p>	

- | | |
|---|--|
| <p>(c) Service salespersons – persons not based in the territory of the People's Republic of China and receiving no remuneration from a source located within China, and who are engaged in activities related to representing a service supplier for the purpose of negotiation for the sale of services of that supplier where:</p> <ul style="list-style-type: none">(a) such sales are not directly made to the general public and(b) the salesperson is not engaged in supplying the service: entry for salespersons is limited to a 90-day period. | |
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C. Japan

Japan is one of the very few major countries making specific commitments in sporting services, although its level of market access commitments is not high (mode two and three only). Foreign sporting services, however, enjoy limited opportunities to compete in the Japanese market.

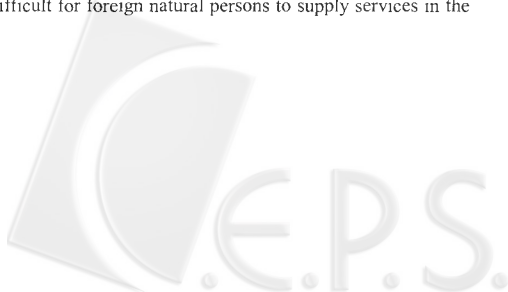


JAPAN: Recreational, Cultural and Sporting Services - Sporting and Other Recreational Services**Sector or subsector: Sporting services 9641**

Limitations on Market Access	Limitations on National Treatment)
1) Unbound 2) None 3) None 4) Unbound except as indicated in HORIZONTAL COMMITMENTS	1) Unbound 2) None 3) None except as indicated in HORIZONTAL COMMITMENTS 4) Unbound except as indicated in HORIZONTAL COMMITMENTS

D. European Communities

Like many other countries (including Taiwan), the EC set limitations on mode four only. Yet the required '**economic needs test**' makes it more difficult for foreign natural persons to supply services in the EC.



EC: Recreational, Cultural and Sporting Services - Sporting and Other Recreational Services

Sector or subsector: Sporting services 9641

Limitations on Market Access	Limitations on National Treatment)
1)None 2)None 3)None 4) Unbound except as indicated in the horizontal section and subject to the following specific limitations: economic needs test	1)None 2)None 3)None 4) Unbound except as indicated in HORIZONTAL COMMITMENTS

E. USA

The US made no specific commitments in sport services, while made horizontal commitments in the mode four of services supply as follows:



Limitations on Market Access

All Sectors: Temporary Entry And Stay of Natural Persons

- 1) Unbound, except for measures concerning temporary entry and stay of nationals of another member who fall into the categories listed below:

Services Salespersons - persons not based in the territory of the United States and receiving no remuneration from a source located within the United States, who are engaged in activities related to representing a services supplier for the purpose of negotiating for the sale of the services of that supplier where: a) such sales are not directly made to the general public and b) the salesperson is not engaged in supplying the service. Entry for persons named in this section is limited to a ninety-day period.

Intra-corporate Transferees - managers, executives and specialists, as defined below, who are employees of firms that provide services within the United States through a branch, subsidiary, or affiliate established in the United States and who have been in the prior employ of their firm outside the United States for a period of not less than one year immediately preceding the date of their application for admission and who are one of the following:

- a) Managers - persons within an organization who primarily direct the organization, or a department or sub-division of the organization, supervise and control the work of other supervisory, professional or managerial employees, have the authority to hire and fire or recommend hiring, firing, or other personnel actions (such as promotion or leave authorization), and exercise discretionary authority over day-to-day operations. Does not include first-line supervisors, unless the employees supervised are professionals, nor does it include employees who primarily perform tasks necessary for the provision of the service.
- b) Executives - persons within the organization who primarily direct the management of the organization, establish the goals and policies of

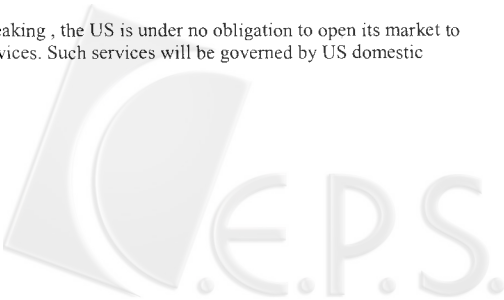
the organization, exercise wide latitude in decision-making, and receive only general supervision or direction from higher-level executives, the board of directors, or stockholders of the business. Executives would not directly perform tasks related to the actual provision of a service or services of the organization.

- c) Specialists - persons within an organization who possess knowledge at an advanced level of continued expertise and who possess proprietary knowledge of the organization's services, research equipment, techniques, or management. (Specialists may include, but are not limited to, members of licenced professions.)

