A TRADE INSTITUTION AS A PEACEFUL INSTITUTION? A CONTRIBUTION TO INTEGRATIVE THEORY

Raul Caruso*
raul.caruso@unicatt.it

Abstract:

Recent studies emphasize the occurrence of conflict as a rational economic activity as well as production and exchange. Agents are assumed to divide their efforts into fighting and productive activities, or as commonly denoted in 'guns' and 'butter'. This paper does try to go beyond this 'manichean' idea, assuming the Boulding's concept of 'integrative system' In particular, the paper investigates whether a trade institution committed to free and fair trade could foster 'peaceful' benefits for member countries. The analysis, produced in a very simplified world, counts as a founding pillar the Contest Success Function. The results of the model suggest that in an institutionalized scenario agents gain more both in terms of economic utility and in terms of peace than in 'continuing conflict' and 'obstructed trade' scenarios.

Keywords: Contest Success Function, Conflict, Trade, Institutions.

* Università Cattolica del Sacro Cuore di Milano. Earlier versions of this paper have been presented at the North America Meeting of Peace Science Society (International), November 12-14 2004, Houston, and at the European Jan Tinbergen Peace Science Conference, June 9-11 2004, Amsterdam, where I benefited from illuminating comments. I am deeply indebted to Simona Beretta, Walter Isard, Ray Dacey, Jack Hirshleifer, Glenn Palmer and two anonymous referees for helpful comments. I also warmly thank Alessia Casetta, Andrea Locatelli, Lou Zarro, the GMO and, last but not least, Damiano Palano and Stefano Procacci for continuous opinion-sharing.

MANICHEAN ECONOMICS?

In recent years a large literature on the economics of conflict has been produced. Many scholars agree on the idea to go far beyond the traditional domain of economics, namely 'exchange' The argument is straightforward. You can buy something, but you can also steal it. You can appropriate, confiscate, grab, plunder instead of producing, contracting or exchanging. Conflict, as a rational activity, plays a role as well as exchange. The acknowledged reference among economists is the work by Jack Hirshleifer, who labelled conflict as 'The Dark side of the Force", making an effective analogy with the Star Wars saga. According to this illuminating comparison, you cannot tell the story of Luke Skywalker and Obe Wan Ben Kenobe forgetting to mention Darth Vader[1]

Central to the argument is the conflict as a permanent feature of human interactions. Conflictual and exchange interactions co-exist and interact. Indeed, the extreme cases of conflict and harmony, namely total peace or total war, do not occur. This idea is consistent with one of the basic concepts expounded by Schelling (1960): "*In fact, the richness of the subject arises from the fact that in international affairs there is mutual dependence as well as opposition. Pure conflict, in which the interests of two antagonists are completely opposed is a special case; it would arise in a war of complete extermination, otherwise not even in war*"[2]. And it is also enriched by Hirshleifer (1991/2001): "*War and Peace, or more generally conflict and settlement, are usually regarded as mutually exclusive.[…]But it will be convenient here to employ a paradigm in which the choice is not between 'going to war' and 'making peace'. Instead, the parties choose a steady state strategy along a continuum ranging between the extremes of struggle and accommodation*"[3]

This argument, however, shows a 'manichean bias'. In fact, the dichotomy 'exchange vs. conflict', that I define *manichean*, also does not seem to exhaust the complex range of human economic activities. Then, I also consider the vigorous argument of 'integrative relationship' presented by Boulding (1962). According to his view, social systems can be analysed along the lines of three large, overlapping and interacting sub-systems: 'exchange', 'threat' and 'integrative' activities. The integrative system, in particular, constitutes the most effective response to threat. In other words, an integrative relationship paves the way for conflict management and

[1] See Hirshleifer (1994).
[2] Schelling (1960), p.4
[3] Hirshleifer (1991/2001), p. 45 in re-printed edition (2001).

resolution. All human institutions and relationships involve different combinations of all three. These three systems governing human affairs, practically never occur in pure form. Different 'states of the world' show different combinations and interactions of the three systems.

Deepening the core argument of this work, I shall assume the existence of a world made of two competing countries only. They can allocate their own resources between productive and unproductive, or as commonly denoted between 'butter' and 'guns'. They also consider a joint-production, say the 'pie', as a contestable output to be split. These countries are assumed to behave like rational risk-neutral agents. They are utility maximizers, and moreover neither benevolent or malevolent. Agents are also assumed to be unitary actors. That is, considering the case of nations-states, they are not subject to pressure from a variety of internal interest groups. In this two-countries world the technology is neutral, that is, both countries retain the same level of technology. In addition, geography does not matter.

In such a world different scenarios can emerge depending on which system among threat, exchange and integration has the dominance on the others: 1) a 'continuing conflict' scenario[4], where conflict is the first option of agents. 2) the 'obstructed trade' scenario. In this scenario, agents face a trade-off between conflict and settlement. Exchange activities between agents are obstructed through a complex range of impediments; 3) in the 'institutional scenario', agents give up a certain amount of resources in order to bind themselves into an institution committed to free and fair trade. In all scenarios, the threat relationship, namely the exploitation of potential force, is captured through the investments in unproductive resources. Hence, I will define a scenario more or less 'peaceful' looking at the level of unproductive 'guns' both parties choose. The greater is the level of 'guns', the less peaceful can be considered that scenario. The same parties have an optimising behaviour, that is they will prefer the scenario where they are able to get a higher payoff.

