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in Cost–Benefit Analysis

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Abstract. How to evaluate the benefits and costs of foreign consumers, foreign producers, and local firms owned by foreigners, seems to cause confusion among cost–benefit practitioners. The screening of the literature and an informal search of the most influential cost–benefit guidelines found no evidence that this issue has been addressed previously, consisting the standard approach in overlooking the benefits of foreigners, with some minor qualifications. Sometimes the practitioner gives standing to non-nationals, though the implicit reason of their inclusion is the practical difficulties of disentangling the surpluses of nationals and foreigners. Usually, there is not an explicit discussion of the question. This paper addresses the issue on standing in cost–benefit analysis. The distinction between the indirect utility function of national and non-national allows the consideration of some relevant cases for the economic evaluation of projects. These are the polar case of zero weights to foreign consumers and foreign companies shipping their producer surpluses abroad, the case of local firms owned by foreigners, the altruist local household case, the consequence of fixed factors for the evaluation of foreign surpluses and the case of transnational projects with asymmetrical distribution of costs and benefits.

KEYWORDS: cost–benefit analysis, foreign-owned firms, multinationals, producer surplus, consumer surplus.

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1. Introduction

Cost–benefit analysis is built on the preferences of individuals. It is common to limit these preferences to local individuals, with an implicit identification of citizenship and standing. This may be a sensible approach for local projects without transboundary significant effects. Many domestic projects like water treatment and local transport infrastructure have benefits and costs that do not spill over national boundaries. Nevertheless, there are others projects affecting foreigners, within the nation or through effects beyond national boundaries. Even in the case of local projects without external effects on third countries, it is common in some local projects to have a significant share of foreigners (as producers, consumers or workers) in the flow of benefits and costs, and this has increased with globalization. For example, the positive net present value of a project affecting national infrastructure may well be including consumer surplus of foreigners in the tourist industry. Other projects may employ foreign labour; or in the in the case of foreign-owned local firms, there are benefits transferred outside the country. The issue of standing has an ethical side impossible to be resolved on technical grounds (Whittington and MacRae, 1986). The starting point of this paper is to accept an external (political) definition of “society” and to work from that point in theoretical terms but keeping in mind the practical consequences on the traditional economic evaluation of projects. It is necessary to examine the cases in which it is correct to exclude the effects on surpluses of people outside the defined “society” and the cases in which the opposite is the right approach.¹

The economic evaluation of projects practically overlooks the treatment of foreigners. The standard procedure is to refer to “the society” without further precision of who is within and who is outside. Furthermore, it is common practice to follow the Kaldor-Hicks (K-H) potential compensation criteria and calculate the net present value of the projects adding the discounted flows of benefits and costs “to whomsoever they may accrue”, though implicitly only nationals seems to count as the literature and practice of cost–benefit analysis show.

¹ “The issue of standing may also have been neglected in the literature because economists felt they had little expertise that could be brought to bear on the question. Thus, following Mishan, they attempted to calculate the willingness to pay for “each person in the defined community,” leaving the determination of the “defined community” to the political process” (Whittington and MacRae, 1986).

Moreover, evaluation efforts are commonly concentrated on the efficiency gains of the project. This presumably means that the analyst follows the Harberger's three basic postulates²; or the implicit assumption of a perfect distribution of income, i.e., that the marginal social utility of income is constant and equal across the households. Distributional weighing is exceptional and the unweighted aggregation facilitates neglecting the previous definition of who stand in the society.

The economic relevance of the explicit consideration of foreigners in cost-benefit analysis can be illustrated through the following cases. Sometime multinationals and other companies³ owned by foreigners "export" their profits to their home country (or a tax heaven). Seemingly, there is an asymmetry between such companies and domestic ones in a cost-benefit analysis; any change in producer surplus by a domestic company is recorded in a cost-benefit analysis while the recorded producer surplus of companies owned by foreigners is zero.

A country investing in public infrastructure financed only by taxation, and heavily used by tourists, has to figure out whether to include their surpluses, even if they are not given standing. *Ex ante* cost-benefit analysis can be seriously biased when foreign surpluses are ignored in the presence of a relevant fixed factor owned by nationals.

