

Evaluation of the Benefits of Transnational Transportation Projects

Glenn P. Jenkins

Department of Economics, Queen's University, Kingston, Canada and
Eastern Mediterranean University, North Cyprus
E-mail: jenkins@econ.queensu.ca

Chun-Yan Kuo

Senior Fellow, John Deutsch International, Department of Economics, Queen's University, Canada
E-mail: chunyankuo@gmail.com

Development Discussion Paper: 2002-13

Abstract

In this paper, we examine the impact of transnational transportation projects on cargo traffic and the distribution of the benefits of the project amongst those affected. The paper has found that the allocation of the economic benefits depends upon whether the goods are traded internationally or regionally. When the goods are internationally traded, producers of the exporting country benefit from the reduction of transportation cost. In the case of regionally traded goods, the gains from the reduction of transportation cost will be shared by producers in the exporting country and consumers in the importing country where the shares are determined by the import demand and export supply elasticities of the commodity.

This analytical framework is applied to the evaluation of a proposed Buenos Aires-Colonia binational bridge project. In the base case we find that for internationally traded goods, the present value of the benefits of freight cost reductions that accrue to Argentina are estimated to be US\$47.0 million and those accrue to Uruguay are about US\$41.8 million. Brazilian producers would even benefit more in the amount of US\$73.8 million. These cost reductions are over and above the reduction in freight costs that are captured by the tolls on the bridge. These net benefits are equal to approximately 18 percent of the investment cost of the bridge. For regionally traded goods, consumers in Argentina and producers in Brazil would share equally the small amount of benefits generated.

JEL Codes: F10, H43, R42

Key Words: Argentina, benefit, Brazil, cargo traffic, transnation, transportation

Published as: Jenkins, G., & Kuo, C. (2002). Evaluation of the benefits of transnational transportation projects.

Abstract

In this paper, we examine the impact of transnational transportation projects on cargo traffic and the distribution of the benefits of the project amongst those affected.

The paper has found that the allocation of the economic benefits depends upon whether the goods are traded internationally or regionally. When the goods are internationally traded, producers of the exporting country benefit from the reduction of transportation cost. In the case of regionally traded goods, the gains from the reduction of transportation cost will be shared by producers in the exporting country and consumers in the importing country where the shares are determined by the import demand and export supply elasticities of the commodity.

This analytical framework is applied to the evaluation of a proposed Buenos Aires-Colonia binational bridge project. In the base case we find that for internationally traded goods, the present value of the benefits of freight cost reductions that accrue to Argentina are estimated to be US\$47.0 million and those accrue to Uruguay are about US\$41.8 million. Brazilian producers would even benefit more in the amount of US\$73.8 million. These cost reductions are over and above the reduction in freight costs that are captured by the tolls on the bridge. These net benefits are equal to approximately 18 percent of the investment cost of the bridge. For regionally traded goods, consumers in Argentina and producers in Brazil would share equally the small amount of benefits generated.

JEL Codes: F10, H43, R42

Key Words: Argentina, benefit, Brazil, cargo traffic, transnation, transportation

Glenn P. Jenkins, Professor, Department of Economics, Queen's University, Canada, and Department of economics, Eastern Mediterranean University, North Cyprus, e:mail: jenkins@qed.econ.queensu.ca

Chun-Yan Kuo, Senior Fellow, John Deutsch International, Department of Economics, Queen's University, Canada, e-mail: kuoc@qed.econ.queensu.ca

Evaluation of the Benefits of Transnational Transportation Projects*

I. Introduction

A transnational transport project brings with it a unique dimension in its evaluation. In addition to the cost of construction, the most important considerations of the project are the volumes of passenger and freight traffic. In the cost benefit analysis, the extent to which each country shares the benefits usually dominates the debate over the results of financial and economic appraisal and thus is vital information for each country in its decision whether to implement the project.

Road transportation projects usually result in the reduction of logistics costs, motor vehicle operating costs, and the cost of accidents and congestion. The primary beneficiaries of these projects are the users of passenger cars, buses and trucks. Some of the benefits and costs are clearly defined, straightforward to quantify, and to identify the stakeholder to whom the benefit or cost accrues. For example, passenger car users would benefit by the additional consumer surplus they receive as reflected by their willingness to pay because of the savings in travel time and operation costs of vehicles. The methodology for quantification has been well developed and widely applied to the evaluation of road transportation projects.¹

In the case of cargo traffic, the allocation of the benefits is not so transparent because of the involvement of several parties in the process of production, transportation and consumption of the items being transported. These parties include producers and shippers of the goods in the exporting country, distributors and consumers of the goods in

*The authors are grateful to Alberto Barreix and Rubi Sugana for helpful discussions and comments.

