Two meanings of cooperation between Japan and Taiwan in China Market

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Abstract

I approach the trade and investment relationships between Japan, Taiwan and China from two aspects. In the first essay, I try to view the external economic relationships between the three nations as a means of reaching political balance and regional peace. Hence the first essay attempts to investigate how strategic aid policies or free trade agreements could resolve potentially political and even military conflicts between countries. The main tasks of a democratic government are not only to increase the general consumption and welfare level of its citizens but also to prevent any potential international conflicts by building a solid national defense. Trade, arguably, provides an alternative channel to serves as an instrument of national defense. The first essay constructs a sample game-theoretical model in which one dictatorial government and one democratic government have potentially political conflicts. The optimal aid schedule is derived from a non-cooperative game under incomplete information and equilibrium strategy profiles under different environmental parameters are provided. The policy implication from this model is that Japan and Taiwan should devote, maybe in a

cooperative way, to build up an economic and strategic relationship with China so as to maintain regional peace and reduce potential threat from North Korea and China itself.

The second short essay turns back to conventional economic perspectives and discusses two levels of strategies when foreign firms enter an emerging market. At government level, I discuss the validity and effectiveness of implementing strategic trade policy and what are possible alternatives to STP if it is not effective in reaching objectives. At firm level, I discuss some possible entry strategies and why cooperation between Japanese and Taiwanese firms is essential to succeed in Chinese market.

International trade as a remedy of political conflict

1. Introduction

The United States trade policy has been used to serve two major purposes during the past few decades, namely, domestication and tactics of foreign policies. Either of these two purposes was focused during some particular period of time. Before Cold War was ended at early 90s, U.S. trade policy was substantially used as an instrument to implement the foreign policies of Anti-Communism (Baldwin 1996). After that, foreign policy and national security concerns to U.S. trade policy have declined its relative importance and what followed was the demand of domestic industrial prosperity. There was a perception among industries and general public that the successful reconstruction of Europe and Japan was mainly attributed by U.S trade and aid policies, but what American people were treated back by those countries was severe competition and unfair terms of trade. More and more pressure of domestication have driven U.S trade policy to the direction of economic protectionism or requesting fair treatment from all trade partners (Richardson, 1986). As other regions have grown relatively faster than U.S after WWII, American-made goods and serves are facing higher degree of competition in both domestic and world market and therefore the concerns of economic prosperity became the priority of U.S trade policy.

However after September 11th 2001, the new foe, international terrorism, has merged. One may infer that national security concerns might again regain its importance in strategic trade policies. Indeed during the past few years under Bush Administration, American government has engaged in bilateral trade talks with several countries which have insignificant economic benefits to U.S. An article by Center for Strategic&

International Studies (CSIS) shows that business community in the United States has blamed the government for implementing economic meaningless free trade agreements (FTA) with some countries like Jordan ($404 million in 2002), Morocco($ 565 million in 2002) and Bahrain($419 million 2002). According to Office of the USTR, President Bush has proposed on May 9, 2003 establishing a U.S.-Middle East Free Trade Area within a decade and Yemen-U.S. bilateral FTA was just signed in February in 2004. It's apparently hard to root out a political ingredient in these negotiations, especially when a FTA provides some exclusive terms not generally available to other countries. The trade volume between Middle Eastern countries and U.S has been very steady at a low volume. It seems implausible that these FTAs were made due to the surged demand by American industries after September 11th 2001.

Economists have always advocated governments to refrain from using strategic trade policies due to their ineffectiveness and possibility of reaching "prisoner's dilemma".[1] In trade policy literature, the existence of political conflicts also hasn't been seriously treated by trade economists, partial because of the lack of a persuasive social welfare function which incorporates the disutility of political conflicts. Nevertheless, political conflicts are indeed one source of negative externality imposed by some country to others. Any countries in the world do have the sovereignty to improve their national defense by building strong armed forces. A stronger army may generate a higher utility for the citizens of an aggressive country however it may rise tensions and therefore generate a negative externality to the citizens of other countries which have political conflicts with that aggressive country. When we come to this point, readers might have realized that this is actually like the typical example of "Pollution problem" discussed by

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[1] For a discussion of national Prisoner's Dilemma, please see Brander (1986).