There are also the so-called regional public goods, defined as goods that benefit consumers in more than a country (Arce and Sandler, 2002). To give zero weights to foreigners may lead to discard efficient projects when several countries are involved.⁴ This problem arises in transnational infrastructure projects when benefits and costs are asymmetrically distributed among countries. In this case, the CBA at a national level is inappropriate. It has to be conducted as a wider exercise involving the affected countries to introduce real compensation and financing according with the net benefit.⁵

A review of the literature and a sample of the most influential cost-benefit guidelines shows a practical approach consisting in ignoring the benefits of the foreigners, with some minor qualifications. Sometimes the recommendation of giving standing to all the affected individuals

² "The postulates are: a) the competitive demand price for a given unit measures the value of that given unit to the demander; b) the competitive supply price for a given unit measures the value of that given unit to the supplier; c) when evaluating the net benefits or costs of a given action (project, program or policy), the costs and benefits accruing to each member of the relevant group (e.g., a nation) should normally be added without regard to the individual(s) to whom they accrue" (Harberger, 1971).

³ The terms company and firm are used interchangeably in this note.

⁴ Beato, Benavides, and Vives (2002) point out three causes explaining why, the levels of transnational investment decided by countries individually are suboptimal: poor information across countries about project costs and benefits, political and economic constraints to bearing the costs of infrastructure built in another country, and lack of schemes for distributing cost and benefits among countries.

⁵ The case of transnational project is not addressed in this paper. For the analysis of regional public goods concerning infrastructure, see Rufin (2003). For a theoretical treatment of the design of incentive mechanisms for the provision of transnational public goods under asymmetric information, see Laffont and Martimort (2005).

and firms follow the practical difficulties of disentangling the surpluses of nationals and foreigners without an explicit discussion of the question.⁶ This paper addresses the issue of the treatment of foreigners in cost-benefit analysis. It is shown that the rule of thumb of ignoring the benefits of foreigners can lead to both errors of underestimation and overestimation of the net social benefit of the project.

Section 2 turns to a brief discussion of who stands in CBA with the focus on the treatment of foreigners. Section 3 uses a simple model to illustrate how firms owned by foreigners or multinationals can be handled in CBA. The inclusion or exclusion of their producer surpluses can have a significant effect on the social profitability of projects and policy changes. This section also examines the treatment of foreign labor in local projects, the analysis of tourism and how it affects welfare in the host country, the presence of fixed factors and the risk of undervalue the net benefit of projects, and the case of the altruistic household. Section 4 concludes.

2. Who stand in CBA?

Imagine a world with no countries and consequently no frontiers. A welfare maximizing government cares equally for any individual, all with the same unique citizenship, though different in preferences and other personal characteristics. The social welfare function in this imaginary world would be the same as the standard one for a country in our down-to-earth world, with countries, frontiers, armies and taxes.

In the imaginary world, any individual wellbeing affected for a project counts. Let us suppose for simplicity that the income distribution is optimal, so we apply the K-H criterion without apology. We concentrate our attention on the efficiency gains derived from implementation of projects or policies.

Consider, in our imaginary borderless world, a project that consists in building a new container terminal in the port of Algeciras (in the Strait of Gibraltar) where vessels from Europe and Asia transship their cargo to carriers crossing the Atlantic to America. This project increases the productivity and so the producer surplus of the shippers. The port authority of Algeciras and other local providers of port services collect part of the efficiency gains. The CBA of this project is quite simple from the position of the world's government. It only has to compare the present value of

⁶ Layard and Glaister (1994, p. 53) report that "The Roskill Commission treated foreigners on the same footing as British nationals, whereas some cost-benefit analyses assign them a distributional weights of zero (often without even discussing the issue)".

construction and operation costs of the port terminal with the discounted flow of consumer and producer surpluses during the project life. The welfare maximizer government does not care who is paying the costs and who the final beneficiaries of the productivity gains are. Everybody counts equally.

A closer look to the earth shows countries and frontiers and, in any country, there is a clear-cut distinction between nationals and foreigners. There exist national budgets and sovereign debts. Citizens pay national projects with direct charges and taxes (now or in the future). Has the CBA of our terminal port the same social net benefit than in the imaginary borderless world?