¹ See, e.g., Meyer, John R. and Mahlon R. Straszheim, Techniques of Transport Planning: Pricing and Project Evaluation, (Washington, D.C.: The Brookings Institution, Transport Research Program, 1971); Arnold C. Harberger, "Cost-Benefit Analysis of Transportation Projects", in Project Evaluation – Collected Papers, (London: the Macmillan Press Ltd., 1972); Pedro Belli, Jock Anderson, Howard Barnum, John Dixon, and Jee-Peng Tan, Economic Analysis of Investment Operations: Analytical Tools and Practical Applications, (Washington, D.C.: the World Bank, 2001).

the importing country, and the trucking companies. The assignment of the benefits and costs between the two or more countries can be a highly contentious issue. The main purpose of this paper is to develop the methodology that will enable us to measure the allocation of the economic benefits arising from the reduction in the costs of cargo transportation.

Section II describes some concerns about the benefits of the project accruing to transportation companies versus users of transportation services. Section III deals with the economic benefits when goods are internationally traded. Section IV discusses the situation when the goods are regionally traded. Section V presents empirical issues in dealing with the case of the Buenos Aires-Colonia bridge investment project, with some concluding remarks are made in the final section.

II. Analytical Considerations

Freight transportation services can be considered a derived demand for the movement of merchandise between two locations. In the case of a transnational transport project, it involves two or more countries. The total costs of shipping merchandise would include the logistics cost and the transportation cost. The former is made up of the loading and unloading costs, storage cost and the waiting time, including the waiting time lost due to the operation of customs at border crossings. The latter involves the cost of fuel consumption, maintenance, insurance, and wear of the tires and depreciation of the truck itself. The lower the transport costs, the greater the benefits received by the parties involved. The conventional treatment suggests that it is the receiver of the merchandise who is the ultimate decision-maker of the shipment in terms of the size of the shipment and the choice of mode. It is assumed that they try to minimize the overall transportation and storage costs associated with the purchase of the commodity.² However, the demand

² Science Applications International Corporation, Freight Mode Split Analysis for the Buenos Aires-Colonia Bridge Feasibility Study, paper prepared for Louis Berger International, Inc., (October 1997).

and supply conditions of the particular merchandise as well as the competitiveness of trucking sector will ultimately determine how the benefits of a transportation improvement project will be allocated.

If the freight service providers are made up of a small number of companies and operate as a cartel, they may try to keep prices above their competitive level and hence not pass on the reduction of the transportation cost brought about by the new project to either the producers/shippers or the buyers of the goods. On the other hand, if the trucking companies are competing among themselves or face competition with alternative transportation modes, they may not be able to capture any of the direct benefits of the project as higher profits. They would benefit only from the expansion of business activities as a result of the lower transportation costs between the locations.

The existence of a monopolized freight service sector is more difficult to realize in today's business environment. First, government regulation of the transportation sector has declined significantly around the world, except in the area of security and safety. A great deal of the traditional public transport providers has been privatized over the past two decades. Second, global trade liberalization has accelerated the movement toward deregulation and competition in this sector. This has been taking place in areas including the Mercosur region where licensed freight firms from any of the countries can operate in all of the Mercosur member countries. Third, the trucking industry has to compete with alternative modes in order to continue or expand their business activities. Fourth, many users of transport services have the option of changing the location of their production and method of distribution, thus minimizing their dependence on a particular transportation mode. Due to these effects, it would be more realistic to analyze the benefits and costs of a transnational transport project under a highly competitive environment in the transportation sector. In other words, the direct benefits attributable

to the reduction of shipping costs are likely to be passed on to either producers in the exporting country, consumers in the importing country or to both.

In terms of measurement, it is difficult to find a common base for comparing the costs of different transportation modes or between different sizes of the same mode such as large, medium and small trucks. As transport is a derived demand, the common base usually used is the cost per unit of goods delivered. Thus, receivers of merchandises tend to minimize the total delivered cost expressed in units of the amount of the product shipped. With this hypothesis, most of the demand models for cargo traffic have been developed at the micro level on an individual commodity movement.³ The important variables determining the total cost include the distance traveled, amount of tolls paid, fuel cost, labor cost of drivers, capital costs for the time the goods are in transit, storage, and waiting to cross borders. It is the cost-minimizing feature of the model that determines the quantity of services demanded from the highway or bridge. The model usually analyzes a stratified sample of actual shipments and picks the mode and route to minimize the total delivered cost. The transportation mode will change when the cost of another mode becomes cheaper.

Since internationally traded merchandise involves at least two countries, the extent to which the exporting or importing country is expected to receive the benefits of cargo traffic using a new or improved bridge or highway would depend upon whether the shipped merchandise is traded internationally or only regionally.