Entry for persons named in this section is limited to a three-year period that may be extended for up to two additional years for a total term not to exceed five years.

Personnel Engaged in Establishment - A person who has been employed in the immediately preceding year by an entity described in Section II, receiving remuneration from that source, who occupies a managerial or executive position with that entity and is entering the territory of the United States for the purpose of establishing an entity described in Section II that will support employment of persons named in paragraphs a), b), and c) therein. The subject persons shall present proof of acquisition of physical premises for the entity that shall commence its business operations within one year of the date of entry of that person.

Briefly speaking, the US is under no obligation to open its market to foreign sport services. Such services will be governed by US domestic regulations.



IV. Impacts of WTO Accession on Taiwan's Sporting Industry

1. Analysis of Industrial Survey

Manufacturers in Taiwan's sporting goods are generally pessimistic about their own profitability under the WTO framework. In the long run, strong competitors will stay. We therefore suggest that the profitability of the industry on the whole will be no lower than the level before. Furthermore, because of the total production growth upon WTO accession, the needs for sporting goods will be much improved eventually.

For sporting services, there will be complicated problems caused by movement of labor and capital or the use of land. Some local sporting services might be under greater competition pressure, but job opportunities will not be too much affected unfavorably, and consumers will benefit most.

2. Analysis of Policy Simulation Results

This study, by using CGE model and policy simulation¹, found that the expected annual increase rate on the production value in Taiwan's sporting goods industry from 2002(WTO accession year) to 2006 will be -3.64%, lower than the baseline expected average annual increase rate -2.98% by 0.66 percentage point, signifying the comparative advantage of this

¹ The construction of the CGE model contains an input-output database compiled from the 1996 Taiwan's Input-Output Tables. The model employed for the present study distinguishes 160 sectors, 6 types of occupations, 8 types of marketing margins and 170 commodities. The most significant features that distinguish our CGE model from other static CGE models are the inclusion of imperfect substitutions between factors, technology bundles, and dynamic mechanism capable of projecting the development of the economy through time. Appendix Table 1 presents the simple structure equations of the dynamics CGE model.

traditional industry will become weaker as the trade liberalization proceeds. According to the simulated annual increase rate time path, we estimate that sporting goods production value will be decreased from NT\$ 53.7 billion of 2001 to NT\$ 44.6 billion of 2006, the estimated decrease scale will be NT\$ 9.1 billion (Figure 1). The Employment of Taiwan's sporting goods manufacturers will be decreased from 23,600 persons of 2001 to 19,100 persons, the estimated decrease scale will be 4,500 persons (Figure 2). After WTO accession, between 2001-2006, the employment annual increase rate in this industry will be -4.14%, lower than the base line expected average annual increase rate -2.03% by 2.11 percentage point, signifying that this industry will continue its production in labor-saving technological process (Barro and Sala-i-Martin, 1995).

The average annual increase of sporting goods export between 2001 and 2006 will be -2.23%, lower by 1.37 percentage point than base line. We estimate that exporting value of sporting goods will decrease by NT\$160,000 thousand between 2001 and 2006 (Figure 3). Importing of sporting goods will be increased by 1.01 percentage point (NT\$340,000 thousand) between 2001 and 2006 (Figure 4).

Due to cultural differences and location advantage, the WTO accession does not make significant impact on sporting services industry. Between 2001-2006, total average annual increase rate of sales maintains at 3.29% higher than the accession base rate 2.94% by 0.35 percentage point, the simulated increase will be NT\$9.412 billion (Figure 5). The employment increase between 2001 and 2006 will be 1.49 percentage point or 14,000 persons (Figure 6). Due to rapid economic growth, price of sporting services will be increased and the profitability of the industry will be improved (Figure 7).