A quick review of the CBA guidelines of different countries suggests a negative answer. The national CBA of the terminal would roughly follow this approach. Compare the investment, maintenance and operating cost of the country building the terminal with the benefits reaped in the country (producer surpluses of the port authority and national firms, public or private). This benefit does not include the producer surplus of foreigners and it could easily fall short of the project costs.

Someone could object that in the long-term these foreign benefits would make the world richer and everybody on average would be better off. This would be also the case of heavy road traffic going from country A to C with significant benefits for both countries if a new road is built crossing country B. No benefits for B but the costs of the infrastructure and the traffic externalities. In practical terms, the long-term argument is irrelevant and it would be better to ask country A and C to finance the project and/or pay a fee for crossing to compensate B for the construction costs and the external effects.

Consider the following social welfare function (Johansson and Kriström, 2015):

$$W = W[V^1(\cdot), \dots, V^H(\cdot)] = W[V^1(\mathbf{p}, w, y^1, z), \dots, V^H(\mathbf{p}, w, y^H, z)], \quad (1)$$

where $V^h(\cdot)$ is the indirect utility function of individual h , \mathbf{p} is a vector of commodity prices, W is the wage rate, y^h is a lump-sum income of individual h , and z is a short-cut for infrastructure (treated as a public good). Suppose that individuals pay according to their willingness-to-pay (WTP) for an investment in infrastructure. Then the change in social welfare is equal to:

$$\Delta W = \sum_{h=1}^H W_h V_y^h dCV^h, \quad (2)$$

where $W_h = \partial W / \partial V^h$, $V_y^h = \partial V^h / \partial y^h$, and dCV^h is the WTP for the project of individual h . Thus, each individual is weighted according to marginal welfare weight attributed to him/her times the marginal utility of income. In a Utilitarian society, the welfare weight is unity for everyone.

The base case for the treatment of foreigners is to give zero weights to their costs and benefits, both to consumers and firms, and this is the approach in the main CBA manuals, which explicitly exclude the surplus of non-nationals (or include them when practical difficulties make the separation difficult). Thus, the base case is to set $W_f = 0$ for all individuals $f \notin D$, where D is the domestic population.

Ignoring the consumer and producer surplus of foreigners can be wrong for various reasons, and in what follows we consider in some detail some of these reasons.

3. The treatment of foreign surpluses

Foreign-owned local firms

An issue in cost–benefit analysis is how to handle the fact that foreign multinationals and other companies/firms owned by foreigners “export” their profits to their home country (or a tax heaven). Seemingly there is an asymmetry between such companies and domestic ones in a cost–benefit analysis; any change in producer surplus by a domestic company is recorded in a cost–benefit analysis while the recorded producer surplus of companies owned by foreigners is zero (for simplicity, assuming here and throughout that the entire surplus is shipped abroad). This asymmetry arises because the domain of the typical cost–benefit analysis is those living in a country, i.e., foreigners (and their profits) are not part of the analysis. A troublesome consequence is that domestic companies may seem to be more valuable to society than foreign-owned ones. In particular, this may be a serious issue when a foreign multinational causes environmental damage.

In some cases one can proceed as follows in a cost–benefit analysis. Suppose that the proposal or project under evaluation involves a strip mine owned by foreigners. The proposal suggests that the scale of mining should be reduced in order to protect environmental values. Typically a social cost–benefit analysis is devoted to those living in a country. Therefore, since the loss of profits is borne by foreigners the proposal is seemingly cheap. However, if the country has granted the company unrestricted mining rights, there is no obvious way to force the company to deviate from its profit-maximizing mining strategy. The way to proceed with the cost–benefit analysis is to provide the firm with an incentive to reduce its mining activities. In effect, this means (hypothetically) covering

the loss the company incurs in exchange for reduced mining; in the cost–benefit analysis this compensation (and other possible cost items) are compared to the environmental and other benefits generated by the proposal. Similar cases might occur if there are partially foreign-owned power plants or forests that policy-makers want to re-regulate (Johansson and Kriström 2015).