III. The Case of Internationally Traded Goods

Suppose that the shipped goods are internationally traded. Prior to the opening of the bridge or highway, the importing country imports goods of $(Q_{AB0}^S - Q_B^S)$ at the cif price

³ Roberts, Paul O., "Factors Influencing the Demand for Freight Transport", MIT Center for Transportation Studies, CTS Discussion Paper 8-75, (August 1975).

(P_B^W) from its neighbor country and imports from the rest of the world an amount of ($Q_B^d - Q_{AB0}^S$), as indicated in the right panel of Figure 1. Let P_{A0} denote the fob price of the goods in the specific exporting country in the left panel of Figure 1. The difference between the cif price of the goods in the importing country and the fob price of the goods in the exporting country represents the transportation and logistic costs (t_c) between two countries prior to the implementation of the bridge or highway project.

The project is expected to result in a reduction of transportation costs from t_c to t'_c , thus [$t_c - t'_c$] will represent cost savings per unit of exported goods delivered. Because of the competitive market in the international transportation sector, buyers of the goods in the importing country will now have an incentive to shift their demand for imports from the rest of the world to imports from the specific neighboring country. The neighboring exporting country will now increase their sales of the goods to the importing country by the amount of ($Q_{AB1}^S - Q_{AB0}^S$). As a result, exporters in the neighboring country will expand their production along their upward sloping supply curve, $S_A + t'_c$. With a higher price, consumers of this commodity in the exporting country will cut back their consumption. In the end, both the increase in supply and the decrease in demand should serve to increase exports from DC to AB, as indicated in the left panel of Figure 1. In the new equilibrium, $Q_{A1}^X = Q_{B1}^m$.

The total net benefits associated with the increased shipment of this merchandise via the new facility accrues to the producers in the exporting country and can be shown as the area of ABCD in Figure 1. It can be segregated between diverted ($\bar{Q}_{A0}$) and induced or generated traffic ($\bar{Q}_{A1} - \bar{Q}_{A0}$).⁴ There will also be a transfer from consumers to producers in the exporting country of an amount equal to $P_{A0} P_{A1} AD$. For the traffic

⁴ The induced traffic is defined as the additional traffic that uses the bridge or highway as a result of reduction in transportation cost caused by the project, while the generated traffic is due to economic developments at both ends of the highway.

diverted from the existing modes, the benefits are estimated by the savings in transportation costs times the volume of diverted traffic. That is, $(Q_{A0}^x) \cdot [t_c - t_c']$. In the case of the induced and generated traffic, the benefits are measured by one half the multiplication of the savings in transportation costs by the volume of the traffic. This can be expressed as $\frac{1}{2} \cdot (Q_{A1}^x - Q_{A0}^x) \cdot [t_c - t_c']$.

IV. The Case of Regionally Traded Goods

The regionally traded goods means that the shipped goods are imported only from the neighboring country. That is, the amount of exports from the exporting country (DC) to the importing country equals the latter's total amount of imports of the commodity (EF), as indicated in Figure 2A. Prior to construction of the bridge or highway, the price differential between the cif price of the goods in the importing country and the fob price in the exporting country is shown as t_c .

When the transportation costs decrease from t_c to t_c' , the supply curve of the exported goods shifts to the right from $(S_A + t_c)$ to $(S_A + t_c')$ in the exporting country. Accordingly, the initial supply of the goods in the importing country also increases by the same amount, moving from S_{A+B} to S'_{A+B} . The excess supply of exports in the exporting country and the excess demand for imports in the importing country both determine the final equilibrium price of the goods in both countries. At equilibrium, the amount of exports increases from DC to AB, while the amount of imports also increases from EF to HG. That is, $Q_{A1}^x = Q_{B1}^m$. In this case, both countries share the savings in the transportation cost reductions, depending upon the supply elasticity of exports and the demand elasticity of imports. The net benefits shared by the exporting country are shown in the area of ABCD and by the importing country in the area of EFGH.

One can integrate the excess supply of the goods in the exporting country and the excess demand for the same goods in the importing country in one diagram, as shown in Figure 2B. The supply curve (S_0^X) is expressed as the supply of exports from the exporting country, which is derived from the domestic supply of exportable goods (S_A) in excess of the domestic demand (D_A) as shown in the left panel of Figure 2A. Similarly, the demand curve (D^m) denotes the demand for imports in the importing country. The intersection of the supply and demand curves determines the international equilibrium prices of the goods at A, namely, P_0 . This is equivalent, as shown in Figure 2A, to the fob price in the exporting country (fob_{A0}) and the cif price in the importing country (cif_{B0}) adjusted for the price differential that is essentially the transportation cost (t_c) of the good between two countries.