The paper proceeds as follows: the next section presents the basic model of the economic theory of conflict and an extension. The third section looks at the role that trade policies could play in determining the optimal choice between conflict and settlement. The fourth section introduces briefly the discussion about the peaceful

[4] This definition is borrowed from Hirshleifer (1988).

impact of a trade institution and the following section presents the 'core' model of this work, which is intended to capture the emergence and the role of institutions in preventing conflict between armed parties competing over a contestable output Such model is extended in order to take into account the impact of asymmetric settlements under the umbrella of trade institution. A final section gives a summary and conclusions.

I. A FORMAL MODELLING OF CONFLICT AND SETTLEMENT

As noted above, the pioneering work on modelling conflict in recent economic literature is by Jack Hirshleifer, whose foundations are in Hirshleifer (1987, 1988, 1989) Specifically, he introduces the study of conflict by using four equations. (a) a *Resources Partition Equation*; (b) an *Aggregate Production Equation* that is characterized by constant returns to scale and constant elasticity of substitution (CES); (c) the *Contest Success Function* (hereafter CSF for brevity) determining the outcome of conflict; (d) an *income distribution equation*[5].

Within Hirshleifer's basic framework, two risk-neutral parties indexed by $i = 1,2$, make simultaneous once-and-for-all choices about their own allocation of resources between 'butter' and 'guns'. Each one is endowed with an initial positive endowment of resources, $n_i \in (0,\infty), i = 1,2$, which can be converted into 'guns', or 'butter' according to a Resources Partition Equation defined by:

$$n_i = x_i + z_i, \forall i \tag{1}$$

where $x_i \in [0,\infty), z_i \in (0,\infty)$ respectively denote 'butter' and 'guns' The CES function denoting the contestable output, that is the aggregate production function, denoted by Y, becomes a simple linear additive function:

$$Y = Y(x_1, x_2) = x_1 + x_2 \tag{2}$$

[5] The Contest Success Function is a mathematical relation that links the outcome of a contest and the efforts of the players. It is actually a founding pillar of many models. Selective seminal contributions are by Tullock (1980), O'Keeffe et al. (1984) and Rosen (1986). Dixit (1987) develops a general framework for contests using the general properties of logit functions. Hirshleifer (1989) focuses on a different form for the CSF: the ratio form and logit form. See also Skaperdas (1996) and Clark and Riis (1998) for a basic axiomatization.

Then, the resources allocated to productive activities determine a total contestable output, say the 'pie', that is to be distributed according to the resources allocated to 'guns'. The outcome of the conflict is determined through a CSF. It summarizes the relevant aspects of what Hirshleifer defines the *technology* of conflict. In particular, even if the CSF can take different forms, I apply the *ratio* form of the CSF[6].

$$p_i = \frac{z_i}{z_i + z_j} \qquad \text{for } i = 1,2 \text{ and } j \neq i \tag{3}$$

where, under the assumption of risk-neutrality p_i denotes the proportion of appropriation going to agent i for $i = 1,2$ and follows the conditions below:

$$\begin{cases} p_1 + p_2 = 1 \qquad p_1 = 1 - p_2 \\ p(.,.) \text{ is twice differentiable} \\ \partial p_i / \partial z_i > 0 \qquad \partial p_i / \partial p_j < 0 \\ \partial^2 p_i / \partial z_i^2 \leq 0 \qquad \partial^2 p_i / \partial z_j^2 \geq 0 \end{cases} \tag{3.1}$$

Eventually, each agent's payoff function is given by:

$$U_i^{cc} = p_i Y = \frac{z_i}{z_i + z_j}(x_1 + x_2) \quad \text{for } i = 1,2 \tag{4}$$

where the superscripts '*cc*' denote 'continuing conflict'. Hence, assuming a Nash-Cournot behaviour, each opponent will maximize its own payoff expecting that the opponent is choosing the similar maximization strategy. Through an ordinary maximization technique (under the resources constraint) it is possible to show each player's optimal choice of 'guns' given the corresponding choice of

[6] Hirshleifer (1989) analyses the different impact of two different function form for CSF: the *ratio form* and the *logistic form*. In the first case, the contest outcome depends upon the ratio of the efforts applied, whilst in the second case it depends upon the difference between the resources committed.

the contender. The interior Cournot solution in the Hirshleifer's basic model of 'continuing conflict' is then given by:

$$z_*^{cc} = z_1^{cc} = z_2^{cc} = (n_1 + n_2)/4 \qquad (5)$$

where the stars subscripted denote the equibrium level throughout the paper. Indeed, whatever the amount of resources available for each player, the contenders allocate the same absolute value to fighting efforts. Therefore the income generated through the aggregate production function is equally divided between the two contenders. Formally, we have:

$$U_*^{cc} = U_1^{cc} = U_2^{cc} = \frac{1}{4}(n_1 + n_2); \qquad (6)$$

However, in relative terms, the wealthier party devotes fewer resources than the poorer side to the contest[7].Within the growing literature[8] applying hirshleifer-style models, Garfinkel and Skaperdas (2000) propose an extension in order to discuss a settlement condition for two risk-neutral rational opponents. The model I present hereafter is in its one-period version able to illustrate the short-run incentives to settle instead to be involved in a war[9].