However, in other cases the above approach is not applicable. A simple example is provided by a spot price of electricity set on an international market (as the Nordic Nord Pool market). How do we evaluate an increase in the spot price when some domestic plants are owned by foreign multinationals? In what follows we will address this issue and provide a simple catcher in the rye. For notational simplicity, instead of working with the social welfare function in equation (1) we turn to a representative individual. The indirect utility function of this individual also acts as the social welfare function:

$$V = V(p, \mathbf{P}, w, y), \quad (3)$$

where p is the domestic price of the traded commodity to be examined here, \mathbf{P} is a vector of other commodity prices with one serving as the numéraire, w is the wage rate, and y is lump-sum income. To simplify the exposition it is assumed that the utility function is quasi-linear. Then Marshallian and Hicksian consumer surpluses coincide. The profit function of the examined representative firm is:

$$\pi(p, w) = p \cdot x(p, w) - w \cdot \ell^x(p, w), \quad (4)$$

where $x(\cdot)$ is the supply function, and $\ell^x(\cdot)$ is the demand function for labor. The firm acts as a price taker in all markets and uses labor as its sole input. Lump-sum income y in equation (3) consists of π and profits of other firms. Obviously, profit incomes are endogenous from the point of view of the economy, but we assume that the representative individual see them as exogenous items.

The price in foreign currency of the commodity under evaluation is assumed to be exogenous, i.e., we employ a small open economy assumption. Consider now a marginal increase in p . Drawing on envelope properties, the impact on welfare can be stated as:

$$dV = \frac{\partial V(\cdot)}{\partial p} dp = \frac{\partial V(\cdot)}{\partial p} \Big|_{dy=0} dp + \frac{\partial V(\cdot)}{\partial y} \frac{\partial \pi(\cdot)}{\partial p} = -V_y(\cdot)[x^d(\cdot) - x(\cdot)]dp = V_y(\cdot) \cdot x^e(\cdot)dp, \quad (5)$$

where $V_y(\cdot) = \partial V(\cdot) / \partial y$ is the marginal utility of lump-sum income, the vertical bar indicates that the derivative is evaluated holding income constant, x^d is domestic demand for the commodity,

and x^e denotes export; the country is initially assumed to be a net-exporter of the commodity. Multiplying through by $1/V_y(\cdot)$ converts the expression from unobservable units of utility to monetary units:

$$dW = \frac{\partial V(\cdot)}{\partial p} dp / V_y(\cdot) = -[x^d(\cdot) - x(\cdot)]dp = x^e(\cdot)dp. \quad (6)$$

Consider next a discrete price change⁷:

$$\Delta W = -\int_{p_0}^{p_1} x^d(\cdot)dp + \int_{p_0}^{p_1} x(\cdot)dp = \int_{p_0}^{p_1} x^e(\cdot)dp. \quad (6')$$

The first term in the middle equation is the change in consumer surplus while the second term is the change in producer surplus. This case is illustrated in Figure 1 for an increase in p . The loss of consumer surplus equals a gain in producer surplus (area $p_0AE p_1$), i.e., the two terms sum to zero. Therefore, the net increase in domestic (producer) surplus equals area EABC. The total supply, including production by firms owned by foreigners, is given by the dotted curve. However, since the surplus earned by foreigners is not included in the income y , it will not be reflected in equation (7).

⁷ Assume that a discrete change in p causes only a marginal adjustment of the wage. Then there is an additional expression: $(\ell^s - \ell^x - \ell^X)dw = 0$, where ℓ^s refers to labor supply, and ℓ^X to demand by other firms than the one under consideration, and the wage is assumed as to clear the market.

