Chapter-6
Viability of an External Road Network for Tripura

6.1 Introduction

In the previous chapter, the efficiency of the internal road transportation network in terms of evaluation of an alternative road link is discussed. But the major problem, as mentioned before is the economic landlockedness of Tripura cannot be fully resolved only through the efficiency in internal road transportation network. To connect this state with its nearest sea port in India that is Kolkata is possible only through an external network through Bangladesh. As mentioned earlier, after partition, the link between Tripura and Kolkata ceased to exist which in turn makes this state a pseudo landlocked region. This is true for the partially landlocked NER of India, in general and for the state of Tripura, in particular. In 2010, India and Bangladesh agreed to provide for transshipment route through Bangladesh to connect north eastern states of India with the rest of India but this raises some serious questions of economics, politics and sub regional development strategy (Murshid, 2011). When hope for transshipment through Bangladesh for NER was almost lost, India has been deliberately exercising the policy of opening of Myanmar route for transshipment for this region. In this chapter, we try to explain the methodological issues in the pricing strategy of Kolkata - Agartala transshipment route in terms of a differentiated Bertrand type competition where the cost per unit of transshipped product is expected to reduce after the opening of proposed alternative transit route through Myanmar. Further, this Chapter extended the model developed by Sen, Gupta and Mukhopadhyay (2013) to investigate the economic viability of an integrated road transport network in Tripura in terms of combining efficiency in internal and external road network for this state.
6.2 Theoretical Framework of External Transportation Link

As mentioned earlier, partition makes the whole NER of India a partially landlocked region. In real sense, it cannot be defined as a landlocked region. However, the chicken neck shaped geographic location coupled with the presence of hilly terrain across the region makes this a partially isolated region from its heartland. A tiny hilly state like Tripura always lies below the National growth rate of State Domestic Product. There may be several reasons behind this underdevelopment but, undoubtedly, lack of proper communication with the rest of the country as well as with the neighboring north eastern states aggravates the problem. This may be identified as a pseudo landlocked region where being a part of the Indian territory this particular state is not landlocked in true sense but the feasible road distance from the nearest sea port i.e. Kolkata port is more than four times the Arial distance from the same, ultimately, makes this state economically landlocked.

As mentioned above, after 1947, the trade and commerce of the North-Eastern sub-region with the rest of India and the outside world used to pass through the territories of what is now Bangladesh. Rail and river transit across the then East Pakistan continued till 1965 and it was suspended later as a consequence of war between India and Pakistan, all transit traffic were suspended. Although river transit was restored in 1972 after the independence of Bangladesh, no progress has been made on the issue of road and rail transit/transshipment. Bangladesh allowed transit in air and sea routes to India while the major issue of transit through road remained unattended. While air transit is still widely used than water transit, it has been considered uncompetitive over the years. The goods carried from the NER reaches the mainland after traversing Assam and North Bengal through the Siliguri corridor, taking a route much longer than what could have been the shortest through Bangladesh. For example, distance between Kolkata to Guwahati is 1080 km and from Kolkata to Agartala is 1640 km but from Kolkata to Agartala is only 400 km if the cargo gets passage through Bangladesh. Moreover, Bangladesh can also benefit directly from this facility. For example, A container usually takes 20-25 days and
occasionally even up to 60 days to move from New Delhi to Dhaka, as the maritime route is via Bombay and Singapore/Colombo to Chittagong Port and then by rail to Dhaka. But the same container could have been moved to Dhaka within 3-4 days, if direct rail connectivity and operation were there between New Delhi and Dhaka.

Against this backdrop, the state Government of Tripura is continuously demanding the transit route through Bangladesh for inflow and outflow of Commodities from its heartland but they were not ready to do this because of possible threat of loss. Apart from this a debate has been raging in Bangladesh on whether transit facilities should be given to India or not through the land territory of Bangladesh. The main reason behind this debate is more of political in nature than that of pure economic logic.

During Prime Minister Sheikh Hasina’s visit to India in 2010, a number of far-reaching measures were announced by Bangladesh to provide transit facilities through its territory to India and allow the use of the Mongla and Chittagong ports for movement of goods to and from India through road and rail. India, in its turn, announced that it would assist Bangladesh in the up gradation and expansion of its transport infrastructure. The India agreed to provide one billion dollar as credit to extend to Bangladesh for improvement of transport. However, the withdrawal, at the last minute, of the agreement reached between the two countries on the sharing of the waters of the Teesta and Feni rivers, turned out to be a big setback. In response, the Bangladesh Government postponed the signing of the MoUs for operations of the transit facilities granted to India for the passage of its goods from the Chittagong and Mongla ports and the agreement on the construction of the Akhaura-Agartala railway link. (Dubey, 2013)

Moreover, if ‘transit’ facility is allowed, it is expected that the cargo will move from Kolkata port to Agartala through Bangladesh by the Indian origin carrier. This may raise the eyebrow of the local transporter of Bangladesh origin as Bangladesh based transporter will lose a huge potential market.
Some argue that what India is demanding is some kind of rights on the territory of Bangladesh to move goods and people from the western part of India to its landlocked NER and hence, they try to solve some of the core bilateral issues with India before giving this type of facility. The other groups are advocating this transit issue as an economic issue for trade facilitation and should not be politicized. Whatever be the view, it is fact that transit issue is a complex one and multi-faceted issue. The ambiguity arises due to two concepts: corridor versus transit. In the corridor, a country gives some kind of rights or control on the land to the other country making it a de facto of its territory, while in transit there is no question of rights involved in the land territory allowed for transit. It provides only transit facilities under certain conditions and can be withdrawn. On the other hand, transit is an inter-country passage (like waterway-transit already provided to India since 1972), where India wants to dispatch goods and other materials from western parts of India to its seven land-locked north eastern states through Bangladesh and no kind of rights exists on the land territory of Bangladesh.

On the other hand, ‘transshipment’ facility implies that the cargo will be transported by the carriers of both the countries in their respective territories. In both the cases India will be able to dispatch cargo from Kolkata port to its seven landlocked states. The difference is that ‘transshipment’ facility will be the more accepted one than the ‘transit’ facility for the domestically operated transport providers in Bangladesh. Demand for transport will be generated in Bangladesh exogenously which in turn will boost the local economy at Bangladesh. Hence, this thesis deliberately uses the term ‘transshipment’ instead of ‘transit’ facility for Tripura. Moreover, till date, Kolkata is considered as the default port for Tripura, though Chittagong port is closer to Tripura than the Kolkata port. In the absence of any treaty between India and Bangladesh in this particular issue, Bangladesh is losing a huge market for its local transporter.
In the absence of a land transit link between India and Bangladesh, the traffic between Kolkata and NER of India is mainly carried by rail and road links through the *Siliguri Corridor* and the requirements of additional transport costs for carrying goods is staggering. To transport goods to and from the NER of India through the corridor, a huge amount is being spent as additional costs to transport goods and services to and from NER of India. As such, as a transit/transshipment route through Bangladesh can integrate the northeast India with its mainland and is set to reduce transportation cost significantly. 