After the implementation of the project, the total transportation cost between two countries is reduced from t_c to t'_c , causing the supply curve of exports to shift downward from S_0^X to S_1^X . The fob price of the goods will initially be reduced to P_2 . With a lower input cost for the exported good, exports will expand. The incremental amount of exports in fact comes from the expansion in domestic production as well as a cut back in consumption in the exporting country. Since the good is regionally traded, the lower prices will result in the additional quantity of exports supplied by the exporting country being equal to the additional quantity of imports demanded by the importing country. A new equilibrium price will be established at P_1 , where the new equilibrium fob price in the exporting country (fob_{A1}) will be adjusted upward from P_2 and the cif price in the importing country (cif_{B1}) will be adjusted downward from P_0 . The total amount of the good traded in equilibrium will now be M_1 . The gains resulting from the reduction in transportation cost will be shared by producers of the exporting country as shown by the area $P_1 P_2 CB$ and consumers in the importing country by the area of $P_0 P_1 BA$.

To quantify the relative gains, one can begin with the equality of the incremental exports and imports as a result of the implementation of a transnational transportation project. That is, for a pair of countries and each commodity we have:

$$\Delta Q_x = \Delta Q_m \quad (1)$$

Let ε_x^S and η_m^D stand for the elasticities of supply of exports and demand for imports, respectively. Equation (1) can be written as follows:

$$\varepsilon_x^S \cdot Q_x \cdot (\Delta P_{fob}/P_{fob}) = \eta_m^D \cdot Q_m \cdot (\Delta P_{cif}/P_{cif})$$

Prior to the implementation of the project, $Q_x = Q_m$ and $P_{fob} = P_{cif}$ in equilibrium if the transportation cost between the two countries is ignored. Equation (1) can now be simplified below:

$$\varepsilon_x^S \cdot \Delta P_{fob} = \eta_m^D \cdot \Delta P_{cif} \quad (2)$$

Since the reduction of the transportation cost (ΔT) equals the sum of the price reduction of imported goods and the price increase of the exported goods, that is,

$$\Delta T = \Delta P_{cif} - \Delta P_{fob} \quad (3)$$

Substituting (3) in equation (2) yields the ratio of $\Delta P_{cif}/\Delta T$, which is the ratio of the price reduction to consumers in the importing country to the total transportation cost reduction. This ratio (λ_m) stands for the share of the total benefits received by consumers of the imported goods in the importing country:

$$\lambda_m = \Delta P_{cif}/\Delta T = \frac{\varepsilon_x^S}{\varepsilon_x^S - \eta_m^D} \quad (4)$$

The quantification of this share has to be measured by the supply elasticity of exports in the exporting country and the demand elasticity for imports in the importing country. The larger the price elasticity of demand for imports, the smaller is the share of

the benefits accruing to the importing country. On the other hand, the greater the elasticity of supply of exports the larger is the share of the benefits that would be received by the importing country.

Estimates of these elasticities are usually derived indirectly in the following manner. The elasticity of demand for imports in the importing country (η_m^D) can be expressed as follows:

$$\eta_m^D = \eta_I^D \frac{Q_T^D}{Q_m} - \varepsilon_I^S \frac{Q_T^S}{Q_m} \quad (5)$$

where η_I^D : Demand elasticity for importable goods in importing country
 ε_I^S : Supply elasticity of importable goods in importing country
 Q_T^D : Total demand for importable goods in importing country
 Q_T^S : Domestic supply of importable goods in importing country
 Q_m : Quantity of imports

The elasticity of supply of exports from an exporting country (ε_x^S) can be derived below:

$$\varepsilon_x^S = \varepsilon_E^S \frac{Q_T^S}{Q_x} - \eta_E^D \frac{Q_T^D}{Q_x} \quad (6)$$

where ε_E^S : Supply elasticity of exportable goods in exporting country
 η_E^D : Domestic demand elasticity for exportable goods in exporting country
 Q_T^S : Total supply of exportable goods in exporting country
 Q_T^D : Domestic demand for exportable goods in exporting country
 Q_x : Quantity of export

For illustrative purposes, the respective demand and supply elasticities of a particular goods and the respective ratios of total demand and supply to imports and exports in the importing and the exporting countries are assumed as follows:

$$\eta_I^D = -0.8, \varepsilon_I^S = 1.2, Q_T^D / Q_m = 2, Q_T^S / Q_m = 1.5;$$

$$\varepsilon_E^S = 2.0, \eta_E^D = -0.9, Q_T^S / Q_x = 4, Q_T^D / Q_x = 2.0.$$

Substituting these parameters into equations (5) and (6), one would obtain: $\eta_m^D = -3.4$ and $\varepsilon_x^S = 9.8$. Thus, the share of benefits received by consumers of the importing country would be approximately 74.2% of the total and the remaining 25.8% would be received by producers in the exporting country.