Ronald Coase in his 1960 work. In a more integrated world today, international forums and communication have lowered the difficulty of bilateral negotiations. It may be welfare improving for both countries to remedy the political conflicts through negotiations and incentive designs. In this example, other countries will have incentives to buy the aggressive country out if they can solve the conflicts at lower costs regardless of the issue of sovereignty. This international externality does justify the political ingredient existed in strategic trade policies. It is only valid to accuse the inefficiency of strategic policies under an ideal world without market failures but apparently we are living in a second best world.

Given the fact that governments have been using strategic trade policies to solve potential political conflicts, the responsibility of an economist is, at least, to recommend governments the most efficient policy instrument. Unfortunately, there have not been many theoretic and empirical studies emphasizing on international relation concerns of trade policies in the literature. Instead, the majority studies have been focusing on "economics self-interest approach".[2]Especially, those studies focus on how trade policies are made through political process. Helpman (1997) integrates different trade policy models into a unified framework and focuses on how optimal trade policies are derived from different political processes. The political support functions under different political processes explain how international economic relations are related to internal politics. Caves (1996) and Anderson Baldwin (1987) focus on the lobbying behavior of interests groups and try to give reasonable explanations for ongoing trade policies. In short, these lines of literature concerns about the distribution of pecuniary welfare and assumes utility is maximized at the firm or industry level.

[2] The detailed discuss about this line of research, please see Baldwin (1989) and Hillman (1989).

When the international relation and national security concerns are the question of interests, then focusing on pecuniary welfare maximization at industry level is no longer valid since national security is a public good and using political process generated policies has a free rider problem. Given this feature, it's arguable that the government should act as if it is maximizing a unitary national welfare over the related issues. Gilpin (1987) argues that some superpowers such as British and the United States have been using trade policies to induce other countries to follow their international political path. When international interaction becomes the nature of the problem, game theory could be applied to model the dispute solution between countries under this simplification of unitary national welfare. Unfortunately, the application of game theory in strategic trade policies were exclusively focusing on how government intervention could raise domestic welfare by deterring foreign competition but not much attention were paid to "the social concerns approach". The following sections make an attempt of applying the game theory to explain how government can use the aid or trade policies as a strategic instrument to resolve the dispute.

The next section of this paper lays out the environment of the model and then characterizes the equilibrium strategy profiles under two cases. A simple comparison between ex-ante and ex-post welfare is provided and the last section discusses the extension of the model and makes conclusions.

2. The simple two country game-theoretic model under incomplete information

The paper attempts to investigate how international aid or trade policies can potentially remedy political and military conflicts. The main tasks of a democratic government are not only to increase the general consumption and welfare level of its citizens but also to prevent any potential international conflicts by building a solid national defense. Trade, however, could provide an alternative channel to serves as a way of national defense. In this section, I demonstrate the role of strategic trade and aid policies in solving national security issues by constructing a sample game theoretical model in which one dictatorial government and one democratic government have political conflicts. The model will be simplified in an easily-handled fashion. Nevertheless, it still serves as a concrete demonstration to show how strategic trade policies can reduce international political externalities.

2.1 Environment of the game

Let's consider two countries, namely, Country A (C_A) and Country B(C_B). C_B is ruled by a centralized government under the control of one dictator, while is a democratic country. The size of nations and their production and consumption patterns are not relevant to the present question, so those concerns can be neglected by assuming homogenous production technology and consumption preferences in these two countries. The national welfare that both governments concern about is derived from the level of consumption and national security.[3] However in this model, only the democratic country will have national security concerns about the threat imposed by the dictatorial country.

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[3] This national welfare function implies risk neutrality in country A's citizens. In other words, the willingness to pay price to expected international political externalities is constant.

The case of mutual military contest is not considered in this model due to its irrelevance. In addition, two countries are not engaging in any FDI so both governments do not have to concern about the welfare consequence of the other country.