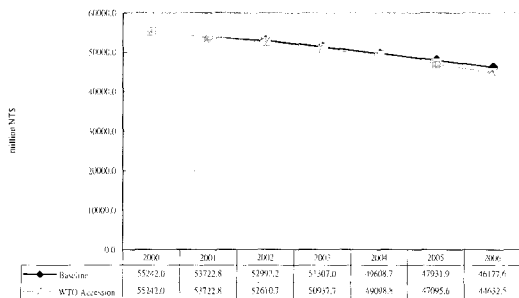


Figure 1 WTO Simulation Results on the Output of Taiwan's Sporting Goods



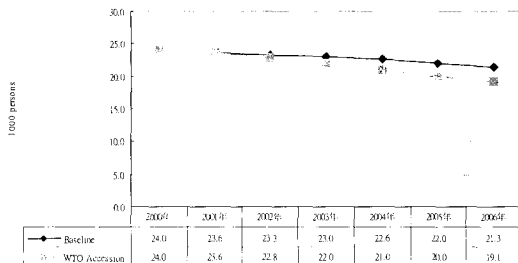


Figure2 WTO Simulation Results on the Employment of Taiwan's Sporting Goods

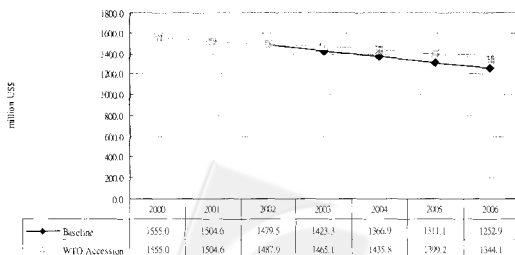


Figure3 WTO Simulation Results on the Export of Taiwan's Sporting Goods

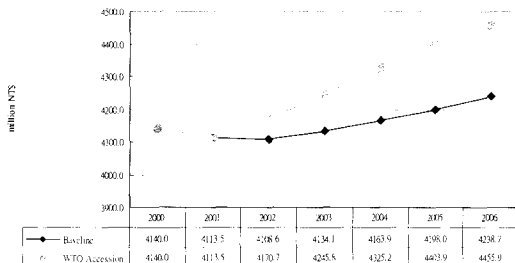


Figure4 WTO Simulation Results on the Import of Taiwan's Sporting Goods

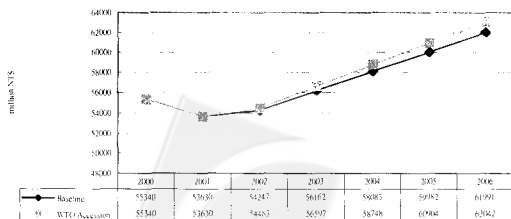


Figure5 WTO Simulation Results on the Sales of Taiwan's Sporting Services

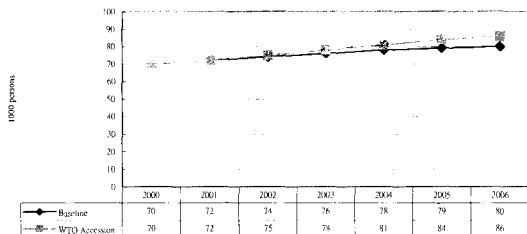


Figure6 WTO Simulation Results on the Employment of Taiwan's Sporting Services

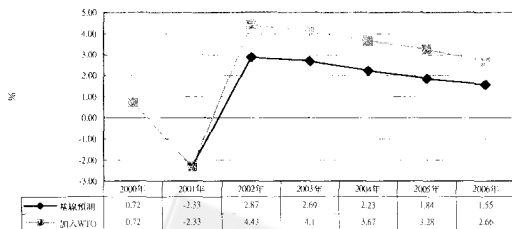


Figure7 WTO Simulation Results on the Price Change of Taiwan's Sporting Services

V. Conclusion

Market access commitments under the WTO framework will not have very serious direct impact too on Taiwan's sporting industry. However, it is advisable for local firms to design more customized, value-added products to meet upcoming challenges. Negotiating bilateral investment agreements with China and other members under the WTO is an option which will improve the flexibility in production location and consolidate our position as world leading manufacturing base of sporting goods.

Facing the competition from foreign sporting services, it is advisable for the local firms to undertake appropriate strategies such as strategic alliance, merger or joint venture to improve competitiveness. The government should also make more efforts in making rules to facilitate sporting industry. Finally, given that the WTO is a negotiation forum, we should make full use of this multilateral mechanism to respond more actively to opportunities and challenges brought by the WTO accession.

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Appendix Table 1 Equations of the Dynamics CGE model

Identifier	Equation	No. of components
	Demand for domestically produced commodities by domestic agents	
(1)	$X_{1D} = F_1(Z, P_1, P_2, A_{1D}, A_{2D})$	N
	Demand for imported commodities by domestic agents	
(2)	$X_{2D} = F_2(Z, P_1, P_2, A_{1D}, A_{2D})$	N
	Technology coefficients(by domestically produced commodities)	
(3)	$A_{1D} = F_3(A_{1D}^*, A_1, A_{12}^{twist})$	N(2N+2)
	Technology coefficients(by imported commodities)	
(4)	$A_{2D} = F_4(A_{2D}^*, A_2, A_{12}^{twist})$	N(2N+2)
	Demand for exports	
(5)	$X_{1F} = F_5(P_1^*, S_{1F})$	N
	Labor demand	
(6)	$L_D = F_6(Z^1, W, R_D, A_L, A_K)$	N
	Capital demand	
(7)	$K_D = F_7(Z^1, W, R_D, A_L, A_K)$	N
	Labor saving technology process	
(8)	$A_L = F_8(A_L^*, A_{prim})$	N
	Capital saving technology process	
(9)	$A_K = F_9(A_K^*, A_{prim})$	N