*Sen, Gupta and Mukhopadhyay* (2013) tried to explain the methodological issues in the pricing strategy of Kolkata - Agartala transshipment route in terms a differentiated Bertrand type competition where the cost per unit of transshipped product is expected to reduce after the opening of proposed alternative transit route through Myanmar. Staring with their model, this thesis attempts to study the stability of equilibrium of charges for such transshipment from Kolkata port to Agartala.

Geographically, Bangladesh has some natural monopoly in this particular issue. Now the question is why Bangladesh was reluctant to permit such facilities to India. Being the natural monopolist in this particular issue, it tried to solve some basic bilateral issues with India (Islam, 2008). Two major bilateral issues can be identified in this case. Firstly, it wants similar transit facilities from India to access Nepal and Bhutan. These landlocked Himalayan countries are geographically quite close to Bangladesh but they are surrounded by India. Nepal and Bangladesh are separated by a narrow piece of Indian Territory of about 22 kilometers in the southeast. Had there been transit facilities (Nepal-India- Bangladesh), landlocked Nepal (so is Bhutan) could use Chittagong and Mongla port of Bangladesh that could cut down its transportation cost dramatically and one could see better trade and tourism relations between these two countries. Secondly, Bangladesh’s export to India accounts for less than seven percent of its total import from the latter. As a result, it has a massive trade deficit with India. Moreover, large volumes

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11 The NER of India is connected with rest of the country with a 22 kilometer tenuous chicken neck shaped corridor in the state of West Bengal, popularly known as the Siliguri corridor.
of informal imports from India cross the land border avoiding Bangladesh import duties. There are allegations from Bangladesh that its products often face India’s non-tariff barriers and other bureaucratic hurdles. But the Trade complementarity Index shows that trade complementarity between Bangladesh and India is very low (in 2007, it is 5.42, Source: UN ESCAP ARTNet on line). This is due to less diversified export basket of Bangladesh for India as well as the later country is highly concentrated on readymade garment product which is not a significant import item for India. On the other hand, India has a broad export basket and close geographical proximity which, in turn, has helped Bangladesh to source for many commodities and final products with comparatively cheaper price. Hence, until and unless these complementarities issues are not overcome, it is hardly possible for Bangladesh to redress such imbalances. Though, in recent years, trade barriers have declined, both in Bangladesh and India, in line with their commitments to World Trade Organization and South Asian Preferential Trade Arrangement (SAPTA). Moreover, India has given preferences to Bangladesh on approximately 2,925 tariff lines under SAPTA (ADB, 2011). However, these two bilateral issues have already been solved through a bilateral treaty between them.

From the above analysis, it seems that Bangladesh was not fully reluctant to allow India to use its territory to access northeast India but what it wants is a continental transit facility, especially in the southern part of the SAARC region (Bangladesh-India-Nepal-Bhutan) which does make more economic sense. There is an overwhelming consensus that, to integrate South Asia with southeast- and other parts of Asia, there is a need for greater transport network across Asia. But India and Bangladesh have significant differences on the selection of the Asian Highway Network (AHN). Bangladesh opposes the proposed route (India-Bangladesh portion) that enters into Bangladesh from India and again, goes back into India. Bangladesh wants to initiate a route that connects it with Southeast Asia as well going through Chittagong and Myanmar, as the proposed route, as it argues, will virtually become a transit route for Indian goods between rest of India and northeast India. For this, Islam (2010) commented that Bangladesh always tried to
maintain this natural monopoly situation in order to solve all its bilateral issues with India in a single package. Indeed, this is one of the reasons why the tripartite gas pipeline project (Myanmar-Bangladesh-India) had not implemented finally.

Here, Bangladesh is always contemplating the transshipment/transit issues with Nepal and Bhutan but Myanmar was not ready to accept the proposed AHN route through Myanmar-Bangladesh-India route rather they are more interested to propose this route in Myanmar-North Eastern India-Bangladesh-India line. If, the role of Myanmar is incorporated in this game, the relative advantage of Bangladesh will turn into potential disadvantage when the later are not ready to provide transit/transshipment facility for NER of India. Another, major issue in this context is to determine the pricing of such transit/transshipment route. Since, transporter country India will utilize the transport infrastructure of Bangladesh, India has to pay the requisite fees or in other words, how much price Bangladesh can charge at most to provide such transit/transshipment facility through its own territory. To understand the dynamics of this transit and or transshipment issue for the state of Tripura, this Chapter analyzes the trade pattern between these gateway countries with special reference to the NER, in general and with reference to Tripura, in particular.

6.2.1 Trade between NER and Bangladesh

Except Mizoram, the NER-Bangladesh trade mainly flows through Assam, Meghalaya and Tripura. A 2-year average (2006-08) of the NER-Bangladesh trade shows that the share of Meghalaya in the NER-Bangladesh trade is the highest. During 2006-08, the contribution of Meghalaya, Assam and Tripura to the total volume of the NER-Bangladesh trade stands at 63.83%, 17.91% and 18.26%, respectively. Another interesting fact is that, while both Assam-Bangladesh and Meghalaya-Bangladesh trade
are characterized by higher export and negligible import, Tripura-Bangladesh trade exhibits just opposite trends, which are, higher import and lower export.

However, the trade statistics between Bangladesh with West Bengal shows just opposite results. Bangladesh suffered a huge adverse trade relation with India so far as its western border with India is concerned.

Moreover, the commodity wise trade between Bangladesh and India further reveals that the pattern of trade between Bangladesh and India dominates inters industry trade relation between these two counties. Bangladesh exports garments and readymade shirt to the Tripura while the same commodity is imported from India by Bangladesh through its western border with India in the state of West Bengal. Hence, Bangladesh is always trying to maintain its relatively better export market in NER in general and for Tripura, in particular (De, 2008).

Exports from NER to Bangladesh dominate NER-Bangladesh trade. The NER exports raw materials like coal, limestone, stone chips, bamboo, to Bangladesh and imports finished products like cement, plastic goods, readymade garments, process food and drinks. Minerals from Meghalaya are exported to Bangladesh through the LCSs of Assam and Meghalaya. Trade flows through Tripura-Bangladesh sector is dominated by imports from Bangladesh.

As the resource structure of the NER and demand structure of Bangladesh are complementary to each other, there exists a huge potential for trade between these two regions. As the NER exports industrial raw material to Bangladesh, trend of the NER’s export is found to be stable. Export trade in exhaustible resources like coal and limestone suffers from severe limitations in that the trade dries up with the depletion of stock of resources. As a result, for sustainable growth it is important to diversify the export basket and also to add value to export by switching over from export of raw materials to export of processed/semi-processed goods.
6.2.2 Trade between Tripura and Bangladesh

As Tripura is located at the furthest corner of the country, import from Bangladesh proves to be more cost-effective than to transport from the mainland India. It is due to the geographical distance. The distance of Agartala from Kolkata is 1680 km from Agartala via the Siliguri Corridor while the distance reduces to only 400 km when travelled via Dhaka. This transport cost differential between Agartala-Dhaka and Agartala-Kolkata makes Dhaka as preferred source for import than Kolkata. The following table shows that import is more stable than export. Except 2001-02, all year on year growth rates are positive. It is an interesting fact that there has been a sudden decline in export and rise in import since 2005-06. Traders feel that it is because of the border fencing which has helped in channelizing the informal imports into the formal route and simultaneously negatively impacted the official export due to increased surveillance. This is presented in the following table.