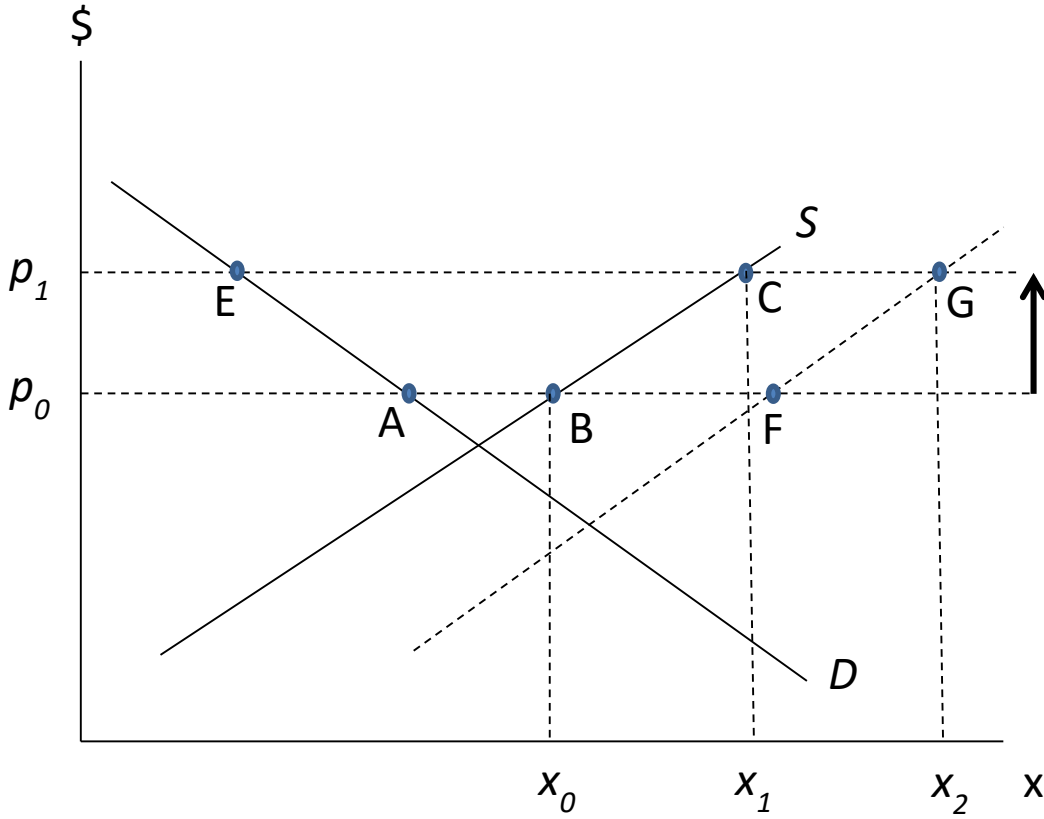


Figure 1. Adding foreign-owned suppliers, dotted upward-sloping supply curve.

This result seems to indicate that we must treat domestically owned companies differently from companies owned by foreigners. However, consider the case in which a domestic company has been acquired by foreigners. If its previous domestic owners have perfect foresight, they sold the company demanding (focusing here on the time span from today and on):

$$\pi^{M;NPV} = \sum_t \frac{\pi_t^M(\cdot)}{(1+r)^t} + SV = \sum_t \int_0^{p_t} \frac{\pi_{tp}^M(\cdot)}{(1+r)^t} dp + SV = \sum_t \int_0^{p_t} \frac{x^M(\cdot)}{(1+r)^t} dp + SV, \quad (7)$$

where p_t is output price in period t , $\pi_{tp}^M(\cdot)$ is the partial derivative of the profit function with respect to the output price, the discount rate is r , and the positive or negative present value of the plant's scrap value is denoted SV ; the right-hand side expression evaluates time t producer surplus as an area to the left of the time t supply curve. Then present value lump-sum income, as viewed from time $t = 0$, equals:

$$y^{NPV} = \pi^{NPV} + \Pi^{NPV} + \pi^{M;NPV}, \quad (8)$$

where π^{NPV} denotes present value profits of the considered domestic firm, and Π^{NPV} is a vector of present value profits of other domestic firms. In this case, a multinational can be treated in the same way as a domestically owned firm. In terms of Figure 1, the welfare gain of the price increase corresponds to the area EAFG rather than the smaller area EABC. In this ideal case, there is no reason to make a distinction between companies owned by citizens and firms owned by foreigners. One can obviously proceed in basically the same way if the country instead is a net importer of the considered commodity.

In reality, domestic owners may be able to extract more or less than the “true” value of the firm. However, it seems tricky to try to figure out (perhaps many years after foreigners acquired the firm) whether it was a profitable or unprofitable to dispose of the company. In addition, it is tricky to determine how the revenues are used; are they invested or consumed (and for what purpose)? Therefore, at least for developed countries, a simple rule of thumb or shortcut in cost–benefit analysis seems to be to ignore whether a company is domestically owned or not. A sensitivity analysis may address the outcome of the evaluation if different assumptions with respect to the use of revenues from sales of domestic companies are employed. The result has been derived using a discrete change in a price. However, the result is equally applicable in a cost–benefit analysis of a marginal change in the scale of operations, and regardless of why and how a plant owned by foreigners is affected by a policy measure.