V. An Application to the Buenos Aires-Colonia Bridge Project

In 1996, a feasibility study was undertaken to evaluate the financial and economic implications of providing a permanent river crossing under all weather conditions between Punta Lara, Argentina, located about 40 km from Buenos Aires and Colonia, Uruguay.⁵ The length of the proposed bridge is about 41 kilometers. The construction of the bridge and viaducts was assumed to begin in 1999 and to last four years. Once the bridge is built, a substantial amount of merchandise will move between Argentina, Brazil and Uruguay via the bridge instead of the current modes by freight, marine or air. The volumes of passenger and cargo traffic are key determinants of the financial viability of the project. In the cost benefit analysis, an important question is who would benefit from the increase in cargo traffic as the result of transnational transportation cost reductions between Argentina and Brazil.

In order to quantify the economic benefits received by the importing or the exporting country, one has to first determine whether the goods being transported are traded internationally or regionally. However, it is difficult to find if a particular good is completely imported from a specific country. The question then becomes the extent to which the good is imported from the country should be considered a regionally traded good. This may also be

⁵ International Institute for Advanced Studies, Inc, “Buenos Aires – Colonia Bridge Project: Financial and Economic Appraisal”, report prepared for Comision Binaacional Puente Buenos Aires Colonia and the World Bank, (July 1998).

influenced by the degree to which details of the commodity category can be empirically obtained for analysis.

For this analysis, we examined the detailed trade statistics by commodity for imports from Brazil by Argentina for 1995 and their percentage share in total imports and vice versa. In total, Argentina imported slightly more than 20 percent of its imported goods from Brazil in 1995. In terms of individual commodities, more than 50 percent of imports coming from Brazil included coffee, sugar/candy, metal, other textile products, and steel and iron. For conservative estimates, let us assume that 75 percent is a criterion. Then only coffee and metals may be considered regionally traded because more than 80 percent of their imports came from Brazil and thus the benefits should be shared between consumers in Argentina and producers in Brazil.

Brazil is a relatively large country, the total amount of imports is one and a half times larger than that of Argentina. About 10 percent of Brazil's imports are from Argentina. For individual commodities, more than 50 percent of the Brazilian imports coming from Argentina are meat, cereals, and furs and leathers. For none of these commodities is the share being imported from Argentina greater than 60 percent, thus no single good is regarded as being regionally traded.

Uruguay is situated between these two large economies, Argentina and Brazil. No single commodity in Uruguay is largely imported from Argentina and therefore, all commodities imported by Uruguay from Argentina are considered internationally traded.

To quantify the benefits of regionally traded goods, one has to estimate (λ_m) in equation (4). Few satisfactory estimates of the elasticities of demand and supply of particular goods are available in the literature. A range of elasticities is therefore assumed. Using the information available to us on domestic production and trade statistics we made estimates of the ratios of the total demand and domestic supply of importable goods to the amount of

imports of these items into country. In a similar fashion estimates were made about the ratios of total supply and domestic demand of the exportable commodities to the amount of exports of these commodities made by the exporting country.

The shares of benefits accruing to the importing countries for different combinations of market parameters in the importing and exporting countries are simulated and presented in Table 1. The results indicate that the share of benefits received by the importing country is likely to range from 40% to 81% of the total benefits. For the purpose of this analysis, we assume that the benefits resulting from savings in transportation costs will be shared equally by the importing and exporting countries.

Table 1
Estimation of the Shares of Gains from the Transportation Cost Reduction
for Regionally Traded Goods

A. Exporting Country					
	Parameters				Estimates
Cases	ϵ_E^S	η_E^D	Q_T^S / Q_x	Q_T^D / Q_x	ϵ_x^S
A ₁	2	-1	3	2	8
A ₂	5	-1	3	2	17
B. Importing Country					
	Parameters				Estimates
Cases	ϵ_I^S	η_I^D	Q_T^S / Q_m	Q_T^D / Q_m	η_m^D
B ₁	2	-1	1	2	-4
B ₂	2	-5	1	2	-12
C. The Shares of Benefits Received by the Importing Country					
Cases	Share Percentages				
A ₁ B ₁	66.67%				
A ₁ B ₂	40.00%				
A ₂ B ₁	80.95%				
A ₂ B ₂	58.64%				

In terms of measurement, the benefits for diverted traffic are calculated as the amount of savings in transportation costs times the traffic. For induced and generated traffic, the benefits are estimated by the multiplication of one half of the transportation cost reduction by the increase in incremental traffic.

