

# **The Trans-Pacific Partnership Agreement: Implications for the Fishery Sector in Taiwan**

## **Abstract**

The Trans-Pacific Partnership Agreement (TPP) is a regional free trade agreement of broad scope and comprehensive coverage with high-standard disciplines. Taiwan government has announced its intention to join the TPP. Under the current TPP agreement, tariffs on fish and fishery products will ultimately be fully eliminated. To support the liberalization effort, this study utilizes a price-endogenous mathematical-programming-based Taiwan fishery sector model (TFSM) to evaluate the potential impact of eliminating tariffs on fishery production and consumption in Taiwan. This qualified support for liberalization stems from production systems for fish being highly heterogeneous and subject to extensive levels of management and border protection. The average nominal tariff rate is 19.85% for Taiwan's fishery products (HS 03), which is much higher than the average tariff of TPP members' fishery products, 3.62%. Thus, the tariff elimination is expected to enlarge the fishery import significantly. On the other hand, Taiwan's main export fishery products including tuna, skipjack, grouper, Pacific saury, squid, eel, etc., have relatively low tariffs (either below 5% or zero) in most TPP members. Thus, the removal of low tariff barriers cannot stimulate more export for Taiwan's fishery products.

TFSM is implemented by the GAMS software, which defines 44 fishing techniques and 57 fishery products. We use the UN FAO database and Taiwan's official data to compare the highest import price and lowest export price of all fishery products between TPP members and Taiwan. The result shows that the total production value of fishery sector will be reduced by 3.90%, in which the potential import products increased by 104.52% and the potential export reduced products by 5.77%. The tariff elimination would also reduce the domestic price of fishery products. For example, the production of saury, mackerel, clams and other offshore and coastal fish reduced more than 10.23%, while the import of these product increased 10~15%. Thus, the government has to negotiate a reasonable transitional period for implementing structural reforms in response. Meanwhile the fishery industry has to enhance their operational efficiency to meet the challenges of globalization and high-standard free trade agreement.

# **The Trans-Pacific Partnership Agreement: Implications for the Fishery Sector in Taiwan**

## **1. Introduction**

After five years' effort, the The Trans-Pacific Partnership Agreement (TPP) negotiations successfully concluded on 6 October 2015 (AEST). TPP is a regional free trade agreement of broad scope and comprehensive coverage with high-standard disciplines in areas like state-owned enterprises, labor, and intellectual property rights. TPP is the highest level of liberalization trade agreement in the 21 century. It currently comprises 12 countries representing a gross domestic product (GDP) of US\$28.05 trillion (36.3% of the world), a combined market of nearly 805.4 million people (11.2% of the world) and world trade values of US\$9.55 trillion (25.5% of the world) in 2014, where the fishery products (HS 03) trade values of US\$63.14 billion.

To avoid being marginalized, Taiwan government has announced its intention to join the TPP. Although Taiwan's far-sea fisheries is relatively competitive in the world, the offshore and coastal fisheries restricted to natural resources and high labor wages are relatively competitive disadvantage.

The purpose of this paper is to discuss the impact of Taiwan's fishery sector under Taiwan joining TPP. Under the current TPP agreement, tariffs on fish and fishery products will ultimately be fully eliminated, except for the Japanese seaweed products. To support the liberalization effort, this study utilizes a price-endogenous mathematical-programming-based Taiwan fishery sector model (TFSM) to evaluate the potential impact of eliminating tariffs on fishery production and consumption in Taiwan.

## **2. The Market Access of Fish and Fishery Products under TPP**

According to the TPP Agreement, TPP had indeed reached the set goal of market opening, TPP member countries agreed to reduce tariffs on industrial products and the elimination of non-tariff trade barriers, and eliminate or reduce tariffs on agricultural products and other restrictive policies. TPP member countries agreed tariff concessions table covers all products in the agricultural and fishing products (HS Chapter 1-24 in Chapter dollars), the Executive expires nearly 95-100% removal of tariffs, Member States will eliminate or reduce tariffs and other restrictions policies to increase agricultural trade within the region and enhance food security. In addition to eliminating or reducing tariffs, TPP member countries agreed to promote policy reforms, including the elimination of agricultural export subsidies, to develop

cooperation on state trading enterprises export regulations in WTO, as well as export credits and shorten the duration of restrictions on grain exports, in order to strengthen food security in the region. TPP member countries agreed to a number of activities related to agricultural biotechnology to increase the transparency and cooperation.

TPP member countries on fish market opening as things stand, this article Member States to organize their own TPP Tariff Schedule to HS Chapter III "fish, crustaceans, molluscs and other aquatic invertebrates" of taxes covered by the table 1, TPP member countries aquatic products (HS Chapter 3 to count) base period (2010) the average nominal tariff of 16.58 percent the highest in Mexico, followed by Vietnam 11.87 percent, other member states are in the average tariff aquatic 10 % lower, in which Australia, Brunei, Singapore is a hundred percent tariff, but also includes: Chile (6%), Japan (5.52%), Malaysia (1.26%), the United States (0.92%), Peru (0.59% ), Canada (0.42%), New Zealand (0.26%), compared to our 2015 average nominal tariff aquatic 19.85 percent, aquatic products in the member States show TPP TPP agreement before executing the original degree of liberalization has been quite high.