Zero-profit condition

$$(10) \quad P_1 = F_{10}(W, R_D, P_2, A_{1D}, A_{2D}, A_L, A_D) \quad N$$

Price of exports(at F.O.B. price)

$$(11) \quad P_1 = P_1^* \Phi T_{1F} \quad N$$

Price of imports(at C.I.F. price)

$$(12) \quad P_2 = P_2^* \Phi T_2 \quad N$$

Keynesian-style consumption function

$$(13) \quad Z^3 = F_{11}(W, L_D, K_D, R_D, P_1, P_2, \Psi) \quad 1$$

Market-clearing conditions for domestically produced commodity

$$(14) \quad Z^1 = X_{1D} + X_{1F} \quad N$$



Appendix Table 2. (continued)

Identifier	Equation	No. of components *
Market-clearing conditions for labor		
(15)	$L = l' L_D$	1
Market-clearing conditions for capital		
(16)	$Z^{TOT} = F_{12}(Z^2)$	1
Market-clearing conditions for imported commodity		
(17)	$M = (P_2^*)' X_{2D}$	1
Capital accumulation		
(18)	$K_D^{+1} = F_{14}(R_D, S_D^2, S^2)$	N
Gross fixed capital formation		
(19)	$Z^2 = F_{15}(K_D, K_D^{+1})$	N
Real wage adjusted process		
(20)	$\dot{W} = F_{16}(L_D, \xi)$	N
Total number of components		$4N^2 + 18N + 4$

* N is the number of industries and commodity categories distinguished in the model.

Appendix Table 2. Variables of the Dynamic CGE model

Symbol	Description	No. of components
X_{1D}	Demand for domestic goods by domestic agents.	N
X_{2D}	Demand for imports by domestic agents.	N
Z	Activity levels of domestic agents. (This comprises four subvectors labeled Z^i , $i=1,2,3,5$. Z^1 and Z^2 contain current output levels and real investment levels for the N industries. Z^3 and Z^5 are the real aggregate spending levels of the single household and the government.)	$2N+2$
P_1	Domestic prices of domestic goods.	N
P_2	Domestic prices of imports.	N
A_{1D}	Technology coefficients relating to the use of domestic goods by domestic agents.	$N(2N+2)$
A_{2D}	Technology coefficients relating to the use of imports by domestic agents.	$N(2N+2)$
A_{1D}^*	User-dependent components of technology coefficients relating to the use of domestic goods.	$N(2N+2)$
A_{2D}^*	User-dependent components of technology coefficients relating to the use of imports.	$N(2N+2)$
A_1	User-independent components of technology coefficients relating to the use of domestic goods.	N
A_2	User-independent components of technology coefficients relating to the use of imports.	N
A_{12}^{twist}	Component of commodity-use technology coefficients determining import/domestic mix.	1

X_{1F}	Demands for exports.	N
P_1^*	At-port foreign-currency prices of exports.	N
P_2^*	At-port foreign-currency prices of imports	N
S_{1F}	Variables locating the positions of export demand schedules.	N
L_D	Employment by industry.	N
K_D	Currently available capital by industry.	N
K_D^{+1}	Capital available for next period.	N
W	The wage rate.	1
R_D	Rental rates on capital by industry.	N
A_L	Technology coefficients: use of labor.	N
A_K	Technology coefficients: use of capital.	N
A_L^*	Industry-dependent component of technology coefficient relating to the use of labor.	N
A_K^*	Industry-dependent component of technology coefficient relating to the use of capital.	N
A_{prim}	Economy-wide, input-independent technology coefficient relating to the use of primary factors.	1
Φ	Nominal exchange rate.	1
T_{1F}	Powers of export taxes (power=1 plus tax rate)	N
T_2	Powers of tariffs on imports.	N
Ψ	Average propensity to consume.	1

L	Aggregate employment.	1
Z^{TOT}	Aggregate real investment.	1
M	Aggregate import bill (foreign currency)	1
S_D^2	Industry-specific shift variable in investment equation (18)	N
S^2	Scalar shift variable in investment equation (18)	1
ξ	Wage rate in steady state.	N
Total number of components		$8N^2+32N+1$
		1