The volume of traffic and the size of the benefits accruing to producers and consumers are also influenced by the amount of toll charged for trucks. In the base case, it is set at US\$225 per truck because the traffic demand model reveals that toll revenues from cargo are maximized at this level, with the increase in the toll being offset by a corresponding decline in traffic captured by the bridge.⁶

The net benefits for this base case are presented in Table 2. Since most of the shifted goods are traded internationally, producers in Argentina and Uruguay would receive benefits of approximately US\$47.0 million and US\$41.8 million, respectively, as a result of freight traffic cost savings. These savings are over and above the amounts paid as a toll on the bridge. For the regionally traded goods such as coffee and metals imported by Argentina from Brazil, the modest benefits would be shared equally between the importing and exporting countries. Finally, producers in Brazil will also benefit in the amount of US\$73.8 million for internationally traded goods because of increased shipments of these commodities from Brazil to Argentina via the bridge.

Table 2
Economic Benefits Received by Various Countries
(thousands of 1998 US dollars)

	Internationally Traded Goods	Regionally Traded Goods	Total
Argentina	46,952	162	47,114
Uruguay	41,767	0	41,767
Brazil	73,835	162	73,997

VI. Concluding Remarks

This paper has developed an analytical framework to evaluate the primary beneficiaries of cargo traffic generated by transnational transport projects. In the

⁶ The toll revenues are virtually unchanged within a range of toll between US\$200 and US\$250. See International Institute for Advanced Studies, Inc., “Buenos Aires – Colonia Bridge Project: Financial and Economic Appraisal”, report prepared for Comision Binaacional Puente Buenos Aires Colonia and the Work Bank, (July 1998); and Science Applications International Corporation, Freight Mode Split Analysis for the Buenos Aires – Colonia Bridge Feasibility Study, paper prepared for Louis Berger International Inc., (October 1997).

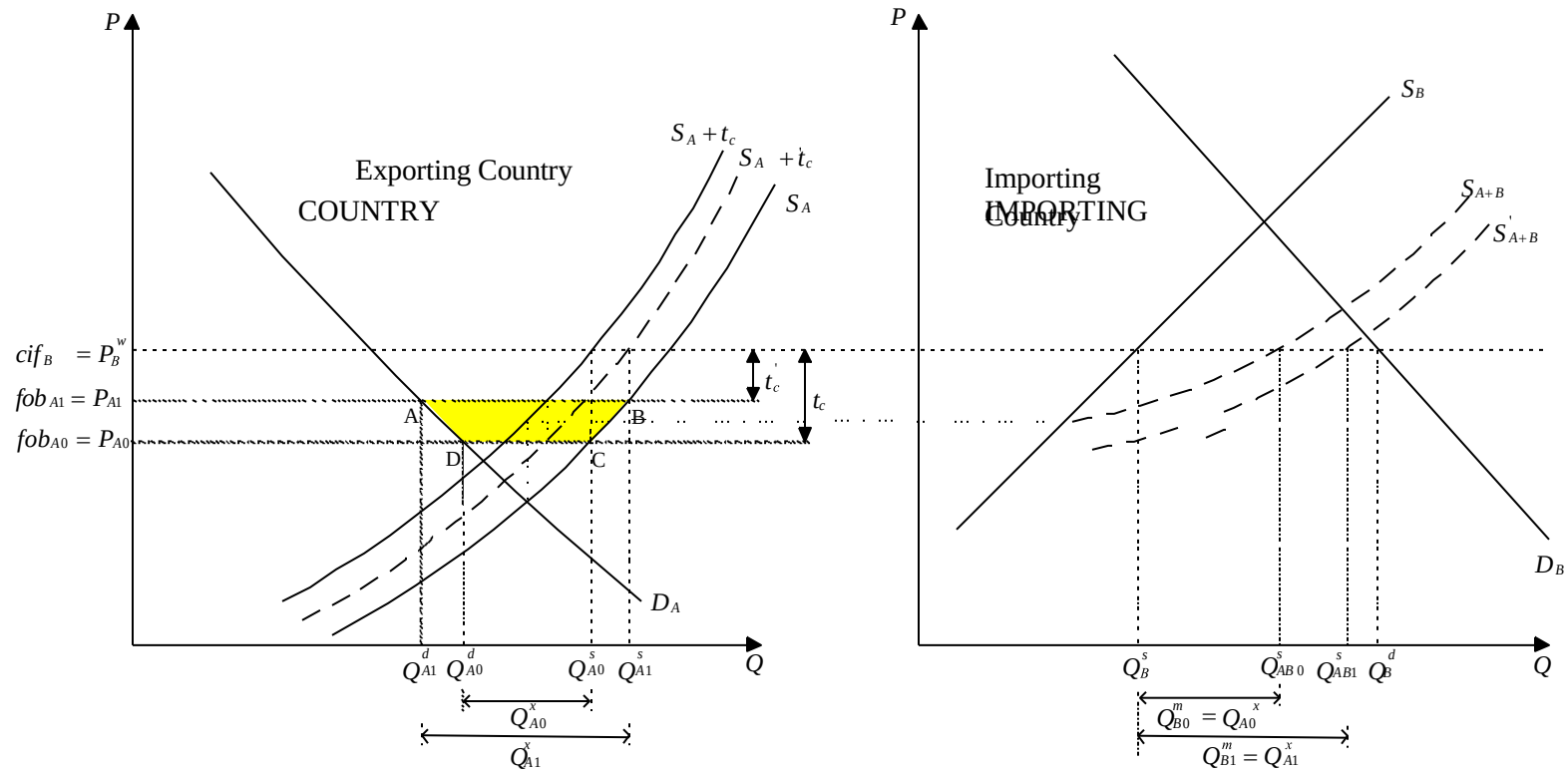
transportation literature, the economic impact of infrastructure projects on cargo traffic has not been developed as fully as for passenger traffic. The conventional treatment is to assume that consumers of the traded goods would receive the full benefits from the reduction in logistics and transportation cost. Unlike the conventional treatment, however, this paper has found that the allocation of the economic benefits first depend upon whether the goods are traded internationally or regionally.