---

[7] This is what Hirshleifer (1991) defined *The Paradox of Power* (POP). In a contest, he says, the initially disadvantaged group has an incentive to fight harder. Moreover, the less endowed side improves its position compared with the better-endowed rival. Hirshleifer, in particular, distinguishes between a strong form and a weak form of the POP. The strong form applies when contenders have an initial endowment of resources moderately unequal. In such a case, equilibrium can be found in the interior range. As the resources disparity increases, the strong form of the paradox no longer holds. When the resource asymmetry becomes sufficiently large, the opponents enter a corner-solution range where only a weak form of the paradox of power applies. It is defined 'weak' because, although no longer equalized, attained incomes could be less unequal than the initial resource endowment.

[8] See among others: Grossman (1991/1998), Skaperdas (1992), Garfinkel (1994), Grossman and Kim (1995), Skaperdas and Syropoulos (1996), Neary (1997), Noh (1999), Anderton and Carter (1999), Anderton (2000), Reuveny and Maxwell (2001), Stauvermann (2002), Dixit (2004).

[9] Garfinkel and Skaperdas (2000) deal with the potential outbreak of a war, that is of exploitation of actual violence. The formal analysis, however, does not change.

Within this framework, the total contestable output denoted by (2) can be disposed in one of two ways: through conflict with an uncertain outcome or through a peaceful and predefined division of the 'pie'. The latter can be interpreted as a negotiated trade agreement over an aggregate output. 'Guns' play a role in both cases. In case of a war, 'guns' determine the probability of winning for each party; while in case of a settlement they influence each party's negotiating position and therefore the share of the 'pie' they receive. Then, each party has an incentive to allocate some of the initial resources to 'guns'. Hence, Garfinkel and Skaperdas assume that each party's share of total contestable output is a weighted combination of two possible rules: (i) the CSF and (ii) a symmetric split-of-surplus[10] rule of division, and the relative weights are determined by a destruction parameter denoted $\beta \in (0,1)$. As β increases, the conflict becomes less and less destructive. The income distribution equation becomes:

$$U_i^w = p_i \beta Y = \frac{\beta z_i}{z_i + z_j}(x_1 + x_2) \qquad \text{for } i = 1,2 \tag{7}$$

where superscripts '*w*' denote 'war'. The level of 'guns' chosen in equilibrium is exactly as in (5) whilst the payoffs are given by:

$$U_*^w = U_1^w = U_2^w = \frac{1}{4}\beta(n_1 + n_2) \tag{8}$$

Consider now the probability of a settlement taking into account the rule for dividing the output produced through the aggregate production function. Each party's share of total output is :

$$U_i^s = [\beta p_i + \frac{(1-\beta)}{2}](x_1 + x_2); \tag{9}$$

where the superscript '*s*' denotes 'settlement'. Hence, relative weights between the two rules of division are determined by the

---

For sake of simplicity, only for this section the superscripts '*cc*' will be substituted by '*w*'. In particular note that $z_i^w = z_i^{cc}$

[10] An equal split of a pie under some circumstances is a common feature of bargaining theory. Lopomo and Ok (2001) provide a positive theory for such a fair (50-50) division of gains from trade.

destruction parameter. When β is small, the contest success function of armed conflict plays a smaller role in the determination of the distribution of output under settlement. That is, each side's choice of fighting efforts has a small impact on the settlement outcome. The equilibrium under settlement is denoted by:

$$z_i^s = \frac{\beta(n_1 + n_2)}{2(1+\beta)} \tag{10}$$

$$U_i^s = \frac{1}{2(1+\beta)}(n_1 + n_2) \tag{11}$$

Comparing the payoffs in case of war and settlement, it is possible to determine when settlement is preferable to conflict: given that $\beta < 1$, the payoffs under settlement are higher than those under war. More precisely $U_*^s > U_*^w$. At the same time, when $\beta < 1$ the settlement induces less arming, i.e. $z_*^s < z_*^w$. Note that if $\beta = 1$ (i.e. the conflict is not destructive) the payoffs are identical in both scenarios. Hence, within this static setting, it would appear that settlement is better than war for both parties. Therefore, given a higher payoff, settlement is likely to be preferred by both rational parties. Formally speaking, recalling (11) and (8) it is possible to write that a settlement is always preferable if and only if:

$$\frac{1}{\beta(1+\beta)} > \frac{1}{2}, \tag{12}$$

For sake of simplicity call (12) a *settlement condition* Whenever it holds (for $\beta < 1$), the settlement is expected to be preferable with respect to conflict. Thus, an agent is expected to prefer settlement if and only if its own utility under settlement is higher than in case of a war. The discriminating factor in the framework presented by Garfinkel and Skaperdas is the destructiveness of a war: the more destructive is a war, the lower will be the incentive to wage it.