Although Country A has been aware of the threat from Country B, but unfortunately, Country A doesn't have any information about Country B's ability of developing mass destructive weapons. The only thing Country A observes is the whether Country B purchases raw material for producing mass destructive weapons. If Country B does develop weapons, the cost of producing them is

$$C(W; \alpha, \theta) = \frac{\alpha W}{\theta} \tag{1}$$

This (marginal) cost function consists of one binary variable W and two production parameters α and θ. W takes value 1 or 0 which indicates whether or not country B purchases raw material and α is the cost per unit of time (including the fixed cost of raw material and variable cost of installation). The ability of develop weapons is denoted by θ, θ could be thought of as a measure of technology or efficiency of producing weapons and getting them operational. θ is evaluated by time efficiency, assigned by nature and only kept as a top secret by Country B. A large θ means Country B can effectively produce weapons and make them operational, while a small θ means Country B will have to pay huge costs in order to accomplish their secret mission.

On the other hand, the existence of mass destructive weapons will raise crisis to Country A therefore the government will try to take necessary actions to prevent it from happening. Country A realizes that, through diplomatic negotiation, using international

aid programs to buy Country B out is a potential instrument to solve this problem.[4]
Hence Country A's task will be to find out how the optimal level of aids is to exchange
the promise from Country B that they will give up developing those weapons. Let's
consider Country A's payoff function associated with the aid programs is,

$$U_A(W, T(W); \theta) = -(T(W) - \theta)^2 \tag{2}$$

Certainly Country A doesn't want to overpay Country B, so Country A will set the
optimal level of aids to be as close as possible to the actual ability of Country B in
developing weapons. If θ is 0 which means Country B has no ability to make those
weapons operational, Country A will not pay anything. However, since θ is only known
by Country B, the best Country A could do is to speculate θ by observing the actions W
from Country B and come up with a best response payment $T(W)$. In the simple model
developed below, I assume that the level of threat imposed by Country B to Country A is
a binary variable which takes value 0 if Country B does not develop or fails to develop
weapons and takes value 1 if Country B succeeds in develop weapons. Meanwhile,
having known what Country A's best responses are, Country B will determine what
signal to release according to its payoff function, which is

$$U_B(W, T(W); \theta) = T(W) - \frac{\alpha W}{\theta} \tag{3}$$

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[4] A simple form of commodity transfer would prevent the issue of welfare redistribution between import
    and export industries in Country A under tariffs. For the case of using tariffs, please see Polachek (1999).

Having described the basic environment of the game, the normal form of the game is presented as showed as figure 1.
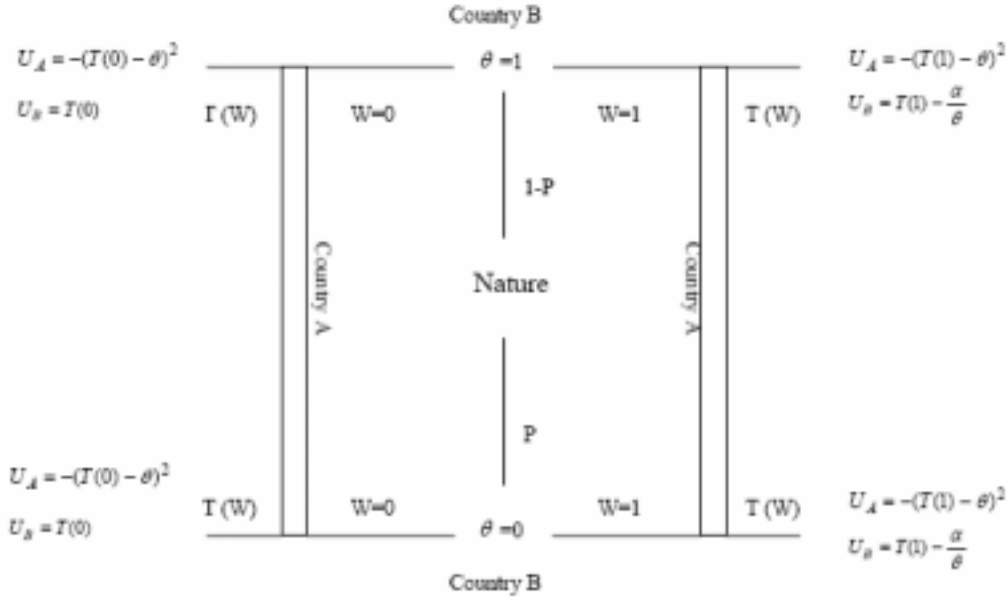