<table>
<thead>
<tr>
<th>Year</th>
<th>Export</th>
<th>Import</th>
<th>Total Trade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rs (in lakh)</td>
<td>% Change</td>
<td>Rs (in Lakh)</td>
</tr>
<tr>
<td>2000-01</td>
<td>75.33</td>
<td>630.68</td>
<td>706.01</td>
</tr>
<tr>
<td>2001-02</td>
<td>130</td>
<td>72.57</td>
<td>442.62</td>
</tr>
<tr>
<td>2002-03</td>
<td>152.8</td>
<td>17.54</td>
<td>582.48</td>
</tr>
<tr>
<td>2003-04</td>
<td>138.49</td>
<td>-9.37</td>
<td>970.63</td>
</tr>
<tr>
<td>2004-05</td>
<td>202.43</td>
<td>46.17</td>
<td>978.3</td>
</tr>
<tr>
<td>2005-06</td>
<td>73.63</td>
<td>-63.63</td>
<td>3559.34</td>
</tr>
<tr>
<td>2006-07</td>
<td>86.56</td>
<td>17.56</td>
<td>4339.22</td>
</tr>
<tr>
<td>2007-08</td>
<td>112.54</td>
<td>30.01</td>
<td>6342.87</td>
</tr>
<tr>
<td>2008-09</td>
<td>142.43</td>
<td>26.56</td>
<td>7983.45</td>
</tr>
</tbody>
</table>

Source: Office of the Commissioner of Customs, Government of India, Shillong, 2012
6.2.2 Trade between NER and Myanmar

Unlike trade with Bangladesh, NER enjoys a relative trade surplus with Myanmar. The NER exports more to Myanmar whereas Myanmar enjoys a trade surplus with all India level. The direct trade between Tripura and Myanmar is almost negligible. India and Myanmar share a common border of 1,643 km. Four states of the NER, namely, Arunachal Pradesh, Manipur, Mizoram, and Nagaland, shares international borders with Myanmar. However, a large part of this international border with Myanmar is porous, mountainous and inhabited. Till date, four numbers of Land Custom Station (LCS) are in operation, serving the trade between India and Myanmar of which Moreh in Manipur is the busiest LCS, handling almost 99 per cent of the NER’s trade with Myanmar. Exports through Moreh LCS increased from US$ 0.1 million in 1995-96 to a peak of US$ 13.5 million in 2006-07 and then declined to US$ 1.5 million in 2009-10. Imports, on the other hand, witnessed relatively less fluctuations, increasing from US$ 1.7 million in 1995-96 to US$ 2.1 million in 2009-10. The interesting development is that the second half of previous decade witnessed a rise in Indian export through Moreh, compared to previous two periods, whereas import declined consistently.

Table 6.2: NER’s Trade with Myanmar through Moreh Only (US Million Dollar)

<table>
<thead>
<tr>
<th>Year #</th>
<th>India-Myanmar</th>
<th>NER-Myanmar</th>
<th>% Share of NER*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Export</td>
<td>Import</td>
<td>Export</td>
</tr>
<tr>
<td>2000</td>
<td>48.05</td>
<td>179.18</td>
<td>1.23</td>
</tr>
<tr>
<td>2001</td>
<td>53.05</td>
<td>197.81</td>
<td>0.26</td>
</tr>
<tr>
<td>2002</td>
<td>71.53</td>
<td>345.64</td>
<td>1.03</td>
</tr>
<tr>
<td>2003</td>
<td>86</td>
<td>390.77</td>
<td>2.02</td>
</tr>
<tr>
<td>2004</td>
<td>104.71</td>
<td>400.05</td>
<td>1.43</td>
</tr>
<tr>
<td>2005</td>
<td>111.32</td>
<td>495.95</td>
<td>0.88</td>
</tr>
<tr>
<td>2006</td>
<td>132.72</td>
<td>718.4</td>
<td>13.52</td>
</tr>
<tr>
<td>2007</td>
<td>174.02</td>
<td>802.79</td>
<td>0.75</td>
</tr>
<tr>
<td>2008</td>
<td>212.23</td>
<td>893.92</td>
<td>1.06</td>
</tr>
<tr>
<td>2009</td>
<td>209.78</td>
<td>1195.26</td>
<td>1.47</td>
</tr>
<tr>
<td>Average**</td>
<td>120.34</td>
<td>561.98</td>
<td>2.36</td>
</tr>
</tbody>
</table>

Source: IMF for India’s trade with Myanmar, and Indian Customs for NER’s trade with Myanmar
Note: *Share in India. **Average for the period 2000-2009.
From the above table, it is clear that India suffered a huge trade deficit with Myanmar where as at the same time NER during continued for India. This is presented in the following figure.

**Figure 6.1: Trend of Trade deficit (US Million Dollar) with Myanmar through Moreh only**

Source: Author’s Calculation from Table 6.2

The direct trade between Myanmar and Tripura is negligible. As mentioned above, trade between Myanmar with NER is mainly carried out with Mizoram state

### 6.3 Background of Kolkata Agartala Transshipment Route

As mentioned before, Bangladesh expressed their interest to provide transshipment facility for the NER in general and for Tripura, in particular. However, the problem is acute when the (partially) landlocked region like Tripura is left with only one feasible transshipment route to integrate itself economically with its own country, ultimately leads to monopoly tendency or to impose unnecessary costs by the transshipment providing country. It is a fact that the transshipment providing country treats this as economic resources and expects a high return from that. Taking this as granted, this Chapter attempts to investigate the process of determination of equilibrium transshipment charges
of that economic resource. For this, this Chapter considers the following model to determine the optimal pricing of such route in the situations: (1) Bangladesh Route is the only available alternative; and (2) Myanmar is also interested in providing transit/transshipment facility to India for its NER.

It requires no mention that Tripura is geographically a sequester land located at the remotest corner of the Country where transportation is relatively a time consuming phenomenon. The NER is connected by land with the rest of India through West Bengal. The surface transport system for movement of cargo/passengers to and from the north eastern states consists of road, rail and waterways. As far as cargo movement is concerned, most of the cargo originates from Kolkata (Port) and terminates at Guwahati and vice-versa. From Guwahati, the cargo gets distributed to various destinations of north eastern states. The transport links to states particularly Mizoram, Tripura, Manipur and Nagaland are affected many a time by floods, landslides, blockages of roads and local agitations.

Apart from that, the stretches and curves of roads in the hilly area do not permit smooth and feasible cargo services in this region. Perhaps, the best example is the Natural Gas based Palatana\textsuperscript{12} Power plant which had waited more than five years, as the road network within Tripura was not capable of carrying the required machinery of that project. Government of India was seeking permission from the Bangladesh Government to allow their roads for this purpose. Ultimately, in December 2010, a Memorandum of Understanding was signed between India and Bangladesh to transship the required heavy machinery through the sea and land route of the latter in phased manner.