In TPP member countries, only Japan and the United States respectively, for 5 and 18 aquatic taxes give other members of the different treatment of market opening, which was due to the sensitivity of these products to different tax TPP countries open markets different individual or TPP member States of the different levels of tax concerns, thus opening up the market to take a different mode, Japan, for example, its fresh chilled mackerel (030 264 000) against the United States of JPB12 the process, but other members of the B16 take away.

By the expiration of liberalization ratio shows that all Member States TPP TPP at the expiration of the agreement, all fish tariff reduction to zero, and the effective date of the Agreement to immediately zero tariff reduction ratio up to 92.76% on average, only Japan, Mexico, three members of the United States is not a hundred percent liberalization agreements in force at the time of day, the day of all the other members of the full tariff reduction to zero in the Agreement enters into force, we can see not only the fish eventually fully liberalized and tariffs reach zero speed is quite fast.

Japanese people because of their preference for fresh fish, along the coastal fishery developed in order to reduce the impact on the open market along the coastal fisheries of small household type, the effective date of immediate tariff reduction in Japan's ratio of 62.50%, is the lowest TPP member countries, Japan also adopted 6 kinds of models and tariff reduction implementation period, in addition to immediate, but also includes 6 years, 8 years, 11 years and 16 years, the average yearly cut tariffs

to zero, and for the United States and set up the first eight years without tariff reduction to 9 12-year average tariff reduction to zero tariff reduction mode.

As for Mexico, because of its relatively high aquatic existing tariff, the effective date of its immediate tariff reduction ratio was 64.41%, also adopted six kinds of tax reduction mode and drive the implementation of a maximum period of 15 years; the United States immediately effective date of the tariff reduction ratio of 82.26 %, lower taxes collected four kinds of modes, the implementation of a maximum period of 10 years.

### **3. The Bilateral Trade of Fish and Fishery Products between Taiwan and TPP Members**

TPP member countries in eight member States Department of Fisheries is the world's top 20 countries, these countries (including: the United States, Japan, Vietnam, Peru, New Zealand, Australia, Chile, Canada) the world's total fishing catch and the global water respectively quarter export volume, but overall still fish (to HS Chapter dollars) a net importer of seafood trade deficit in 2014 amounted to \$ 13.241 billion.

Our country is a net exporter of fish, predominantly export competitiveness in the bigeye tuna, skipjack, albacore tuna, squid and saury catch and ocean perch, grouper, eel and other farmed fish, and imported shrimp, salmon, scallops , halibut and eggs. Table 2 shows that in 2014 China's aquatic world trade surplus of about \$ 884 million for TPP countries also have trade surplus of 443 million US dollars, among which Japan, the United States, Vietnam, Australia and Canada as the main export of aquatic products market, Vietnam, Chile, Japan, the United States and Canada as the main source of imports of aquatic products, aquatic products in 2014 but our trade with TPP countries Subtotal although the surplus, but individual countries in addition to Japan, the United States, Vietnam, Australia and Canada surplus, the deficit compared with other countries, we can see the majority of TPP member countries should be China's aquatic products market liberalization and tariff removal some concerns.

On individual aquatic products, China's former TPP countries 10 largest export of aquatic products has 84.71 percent of total exports of aquatic products, from Table 3, the top three export markets for individual items, as well as China's current exports face tariffs, and the market in TPP tariff reduction commitments mode. In general, if our country to join TPP, the top 10 export products except in the Japanese market, most immediately eligible for tariff reduction to zero concessions, especially in the Vietnamese market, as their current tariff rates generally above 10%, but in TPP under

Vietnam's tariff reduction commitments are immediately to zero, so that after China's accession to TPP, Vietnam's seafood export market should be able to save a lot of tariffs. The Japanese market is more than 5, 6, 11 years later, you can zero-tariff access to markets for its current relatively high tariff rates, so the tariff savings are relatively small.

However, if the country did not join the TPP is still the current export tariff countries faced various export markets, while the other TPP countries, or to enter the second round of TPP countries who are able to export at preferential tariffs, so as to maintain the existing export interests, and to further expand exports, China should strive to join TPP, to reduce tariff barriers facing exports.

On the import side, we can see from Table 4, our country imports from TPP top 10 imports of aquatic products has 64.06 percent of total fish imports, the main source of imports to Vietnam, Chile, the United States, Canada and Japan, while China's current import tariffs are still higher than the general tariff countries, and are more than 10%, if the countries in the TPP commitment, these products much more expensive way of tariff reduction to zero immediately open market, so if our country to join TPP, may be required to be apply mutatis mutandis, if further control of such products in Japan tariff reduction commitments circumstances, the number of items including salmon, molluscs and scallops or for 6 or 11-year implementation period, yearly tariff reduction to zero in order to minimize the impact on our country's .

#### **4. Economic Modeling of Fishery**

The economic modeling of fishery in this study is based on Samuelson 's (1952) study which defined a "net social pay-off function," and transferred the regional exchange problem from the concept of consumer's surplus to a solution of social welfare maximized problem under a perfectly competitive market.