II. The Impact of Trade Policies

Hereafter I borrow and extend the latter model presented in the foregoing section. First, differently from Garfinkel and Skaperdas I assume that conflict does not involve actual violence, but only a potential use of force and violence. Indeed, potential exploitation of

force is captured through the level of 'guns' chosen by both parties. Hence, following Hirshleifer, I assume that each side makes an optimal once-and-for-all choice of 'butter' and 'guns'. Following this idea, it might be said that the expected real impact of conflict, captured through the destructiveness parameter $\beta \in (0,1)$, is related to the welfare losses due to devoting resources to permanent military expenditures[11], that is the amount of resources devoted to 'guns'.

The extension I introduce here deals with the existence of trade policies. In fact, in reality trade is often obstructed by several unnatural measures imposed by rulers and commonly known as trade policies: tariffs, quotas, blockades, standard regulations etc… These measures negatively affect the patterns of trade between the two parties. Following the common international trade theory, in most cases, it is possible to say that tariffs and other instruments of trade policy negatively affect the welfare effects of trade through the combined effect of consumer surplus, producer surplus and government revenue. In general, protectionism benefits producers and hurt consumers. In fact, trade policies are commonly designed and implemented to favour interest groups and to redistribute income to politically influential sectors. Governments are not committed to benefit total welfare, but only to favour some interest groups. This would imply that the main concern of policy-makers is the emphasis on producer surplus. Such approach of over-weighting the producer surplus is not a novelty in literature. For instance, Staiger (1995) designs a government's utility function imposing a weight on producer surplus that captures political economy considerations. Consider such economic incentive as a 'primary' objective of trade policy implemented by a government. Consider now that there can be also 'secondary' objectives[12] related to the non-economic effects of trade policies. Hirschmann (1945/1980) presented the famous argument of the two-fold effect of international trade: (i) the *supply effect* that is the ordinary and well known benefiting effect of larger markets; (ii) the *power (influence) effect* according to which trade can become a direct source of power. In narrative form, Cooper (1972) explains a similar concept when he

[11] For a general discussion of the huge literature on the negative affects of military investments see Arrow (2000).

[12] However, I do not use 'primary' and 'secondary' to rank governments' preferences. I do it only in order to describe different objectives.

interprets trade policy as an important part of a broader foreign policy[13].

Therefore, I modify the value of the contested output using a weight that is assumed to proxy the complex range of trade policies[14]. Let θ be the weight denoting the complex range of trade policies. Thus, it is possible to write:

$$U_i^{ot} = [\beta p_i + \frac{(1-\beta)}{2}]\theta(x_i + x_j); \qquad (13)$$

with the superscript '*ot*' denoting the 'obstructed trade' scenario. I assume $\theta \in (0, \infty)$. If $\theta = 1$, trade policies are neutral. That is, it means that trade policies are supposed not to affect the contestable output, or that there is no kind of impediment. If $\theta < 1$ trade policies negatively affect the available output. By contrast, if $\theta > 1$, trade policies are intended to pose an over-weight on producer surplus.

Comparing the payoffs of continuing conflict and settlement under the impact of trade policies it would be possible to determine when settlement is preferable to conflict. Through ordinary maximization process the optimal simultaneous choices of 'guns' are derived, as well as the payoffs.

$$z_*^{ot} = z_1^{ot} = z_2^{ot} = \frac{\beta(n_1 + n_2)}{2(\beta + 1)} \qquad (14)$$

$$U_*^{ot} = U_1^{ot} = U_2^{ot} = \frac{\theta(n_1 + n_2)}{2(\beta + 1)} \qquad (15)$$

It is possible now to re-write the *settlement condition*. Recalling equation (8)[15] it is possible to write that a settlement is always preferable if and only if:

$$\frac{\theta(n_1 + n_2)}{2(\beta + 1)} > \frac{\beta(n_1 + n_2)}{4} \qquad (16)$$

[13] See also Cooper (1973) and Cooper (1987).

[14] Note that in this extremely simplified scenario, I do not consider the effects of prices, exchange rates, and hence terms of trade.

[15] Equation (8) is exactly equivalent to the continuing conflict equilibrium solution weighted by the destruction parameter, namely $U_i^w = \beta U_i^{cc}$.

Call (16) *settlement condition under protection*, linking the expected impact of conflict with the existence of trade policies. Rearranging and manipulating inequality (14), the settlement condition becomes:

$$\theta > \frac{(1+\beta)\beta}{2} \qquad (17)$$

Moreover, it is also possible to look at the 'peacefulness' of the latter scenario. As specified above, a state of the world is considered more 'peaceful' than another if the equilibrium level of 'guns' is lower. In this case, it implies that: $z_*^{ot} < z_*^{cc}$ where the stars subscripted denote the symmetric equilibrium level. That is, recalling (14) and (5), 'peacefulness' implies that:

$$\frac{\beta(n_1+n_2)}{2(\beta+1)} < \frac{n_1+n_2}{4}; \qquad (18)$$

Rearranging, simplifying and manipulating (18) the 'peacefulness condition' simply becomes:

$$\beta < 1 \qquad (19)$$

Using (17) and (19) as strict equalities it is possible to plot the indifference loci curves. Scaling the expected real impact of the conflict (β) against the impact of trade policies (θ), different areas can be identified (see figure 1). The graph shows how the settlement/conflict trade-off is modified when the impact of both trade policies and conflict changes. The curve plots the indifference *locus* capturing the settlement condition. That is, at any point of this curve agents are able to reach the same level of utility both if they choose to conflict and if they choose to settle and exchange. At any point on the right of this curve, conflict provides a higher utility than settlement. The vertical line plots the *locus* of peacefulness condition. At any point at the left of the line, the level of 'guns' under protection is lower than in the continuing conflict scenario.