A similar argument seems to be valid in the case where a foreign company finances and builds a plant or opens a new mine, say. In this case the host country can invest the corresponding resources in other domestic projects. Possibly, but not necessarily, these alternative investments will earn a return as high as the direct investment. Then the foreign direct investment can be evaluated as it was owned by citizens in the host country. The argument need not be true for heavily resource-dependent developing countries with a weak bargaining power.

Do foreign labor surplus stand in the CBA of the host country?

Foreign labor hired by local firms has a different opportunity cost than local employees in the CBA of the host country. Foreign labor is a cost for the host country and hence it is not measured by the production lost in their home country or the value of their leisure in the case of the unemployed. Foreign workers accounts as the opportunity cost for the country hiring them as shown in expression (9):

$$[\varphi w(1-\tau_w)]dL_f^p - p_s dx_f^p \quad (9)$$

where, w denotes the wage rate, φ is the proportion of the wage sent home as remittances, τ_w is the income tax paid by the employee, dL_f^p denotes foreign labor hired for the project, p_s is the producer price net of taxes and dx_f^p is the local consumption by foreign labor working in the project.

The second term of expression (9) can be valued as:

$$p_s dx_f^p = [(1-\varphi)w(1-\tau_w)(1-\theta)] dL_f^p \quad (10)$$

where, θ is the value added (plus any commodity-specific) tax.

Using equation (10) in equation (9), the opportunity cost of foreign labor is then equal to the remittances sent by non-national workers to their home countries plus the resource cost of local consumption by foreign labor working in the project:

$$[\varphi w(1-\tau_w)] dL_f^p + [(1-\varphi)w(1-\tau_w)(1-\theta)] dL_f^p \quad (11)$$

Do foreign consumers stand in the CBA of the host country?

Tourism provides a source of economic growth and job creation for the host country, as well as increasing the possibilities for social and cultural exchange. The entry of tourist income represent an increase of the economic potential of the recipient country, which can also have access to a greater variety of goods and services available for local consumption. A cost-benefit analysis of tourism also has social costs as congestion of infrastructure and natural areas, deterioration of the physical environment, increasing spending on public infrastructure etc.

Does tourism increase social welfare for the host region? Leaving aside externalities and non-economic benefits like cultural exchange, this question has a theoretical response. Simplifying, Figure 2 represents the market of a product demanded by local consumers (D_0) with equilibrium at point C. The arrivals of tourist to the region shifts demand to D_1 with a new equilibrium at point B: the price rises from P_0 to P_1 and quantity from X_0 to X_1 . The separation of local consumers and tourists provides valuable information for the economic assessment of the social benefits of tourism.

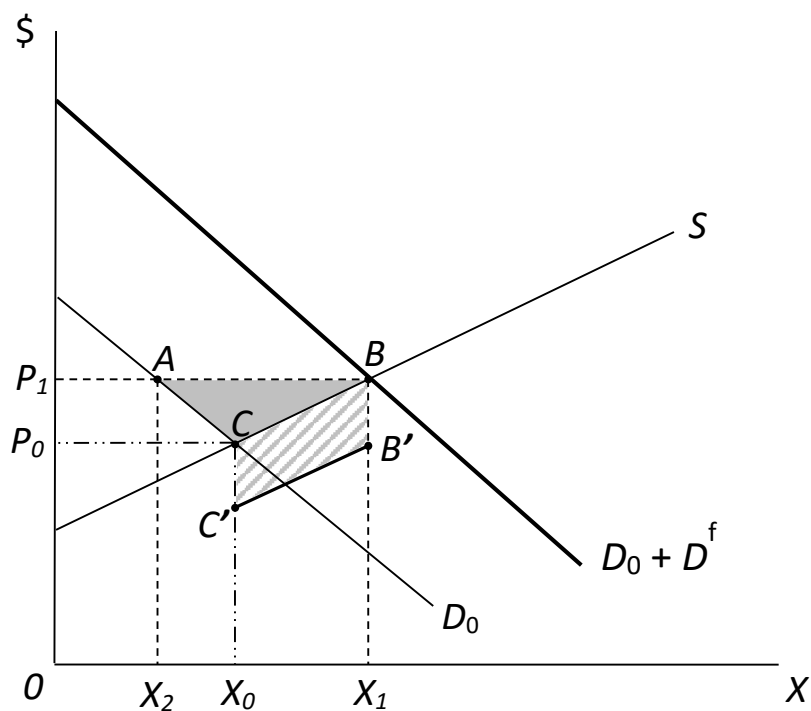


Figure 2. Adding foreign demand. Tourism and welfare.