Based on the postulate of linear price-supply functions and price-demand functions, Takayama and Judge (1964) developed a quadratic programming model using mathematical programming from Samuelson's approach.

Yaron (1967), Hall, Plessner and Heady (1968), Duloy and Norton (1973), Baumes (1978), Burton and Martin (1987), Adams et al. (1986), and Chang et al. (1992) are just a few of the many applications of the concept to the agricultural sector to establish a price endogenous equilibrium model in order to simulate the economic impacts of policy changes or the shift in the demand or supply side. In the energy, the model by Kennedy (1974), the PIES model (Hogan, Sweeney and Wagner in 1978), and the Zimmerman (1981) Coal Model and the associated paper by Shapiro and

White (1982) are based upon the SPE model. Sun, Chang and Chiang (1999) had specifies a Single-Sector Multi-Activities Partial Equilibrium Model for the fisheries sector in Taiwan evaluate the impacts of the zero tariff reduction on all fisheries output.

The model is specified as follows,

$$\begin{aligned}
 \text{Max} \quad & \sum_h \int P_h^D(Z_h) dZ_h + \sum_h P_h^D E_h \\
 & - \sum_i \int P_i^S(X_i) dX_i \\
 & - \sum_i \sum_h P_i^S M_h
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 \text{Subject to} \quad & Z_h + E_h \\
 & - \sum_k \alpha_{hk} Q_k - M_h \\
 & \leq 0 \quad \text{for all } h \\
 & \sum_k \beta_{ik} Q_k - X_i \\
 & \leq 0 \quad \text{for all } i
 \end{aligned} \tag{2}$$

$$\text{And} \quad Z_h, X_i, Q_k \geq 0 \quad \text{for all } h, i, k$$

Suppose there are  $k$  activities in the fisheries sector in Taiwan, such as defined in equation (1) to equation (3). Each of the activity produces the  $Q_k$  output level base on the number of fishing boats or the acres of the aquaculture farm. Suppose the “ $h$ ” represent the  $h$ th output fish species and each of the fish output production activity requires “ $i$ ” input factors.

Suppose there exists an integratable inverse demand curve for each of the outputs and input factors, which is represents as  $P_h^D(Z_h)$  and  $P_i^S(X_i)$ , where  $P_h$  and  $P_i$  represent the output price and input price, respectively.

In addition,  $Z_h$ ,  $E_h$ , and  $M_h$  represent the consumption, export, and import level of the  $h$ th commodity;  $\alpha_{hk}$  is the output level of the  $h$ th commodity via the  $k$ th activity;  $\beta_{ik}$  is the input demand of the  $i$ th input factor via the  $k$ th activity;  $X_i$  is the input supply of the  $i$ th input factor.

The objection function such as defined in Equation (1) represents the sum of the consumer surplus and producer surplus, which also defined the market equilibrium condition. Equation (2) and (3) represent the total demand for the  $h$ th commodity

must less or equal to the supply from all  $k$  activity export; the demand for the  $i$ th input factor must less or equal to the quantity of input supply.

When the equilibrium conditions of the problem are satisfied, the shadow prices implied in equation (2) and (3) represent the equilibrium output and input prices. Since the possibility of substitution one input factor to the others are quite low, i.e., it's not possible to substitute the oil input by more employment to maintain the output level under the fishing activity, this paper assume a constant return to scale Leontief production function to represent the fixed input-output relationship.

## 5. Data

Based on the differences in fish species, production activity and the input cost structure, this paper has further disaggregated the output value into three sectors, such as aquaculture fishery, far-sea fishery, and offshore and coastal fishery. In addition, we specified a 57 commodities-44 production activities partial equilibrium model, such as shown in Figure 1, to represent the fisheries sector in Taiwan based on the number of fishing vessels, number of aquaculture acres, and the output fish species level reported in the most recently published of the Fisheries Statistical Yearbook Taiwan.

The far-sea fishery in Taiwan targets the export market rather than the domestic market, which is the target market for the aquaculture and offshore and coastal fishery. Furthermore, the major cost item in far-sea, offshore and coastal fishery is fuel(oil) cost, but the feed expense is the major cost in aquaculture fishery. However, each of the production activities is specified based on one composite fixed cost and three variable input levels, such as labor, vessel, and land by Annual Economics Survey of Offshore Fisheries and Aquaculture in Taiwan and Ocean Fishery Economic Survey Analysis in Taiwan. The composite fixed cost includes cost for fishing gear, fry, feed, fertilizer, medicine, electricity, maintenance, transportation, insurance, oil, rent, ice and salt, fresh water, bait, entrance fee, and other costs. Each of the fishing activities is available for fishing vessels in various tonnage classes and various input supply elasticities for each class of fishing vessels is specified. The aquaculture farming land is also specifies as an input supply for the total acres of land utilized in aquaculture fisheries. In the meantime, labor supply is account for the total person-day devoted in all 44 activities. The market cleaning mechanisms will force the equilibrium condition on the total number of fishing vessel for each tonnage class, the number of aquaculture land and the total number of labor.

The domestic consumption for fresh, chilled, or frozen fish commodities is defined as domestic production minus export plus import for each of the output fish

species. The domestic demand elasticity for each fish species is specified according to various publications regarding the estimation result of fish demand system (Sun et al., 1999).