Figure1

This two-stage extensive game with incomplete information is well known as the "signaling model" that was firstly developed by Spence (1973). The appealing feature of the signaling model is its convenience to present strategic interactions under information asymmetry which I think closely reflects the international relations in reality. So, in the present question of interests, the formal mathematical layout and the process of the game are as follows

$\Gamma : \{CountryA, CountryB\}$

$\theta : \{0,1\} \quad \forall \Pr ob(\theta = 0) = p \quad \Pr ob(\theta = 1) = 1 - p$

$W : \{0,1\} \quad T(W) : R^{+}$

$U_A(W, T(W); \theta) = -(T(W) - \theta)^2 \quad U_B(W, T(W); \theta) = T(W) - \dfrac{\alpha W}{\theta}$

Step1. Country B will be informed about its type θ and then decides the action, W.

Step2. Country A observes W and uses Baye's rule to derive its belief about the types of Country B.

Step3. Country A will maximize its expected payoff by choosing its best response $T(W)$ to W, under his belief about the types of Country B.

Step4. The pair of strategy profiles $(W^*(\theta), T^*(W^*))$ is said to be a Perfect Bayesian Equilibrium (PBE) if both players have no incentive to deviate from their current strategy.

2.2 Strategy manipulation

Now let's consider the equilibrium strategy profiles under different circumstances.

Course of action 1:

When cost of developing the weapons is less than its threat level, Country A should only give aid when Country B takes aggressive action.

Proving that when $0 < \alpha < 1$, there exists a separating PBE where

$$W^*(\theta) = \begin{cases} 0 & if\, \theta = 0 \\ 1 & if\, \theta = 1 \end{cases} \qquad T^*(W) = \begin{cases} 0 & if W = 0 \\ 1 & if W = 1 \end{cases} \qquad \mu(\theta = 0 \mid W) = \begin{cases} 1 & if W = 0 \\ 0 & if W = 1 \end{cases}$$

Prove: See Appendix.

In this separating PBE case, Country B releases a perfect signal about what its type is through the action W and Country A then can decide the aid schedule without

uncertainty because from Country A's belief, there is no incentive for Country B to mimic. So the optimal level of aid will be made exactly equal to the level of threat which is perfectly released by signals. In this case, both countries are indifferent between their possible actions in the equilibrium in terms of payoffs. However, there is a potential welfare improvement in both countries from this aid schedule and negotiation. Of course any welfare analysis in a simple game theoretic model is by no mean convincing and the results can be highly sensitive to the model settings.[5] However, it is still worth to compare the welfare levels with and without the aid programs. The welfare analysis is merely used to provide the justification of implementing strategic trade or aid policies.

Course of action 2:

When cost of developing the weapons is at least as greater as its threat level, Country A can use the aid schedule to prevent Country B from taking any aggressive action.

Proving that when $\alpha \geq 1$, there exists a pooling PBE where

$$W^*(\theta) = 0 \quad \forall \theta \qquad T^*(W) = \begin{cases} 1-p & ifW = 0 \\ 1-\lambda & ifW = 1 \end{cases} \qquad \mu(\theta = 0 \mid W) = \begin{cases} p & ifW = 0 \\ \lambda & ifW = 1 \end{cases}$$

Prove: See Appendix.

In this pooling PBE case, if Country A could create the right incentive through the aid schedule, then Country A could prevent Country B from taking any initial action

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[5] One can assume that the people in country A evaluates one unit of the threat more than one unit of consumption and therefore the aid schedule may improve welfare in the equilibrium for Country A more than country B.

regardless of what the real type Country B is. Furthermore, in the equilibrium, the expected payoffs both countries could get are better than the expected payoffs without the aid programs and negotiation. As we can see in the table below, in both scenarios, there are potential gains for country A by adapting the aid policies, even though the interaction is taken place under incomplete information and non-cooperative formation.