When price goes up to P_1 local demand goes down to X_2 and the quantity supplied goes up from X_0 to X_1 ; tourism demand ($X_1 - X_2$) is supplied with new production ($X_1 - X_0$) and with the crowding out of some local consumption ($X_0 - X_2$). Local consumers lose the surplus represented by the area P_1ACP_0 , while producers earn a surplus equivalent to P_1ACP_0 . The result is a net gain represented by the area ABC , according to the K-H compensation test.

Clarke and Ng (1993) argue that ignoring the issues of equity and assuming that tourists pay for the externalities they generate, a tourist expansion always produce positive net benefits for residents, though not everybody is better off. This occurs even in the case of foreign owned firms, assuming that the locals sell the firms at the discounted present value of expected future benefits,

There are some key assumptions in the above argument so that the producer surplus of the foreign firms can account for as benefits. If there are information asymmetries it may occur that foreign

companies pay prices to acquire land or local firms which are lower than P_1ACP_0 and, in the event of leakage in excess of ABC , social welfare is reduced with the entry of tourism.

Benefits could be higher in the case of market distortions as taxation or unemployment. With VAT taxes, for example, or with a shadow price of labor below the market wage, the expansion of production thanks to inbound tourism has positive effects on social welfare. For example, in the case of unemployment, we should correct the supply function to count only the opportunity cost of workers employed after the expansion of production (assuming that marginal social cost is $C'B'$, $CBB'C'$ should be added as a benefit to ABC triangle).

There are other possibilities depending on the elasticities of supply and demand, but the general case is represented in Figure 2. Given that tourism demand is not perfectly inelastic, the above argument is sufficiently general. Nevertheless, the case of perfectly elastic supply leads to a net social benefit equal to zero, unless the opportunity cost of resources is less than the market price.

Expression (12) shows the sign of the welfare change depending on the elasticities:

$$\Delta W = \int_{P_0}^{P_1} X^s(P, w) dP - \int_{P_0}^{P_1} X^d(P, \mathbf{P}, w) dP \quad (12)$$

where $X^s(\cdot)$ and $X^d(\cdot)$ are the supply and demand functions. In terms of Figure 2, it is the area to the left of the supply curve, between initial and final prices less the loss in domestic consumer surplus, as measured to the left of the domestic demand curve between P_0 and P_1 .

When expression (12) is greater than zero social welfare increases, which occurs whenever the supply function is not perfectly elastic or perfectly inelastic, i.e., the slope of the supply curve is:

$$0 < \frac{dP}{dq^s} < \infty. \quad (13)$$

In the case of infinite elasticity, tourism does not affect welfare unless there are market distortion as discussed above.

Foreign consumers and fixed factors

Frequently the analyst follows a resource cost approach for the identification and calculation of the flow of benefits and costs. This is a useful shortcut when information is not available for the calculation of the changes in the surpluses of the individuals involved.

The lack of identification of the final beneficiaries of a project may create some problems when local fixed factors are present and foreigners' surplus constitute a significant share of the flow of net benefit. An example can help.

Suppose a large infrastructure transport investment with its main effect consisting in the significant reduction of the travel time in a country with a well-developed tourist industry. Under the assumption of giving zero weights to the surplus of foreigners, the practitioner subtracts their share when the value of the travel time savings is calculated through the resource cost approach.

Suppose now the existence of local fixed factors in the final destination of these foreign visitors. Other things being equal, the economic effect of the reduction in travel time is an increase in the prices of the fixed factors in the final destination. The final beneficiary are the owners of the fixed factors: local land owner of hotels, restaurant and leisure activities. If this is the case and, in the *ex ante* evaluation, the consumer surplus of foreigners (time savings) are excluded, the benefits of the project are underestimated. The right approach is to include the surplus of foreigners. This is similar to the case illustrated in equation (12) and Figure 2. A shift in demand for the services using the fixed factor as an input causes their producer surpluses to increase.

