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# FROM BILATERAL APPROACH TO GLOBAL FREE TRADE

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**Abstract**

Previous literature questions whether it is possible to reach global free trade from a bilateral approach, and concludes that bilateral trade negotiations cannot guarantee global free trade. But this result is sensitive to the assumption on the existence of only one large country that has the enforcement power. We develop a model that has two large countries where they may interact/cooperate or compete. Assuming that the two large countries are in a Bertrand competition, bilateral approach still cannot lead to global free trade. On the other hand, we found that the outcome is the efficient allocation. This is due to the fact that all countries that have valuation more than the cost of the free trade are being offered free trade. Moreover, multilateral negotiations are found to be equivalent to bilateral case.

**Keywords:** Bilateral Approach, Free Trade, Mechanism Design, Principal Agent

**JEL Classifications:** D82, F13

## 1. Introduction

There is a recent shift to regionalism in international trade and preferential trade agreements (PTAs) in the world. For example, European Union shifted the trade policy from multilateral perspective to bilateral free trade agreements in recent years. In EU context, one of the main factors driving this shift is political strategies of EU. Meunier and Nicolaidis (2005) claim that an active pursuit of FTAs is a further reinforcement for the EU to become a global power, and a firm reaction to the US regionalism; as well as a route to becoming a power through trade by imposing a European model of society to the rest of the world. The share of preferential trade accounts for almost 60 percent of total EU trade in 2008 (excluding the intra-EU trade). Therefore, the share of trade under preferential schemes is increasing constantly as the EU shifts to a trade policy that envisages a greater use of regional and bilateral agreements (Woolcock, 2007).

This general trend towards discriminatory trade agreements, especially considering the countries having global or regional powers, appears to be dominating the new trade agreements among WTO members. Thus, we can argue that PTA are more likely to dominate future trading scheme on the globe (Akman, 2010).

McCalman (2002) presents a model as an incomplete information[1] mechanism design problem where one large country designs trade agreement by giving transfers to the small

[1] The information asymmetry in the paper arises from large country's not knowing exact valuation of free trade for each type of small country.

countries to ensure their participation. In the bilateral context, large country considers the individual rationality constraint of each small country, and in multilateral context, the large country considers only aggregate individual rationality constraint. In the paper, since he focuses on direct revelation mechanism, he builds a mechanism design problem with three constraints.

Firstly, any type of small country must have an incentive to negotiate, thus a small country must expect non-negative utility from negotiations. This first constraint is conventional individual rationality constraint. Second constraint is incentive compatibility constraint, so large country must ensure that each type of small country report their valuation truthfully. Last constraint imposes that the probability of free trade lies between zero and one.

McCalman (2002) questions whether it is possible to reach global free trade from a bilateral approach, and concludes that bilateral trade negotiations cannot guarantee global free trade. But his result is sensitive to the assumption on the existence of only one large country that has the enforcement power. In this paper, the robustness of this result is analyzed. We can think one large country assumption as the large country's having monopoly power in the international trade market. Since economic intuition implies that monopolistic market is far from competitive market, McCalman (2002)'s result is expected and compatible with the economic intuition. But in reality, it may not be plausible to impose one large country assumption, since it restricts the real world. In the international trade context, this assumption lacks of important interaction and strategies of developed countries among each other. Thus, we develop a model that has two large countries where they may interact/cooperate or compete. The cooperation or bargaining of large countries will be a topic for future research so for now, we focus on competition. Even though we assume that the two large countries are in a Bertrand competition, bilateral approach still cannot lead to global free trade as in McCalman (2002). On the other hand, we found that the outcome is the efficient allocation. This is due to the fact that all the countries which have valuation more than the cost of free trade are being offered free trade. Moreover, multilateral negotiations are found to be equivalent to bilateral case. These results show that the findings of McCalman (2002) are sensitive to the assumption of one large country.

## 2. Related Literature

Levy (1997), using a Heckscher-Ohlin setting, shows the impossibility of bilateral trade agreement supplanting multilateral free trade. On the other hand, he stresses out that when there are differentiated products and variety gains, bilateral free trade may undermine multilateral trade. Thus, which scenario will happen depends on the conditions. Even though at first glance regionalism or bilateral trade approach may seem in contradiction with global free trade, indeed they can survive together. Ethier (1998) claims that regional integration is not a threat for multilateral liberalism as opposed to the negative approach of trade economists, and indeed regionalism may be a consequence of the success of multilateralism as well as a guarantee for its success. In that sense, regionalism and multilateralism may complement each other. Saggi and Yildiz (2011) analyze the effect of free trade agreements on the likelihood of having multilateral free trade. Theoretically, comparing the stable Nash equilibria of FTA game and No FTA game, they come to a major result that there are conditions that being able to pursue bilateral free trade agreements is necessary to achieve multilateral free trade.