Figure 1 about here

Note that these conditions hold regardless of any disparity in initial resources endowments. In fact, manipulating (16) and (18), the sum of endowments $(n_1 + n_2)$ cancels out. Therefore, only the impact of trade policies and conflict matters. The four areas drawn have different equilibria configurations:

Area (I), that I shall call *peaceful settlement*, is characterised by:

$$\begin{cases} U_*^{ot} > U_*^{cc} \\ z_*^{ot} < z_*^{cc} \end{cases} \qquad (20a)$$

That is, the level of utility achieved through a settlement, although under protection, is higher than in the continuing conflict scenario. In a parallel way, the settlement occurs with a lower level of 'guns' This scenario better fits with the idea of the 'peaceful spillover' of trade between states. Albeit non-cooperative, the agents recognize the incentives to trade instead of engaging in a continuing conflict[16].

This is also due to the opportunity cost of a conflict. This appears to be extremely powerful if it is considered that states are also willing to suffer a high burden of trade protection rather than being engaged in a struggle. This links with the traditional liberal idea according to which free trade is associated with a more peaceful situation because of the certainty of welfare gains to be achieved by

[16] This is exactly the basic idea surrounding the argument of peaceful effect of trade. In sum, the basic consideration is that societies can gain and pursue a higher level of welfare from trading. Hence when it comes to choose whether being involved in conflict or not, a rational actor (the state) takes into account the opportunity cost of reducing welfare. Hence, freer trade is associated with a more peaceful situation because of the certainty of welfare gains to be achieved by societies. Polachek (1980) firstly provides a simple formal microeconomic model. The model is based on a country social welfare function assumed to be derived from the preference sets of the entire population. Following a standard trade model, when a country is engaged in a conflict, a restriction in trade fosters a deterioration of terms of trade given the impact of conflict on prices. Then, since conflict is assumed to affect the price of trade, the rational behaviour of a country will be choosing an optimal level of hostility that maximizes the welfare function given the balance of payments constraint. The equilibrium is reached when results of the model that the net cost associated with extra hostility equals the welfare benefit of more hostility. Polachek has refined his basic model also providing empirical support to his argument in Polachek (1992, 1994, 1997) and in Polachek et al. (1999).

societies. This resembles the historical experience of the German *Zollverein*[17]

The area denoted by the expression *weak conflict*, is characterised by:

$$\begin{cases} U_*^{cc} > U_*^{ot} \\ z_*^{ot} < z_*^{cc} \end{cases} \qquad (20b)$$

That is, agents have an incentive to follow the path of a continuing conflict due to the higher utility they can reach, but at the same time the level of 'guns' they choose simultaneously is lower than that they would have chosen under trade policies. This is due to the different impact of destructiveness and trade protection. More precisely, on the left of the intersection point of the two curves the expected real impact of conflict appears to be more powerful. States are willing to suffer the burden of a depriving trade protection because a struggle appears to be extremely destructive.

This could be close to the historical experience of the Cold War. The political climate, in fact, strongly affected the potential trade patterns between Western and Eastern hemispheres, through creating formal and informal high trade impediments. At the same time the escalation of a nuclear war appeared to be so destructive as to prevent the occurrence of a total war. As the conflict becomes less and less destructive, agents choose to be engaged in a permanent conflict at a lower level of 'guns' than in a continuing conflict scenario. When the conflict appears to be not-destructive, parties are still willing to experience a weak conflict if the impact of trade policies is expected to deprive available income. This appears to be also the case of international economic sanctions (boycotts and embargoes)[18] imposed in order to inflict an economic damage to an opponent country. The phenomenon of international negative sanctions is a clear example of conflict as a permanent feature. Both sender and target country are negatively affected because of the trade disruption that emerges.

Thus, it is worth noting that the model shows how different combinations of the parameters lead to different equilibria. Note that

[17] On development of *Zollverein* see Bazillion (1990).

[18] For a survey on some key theoretical contributions on sanctions see Caruso (2003).

an important finding is linked to the irrelevance of the initial resource endowments, whereas asymmetry does not seem to affect the choices of the parties. The most important element is re-distributive mechanism.

These findings partly contribute to the enduring debate among scholars on the relationship between trade and conflict. Traditionally, there are two basic theoretical positions. The liberal idea argues that international trade is the root of political co-operation and amity, whereas a second position argues that international trade can contribute to political conflict and hostility[19] The model does not allow to espouse neither the first nor the second. It provides the classical economists' answer - 'it depends'.

III. A TRADE INSTITUTION AS A PEACEFUL INSTITUTION?

What are the potential 'peaceful' benefits from establishing rules for the conduct of trade policy? Moreover, what are the gains in terms of peace of a trade agreement? Although the relationship between trade and conflict has been controversial among scholars, relatively little attention has been paid to the impact of institutional framework underpinning the expansion of economic interactions. Only a few studies deal with the question of whether an institutional scenario on trade also fosters an easing of tensions between opponents.