The net increase in welfare will depend on the share of the factor capacity used by domestic consumers and their demand elasticity. When exclusively foreigners use the facility, or the local demand elasticity is infinite, (e.g. the local factor has a perfect substitute for domestic consumers) the increase in producer surplus is a net increase in welfare. Equation (12) and figure 2 apply otherwise. On the other hand, services whose supply is infinitely elastic will not earn any additional surplus.

The empirical evidence shows that time savings usually is the main source of benefits in transport infrastructure projects. In roads, for examples, it is common that benefits coming from travel time savings reach 80% of total benefits. The same happen with high-speed rail. When this is the case, the *ex ante* cost-benefit analysis measures the expected time savings without distinguishing the final user and convert in monetary units these savings using the value of time and its change overtime during the project life, a parameter usually available or easily obtained through contingent valuation or conjoint analysis.

Assuming a $W_f = 0$ for all individuals $f \notin D$, where D is the domestic population in projects where a significant proportion of users belong to $f \notin D$ can be apparently consistent with the *a priori* position of not giving standing to foreigners.

The problem is that when there is a fixed factor of production, like land, the final beneficiary of the expected time saving is not necessarily the user, primarily identified in the *ex ante* evaluation.

In a perfect market the owner of the fixed factor is the one who gets the gains from time savings and therefore the underestimation of benefits is a consequence of giving a zero weight to the consumer surplus of foreigners using the infrastructure. The reason explaining the high probability of this error is the usual resource cost approach used in practice in cost–benefit analysis of infrastructure projects.

The altruistic household

A project can cause cross-border externalities. For example, airborne emissions might cause damage in neighboring countries. A conventional cost-benefit analysis deals with monetary welfare consequences at the national level. The key question is whether this implies that project consequences occurring outside the borders of the country should be ignored. The answer is provided by the fact that a conventional cost-benefit analysis, just like conventional welfare theory, relies on the concept of consumer sovereignty, that individual preferences should be respected. Therefore, if Britons, say, are "nationalistic" egoists in the sense that they care only about effects within the borders of the country, a cost-benefit analysis should ignore any effects caused abroad by the project under evaluation. On the other hand, if Britons are altruists in the sense that they care about the impact of their actions irrespective of where the impact occurs, a cost-benefit analysis should respect this fact. Then the social welfare function might be stated as follows:

$$V = V(p, y, z^f) \tag{14}$$

where z^f refers to effects on foreigners (or more broadly living species abroad). If our project changes z^f there is an effect that should be accounted for in cost-benefit analysis. The positive or negative willingness-to-pay is captured by the term:

$$\frac{V_{z^f}}{V_y} dz^f \tag{15}$$

However, if people are not concerned about impacts abroad $V_{z^f} = 0$.

4. Conclusions

Who stand in cost-benefit analysis? This question has several dimensions related to the preferences of individuals (living and future generations, children, foreigners, etc.), and which the criteria are to establish the boundaries of whom account in the measurement of changes in social welfare and whom are leaving outside. This paper addressed the treatment of foreigners in cost-benefit analysis. A quick review of the cost-benefit analysis literature, and the official guidelines for the economic evaluation of projects, show that economists generally overlooked this issue. They use the concept “society” without further considerations of what this means, leaving the content to the political process, possibly identifying citizenship with the right to have their preferences included in the aggregate measures of welfare.

This paper starts accepting this standard assumption on standing but concludes that net benefit of foreigners should be included in the flows of net benefit of projects both in projects with cross-border effects and those whose benefit and costs occur within the national boundaries. It examines the cases of local firms owned by foreigners, who repatriate their profits to their home country; the case of the foreign consumers who benefit from national public goods projects; the case of foreign labor and the altruistic household. Finally, the problem of the lack of identification of final beneficiaries in the presence of fixed factor is also considered.

The main conclusion is that even assimilating citizenship with accounting, foreigners ‘surplus should not be disregarded without further consideration of the property of assets, the type of preferences, and the existence of fixed factors when the resource cost approach is used in the calculation of the social net present value.

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