## **6. Simulations and Results**

It is very important to define the commodities be imported and exported in the future in this study, for the suitable choice of exogenous variables of TFSM applies in the purpose of policy simulation.

For the scenario, we use the UN FAO database and Taiwan's official data to compare the highest import price and lowest export price of all fishery products between TPP members and Taiwan. Both of the databases which are used in this study of import values are mostly reported as Cost-Insurance-Freight (CIF). CIF-trade values include the transaction value of the goods, the value of services performed to deliver goods to the border of the exporting country and the value of the services performed to deliver the goods from the border of the exporting country to the border of the importing country. Further, export values are mostly reported as Free on Board (FOB) in the FAOSTAT database and the official data of Taiwan.

However, if one TPP member has an import price above the export price of Taiwan, the product will be defined as a "potential export product". If the product has lower export price than the import price of Taiwan, then it is defined as a "potential import product". Simultaneously, considering Taiwan market conditions as well as TPP countries annual trade volume and price are excluded when extreme values exist.

## **7. Conclusion**

This article from the analysis shows, TPP member countries in the extent of fish and fishery products market opening is quite high, with an average tariff reduction over ninety percent of all fish immediately to zero, so if our country to join the TPP, should be able to save a lot of fish and fishery products export tariff costs for China, may also create new market access opportunities, particularly with our export advantage pelagic fish catch and aquaculture products, currently in Japan, the United States, Canada, Australia, has a good performance, the future should further expand exports to Mexico, Malaysia, Vietnam and other opportunities. But the import side, China also faces the same challenges the removal of existing tariffs, but did not avoid a strong impact on China, should strive cf Japan, Mexico, the implementation of a longer way to open markets, especially the green scales, mackerel, Miao Aberdeen, Aberdeen Mo, these current high level of tariff protection of fish and fishery products, performance and import from the United States, Malaysia, Vietnam, New Zealand and



other trading partners country, and halibut, scallops, oysters, squid, octopus, shrimp, lobster, crab, Jie, other crab crab, flatfish, etc., because of import demand is high, so after the tax cuts should help to defuse the domestic demand.

The challenge TPP hundred percent open fish market, our country should first enhance the competitiveness of domestic industries, so that China has gradually have the conditions to join the TPP. Secondly, also make good use of China's fish and fishery products export advantage, actively assist the industry to enter the TPP national markets, and to develop high value-added processing of fish and fishery products to enhance the international competitiveness of China's fish and fishery products, thereby reducing the negative impact of participation in the TPP may cause me.

**Table 1 The Market Access of Fish and Fishery Products under TPP**

| member        | The average nominal tariff rate | Tariff lines in HS03 | Tariff lines of bilateral concession in HS03 | The ratio of liberalization in the fully implementation | The ratio of liberalization into the force | The numbers of reduction mode | The reduction mode        |
|---------------|---------------------------------|----------------------|----------------------------------------------|---------------------------------------------------------|--------------------------------------------|-------------------------------|---------------------------|
| Australia     | 0.00%                           | 106                  | 0                                            | 100.00%                                                 | 100.00%                                    | 1                             | immediately               |
| Brunei        | 0.00%                           | 159                  | 0                                            | 100.00%                                                 | 100.00%                                    | 1                             | immediately               |
| Canada        | 0.42%                           | 109                  | 0                                            | 100.00%                                                 | 100.00%                                    | 1                             | immediately               |
| Chile         | 6.00%                           | 417                  | 0                                            | 100.00%                                                 | 100.00%                                    | 1                             | immediately               |
| Japan         | 5.52%                           | 248                  | 5                                            | 100.00%                                                 | 62.50%                                     | 6                             | immediately,6,8,11,12*,16 |
| Malaysia      | 1.26%                           | 141                  | 0                                            | 100.00%                                                 | 100.00%                                    | 1                             | immediately               |
| Mexico        | 16.58%                          | 118                  | 0                                            | 100.00%                                                 | 64.41%                                     | 6                             | immediately,3,5,10,13*,15 |
| New Zealand   | 0.26%                           | 117                  | 0                                            | 100.00%                                                 | 100.00%                                    | 1                             | immediately               |
| Peru          | 0.59%                           | 138                  | 0                                            | 100.00%                                                 | 100.00%                                    | 1                             | immediately               |
| Singapore     | 0.00%                           | 159                  | 0                                            | 100.00%                                                 | 100.00%                                    | 1                             | immediately               |
| United States | 0.92%                           | 131                  | 18                                           | 100.00%                                                 | 86.26%                                     | 4                             | immediately,3,5,10        |
| Vietnam       | 11.87%                          | 165                  | 0                                            | 100.00%                                                 | 100.00%                                    | 1                             | immediately               |

Sources : TPP's schedules.