To deal with such logistical problems of linking the Northeast with the rest of India, New Delhi is left with the only option of urging the reopening of the northeastern routes through Bangladesh to its West, and with Myanmar and south- East Asia to the East. The

\textsuperscript{12} Palatana Power Project is situated near Udaipur, the district head quarter of South Tripura, approximately 60 KM away from Agartala, the Capital City of Tripura.
region that is also rich in energy resources like natural gas and hydro-electricity can progress, thus addressing problems that give rise to long-standing grievances, which in turn encourage insurgency surrounding the region.

Bangladesh, on the 31 May, 2010 signed an agreement to finalize a transshipment deal with India to allow Indian goods to be transported to the northeastern city of Tripura in the state of Assam through Bangladeshi territory. Anything produced in the NER faces the difficulty of marketing to the rest of the country, the main reason being the distance to the port of Kolkata. With globalization and the policy of liberalization no foreign or private company is going to be inclined to invest in the north-east corner of India owing to several hassles, including the rise in transportation cost which hampering the development of the north eastern market. The alternative transshipment routes for the Agartala through Bangladesh and Myanmar is presented below (Figure 6.2).

6.3.1 Assumptions

Sen, Gupta and Mukhopadhyay (2013) built their model on the basis of three assumptions mentioned below (Assumptions 1, 2 and 3). This chapter, further, extended that model for determination of stability of equilibrium of such transshipment facility and the associated equilibrium charges charged by the gateway countries. These are presented as following:

**Assumption 1:** *Here, transshipment route itself is treated as a tradable commodity*

**Explanation:** The economy of Tripura is suffering from acute transportation bottleneck. The geographically sequester characteristics coupled with presence of hilly terrain landscape makes transportation a time consuming phenomena. Hence, the internal route of its road network is not sufficient to cater to the needs of the economy of Tripura. This economic landlockedness characteristic of Tripura compels itself to seek for greater regional cooperation for transportation. The immediate neighbouring countries like
Bangladesh and or Myanmar enjoyed some geographic advantage for Tripura through which Tripura can transport its required commodity basket at a cheaper rate than that of its available internal road network. This gives the rise of a new tradable commodity for these countries to offer its internal route for trade to Tripura. In this sense, the transit route itself can be treated as a tradable commodity. Hence, if the producer other than from the NER of India operates under break even situation then they hardly find any inducement to sell their products beyond Guwahati market due to this extra cost burden above its normal level. Simply, due to this adverse geographical locational problem, the transport subsidy for this region is staggering.

**Assumption 2: Amount of transhipment is measured in terms of total amount of cargo movement from Kolkata port to Agartala during that period through Bangladesh and Myanmar;**

**Explanations:** The transport costs are charged by the private transportation provider where as the transhipment fees, above and over the normal transportation costs are charged by the respective government. It may be noted that the normal transportation cost is assumed to be included in the cost schedule in contemporary economic literature. Since the government of the respective gateway countries charging this fee as transit/transhipment charges, it is very natural that the charges will be levied on cargo carrying the commodities with a predefined size and weight.

**Assumption 3: All cargo transshipped to Agartala may not be homogeneous;**

**Explanations:** Apart from providing transit route through their own territory, both the gateway countries have some export basket for India. Hence, any cargo containing readymade garments originating from Kolkata port towards Agartala can hardly get any passage through Bangladesh because this item is one of the most important exportable items for Bangladesh. But the same cargo can easily reach Agartala through Myanmar.
route. Similarly, any cargo containing rice can hardly expect to get passage through Myanmar though it can reach Agartala via Bangladesh. For this, we assumed that all cargos are not homogeneous.

**Assumption 4:** *The transhipment providing country has dealt with twin objective: maximising its gain from transhipment subject to the maintenance of its export basket for that region.*

**Explanations:** The transit providing country has dealt with twin objective: maximizing its gain from transit subject to the maintenance of its export basket for that region. This may be considered as a constrained optimization problem for the gateway countries like Bangladesh and Myanmar. The transshipment providing countries will find it hardly acceptable if after participating in the process of transshipment, the export basket squeezes from its present level. In that case, the local producers who are exporting their commodities to the NER in general and to Tripura in particular will directly suffer a loss.

### 6.3.2 Notations

- \( t_g \): average transportation cost per unit from Kolkata Port to Guwahati at par with the all India level;
- \( t_A \): average transportation cost per unit from Guwahati to Agartala;
- \( T_1 \): average transportation cost per unit from Kolkata Port to Agartala via Bangladesh (denoted by ‘1’) route;
\( T_2 \): average transportation cost per unit from Kolkata Port to Agartala via Myanmar (denoted by ‘2’ route);

\( t_0 \): average transportation cost per unit from Kolkata Port to Agartala through internal transport network via Guwahati;

\( t_i \): the actual transhipment fees that may be charged for ‘i’th external route, for all \( i = 1, 2 \)

\( Q^i_j \): the total unit of cargo that may be transhipped from Kolkata Port to the capital city of Tripura, Agartala, for all \( i = 0, 1, 2 \)

\( \hat{Q}^i_j \): the actual commodity bundle that may be transhipped through ‘i’th route, for all \( i = 1, 2 \)

\( Q^i_j = \{ Q^i_{m+1}, Q^i_{m+2}, \ldots, Q^i_{m+l} \} \) denotes the import basket of Tripura from Bangladesh; and

\( Q^2_j = \{ Q^2_{m+l+1}, Q^2_{m+l+2}, \ldots, Q^2_{m+l+k} \} \) denotes the import basket of Tripura from Myanmar.
Figure 6.2: Map of the Transshipment Route from Kolkata Port to Agartala

Note: The Transshipment route is prepared on the basis of route map of Asian Highway Network in Bangladesh.
6.4 Existence of Transshipment Route

Zaman (2011) has applied the game theory from the perspective of SAARC regional and Indo-Bangladesh cooperation in two ways – (1) where countries/member states know the equilibrium strategies of the other players (Nash Equilibrium); and, (2) where one country faces difficulties in comprehending the others’ strategies (Prisoner’s Dilemma).

The standard game theory solution leads to a Nash Equilibrium solution with \((C,C)\) as the pay off in a symmetric information game when the policy makers of the two countries agreed on starting Transit/Transshipment facility from Kolkata to Agartala. However, the same game can lead to a Prisoner’s Dilemma with \((NC, NC)\) where neither player has any incentive to interact with each other in the absence of symmetric information. It is a fact that without Bangladesh, it is hardly possible to for Player I to connect its NER with Kolkata port. But, the concept of alternative solution concept of either Nash equilibrium or Prisoner’s Dilemma depends solely on the policy of ruling government in Bangladesh.

Note in this context that the model developed by Sen, Gupta and Mukhopadhyay (2013) is extended in this thesis by incorporating Assumption 4 mentioned above (see pp. 122). For which, this thesis considers a super additive game with the possibility of side payments. From the above mentioned discussion, this thesis identified some of the side payments which the Government of Bangladesh expects in return when it will allow transshipment facility to India. Some of these are as following:

(i) upgradation and expansion of transport infrastructure in Bangladesh by India;
(ii) another one billion dollar credit extension to Bangladesh for improvement of local transport sector in Bangladesh;
(iii) reduction of trade deficit of Bangladesh with India by withdrawing import duty on most of the Bangladesh made products, particularly in garments related goods;
(iv) sharing of the waters of the Teesta and Feni rivers, and
(v) reciprocal transhipment rights to Bangladesh to reach Nepal and Bhutan through Indian territory.