When the goods are internationally traded, producers of the exporting country within the region would benefit from the savings in transportation or logistics cost between the two neighboring countries. In the case of regionally traded goods, the benefits will be shared by producers in the exporting country and consumers in the importing country. The distribution of the benefits depends upon the elasticities of supply of exports in the exporting country and the elasticities of demand for imports in the importing country.

In reality, there are little satisfactory estimates of demand and supply elasticities available in the literature. We have constructed a range of cases in order to test the sensitivity of the share of economic benefits received by the respective parties. The case of the Buenos Aires – Colonia bridge project is an application of this methodology. These estimates address some of the most debated questions surrounding the decision whether or not to implement this project. Because Brazilian producers are a major beneficiary group of the Buenos Aires-Colonia, bridge some mechanism should be found to enable Brazil to participate in the financing and implementation of the bridge.

Figure 1

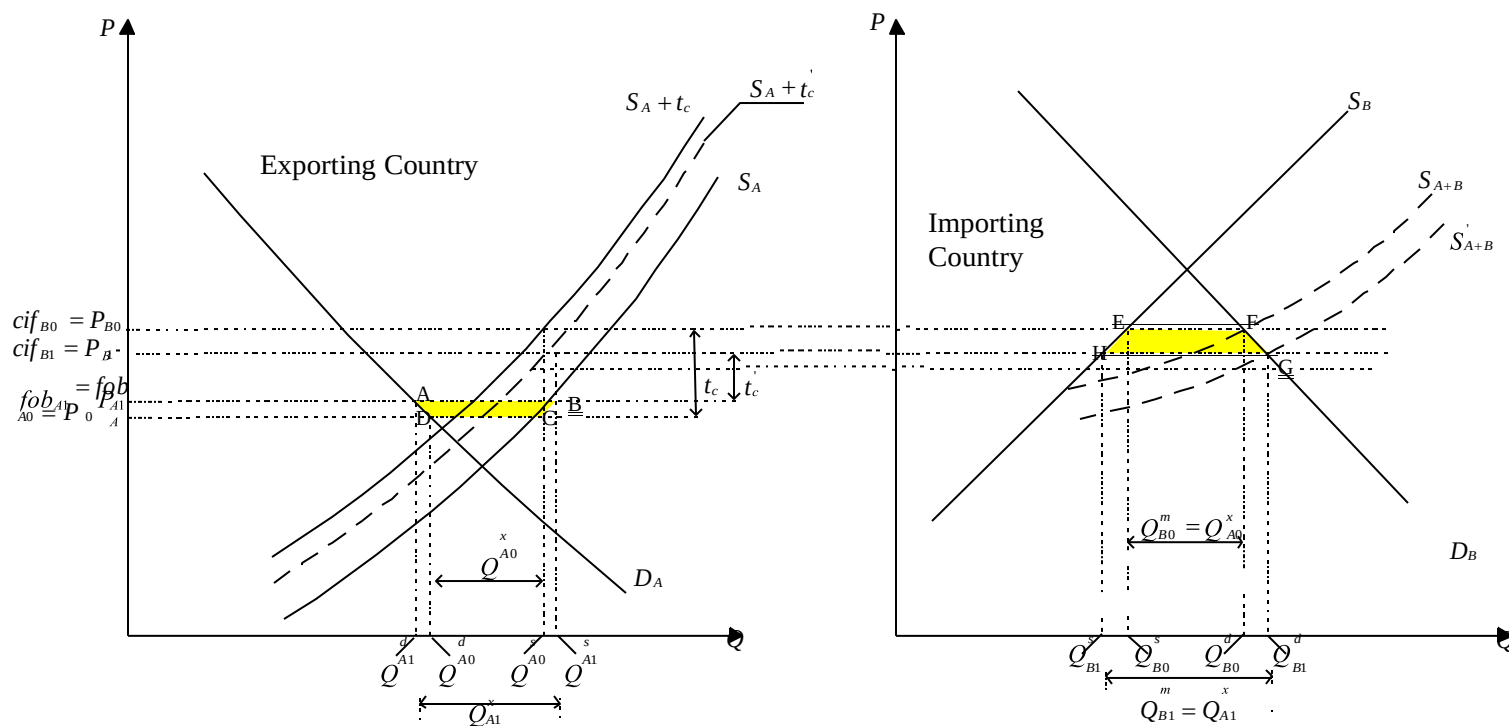
Impact of Transportation Cost Reduction on International Traded Goods