**Table 2 The Bilateral Trade of Fish and Fishery Products between Taiwan and TPP Members in 2014**

unit : US\$ million 、 %

| members       | Export of HS03 in 2014 |              |            | Import of HS03 in 2014 |              |            | Balance of trade |
|---------------|------------------------|--------------|------------|------------------------|--------------|------------|------------------|
|               | rank                   | Export value | % of world | rank                   | Import value | % of world |                  |
| World         | -                      | 1,736.83     | 100.00%    | -                      | 852.922      | 100.00%    | 883.91           |
| TPP           | -                      | 701.802      | 40.41%     | -                      | 259.125      | 30.38%     | 442.68           |
| Japan         | 1                      | 424.956      | 24.47%     | 7                      | 33.281       | 3.90%      | 391.68           |
| United States | 4                      | 123.638      | 7.12%      | 9                      | 31.411       | 3.68%      | 92.23            |
| Vietnam       | 6                      | 72.879       | 4.20%      | 3                      | 72.132       | 8.46%      | 31.90            |
| Australia     | 11                     | 40.998       | 2.36%      | 19                     | 9.096        | 1.07%      | 6.05             |
| Canada        | 13                     | 23.463       | 1.35%      | 11                     | 28.415       | 3.33%      | 0.75             |
| Malaysia      | 23                     | 7.728        | 0.44%      | 15                     | 12.949       | 1.52%      | -0.17            |
| Singapore     | 25                     | 6.581        | 0.38%      | 54                     | 0.527        | 0.06%      | -0.52            |
| New Zealand   | 48                     | 0.752        | 0.04%      | 36                     | 2.919        | 0.34%      | -2.17            |
| Mexico        | 50                     | 0.738        | 0.04%      | 43                     | 1.258        | 0.15%      | -4.71            |
| Peru          | 76                     | 0.053        | 0.00%      | 64                     | 0.227        | 0.03%      | -4.95            |
| Chile         | 82                     | 0.016        | 0.00%      | 4                      | 62.202       | 7.29%      | -5.22            |
| Brunei        | 133                    | 0            | 0.00%      | 27                     | 4.708        | 0.55%      | -62.19           |

Sources : ITC, Trade Map.

**Table 3 Top three export markets of TPP for Taiwan's top ten exporting fish and fishery products (HS03)**

| rank | products                     | Tariff rate | Total export values to TPP | The first export market of TPP |                                     |                          |                             | The second export market of TPP |                                     |                          |                             | The third export market of TPP |                                     |                          |                             |
|------|------------------------------|-------------|----------------------------|--------------------------------|-------------------------------------|--------------------------|-----------------------------|---------------------------------|-------------------------------------|--------------------------|-----------------------------|--------------------------------|-------------------------------------|--------------------------|-----------------------------|
|      |                              |             |                            | member                         | % of Taiwan's export of the product | Export faces tariff rate | The reduction commit in TPP | member                          | % of Taiwan's export of the product | Export faces tariff rate | The reduction commit in TPP | member                         | % of Taiwan's export of the product | Export faces tariff rate | The reduction commit in TPP |
| 1    | Frozen bigeye tuna           | 17.50%      | 250.43                     | Japan                          | 95.19%                              | 3.5%                     | B11                         | Vietnam                         | 0.09%                               | 18.0%                    | EIF                         | United States                  | 0.01%                               | 0.0%                     | EIF                         |
| 2    | Other frozen fillets         | 20.00%      | 87.21                      | United States                  | 50.34%                              | 6.0%                     | EIF or B5                   | Australia                       | 31.09%                              | 0.0%                     | EIF                         | Canada                         | 5.20%                               | 0.0%                     | EIF                         |
| 3    | Frozen yellow fin tuna       | 10.00%      | 58.32                      | Japan                          | 49.02%                              | 3.5%                     | EIF                         | Vietnam                         | 2.56%                               | 18.0%                    | EIF                         | United States                  | 0.07%                               | 0.0%                     | EIF                         |
| 4    | Frozen squid, but not smoked | NT\$15/KGM  | 43.50                      | Vietnam                        | 35.76%                              | 17.0%                    | EIF                         | United States                   | 7.39%                               | 0.0%                     | EIF                         | Australia                      | 1.39%                               | 0.0%                     | EIF                         |
| 5    | Frozen tilapia               | 25.00%      | 37.82                      | United States                  | 60.22%                              | 0.0%                     | EIF                         | Canada                          | 7.28%                               | 0.0%                     | EIF                         | Australia                      | 6.39%                               | 0.0%                     | EIF                         |
| 6    | Frozen albacore              | 10.00%      | 36.85                      | Japan                          | 25.32%                              | 3.5%                     | B6                          | Vietnam                         | 4.24%                               | 15.0%                    | EIF                         | United States                  | 0.25%                               | 0.0%                     | EIF                         |
| 7    | Eel (Anguilla)               | 15.00%      | 24.65                      | Japan                          | 87.65%                              | 3.5%                     | B11                         | Vietnam                         | 0.00%                               | 20.0%                    | EIF                         | Singapore                      | 0.00%                               | 0.0%                     | EIF                         |
| 8    | Other frozen fish            | 25.00%      | 22.88                      | United States                  | 17.21%                              | 0.0%                     | EIF                         | Canada                          | 10.27%                              | 0.0%                     | EIF                         | Australia                      | 4.21%                               | 0.0%                     | EIF                         |
| 9    | Frozen saury                 | 20.00%      | 17.37                      | Vietnam                        | 11.46%                              | 18.0%                    | EIF                         | United States                   | 3.62%                               | 0.0%                     | EIF                         | Japan                          | 3.19%                               | 10.0%                    | B11                         |
| 10   | Frozen swordfish             | 25.00%      | 15.87                      | Japan                          | 55.27%                              | 3.5%                     | B6 或 B11                    | Singapore                       | 9.58%                               | 0.0%                     | EIF                         | Vietnam                        | 0.00%                               | 18.0%                    | EIF                         |

Sources : ITC, Trade Map.