Mansfield and Pevehouse (2000) and Mansfield (2003) argue that parties in a same preferential trade agreement are less prone to interstate conflict than other states, thanks to the higher gain from trade arising under a preferential agreement. However, such approach minimizes the importance of specific choices among several types of preferential trade agreement. In reality, a different institutional framework affects and modifies incentives, gains and costs for participating countries. Schiff and Winters (1997) also address this point modelling a world in which regional trade agreements are expected to reduce security tensions between neighbors. Padoan (1997) distinguishes different degrees of integration. The deeper the level of integration, the higher the gains in terms of security. Given the benefits of reciprocal exchange are higher than those of reciprocal aggression a deeper integration also raises the capability of resistance against a common external threat, both economic and non economic.

[19] For a comprehensive survey see Reuveny (2000). See also the volume edited by Mansfield and Pollins (2003).

These studies, however, consider the 'peacefulness' of a trade arrangement exclusively as a positive externality and abstract from the relevance of defence expenditures as a way to generate security. If we do not consider the existence of resources allocated to defence and aggression, this would imply that in a broader view all the literature on economic integration can be broadly meant as a literature on security and formation of a peaceful environment. But this is just a part of the story. In fact, the outcome of the foregoing section showed that two opponents may have incentive to settle, but under set of conditions they still have incentives not to settle (recall the *weak conflict* scenario). This result does suggest that the expected gains of trade do not suffice to prevent arming and perhaps also the escalation of conflict. Harmony does not take place suddenly because of higher gains. It is reasonable to think that there could be an amount of resources agents are willing to devote in order to pursue this kind of goal.

To the best of my knowledge, a first attempt in this direction is by Genicot and Skaperdas (2002). They develop a model where adversaries divide their resources between guns, butter and investments in conflict management. The authors show that how rich the adversaries are has a large effect on the probability of peace. The poorer the adversaries, in the sense of the real resources they possess, the lower their investment in conflict management and the lower the probability of peace. In addition, poorer adversaries will devote proportionately greater percentage of their resources to guns and less to butter than richer adversaries, thus compounding the effects of initial resource poverty. Genicot and Skaperdas also show that a greater number of adversaries increases the probability of peace, when adversaries start with their own resources - like when a new country enters an existing conflict. The authors show that there are different feasible equilibria.

IV. A TENTATIVE MODELING OF A TRADE INSTITUTION

Up to this point, I considered formally only the distinction between 'butter' and 'guns' Now, I assume that agents divert a certain amount of resources to join a trade institution. The agents of the model can either fight or settle, as before. The main novelty is the existence of a set of rules for trade interactions which affects the incentives of agents. Therefore, the agents can bind themselves in a set of rules and procedures that affect the outcome of conflict on the contestable output.

I also introduce some limiting hypothesis on the 'benchmark' design for a trade institution. First, a trade institution is capable to establish and enforce a free trade area between members; no barriers to trade or strategic policies are allowed. Moreover, the institution is supposed to implement a set of rules and procedures governing trade interactions. Hence, given the existence of rules, trade is supposed to be 'fair'. In other words, there is no bias in favour of a more powerful or an unfair 'contestant'[20].

The countries join the institution by giving up a certain amount of resources, say the *membership fee*. This amount of resources is assumed to be equal between contestants. Paying this *membership fee*, governments also signal the intention to comply with obligations emerging under an institutional regime. For analytical simplicity, it is assumed to be exogenous. Being exogenous, the *membership fee* does fit more with a scenario where an institution already does exist and other parties are allowed to join it. The intuition behind the nature of such *membership fee* relates to Boulding's idea of 'grant economy' in integrative systems[21] A grant is supposed to be an unilateral transfer from an individual, a group or a social unit to another. When it occurs, the agent does not receive directly anything in return. Parties obviously expect to benefit from this disbursement. Such a benefit is supposed to come indirectly, enhancing the advantages of trade within the framework of the institutional set of rules. The reduction of resources devoted to unproductive 'guns' is also a pillar of contractarian approach as expounded in Skogh and Stuart (1982).

To summarize, in the benchmark case, a trade institution is assumed to: a) establish free trade between participants; b) make the trade 'fair', that, in absence of asymmetries by assumption, does imply the *split-of-surplus* rule of division of the pie between

[20] Usually, an enduring enforcement is associated with the existence of a dispute settlement system (DSS). Hence, this rules out any 'imbalance of power' between countries, since a dispute settlement procedure is designed to be rule-driven and not power-driven and it is assumed not to be biased in favour of any party in a dispute This is supposed to pave the way for a stable rule-oriented system. Agents observe the existence of DSS and assume that it is able to enforce the set of rules to keep the trade contest 'fair'. Since the system is designed to preserve free and fair trade, each player trusts the capacity of the institution to ensure an enduring compliance with the institutionalized set of rules. Perhaps, the most effective example of a successful dispute resolution mechanism is the European Court of Justice. It doubtlessly has been a cornerstone of European integration.