Net Gains in Exporting Country: ABCD
Net Gains in Importing Country: Nil

Figure 2A

Impact of Transportation Cost Reduction on Regionally Traded Goods

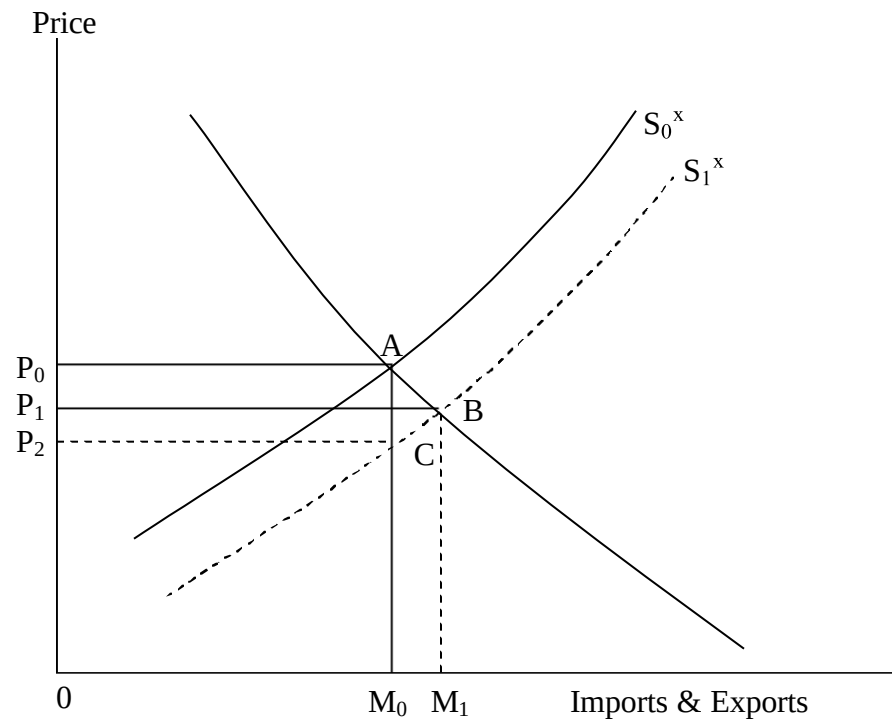


Net Gains in Exporting Country: ABCD

Net Gains in Importing Country: EFGH

Figure 2B

Impact of Transportation Cost Reduction on Regionally Traded Goods



Reference

Belli, Pedro, Jock Anderson, Howard Barnum, John Dixon, and Jee-Peng Tan, Economic Analysis of Investment Operations: Analytical Tools and Practical Applications, (Washington, D.C.: the World Bank, 2001).

Button, Kenneth J., Transport Economics, (Cambridge: Edward Elgar Publishing Limited, 1993).

Harberger, Arnold C., “Cost-Benefit Analysis of Transportation Projects”, in Project Evaluation: Collected Papers, (London: the Macmillan Press Ltd., 1972).

International Institute for Advanced Studies, Inc, “Buenos Aires – Colonia Bridge Project: Financial and Economic Appraisal”, report prepared for Comision Binaaccional Puente Buenos Aires Colonia and the World Bank, (July 1998).

Meyer, John R. and Mahlon R. Straszheim, Techniques of Transport Planning: Pricing and Project Evaluation, (Washington, D.C.: The Brooking Institution, Transport Research Program, 1971).

Roberts, Paul O., “Factors Influencing the Demand for Freight Transport”, MIT Center for Transportation Studies, CTS Discussion Paper 8-75, (August 1975).

Science Applications International Corporation, Freight Mode Split Analysis for the Buenos Aires – Colonia Bridge Feasibility Study, paper prepared for Louis Berger International, Inc., (October 1997).