As mentioned above, Islam (2008) pointed out that being the natural monopolist in this particular issue, Bangladesh tried to solve some basic bilateral issues with India. India has agreed in principally to extend all the facilities to Bangladesh. However, the state government of West Bengal is not ready to reach a consensus on sharing of waters of the Teesta River with Bangladesh, at least till date. This becomes a big setback for India and Bangladesh postponed signing of MoU with India to extend transit facility to the latter in 2012. It seems that Bangladesh wants to resolve all its bilateral issues with India with this single issue of providing Transit/ Transshipment facility to India for NER of India.

Hence, in this transit game, non-cooperation (NC) from Bangladesh is evident if all the bilateral issues with India are not resolved fully. Being the natural monopolist in this situation, Bangladesh will deliberately use this NC strategy to get maximum side payments from India. Bangladesh will cooperate (C) only when it receives maximum side payments apart from the natural payoff associated with the transit fees it received from India. On the other hand, India is willing to cooperate (C) to reduce its staggering transport subsidy for the NER of India. India may follow non-cooperation (NC) in this game, if India finds that the huge side payments to be paid to the Bangladesh are higher than its staggering transport subsidy for the NER of India.

Further, \( t_0 > T_i \) for all \( i = 1, 2 \). Otherwise, the issue of transit or transshipment through the neighboring counties will not arise. Further, without loss of generality, it is assume that \( T_1 < T_2 \). Accordingly, the unit transshipment costs to Agartala from Kolkata may be rewritten as \( t_0 = t_c + t_A \)

Hence the net potential gains due to transshipment through Bangladesh and Myanmar, respectively yield \( (t_0 - T_1) \) and \( (t_0 - T_2) \). The right hand sides show the individual net actual gains that may be reaped beyond its normal level from providing transshipment facility to Agartala by the Country through which the transshipment takes place.
Hence, if \( T_1 < T_2 \Rightarrow (t_0 - T_1) > (t_0 - T_2) \)

After a small algebra, it may be shown that

\[ t_0 = t_A + (t_G - t_i) + t_i \text{ for all } i = 1, 2. \]

That is the present unit transportation cost to Agartala from Kolkata port can be decomposed into three parts: first, the net unit cost due to inter regional strategic disadvantage \( (t_A) \), secondly, the net cost due to intra regional strategic disadvantage \( (t_G - t_i) \), if any and thirdly, transportation cost through the gateway countries \( (t_i) \) for all \( i = 1, 2 \).

Usually, a coalition's payoff also depends on what the excluded players do. This problem is absent here because India is an essential player, without whom no payoff can be realized. A coalition of Bangladesh and Myanmar alone would not form a complete transshipment route, since they have no reason to transship their own basket of their own. Therefore, a coalition must include India to generate a payoff.

Hence, the coalition \{B, M\} without considering India is economically meaningless where as the options \{I\}, \{B\} and \{M\} signifies the situations before the game is played. Hence, the feasible coalition set exists are \{I, B\}, \{I, M\}, \{I, B, M\}.

Here, the game has been constructed in two phases; the first phase illustrates a game that describes the political approaches of the two main regional core players “India and Bangladesh”, which traditionally has been described as a zero-sum game; however, in the course of this research, the India-Bangladesh game has been translated into a “partial sum” prisoner dilemma game. In the second phase, we introduce the third player ‘Myanmar’, to examine its effect on the game.

### 6.4.1 First Phase of the Game

Zaman (2011) has applied the game theory from the perspective of SAARC regional and Indo-Bangladesh cooperation in two ways – (1) where countries/member states know the equilibrium strategies of the other players (Nash Equilibrium); and, (2)
where one country faces difficulties in comprehending the others’ strategies (Prisoner’s Dilemma). The first phase of the game considers the coalitions \{I, B\} and \{I, M\}, this chapter first consider the coalition \{I, B\}. The standard game theory solution leads to a Nash Equilibrium solution with \((C,C)\) as the pay off in a symmetric information game when the policy makers of the two countries agreed on starting Transit/Transshipment facility from Kolkata to Agartala. However, the same game can lead to a Prisoner’s Dilemma with \((NC, NC)\) where neither player has any incentive to interact with each other in the absence of symmetric information. It is a fact that without Bangladesh, it is hardly possible to for Player I to connect its NER with Kolkata port. But, the concept of alternative solution concept of either Nash equilibrium or Prisoner’s Dilemma depends solely on the policy of ruling government in Bangladesh. Following the above study and the model solution obtained in the preceding sub section, the transit game is presented in Table 6.3.

**Table 6.3: Nash Equilibrium & Prisoner’s Dilemma solution for Transit Fee Determination**

<table>
<thead>
<tr>
<th>The Transit Game</th>
<th>Player I (India)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Co-operation (C)</td>
</tr>
<tr>
<td>Player B</td>
<td></td>
</tr>
<tr>
<td>(Bangladesh)</td>
<td>Co-operation (C)</td>
</tr>
<tr>
<td></td>
<td>Non Co-operation (NC)</td>
</tr>
<tr>
<td></td>
<td>(0, potential loss of Inter Cost)</td>
</tr>
</tbody>
</table>

Source: Based on Author’s calculation.

The development of a new transshipment route through Myanmar, depriving Bangladesh of its former monopoly, has modified the situation profoundly. For India, the strategy non-cooperation (NC) is always strictly dominated by the strategy cooperation (C). Hence, we rule out the possibility of strategy ‘NC’ as any feasible
strategy. Hence, whether to participate or not in this transshipment game is purely determined by the policy of the ruling government in Bangladesh and Myanmar.

The standard game theory solution leads to a Nash Equilibrium solution with \((C,C)\) as the payoff in a symmetric information game when the policy makers of the two countries agreed on starting Transit/Transshipment facility from Kolkata to Agartala. However, the same game can lead to a Prisoner’s Dilemma with \((NC, NC)\) where neither player has any incentive to interact with each other in the absence of symmetric information. It is a fact that without Bangladesh (or Myanmar), it is hardly possible for India to connect its NER with Kolkata port efficiently. But, the concept of alternative solution concept of either Nash equilibrium or Prisoner’s Dilemma depends solely on the policy of ruling government in Bangladesh. The similar results also hold for Myanmar, too.

Hence, opening of transshipment route for India is inevitable since transshipment route is such an economic resource which does not have any alternative use and thereby the opportunity cost of such resources is simply zero. Any unilateral deviation from providing such facility for India either by Bangladesh or Myanmar will simply induce the other player to fill the caveat. Though Zaman (2011) has identified the Indo-Bangladesh game as a Zero-sum game, the presence of Myanmar in the game simply left Bangladesh with only one option, participate if not ready to turn its scare resource unutilized with huge potential loss.