註：EIF 是指立即降稅至零、B5 是逐年平均降稅至第 5 年為零關稅、B6 是逐年平均降稅至第 6 年為零關稅、B11 是逐年平均降稅至第 11 年為零關稅。

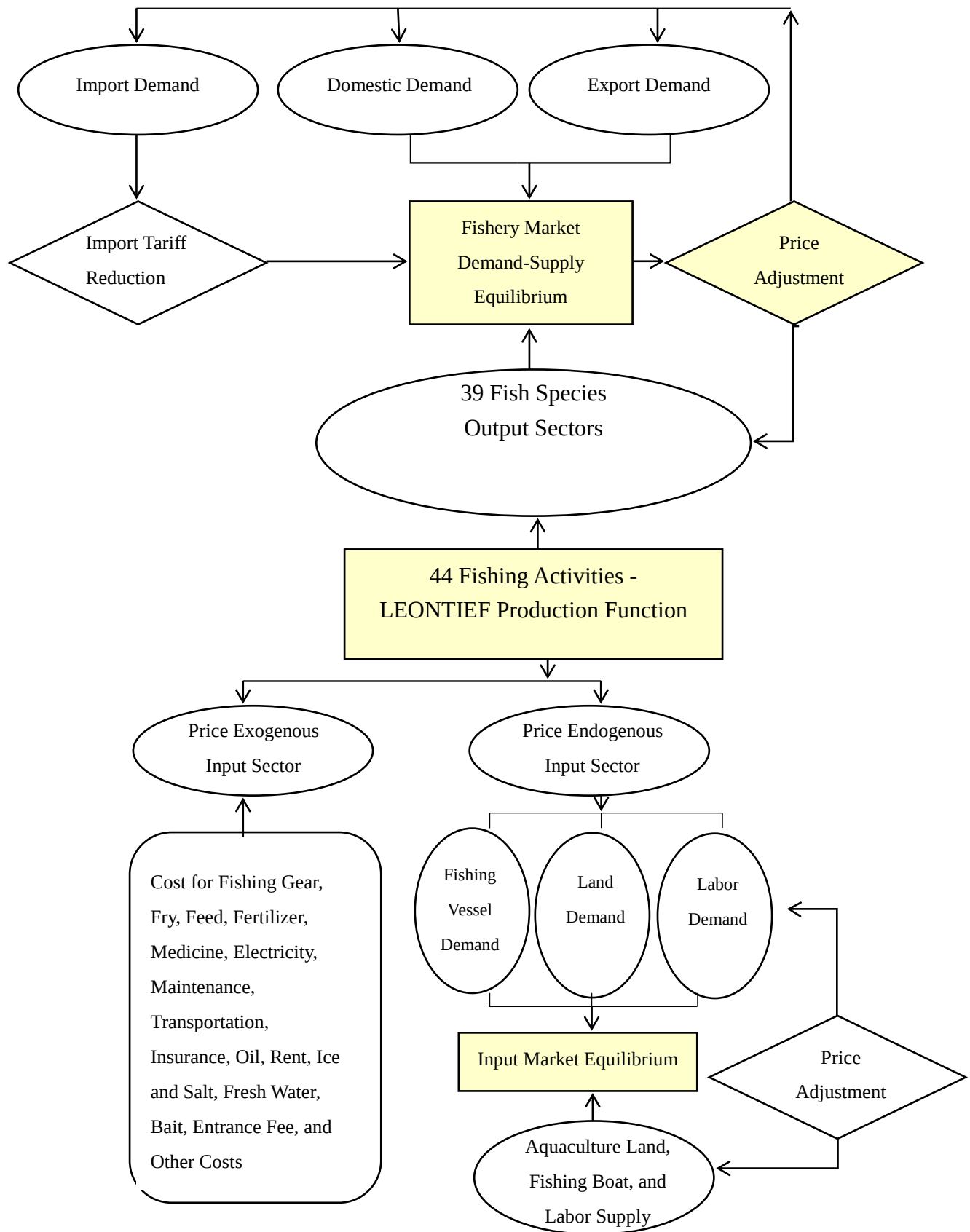
**Table 4 Top three import countries of TPP for Taiwan's top ten importing fish and fishery products (HS03)**