[21] Boulding expounded in a comprehensive manner the theory of 'grants economics' in Boulding et al. (1972) and in Boulding (1973).

contestants holds; c) preserve a 'fair' free trade through a rule-driven system; d) it also requires an exactly identical *membership fee* from all members. Thus, the resources partition equation becomes:

$$n_i = x_i + z_i + h_i \tag{21}$$

where h denotes the exogenous *membership fee*. As in the foregoing section, each party's share of total output is a weighted combination of two rules of division. Their relative weights are determined by the parameter denoting the expected real impact of the conflict. Then, also in this case, the second rule is indicated as the *split-the-surplus* rule of division. The utility function for each country becomes:

$$U_i^{ins} = [\beta \frac{z_i - h}{z_i + z_j - 2h} + (1-\beta)/2](n_i + n_j - z_i - z_j - 2h) \tag{22}$$

where the superscript '*ins*' denotes 'institution'. In the CSF, h can be considered a constant vector that affects the ordinary outcome of the contests[22]. In the CSF the *membership fee* decreases the amount of resources devoted to 'guns'[23]. In this case it would negatively affect the poorer participant. That is, given the resources constraint of each contestant, the poorer side is relatively more impoverished. The first order conditions for the maximization problem are:

$$\frac{\partial U_i^{ins}}{\partial z_i} = \left[\frac{\beta(z_j - h)}{(z_i + z_j - 2h)^2}\right](n_i + n_j - z_i - z_j - 2h) - \left[\frac{\beta(z_i - h)}{(z_i + z_j - 2h)} + \frac{(1-\beta)}{2}\right] = 0$$

(23.a)

The second order conditions are given by:

$$\frac{\partial^2 U_i^{ins}}{\partial z_i} = \frac{2\beta\left[4h^2 - h(n_i + n_j + 4z_j) + z_j(n_i + n_j)\right]}{(2h - z_i - z_j)^3} < 0 \tag{23.b}$$

[22] As pointed out by Skaperdas (1996) this is not true for 'logit' form of CSF.

[23] To the best of my knowledge, such type of modification is a novelty in literature, whilst there are some examples with an additive form. See Amegashie (2005), Dasgupta and Nti (1998).

Expression (23.b) leads to the conditions $h < \lfloor (n_i + n_j)/2 \rfloor$ and $z_i - h > 0, i = 1,2$ at the symmetric equilibrium. It is simple to demonstrate that a symmetric interior Nash equilibrium level of 'guns' with $z_*^{ins} = z_1^{ins} = z_2^{ins}$ is:

$$z_*^{ins} = z_1^{ins} = z_2^{ins} = \frac{\beta(n_1 + n_2) - 2h(\beta - 1)}{2(\beta + 1)}; \tag{24}$$

In this symmetric equilibrium the payoffs of both agents are:

$$U_*^{ins} = U_1^{ins} = U_2^{ins} = \frac{\beta(n_1 + n_2)}{2(\beta + 1)} - \frac{2h}{\beta + 1} \tag{25}$$

Recalling equation (8)[24] it is possible to show that a settlement under a trade institutions is always preferable for both agents when:

$$\begin{aligned} &U_*^{ins} > U_*^{cc}, \\ &\frac{\beta(n_1 + n_2)}{2(\beta + 1)} - \frac{2h}{\beta + 1} > \frac{1}{4}\beta(n_1 + n_2) \end{aligned} \tag{26}$$

Manipulating and rewriting, the settlement condition becomes:

$$h < \frac{(\beta + 2)(1 - \beta)(n_1 + n_2)}{8} \tag{27}$$

Call this *settlement condition under institution*. Given $n_1 \in (0, \infty)$ and $n_2 \in (0, \infty)$ the settlement condition depends upon the value of β and h. Since $\beta \in (0,1)$, the settlement condition is satisfied if and only if $h < [(n_1 + n_2)/4]$. In other words, parties can retain a level of utility higher than in continuing conflict, when they perceive the conflict as being destructive and the level of *membership fee* lies in an interval whose upper bound is given by the level of 'guns' each side would choose optimally under continuing conflict. To summarize formally, parties will settle under the umbrella of a trade institution when

[24] For sake of simplicity consider equation (8) as being applied to a continuing conflict scenario. then hereafter $U_*^{cc} = \frac{\beta(n_1 + n_2)}{4}$. See also footnote no. 17.

$$U_*^{ins} > U_*^{cc} \Leftrightarrow \begin{cases} \beta \in (0,1) \\ h \in \left(0, \frac{n_1 + n_2}{4}\right) \end{cases} \tag{28}$$

What about the level of 'guns'? According to the common definition adopted in this work, a scenario is considered more peaceful if and only if the level of guns is lower than in another scenario. Therefore, the *peacefulness condition under institution* is $z_*^{ins} < z_*^{cc}$. That is, recalling equations (5) and (24), it is possible to write:

$$\frac{\beta(n_1 + n_2) - 2h(\beta - 1)}{2(\beta + 1)} < \frac{n_1 + n_2}{4} \tag{29}$$

Manipulating and re-arranging:

$$\frac{h(\beta - 1)}{\beta + 1} > \frac{(n_1 + n_2)(\beta - 1)}{4(\beta + 1)} \tag{30}$$

Then, the allocation of resources to conflict also depends upon the value of β and h. Inequality (30) leads to:

$$z_*^{ins} < z_*^{cc} \Leftrightarrow \beta \in (0,1) \quad and \quad h \in \left(0, \frac{n_1 + n_2}{4}\right) \tag{31}$$

also in this case the peacefulness condition is satisfied when $\beta \in (0,1)$, and the upper bound for the critical value of h equals exactly the level of 'guns' which parties would choose in continuing conflict scenario[25]. This suggests the idea that guns and *membership fee* can be interpreted as substitutes. When the conflict appears to be destructive and the membership fee is lower than the amount of

[25] Given the second order conditions (23.b) this would mean that there are feasible equilibria for $[(n_1 + n_2)/4] < h < [(n_1 + n_2)/2]$ which are not more 'peaceful' than continuining conflict scenario and where parties do not settle.

resources allocated to 'guns' under conflict, joining a trade institution is unambiguously more peaceful than continuing conflict.