When hope for transshipment through Bangladesh for NER was almost lost, India has been deliberately exercising the policy of opening of Myanmar route for transshipment, as part of this strategic solution for this region. Actually, inclusion of Myanmar as another transshipment provider in this game acts as a credible threat to Bangladesh of losing side payments from India and possibility of new coalition between India and Myanmar depriving Bangladesh from the game.
6.4.2 Determination of Equilibrium Transshipment Fees

The exact amount of transshipment fee from Kolkata (Port) to Agartala is a function of expected sale in Tripura where as actual amount of cargo booking in Kolkata depends on both sale and transshipment charge imposed by the transshipment providing country(s): Bangladesh and/or Myanmar. When transshipment through two gateway country comes into the picture,

It may be noted that transshipment fees are collected over and above the normal transportation cost. For example, the difference term \((t_0 - T_1)\) shows the savings in transportation cost for Tripura if the cargo moves through the Bangladesh route avoiding the internal route through Guwahati. The Bangladesh government can at most charge this as transshipment fees for each cargo moves through its own territory. Similar is the case for Myanmar. Combining these, \(t_i \leq \{t_0 - \min(T_1, T_2)\}\) for all \(i = 1, 2\) may be taken as the upper bound of transshipment charge.

Moreover, combing the present internal transportation network for Agartala, the choice of transshipment route is determined as

\[
t^*_i = \begin{cases} 
\min(T_1 + t_i, T_2 + t_i); (T_1 + t_i) < t_0 & \text{for all } i = 1, 2 \\
t_0; & (T_1 + t_i) \geq t_0
\end{cases}
\]

Assuming \(T_1 < T_2\) we must have \(t^*_i < (t_0 - T_1)\) which may be taken as the upper bound of equilibrium transshipment charges that may be charged by the transshipment providing countries.

Further, equating the total cost of transshipment including the transportation cost through the member country (Bangladesh being the leader with cost advantage over Myanmar), we get

\[(T_1 + t_1) = (T_2 + t_2)\]

or, \(t_1 = t_2 + (T_2 - T_1)\) and \(T_1 < T_2 \Rightarrow t_1 > t_2\)

Moreover, the demand function for cargo transshipment through ‘i’th route may be
considered as: $t^* = f(Q)$; $f'<0, f''=0$ for all $i=1,2$ thereby confirming the negatively sloped (linear) demand curve. However, the actual equilibrium charge is determined on the basis of expected sale at Agartala as well as on capacity constraint in transhipment service, if any of the member country(s).

### 6.4.3 Second Phase of the Game

This is the extension of the First Phase Game with the introduction of Myanmar (Player M) in the present scenario. The first phase of the game will simply converted into a transit duopoly situation where Player B can choose either to cooperate and enjoy cartel solution between Player B and Player M or go for adopting a non-cooperative strategy with Bertrand type completion model. In either of the alternative, Player I would be the gainer in terms of the sustainability of such transit facility in the long run. This is depicted in the following:

As mentioned in Chapter 3, we have a total number of 3 players namely India (I), Bangladesh (B) and Myanmar (M). Coalitions K can be formed with $k \leq 3$ players and a payoff $v(K)$.

Hence total number of Coalitions that can be formed is

$$\sum_{j=0}^{3} \frac{3!}{x!(3-x)!} = 3 + 3 + 1 = 7$$

The various possibilities to form coalitions are the following:

$K = \{I\}, \{B\}, \{M\}, \{B, M\}, \{I, B\}, \{I, M\}, \{I, B, M\}$

Now, the feasible commodity bundle to be transshipped to Tripura, which the economy of Tripura purchased from the rest of Tripura (for simplicity, we exclude the purchase from other states of NER), may be written as:

$$\bar{Q} = \{Q'_{m}, Q'_{m+1}, Q'_{m+2}, \ldots, Q'_{m+t}, Q^2_{m+t+1}, Q^2_{m+t+2}, \ldots, Q^2_{m+t+k} \}$$
Where, \( Q^0_j = \{Q^0_0, Q^0_1, \ldots, Q^0_m\} \) represents the commodity bundle that the economy of Tripura purchased via Kolkata port outside Tripura. The amount imported from Bangladesh and Myanmar is not captured in this bundle.

Rather, \( Q^1_j = \{Q^1_{m+1}, Q^1_{m+2}, \ldots, Q^1_{m+k}\} \) and \( Q^2_j = \{Q^2_{m+1}, Q^2_{m+2}, \ldots, Q^2_{m+k}\} \) represents the import basket of Tripura from Bangladesh and Myanmar, respectively.

For the sake of simplicity, this chapter considers, \( Q^1_j = \tilde{Q}_1 \), \( Q^2_j = \tilde{Q}_2 \) and \( Q^0_j = \tilde{Q}_0 \) as three the commodities that may be transshipped. Hence, we have, \( Q^0_j, Q^1_j \) and \( Q^2_j \) may be defined as the disjoint partition of the transshipment bundle \( \tilde{Q} \). Hence, the choice set of the transshipment providing countries may be defined as \( \hat{Q}_i = \{Q^0_i, Q^1_i, Q^2_i\} \) for \( i \neq j=1,2 \) where \( \hat{Q} \) denotes the homogeneous cargo transshipment whereas and \( \tilde{Q} \) denotes the heterogeneous cargo transshipment comprising of the export basket of the other transshipment providing country’s export basket for the NER of India.

Further, suppose, \( P_i \) and \( P_i \) denotes the price of \( \tilde{Q}_i \) at Agartala and at Kolkata Port, respectively for all \( i = 1,2 \).

*Obviously, \( P_i + t_0 - (t_j + T_j) \) < \( P_i + t_0 \) for all \( i \neq j = 1,2 \).*

Hence, \( \tilde{Q}_i \) for all \( i=1,2 \) will no longer exists as export basket for NER of India of ‘i’ th member country if the same is transshipped to Agartala via ‘j’ th member country for all \( i \neq j = 1,2 \)

### 6.5 Different Constellations

At the point of Inception, India and Bangladesh (or Myanmar) are not integrated. Obviously, Bangladesh (Myanmar) is the transshipment monopolist and as an independent player it can charges a monopoly rate. No monopolist can set the price (charge) and quantity simultaneously. The monopolist can choose the price and let the
buyer to decide what amount they wish to transship. Alternatively, choose the amount of cargo to be transshipped and let the buyer to decide what price they wish to offer. Though, it enjoys a monopoly power being the sole transshipment providing gateway country, it hardly charging any monopoly price, rather go for revenue maximization (denoted by super scrip \( 'R' \)). We have already assumed that the transshipment fees charged by the transshipment providing and the actual transport cost are not synonymous. Rather, transshipment fees are charged as cost of resources for allowing transportation through the gateway country(s). Assuming \( \bar{Q}=\bar{Q}_0=\{Q^0_1,Q^0_2,\ldots,Q^0_m\} \) as the transshipment bundle for both the member country, we end up with the following Proposition.

**Proposition 1:** When the size of the market for homogeneous cargo transshipment is sufficiently large, in the absence of any transshipment capacity constraint, the member countries will opt for revenue maximization, unilaterally. The resulting situation leads to a stable Nash Equilibrium type solution.