Mansfield and Reinhardt (2003) argue that the reason why preferential trade arrangements (PTAs) are spreading over the last decades is that members of WTO use PTA as a tool to increase their bargaining power. They find strong empirical evidence supporting this hypothesis. Moreover, Rose (2004) shows that there is little evidence that the member countries of GATT/WTO have different patterns of trade compared to outsiders.

Mansfield and Reinhardt (2015) examine the issue from a different angle. They argue that international trade institutions established by states have an important function that has been ignored in the literature. These institutions help the states to decrease the volatility in trade flows and policies. Ludema and Mayda (2009) address the issue of the free rider problem in multilateral negotiations. Using a mechanism design approach, they show that an optimal mechanism induces solely the largest exporters to participate in the negotiations. This result confirms the Principal supplier rule. Using US sector level data, they find strong support for their

argument. Trade negotiations take place through time and between many different countries. Bagwell and Staiger (2004) identify the rules that help to protect the governments' welfare which does not participate in the bilateral processes. They show that two main principals of GATT/WTO, namely, nondiscrimination (MFN) and reciprocity, help the non-participating countries to preserve their welfare. Thus, these two principals offer a "first-line of defense" against bilateral opportunism.

Subramanian and Wei (2007) show robust evidence that even though WTO promotes trade, the distribution is uneven. This result is in compliance with theoretical models. They prove that the theoretical predictions are consistent with the evidence. Industrial countries that actively participate in reciprocal trade negotiations enjoyed a larger increase in trade compared to developing countries. Also, bilateral trade becomes greater when both parties commit liberalization than when only single party commit.

Considering the relation between bilateral trade and free trade, Riezman (1999) asks the question of whether trading blocks forming bilateral agreements decrease the possibility of having free trade. He mentions that the answer depends on the size and the distribution of the trading blocks. When there exists single large block along with smaller blocks, the bilateral trade agreements seem to result with free trade. On the other hand, when blocks are in similar size, this time bilateral agreements allow their group members to monopolize world trade, meaning that the resulting scenario will be less close to free trade. This result is in accordance with our claim in this paper that the possibility of efficient free trade depends on the number of powerful (large) countries. Baldwin and Jaimovich (2012) test the hypothesis that whether free trade agreements are contagious or not. Their central finding is that the data they use supports the contagion hypothesis. They also find support for political distance theories but not slow multilateralism theories. Ornelas (2005) evaluates the effect of free trade areas on world trading. Using an oligopolistic model, he shows that FTAs are beneficial to multilateral trading.

## 3. The Model

McCalman (2002) constructs a model that allows a general structure of arbitrary number of countries. Given that gains from trade exist, these countries come together to negotiate the nature of trade. The underlying rationale for these negotiations is that at least one country has monopoly power in world markets and therefore can impose an optimal tariff in order to extract a terms of trade benefit. McCalman (2002) analyzes the case where only one large country exists. He assumes that the small countries have private information on their valuation of the free trade. Moreover, to keep the framework simple he assumes that any information revealed during the negotiations cannot be used by the large country.

### 3.1. Technology

McCalman (2002) considers a world economy with two goods ($x$ and $m$), two large countries and $N$ small countries. Each country has Ricardian technology, with the properties of each country's technology assumed to be common knowledge. The large countries are assumed to possess the following technology and resource constraint (where $L^B$ is the large countries' endowment of labor and $L_j$ is the labor devoted to the production of good $j$, $j \in x, m$):

$$x = \alpha L_x \ , \ 0 < \alpha < 1, \quad m = L_m \ , \quad L_m + L_x = \ L^B \tag{1}$$

Each small country is assumed to have labor endowments of the same size, $L$, and each possesses a common technology that exhibits a technological comparative advantage in $x$ relative to the large country:

$$x_i = L_{xi} \ , \quad m_i = L_{mi} \ , \quad x_i = L_{xi} + \ L_{mi} = L_i \ \in 1, \dots , n \tag{2}$$

The assumption that all the small countries have the same technology rules out the possibility of trade diversion from a preferential trade agreement.