Table 1 The welfare comparison

Cases	No Aid Programs (U_A, U_B)	Aid Programs (U_A, U_B)
Separating PBE	$[(-(1-p), -(1-p)\alpha]$	$[0, (1-p)(1-\alpha)]$
Pooling PBE	$[(-(1-p), -(1-p)\alpha]$	$[-p(1-p), (1-p)]$

3. Discussion and extensions

The reason that I excluded the other two possible strategy profiles in the previous section is due to their infeasibility. Apparently, it is implausible to have both types of Country B being aggressive or the low type $(\theta = 0)$ being aggressive and high type $(\theta = 1)$ not. After proving the existence of equilibrium strategy profiles in the previous cases, indeed the results show aid programs and policies could potentially correct for the political conflicts and externalities and improve the welfare of both countries. It implies the Coase Theorem is still applied under a non-cooperative game framework. Hence when international mediation is inadequate to solve the political conflicts, launching direct bilateral negotiation through trade terms or aid programs may serve as an

alternative instrument to achieve the objectives. Strategic aid (ODA), FDI or even FTA, form this aspect, might be even stronger than tanks and missiles to safeguard homeland and economic prosperity of the country.

The possible extension could be done by considering the cost of developing weapons as endogenous. Country A under this circumstance may also want to take actions on the market of the raw material. If country A happens to be the abundant country of the raw material, then imposing export restrictions along with aid programs can potentially solve the problem without scarifying domestic welfare. If Country B happens to be the abundant country of the raw material, then again we will have the first case discussed previously. If a third country is the abundant country of the raw material, then Country A can choose to directly deal with Country B or the third country, depending on the market share of the raw material in the third country and costs of negotiation.

The practical implication from this model is that Japan and Taiwan should devote, maybe in a cooperative way, to build up strategic relations with China through trade and investment so as to maintain regional peace and reduce potential threat from North Korea and China itself. China supplies most of North Korea's crude oil and almost half its food. For Beijing's point of view, there are countervailing incentives regarding whether or not Chinese government should grip Pyongyang because that would affect its influence in the region. There is one possibility that China would like to keep a moderate but still heavily armed North Korea so as to maintain a tactic balance within Northeastern Asia, but China certainly does not want to see South Korea and Japan going nuclear themselves and hitting up regional tension. Japan and other neighbor countries (including Taiwan) would

also need to rely on China to be the effective channel on communicating with North Korea. Hence, building up a more close economic relationship with China would potentially help Japan in dealing with the issue with North Korea or even with China itself.

Appendix:

Case1: Prove when $0 \le \alpha \le 1$, the following separating PBE exists

$$W^*(\theta) = \begin{cases} 0 & if \theta = 0 \\ 1 & if \theta = 1 \end{cases} \qquad T^*(W) = \begin{cases} 0 & if W = 0 \\ 1 & if W = 1 \end{cases} \qquad \mu(\theta = 0 \mid W) = \begin{cases} 1 & if W = 0 \\ 0 & if W = 1 \end{cases}$$

1. For proving a separating PBE exists, I start by postulating Country B's strategy:

$$W^*(\theta) = \begin{cases} 0 & if \theta = 0 \\ 1 & if \theta = 1 \end{cases}$$

2. Country A's beliefs are derived by Bayes' rule along the equilibrium path:

$$\mu(\theta = 0 \mid W = 0) = 1 \qquad \mu(\theta = 0 \mid W = 1) = 0$$
$$\mu(\theta = 1 \mid W = 0) = 0 \qquad \mu(\theta = 1 \mid W = 1) = 1$$

3. Country A's best response is determined by maximizing its expected utility,

$$E_\mu U_A(W, T; \theta) = -[\mu(T - 0)^2 + (1 - \mu)(T - 1)^2]$$

Taking FOC with respect to T, we can get $T = 1 - \mu$, so the aid schedule that

maximizes the expected utility is

$$T^*(W) = \begin{cases} 0 & if W = 0 \\ 1 & if W = 1 \end{cases}$$

4. Now we need to check that neither type of Country B will have incentive to deviate

under this aid schedule.

   (a) For type $\theta = 0$, Country B's payoff from not purchasing raw material is

   $$U_B(W = 0, T^*(0); \theta = 0) = 0 - 0 = 0$$

   If Country B is aggressive and purchases raw material, the payoff is

   $$U_B(W = 1, T^*(1); \theta = 0) = 1 - \infty = -\infty$$

   The condition for Country B not to deviate is therefore

$$U_B(W = 0, T^*(0); \theta = 0) \geq U_B(W = 1, T^*(1); \theta = 0)$$

The inequity holds since not purchasing dominates purchasing, Country B with type $\theta = 0$ will not deviate.