**Proof:** Suppose, we start with the assumption of homogeneous cargo transshipment that is \( \hat{Q}_1=\{\bar{Q}_0\}, \hat{Q}_2=\{\bar{Q}_0\} \Rightarrow \bar{Q}=\{\bar{Q}_0\} \)

The inverse demand function for transshipment of cargo is \( t_i^* = f(Q); f'<0, f''=0 \) for all \( i=1,2 \) thereby confirming the negatively sloped (linear) demand curve. Accordingly, in the absence of any specific cost function for transshipment fees, the objective of gateway country is to maximize its earnings from this strategic resource. Since, \( t_i^M > t_i^R \ and \bar{Q}^i_M < T^R_i \ but \ TR_i^R > T^M_i \). The basic microeconomic theory postulates that for a negatively sloped (linear) demand curve, monopoly equilibrium is achieved only on the elastic portion of the demand curve where as revenue is maximized only when the elasticity of demand is unitary elastic. Bangladesh, being the leader in this game, always tries to maximize its revenue for the scare resource by supplying the half of the market.
Being the leader in this market, Bangladesh will maximise its revenue with \((t_1^R, Q_1^R)\) thereby only \((\bar{Q}_0 - Q_1^R)\) left for Myanmar as the residual amount. Now the question is whether Myanmar can also achieve the same or not. The answer to this question depends on two other preconditions: size of the market and capacity of transshipment in the member country.

When, the size of the transshipment market is sufficiently large such that \(Q_2^R \leq (\bar{Q}_0 - Q_1^R)\) at \(t_2^R\), Myanmar is also achieving maximum revenue from transshipment. Since both member countries are achieving the available best solution through participation, none of them has any incentive to deviate from its current situation, thereby the Nash solution with \((t_1^R, Q_1^R, t_2^R, Q_2^R)\) is achieved. The residual quantity \(\{\bar{Q}_0 - (Q_1^R + Q_2^R)\}\) will be transported through the existing internal transport network via Guwahati. However, the equilibrium transshipment charges will be a three step function:

\[
t_i^* = \begin{cases} 
 t_1^R; Q \in [0, Q_1^R] \\
 t_2^R; Q \in (Q_1^R, Q_2^R] \\
 t_0; Q \in (Q_2^R, \bar{Q}_0] 
\end{cases}
\]

Obviously, \(t_0 > t_1^R > t_2^R\) as \(T_1 < T_2 \Rightarrow t_1 > t_2\)

Before the game is played, actual transportation cost for Tripura was: \((t_0, \bar{Q}_0 - S_1)\)

Once the transshipment facility offered unilaterally, the actual transportation cost to Agartala (including the subsidy amount \(S_2\) including the transshipment fees may be written as:

\[
[t_1^R + T_1]^*Q_1^R + (t_2^R + T_2)^*Q_2^R + t_0^*\{\bar{Q}_0 - (Q_1^R + Q_2^R)\}] - S_2
\]

Accordingly, after a little algebra, we may write

\[
(S_1 - S_2) = \{(t_0 - t_1^R - T_1)Q_1^R + (t_0 - t_2^R - T_2)Q_2^R\}
\]
Or, \((S_1 - S_2) = \{(t_1 - t_1^R)Q_1^R + (t_2 - t_2^R)Q_2^R\}\)

Or, \((S_1 - S_2) = \{(t_1 - t_1^R)Q_1^R + (t_2 - t_2^R)Q_2^R\} > 0\)

This implies that there is a net savings in transportation subsidy for Agartala.

**Lemma 1**: However, \((Q_i^R + Q_j^R) > \bar{Q}: \hat{Q}_i \in \{\bar{Q}_0\}, \hat{Q}_2 \in \{\bar{Q}_0\} \Rightarrow \bar{Q} \in \{\bar{Q}_0\}\) compels either of the member country to compete for \(\hat{Q}\) and \(\hat{Q}\leq (Q^0 - \hat{Q}^i); i \neq j\) only. Accordingly, the choice set for transshipment bundle for both the member country shifted from \(\hat{Q}_i = \{\bar{Q}_0\}\) to \(\hat{Q}_i = \{\bar{Q}_0, \bar{Q}_j\}\) for \(i \neq j = 1, 2\) and thereby, leads to a Prisoner's Dilemma Solution.

**Proof**: Suppose, Bangladesh continues to enjoy \((t_1^R, Q_1^R)\) which ultimately render Myanmar to achieve \((t_2^R, Q_2^R)\) since \((Q_i^R + Q_j^R) > \bar{Q}: \bar{Q} = \bar{Q}_0\). Hence, Myanmar will end up with a suboptimal solution where its return from the scare resource is under priced. The lack of sufficiently large homogeneous cargo transshipment market will induce Myanmar to fill up the caveat by shifting its feasible cargo transshipment bundle from \(\hat{Q}_2 \in \{\bar{Q}_0\}\) to \(\hat{Q}_2 \in \{\bar{Q}_0, \bar{Q}_1\}\) which directly squeezes the export basket of Bangladesh for NER of India. To avoid such losses, Bangladesh will definitely retaliate by shifting its feasible set of cargo transshipment from \(\hat{Q}_i \in \{\bar{Q}_0\}\) to \(\hat{Q}_i \in \{\bar{Q}_0, \bar{Q}_1\}\). Again, the actual earning of the either of the transshipment providing countries will be lower in the sense that they are going to lose their respective export basket for the NER. For example, readymade garments and rice for Bangladesh and Myanmar respectively are the major export items for the respective transshipment providing countries but unilaterally either of them can allow the export basket of the other country to get passage for Tripura through their route. In the extreme situation of retaliation and counter retaliation by both the member country may lead to complete abolition of the export bundle due this heterogeneous nature of cargo transshipment thereby making both of them worse off. The commodity bundles \(\{\bar{Q}_1\}\) and \(\{\bar{Q}_2\}\), separately will no
longer exist as an export baskets for Tripura since they will be substituted by domestic commodity bundles transshipped from Kolkata port to Agartala, if these commodity bundles really allowed by either of the transshipment providing countries to get passage for Tripura. Hence, we cannot expect a stable equilibrium under this situation. In either of the situation, the economy of Tripura will be gainer in the sense that its staggering transport subsidy shall reduced substantially from its present level. This in turn compels either of the transshipment providing countries to deviate from its present situation in the fear of losing its existing export market in Tripura. Since, none of the member country ants lose their respective export basket for Agartala, simultaneous choice of transshipment basket is the most important factor. Unilaterally, it is hardly possible for any of the member country to stick to their initial preference of \( \hat{Q}_i = \{\overline{Q}_0\} \) rather than \( \hat{Q}_i = \{\overline{Q}_0, \overline{Q}_1\} \).

This is because when the member country chooses their strategy unilaterally, the strategy, \( \hat{Q}_i \) is always dominated by the strategy, \( \hat{Q}_i \) for all \( i = 1, 2 \). Hence, \( (\hat{Q}_1, \hat{Q}_2) \) never realized as a stable solution though at this pair of strategy both the member country can optimize their respective payoffs. The stability of equilibrium takes place due to the mutually trigger off strategies played by these two gateway countries. Any unilateral movement will make either of the party worse off. These are portrayed in terms of the strategic solution in the next subsection.