### 3.2. Gains from a Trade Agreement

Tariffs can only act as an efficient international transfer scheme when the income gain to the large country is equal to the income loss of the small country. Given the assumption imposed by McCalman (2002) on preferences, the only situation in which tariffs have this property is when the small country has an elasticity of substitution equal to zero (i.e. Leontief preferences). In this case, the Nash tariff does not distort the consumption or production decisions of the small country. Therefore, the Nash tariff generates a pure income transfer of $L(1-\alpha)/2\alpha$ from the small country to the large country. If a small country possesses preferences other than Leontief preferences, then it will experience a distortion in consumption. Hence, the Nash tariff will cause the income loss to the small country to be greater than the income gain to the large country. It is the removal of this inefficiency that generates a surplus that can be realized through the negotiation of a trade agreement.

## 4. Trade Agreement as Mechanism Design Problem

Bilateral trade negotiations are modeled in McCalman (2002) as incomplete information mechanism design problem where the large country is the mechanism designer and gives compensation to the small countries. Large country does not know the preferences of individual small country, but only knows that its valuation of free trade must lie within the range set by Leontief and Cobb-Douglas preferences. To determine the limits of this range, McCalman (2002) defines a small country's valuation of free trade to be the increase in real income associated with the move from the Nash tariff equilibrium[2] to free trade. For a Leontief small country, the increase in real income is $a = L(1-\alpha)/2\alpha$. For a Cobb–Douglas country, the increase in real income is $b = (1/\alpha - (1/\alpha)^{1/2}L$. Therefore, the large country knows that small country $i$'s valuation of free trade, $v_i$, must lie between $a$ and $b$, i.e. $v_i \in [a,b] \equiv d$.

The large country's uncertainty about country $i$'s valuation of free trade is assumed to be described by a continuous probability distribution over this interval. Let $f: d \to \mathbb{R}_+$ be the probability density function for small country $i$'s valuation of free trade. In addition, assume that $f(v_i) > 0$ for all $v_i \in d$; and that $f(.)$ is a continuous function on $d$. Let $F: d \to [0,1]$ denote the cumulative distribution function corresponding to the density function $f(.)$.

McCalman (2002) analyzes the question of when confronted with a single small country, what terms will maximize the expected surplus of the large country. Then, he treats this question as a mechanism design problem described by a pair of outcome functions $p(y_i)$ and $t(y_i)$ such that;

$p(y_i)$: $[a,b] \to [0,1]$ maps any reported valuation, $y_i$, into a probability of free trade and
$t(y_i)$; $[a,b] \to \mathbb{R}_+$ maps any reported valuation into a bribe/transfer.

Since he focuses on direct revelation principle, he represents the model as;

$$\max_{\{p(.),t(.)\}} \int_{[a,b]} p(v_i)[t(v_i) - r] f(v_i) dv_i \quad (3)$$

$$\text{s.t.}$$

$$p(v_i)[v_i - t(v_i)] \geq 0 \text{ for all } v_i \in [a,b] \quad (4)$$

$$p(v_i)[v_i - t(v_i)] \geq p(y_i)[v_i - t(y_i)] \text{ for all } v_i, y_i \in [a,b] \quad (5)$$

$$p(v_i) \in [0,1], \text{for all } v_i \in [a,b] \quad (6)$$

The incentive compatibility constraint implies that the large country cannot choose $p(.), t(.)$ independently. Thus, McCalman (2002) transforms the problem above into one that involves a single choice variable:

[2] If a trade agreement fails to be negotiated, then a non-cooperative tariff game is assumed to occur. In this tariff game, each country simultaneously announces ad valorem tariffs on its imports, with any resulting tariff revenue assumed to be distributed among domestic consumers in the form of a lump sum transfer.

$$\max_{p(.)} \int_{[a,b]} p\,(v_i)\{v_i - [1 - F(v_i)]/f(v_i) - r\}f(v_i)dv_i \quad (7)$$

$$\text{s. t.}$$

$$p(v_i)\text{is non} - \text{decreasing} \quad (8)$$

$$p(v_i) \in [0,1], \text{for all } v_i \in [a,b] \quad (9)$$

Note that the transfers can be recovered from: $p(v_i)t(v_i) = p(v_i)v_i - \int_{[a,v_i]} p\,(s)ds$.