| rank | products                                                                     | Tariff rate         | Total import values to TPP | The first import country of TPP |                                     |                          |                             | The second import market of TPP |                                     |                          |                             | The third import market of TPP |                                     |                          |                             | The reduction commit of Japan in TPP |
|------|------------------------------------------------------------------------------|---------------------|----------------------------|---------------------------------|-------------------------------------|--------------------------|-----------------------------|---------------------------------|-------------------------------------|--------------------------|-----------------------------|--------------------------------|-------------------------------------|--------------------------|-----------------------------|--------------------------------------|
|      |                                                                              |                     |                            | member                          | % of Taiwan's import of the product | import faces tariff rate | The reduction commit in TPP | member                          | % of Taiwan's import of the product | import faces tariff rate | The reduction commit in TPP | member                         | % of Taiwan's import of the product | import faces tariff rate | The reduction commit in TPP |                                      |
| 1    | Other frozen shrimp, smoked including                                        | 20.00%              | 48.93                      | Vietnam                         | 26.15%                              | 15.0%                    | EIF                         | Malaysia                        | 4.68%                               | 0.0%                     | EIF                         | Australia                      | 1.11%                               | 0.0%                     | EIF                         | EIF                                  |
| 2    | Frozen Atlantic salmon and Danube salmon                                     | 10.00%              | 26.52                      | Chile                           | 76.03%                              | 6.0%                     | EIF                         | -                               | -                                   | -                        | -                           | -                              | -                                   | -                        | -                           | B11                                  |
| 3    | Other frozen molluscs not smoked                                             | 22.50%              | 13.02                      | Chile                           | 41.31%                              | 6.0%                     | EIF                         | Peru                            | 10.44%                              | 0.0%                     | EIF                         | Mexico                         | 2.19%                               | 20.0%                    | B10                         | B11                                  |
| 4    | Other frozen fish paste                                                      | 10.00%              | 12.71                      | Vietnam                         | 20.79%                              | 18.0%                    | EIF                         | United States                   | 1.98%                               | 0.0%                     | EIF                         | Malaysia                       | 0.78%                               | 0.0%                     | EIF                         | EIF                                  |
| 5    | Frozen sea scallops (including shellfish and whole scallops), but not smoked | 10% OR NT\$17.2/KGM | 12.15                      | Japan                           | 58.66%                              | 10.0%                    | B11                         | Peru                            | 0.97%                               | 0.0%                     | EIF                         | United States                  | 0.93%                               | 0.0%                     | EIF                         | B11                                  |
| 6    | Live, fresh or chilled giant crayfish                                        | 15% OR NT\$33.7/KGM | 11.55                      | United States                   | 67.46%                              | 0.0%                     | EIF                         | Canada                          | 32.42%                              | 0.0%                     | EIF                         | -                              | -                                   | -                        | -                           | EIF                                  |
| 7    | Frozen halibut                                                               | 12.50%              | 11.04                      | Canada                          | 20.72%                              | 0.0%                     | EIF                         | Japan                           | 0.05%                               | 3.5%                     | EIF                         | -                              | -                                   | -                        | -                           | EIF                                  |
| 8    | No other smoked crabs, frozen                                                | 15.00%              | 10.69                      | Chile                           | 37.43%                              | 6.0%                     | EIF                         | Japan                           | 3.78%                               | 4.0%                     | EIF                         | United States                  | 2.92%                               | 7.5%                     | EIF                         | EIF                                  |

| rank | products                    | Tariff rate | Total import values to TPP | The first import country of TPP |                                     |                          |                             | The second import market of TPP |                                     |                          |                             | The third import market of TPP |                                     |                          |                             | The reduction commit of Japan in TPP |
|------|-----------------------------|-------------|----------------------------|---------------------------------|-------------------------------------|--------------------------|-----------------------------|---------------------------------|-------------------------------------|--------------------------|-----------------------------|--------------------------------|-------------------------------------|--------------------------|-----------------------------|--------------------------------------|
|      |                             |             |                            | member                          | % of Taiwan's import of the product | import faces tariff rate | The reduction commit in TPP | member                          | % of Taiwan's import of the product | import faces tariff rate | The reduction commit in TPP | member                         | % of Taiwan's import of the product | import faces tariff rate | The reduction commit in TPP |                                      |
| 9    | Other frozen Pacific salmon | 10.00%      | 10.22                      | Chile                           | 78.35%                              | 6.0%                     | EIF                         | Japan                           | 10.61%                              | 3.5%                     | B6                          | United States                  | 7.74%                               | 0.0%                     | EIF                         | B6                                   |
| 10   | Frozen eggs                 | 11.00%      | 8.89                       | United States                   | 25.80%                              | 0.0%                     | EIF                         | Australia                       | 15.82%                              | 0.0%                     | EIF                         | New Zealand                    | 11.45%                              | 0.0%                     | EIF                         | EIF                                  |

Sources : ITC, Trade Map.

註：EIF 是指立即降稅至零、B6 是逐年平均降稅至第 6 年為零關稅、B11 是逐年平均降稅至第 11 年為零關稅。



**Figure1. Model Structure on the Fisheries Sector via Taiwan Fishery Sector Model (TFSM)**

Table 5 Impacts of Joining TPP on the Output of the Fisheries Sector in Taiwan via  
TFMS

Unit : Quantity : M.T ; Value : Thousand NT \$

| Fishing Gear     |                       | Base Year 2013 | Scenario   | %Change |
|------------------|-----------------------|----------------|------------|---------|
| Fisheries Sector | Output(M.T.)          | 1,271,311      | 1,221,785  | -3.90%  |
|                  | Revenue(1000NT)       | 94,572         | 87,286     | -7.70%  |
|                  | Cost(1000NT)          | 67,708         | 67,191     | -0.76%  |
|                  | Profit(1000NT)        | 26,864         | 20,095     | -25.20% |
|                  | Import Quantity(M.T.) | 313,369        | 590,268    | 88.36%  |
|                  | Import Value(1000NT)  | 17,435,031     | 35,657,728 | 104.52% |
|                  | Export Quantity(M.T.) | 646,748        | 617,760    | -4.48%  |
|                  | Export Value(1000NT)  | 56,192,445     | 52,948,318 | -5.77%  |