### 6.5.1 The Best Alternative

The heterogeneous nature of choice set for cargo transshipment leads to this type of solution where both member countries end up with a worse off position at the cost of abolition of their respective export basket for the Agartala market. The mutual non cooperation coupled with unilateral aggressive naive strategy choice is the basic reason behind such outcome. However, after reaching this stage of prisoner’s dilemma solution with \( (\hat{Q}_1, \hat{Q}_2) \), the presence of active threat of losing their respective export basket force them to review their strategy selection. Obviously, the strategy of
choosing the option of homogeneous cargo transshipment marked as $\hat{Q}_i$ is not always dominated by the strategy of choosing the option of heterogeneous cargo transshipment marked as $\hat{Q}_i$ for all $i=1,2$. Hence, $(\hat{Q}_i, \hat{Q}_2)$ will never be realized as a viable solution for both the member country. Both the member country will stick to $\hat{Q}_i$ and not to $\hat{Q}_2$ just to protect their export basket from the other. Thus, the existence of credible threat from both sides of losing the export basket for Agartala market force $\hat{Q}_i$ to be dominated by $\hat{Q}_2$. Hence, $(\hat{Q}_1, \hat{Q}_2)$ is realized as a forced cartel solution in the presence the second objective as mentioned under fourth assumption. Though, $(\hat{Q}_1, \hat{Q}_2)$ is a (forced) cartel solution, it is, again, a Nash equilibrium derived in the subsequent stage with symmetric information among the member country. Once the heterogeneous choice set of transshipment basket converted to homogeneous nature through mutual (forced) cooperation, none of the member country has any incentive from this cartel solution $(\hat{Q}_1, \hat{Q}_2)$, thereby, guarantees a stable equilibrium.

For this scenario, the r third assumption needs to be dropped since under cartel, both the players; B and M are expected to act jointly as monopolist. In that case, for long term sustainability of their cartel situation, the players are expected to maintain the relative advantage of the products which are already exported either of the party to NER. As a result, cargo will no longer be treated as non homogeneous rather it would be a homogeneous one simply by excluding those products in the cargo. The feasible commodity space under cartel like solution must be $Q = \{Q_1^0, Q_2^0, \ldots, Q_m^0\}$. This is concluded in the form of following results:

**Result 1:** The Nash solution for the transshipment game is achieved at $(\hat{Q}_1, \hat{Q}_2)$ through a (forced) cartel between the member countries under the presence of active threat of losing their respective export basket for Agartala market if retaliated by either of the member countries.

This has been summarized in the following table.
Table 6.4: The Transshipment Game between the member countries

<table>
<thead>
<tr>
<th></th>
<th>Myanmar</th>
<th>Bangladesh</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\hat{Q}_2$</td>
<td>$(TR_1 + X_1), (TR_2 + X_2)$</td>
</tr>
<tr>
<td>$\hat{Q}_1$</td>
<td>$(TR_1 + X_1), (TR_2, (TR_2 + X_2))$</td>
<td>$(TR_1, TR_2)$</td>
</tr>
</tbody>
</table>

Source: Based on Author’s calculation.

Where, $X_1$ and $X_2$, represents the export earning of the gateway countries from Tripura. For the sake of simplicity ($X_1, X_2$) are taken as constant.

From the above analysis, it is clear that the transshipment providing countries have three strategies to play. These are as following:

For Bangladesh

**Best Strategy (B1):** Provide Transit Facility Unilaterally and enjoy monopolistic (bounded upward) transit fee

**Next Best Strategy (B2):** Go for market sharing with a cartel like solution with Player M converting the non homogeneous cargo into homogeneous cargo to protect the interest of both Player B and Player M

**Worst Strategy (B3):** Withdrawal of transit facility and suffers potential loss

For Myanmar

**Best Strategy (M1):** Provide Transit Facility Unilaterally and enjoy monopolistic (bounded upward) transit fee.

**Next Best Strategy (M2):** Go for market sharing with a cartel like solution with Player B converting the non homogeneous cargo into homogeneous cargo to protect the interest of both Player B and Player M

**Worst Strategy (M3):** Withdrawal of transit facility and suffers potential loss
It is clear that though (M1, B1) are the dominant strategy unilaterally for both the player to opt for monopolistic transit fees, separately but when the game will be played it will reduced to a Bertrand type solution with marginal cost pricing of transit fees to be charged from India. On the unilateral deviation from the game by either of the Player will simply promote the other player to opt for monopolistic transit fees and suffering potential loss for the player who will try to exit. Hence, the strategy of withdrawal of transit facility is always dominated by other two available strategies. Ultimately, the game will be reduced to a 2X2 form.

Within this reduced form game, the transit facility will continue thereby, giving Player I some relief in terms of reduction in staggering transport subsidy spent for its states in the NER. The reduced form game also reveals that though M1 and B1 strategies are the dominant strategies unilaterally for Player M and Player B, respectively the game will end up with a stable solution at (M2, B2). The sustainability of such solution is further strengthened by avoiding transshipment the exportable items for Tripura b the other’ gateway countries. The homogeneity of cargo simply implies that export advantage of the transit providers are maintained within the cartel solution. As mentioned above, if cargo is not homogeneous, Player I can easily transships rice through Bangladesh or transships readymade garments through Myanmar avoiding Myanmar and Bangladesh, respectively. Under homogeneity assumption, both the countries will try to maintain their relative advantages of their product through mutual cooperation. In this sense, (M2, B2) strategy will be a stable Nash solution for both the players. Simultaneously, Player I should not have any object against this strategy since cooperation would be the dominant strategy rather than to withdrawal from the game. Hence, this type of Nash equilibrium scenarios will benefit all the players where none of the players has any incentive to deviate from the game, thereby, making it sustainable In the long run.

It is a fact that without India, any coalition between Bangladesh and Myanmar is economically meaningless. Depriving either Bangladesh or Myanmar, if India wants to form any coalition with Myanmar or Bangladesh, respectively, that will again lead to the possibility of side payments to Myanmar and Bangladesh, respectively. Hence
for India, a grand coalition between India, Bangladesh and Myanmar is always beneficial for India rather than to form any bilateral coalition with either Bangladesh or Myanmar depriving the other.

6.6 Concluding Remarks

Though Bangladesh is suffering from mounted trade deficit with India but a close look towards its deficit component clearly shows that it is a net importer in multiple dimensions so far as its western side is considered. At the same time, it is a net exporter to India if its trade statistics is considered, it enjoys trade surplus with Tripura. Due to this strategic advantage, Bangladesh has some specific interest for trade with this state. Initially, Bangladesh was hesitating to allow India to provide transshipment facility for the NER in general and for Tripura in particular but India reciprocate it in right direction by providing similar transit facility to Bangladesh to reach the Himalayan landlocked countries like Nepal and Bhutan, thereby, actively participate in moving towards an integrated transport network for this region as a whole. Opening of Myanmar route further gives India some relief in terms of reduced transportation cost due to both inter and intra regional disadvantage for the partially landlocked state like Tripura. Further, a mutually trigger off strategy among the two gateway countries with homogeneous cargo movement will make the game sustainable over time where none of the players has any incentive to deviate from the game.