Borrowing the idea from Bulow and Roberts (1989), McCalman (2002) represents an optimal mechanism for the large country as;

$$p^*(v_i) = \begin{cases} 1 & \text{if } v_i - [1 - F(v_i)]/f(v_i) > r \\ 0 & \text{otherwise} \end{cases}$$

$$t^*(v_i) = \begin{cases} v^* & \text{if } v_i - [1 - F(v_i)]/f(v_i) > r \\ 0 & \text{otherwise} \end{cases}$$

Where $v^*$ is defined as the solution to $v^* = [1 - F(v_i)]/f(v_i) + r$.

McCalman (2002) shows that these optimal rules imply that only countries with valuations above $v*$ will be able to achieve free trade, and by design this excludes the low valuation countries. As he claims, the need to exclude low valuation types follows from the fact that the only thing that the large country can use to induce truthful revelation is the probability of free trade. If a large country were to always grant free trade, then it would never get a small country to admit to having a valuation greater than the lowest valuation. Hence, he concludes that a bilateral approach to liberalization cannot guarantee free trade as the large country uses the possibility of impeded trade to extract rents from high valuation countries, with the most effective way to back this threat being not to liberalize with low valuation countries.

## 5. Bertrand Price Competition

As opposed the McCalman (2002) assumption, we focus on two large country case to capture the effects of competition between them. The mechanism design problem stays the same as summarized above. However, this time the large countries compete in offering transfers[3] from the small countries, which derive their gains to zero. In the bilateral context, Bertrand price competition does not change the result that bilateral approach cannot maintain global free trade but it may change the cut off level valuation, $v^*$ and transfer amount. Due to price competition, the transfer amount is $t(v_i) = r$, for all $v_i \geq r$. And the cutoff level valuation is; $v^* = r$, implying that more countries are offered free trade compared to McCalman (2002) case. Indeed, this result of $v^* = r$ is the efficient outcome since all the countries which have a valuation above $r$ (the cost of free trade for large countries), are offered free trade. Thus, as economic intuition suggests the Bertrand competition converges to the efficient allocation since only low valuation types (having $v_i < r$) are excluded from free trade. This result is summarized in the following proposition.

**Proposition 1:** Due to Bertrand competition between two large countries, bilateral trade negotiations result with efficient allocation. Thus all types of small countries having valuation above $r$, which is the cost of free trade for large countries, will be offered free trade.

**Proof**: Suppose not. Then $\exists v_j > r$ such that country type $j$ is not offered free trade. Then one of the large countries can offer free trade to small country $j$ with a transfer $t(v_j)$ such that $v_j > t(v_j) = r + \epsilon$ and can make positive profit since type $v_j$ will accept this offer. Yet this is a contradiction to zero profit result of Bertrand competition.

Another interesting result comes from the multilateral negotiations case. Multilateral case is just same as the bilateral case. The logic is as follows; bilateral case is the subset of multilateral since multilateral negotiations treat all type of small countries as aggregate and since we concluded that due to Bertrand competition, bilateral case already supports the efficient outcome, multilateral negotiations cannot do better. Therefore, we conclude that

[3] The transfer can be considered as the price paid by small countries for free trade.

Bertrand price competition between large countries make bilateral and multilateral approaches equivalent. This logic also can be supported by economic intuition, which suggests that Bertrand competition converges to competitive market allocations.

**Proposition 2:** Bertrand price competition between large countries make bilateral and multilateral approaches equivalent. For the proof, please see the above argument.

## 6. Conclusion

McCalman (2002) analyzes whether it is possible to reach global free trade from a bilateral approach, and he concludes that bilateral trade negotiations cannot guarantee global free trade. Moreover, he finds that the result from bilateral negotiations are inefficient since small countries having types $r < v_j < v^*$ are excluded from free trade even though they value free trade more than the cost of it. However, his conclusion is sensitive to the assumption on the existence of single large country that has the monopoly power.

In this paper, we focus on the robustness of his results. Since economic intuition implies that monopolistic market is far from competitive market, McCalman (2002)'s result is compatible with the economic intuition. However, in reality, it may not be plausible to impose single large country assumption, since it restricts the real world by lacking of important interaction and strategies among the developed countries. Thus, we analyze a model that has two large countries, which are in a Bertrand price competition. Again, bilateral approach cannot lead to global free trade as in McCalman (2002) result. Yet, this time, the outcome is the efficient allocation since all countries having valuation more than the cost of the free trade are offered free trade. Furthermore, multilateral negotiations are found to be equivalent to bilateral case meaning that both of them can be used as a way to achieve the efficient allocation.

The cooperation or bargaining of large countries may be a fruitful topic for future research. Especially considering the current trend of so called "trade war" started by the US, the strategic interaction among developed countries is an interesting arena of research.

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