Table 6 Impacts of Joining TPP on the Output of the Fisheries Sectors in Taiwan via  
TFMS

Unit : Quantity : M.T. ; Value : Thousand NT \$

| Fishing Gear                 |                 | Base Year 2013 | Scenario | %Change |
|------------------------------|-----------------|----------------|----------|---------|
| Far-Sea Fisheries            | Output(M.T.)    | 762,293        | 762,293  | 0.00%   |
|                              | Revenue(1000NT) | 44,890         | 45,010   | 0.27%   |
|                              | Cost(1000NT)    | 32,842         | 36,683   | 11.70%  |
|                              | Profit(1000NT)  | 12,048         | 8,327    | -30.88% |
| Offshore & Coastal Fisheries | Output(M.T.)    | 111,504        | 111,494  | -0.01%  |
|                              | Revenue(1000NT) | 10,911         | 10,233   | -6.22%  |
|                              | Cost(1000NT)    | 4,275          | 4,276    | 0.02%   |
|                              | Profit(1000NT)  | 6,636          | 5,957    | -10.23% |
| Aquaculture                  | Output(M.T.)    | 397,514        | 347,997  | -12.46% |
|                              | Revenue(1000NT) | 38,771         | 32,043   | -17.35% |
|                              | Cost(1000NT)    | 30,591         | 26,232   | -14.25% |
|                              | Profit(1000NT)  | 8,180          | 5,811    | -28.96% |

Table 7 Impacts of Joining TPP on the Output and Import of Major Species in Taiwan

Unit : Quantity : M.T. ; Value : NT \$/K.G.

| Fishing Species |                 | Base Year 2011 | Scenario | %Change   |
|-----------------|-----------------|----------------|----------|-----------|
| Clam            | Import Quantity | 0              | 20,838   | -         |
|                 | Domestic Output | 58,789         | 51,074   | -13.12%   |
|                 | Domestic demand | 58,789         | 71,912   | 22.32%    |
|                 | Domestic Price  | 69.11          | 37.70    | -45.45%   |
| Cod             | Import Quantity | 2,418          | 3,029    | 25.27%    |
|                 | Domestic Output | 0              | 0        | -         |
|                 | Domestic demand | 2,418          | 3,029    | 25.27%    |
|                 | Domestic Price  | 90.10          | 64.80    | -28.08%   |
| Crab            | Import Quantity | 3,485          | 9,824    | 181.89%   |
|                 | Domestic Output | 0              | 0        | -         |
|                 | Domestic demand | 3,485          | 9,824    | 181.89%   |
|                 | Domestic Price  | 144.40         | 143.38   | -0.71%    |
| Lobster         | Import Quantity | 625            | 1,776    | 184.16%   |
|                 | Domestic Output | 0              | 0        | -         |
|                 | Domestic demand | 625            | 1,776    | 184.16%   |
|                 | Domestic Price  | 449.90         | 234.71   | -47.83%   |
| Mackerel        | Import Quantity | 10,201         | 11,378   | 11.54%    |
|                 | Domestic Output | 48,414         | 48,414   | -         |
|                 | Domestic demand | 10,201         | 59,792   | 486.14%   |
|                 | Domestic Price  | 50.90          | 31.32    | -38.47%   |
| Trout           | Import Quantity | 934            | 1,530    | 63.81%    |
|                 | Domestic Output | 491            | 420      | -14.29%   |
|                 | Domestic demand | 1,425          | 1,950    | 36.92%    |
|                 | Domestic Price  | 190.10         | 132.86   | -30.11%   |
| Other Tunas     | Import Quantity | 0              | 238,989  | -         |
|                 | Domestic Output | 2,345          | 2,345    | 0.00%     |
|                 | Domestic demand | 2,345          | 241,334  | 10192.34% |
|                 | Domestic Price  | 92.44          | 69.20    | -25.14%   |
| Pomfrets        | Import Quantity | 1,217          | 1,635    | 34.35%    |
|                 | Domestic Output | 0              | 0        | -         |
|                 | Domestic demand | 1,217          | 1,635    | 34.35%    |
|                 | Domestic Price  | 102.00         | 58.21    | -42.93%   |
| Seabreams       | Import Quantity | 0              | 665      | -         |
|                 | Domestic Output | 1,097          | 1,096    | -0.05%    |
|                 | Domestic demand | 1,097          | 1,761    | 60.59%    |
|                 | Domestic Price  | 398.33         | 72.50    | -81.80%   |
| Squid           | Import Quantity | 16,528         | 22,643   | 37.00%    |
|                 | Domestic Output | 129,577        | 129,577  | 0.00%     |
|                 | Domestic demand | 25,888         | 152,220  | 487.99%   |
|                 | Domestic Price  | 49.70          | 31.14    | -37.34%   |