(b) For type $\theta = 1$, Country B's payoff from not purchasing raw material is

$$U_B(W = 0, T^*(0); \theta = 1) = 0 - 0 = 0$$

If Country B is aggressive and purchases raw material, the payoff is

$$U_B(W = 1, T^*(1); \theta = 1) = 1 - \frac{\alpha}{1} = 1 - \alpha$$

The condition for Country B not to deviate is therefore

$$U_B(W = 1, T^*(1); \theta = 1) \geq U_B(W = 0, T^*(0); \theta = 1)$$

The inequity holds when $0 \leq \alpha \leq 1$, Country B with type $\theta = 1$ will not deviate.

5. We have proved that when $0 \leq \alpha \leq 1$, such a separating PBE exists.

Case2: Prove when $1 \leq \alpha$, the following pooling PBE exists

$$W^*(\theta) = 0 \quad \forall \theta \qquad T^*(W) = \begin{cases} 1 - p & if W = 0 \\ 1 - \lambda & if W = 1 \end{cases} \qquad \mu(\theta = 0 \mid W) = \begin{cases} p & if W = 0 \\ \lambda & if W = 1 \end{cases}$$

1. Again, I start by postulating Country B's strategy:

$$W^*(\theta) = 0 \quad \forall \theta$$

2. Country A's beliefs are derived by Bayes' rule along the equilibrium path:

$$\mu(\theta = 0 \mid W = 0) = p$$
$$\mu(\theta = 1 \mid W = 0) = 1 - p$$

3. Beliefs when purchasing is observed are not determined by Bayes' rule, so we arbitrarily assign a probability for them

$$\mu(\theta = 0 \,|\, W = 1) = \lambda$$
$$\mu(\theta = 1 \,|\, W = 0) = 1 - \lambda$$

4. Country A's best response is determined by maximizing its expected utility,

$$E_\mu U_A(W, T; \theta) = -[\mu(T - 0)^2 + (1 - \mu)(T - 1)^2]$$

Taking FOC with respect to T, we can get $T = 1 - \mu$, so the aid schedule that maximizes

the expected utility is

$$T^*(W) = \begin{cases} 1 - p & if W = 0 \\ 1 - \lambda & if W = 1 \end{cases}$$

5. We need to check that neither type of Country B will have incentive to deviate under

this aid schedule.

(a) For type $\theta = 0$, Country B's payoff from not purchasing raw material is

$$U_B(W = 0, T^*(0); \theta = 0) = 1 - p - 0 = 1 - p$$

If Country B is aggressive and purchases raw material, the payoff is

$$U_B(W = 1, T^*(1); \theta = 0) = 1 - \lambda - \infty = -\infty$$

The condition for Country B not to deviate is therefore

$$U_B(W = 0, T^*(0); \theta = 0) \geq U_B(W = 1, T^*(1); \theta = 0)$$

The inequity holds since not purchasing dominates purchasing, Country B with

type $\theta = 0$ will not deviate.

(b) For type $\theta = 1$, Country B's payoff from not purchasing raw material is

$$U_B(W = 0, T^*(0); \theta = 1) = 1 - p - 0 = 1 - p$$

If Country B is aggressive and purchases raw material, the payoff is

$$U_B(W = 1, T^*(1); \theta = 1) = 1 - \lambda - \frac{\alpha}{1} = 1 - \lambda - \alpha$$

The condition for Country B not to deviate is therefore

$$U_B(W = 1, T^*(1); \theta = 1) \geq U_B(W = 0, T^*(0); \theta = 1)$$

$$1 - p \geq 1 - \lambda - \alpha \Rightarrow \lambda + \alpha \geq p$$

This inequity holds given $\alpha \geq 1$ and $\lambda, p \geq [0,1]$

6. Since both types of Country B have no incentive to deviate from the current strategy profile. So we have proved that when $\alpha \geq 1$, such a pooling PBE exists.

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