To summarise, if $\beta \in (0,1)$ and $h \in \left(0, z_*^{cc}\right)$ the model shows that both parties are better off if they settle under an institution. The choice of parties is driven by the level of payoffs which are higher than in continuing conflict scenario. In other words, parties are aware of the room of improvement in both their payoffs. Then, they decide to decrease their allocations to guns and increase their allocations to productive activities. In such a way, they move towards a more efficient equilibrium.

V. UNFAIRNESS OF SETTLEMENT

In the foregoing section a cornerstone of the model presented was the *split-of-the-surplus* rule of division. Now I relax this assumption. Albeit rationally justified, a symmetric split is not likely to occur very often in reality. Many situations in reality confirm the existence of 'unfair' agreements[26] Therefore, it is possible to say that expression (22) is a special case of:

$$U_i^{ins} = \left[\beta \frac{z_i - h}{z_i + z_j - 2h} + (1-\beta)\delta_i \right] \left(n_1 + n_2 - z_1 - z_2 - 2h\right) \qquad (32)$$

Where $\delta_i \in [0,1], i = 1,2$ denotes the share of output received by each agent under a negotiated settlement over the contestable output. Moreover, I assume that $\delta_1 + \delta_2 = 1$ and that $\delta_1 > \delta_2$. Then, more precisely $\delta_1 \in (1/2,1]$ and $\delta_2 \in [0,1/2)$. That is, agent 1 retains a larger fraction of contested output than agent 2. The utility functions of both agents become:

[26] Perroni and Whalley (1994) try to resolve this seeming paradox by interpreting such agreements as insurance arrangements for smaller countries, which partially protect them against the consequences of a global trade war. What they offer to the large countries in return is largely non-trade benefits (such as restraints on domestic policies in the smaller countries, firmer intellectual property protection, firmer guarantees of royalty arrangements affecting resources on state-owned lands). In fact, when evaluated relative to a post-retaliation tariff equilibrium the value of these agreements to small countries is large because they help preserve existing access to larger foreign markets.

$$U_1^{ins} = \left[\frac{\beta(z_1 - h)}{z_1 + z_2 - 2h} + (1-\beta)\delta_1 \right](n_1 + n_2 - z_1 - z_2 - 2h) \quad (33a)$$

$$U_2^{ins} = \left[\frac{\beta(z_2 - h)}{z_1 + z_2 - 2h} + (1-\beta)\delta_2 \right](n_1 + n_2 - z_1 - z_2 - 2h) \quad (33b)$$

The first order conditions[27] for the problem of maximization are:

$$\frac{\partial U_1^{ins}}{\partial z_1} = \left[\frac{\beta(z_2 - h)}{(z_1 + z_2 - 2h)^2} \right](n_1 + n_2 - z_1 - z_2 - 2h) - \left[\frac{\beta(z_1 - h)}{(z_1 + z_2 - 2h)} + (1-\beta)\delta_1 \right] = 0$$

(34a)

$$\frac{\partial U_2^{ins}}{\partial z_2} = \left[\frac{\beta(z_1 - h)}{(z_1 + z_2 - 2h)^2} \right](n_1 + n_2 - z_1 - z_2 - 2h) - \left[\frac{\beta(z_2 - h)}{(z_1 + z_2 - 2h)} + (1-\beta)\delta_2 \right] = 0$$

(34b)

Solving simultaneously the system of (34a) and (34b) and using $\delta_1 + \delta_2 = 1$ yields the asymmetric equilibrium choices of 'guns' for the two parties:

$$z_i^{ins} = \frac{\beta(n_1 + n_2)(\beta\delta_i - \delta_i + 1) - h\left[4\beta\delta_i(\beta - 1) - (\beta - 1)^2\right]}{(\beta + 1)^2}, i = 1,2 \quad (35)$$

Equilibrium level of 'guns' are expressed in terms of any party own share of the 'pie', the destruction parameter, the 'membership fee' and the sum of both parties initial endowment. Given $\delta_1 \neq \delta_2$ the equilibrium level of 'guns' for both agents differ, that is $z_1^{ins} \neq z_2^{ins}$. In particular given $\delta_1 > \delta_2$ and $\beta \in (0,1)$ by assumption, it is possible to verify that $z_1^{ins} < z_2^{ins}$ if and only if $h < \left[(n_1 + n_2)/4\right]$.

Thus, the party which has to receive the larger part of the output would arm less than the opponent. This confirms the outcome of the previous section. The payoffs for both parties are given by:

$$U_i^{ins} = \frac{(4h - n_1 - n_2)(\beta(\delta_i - 1) - \delta_i)}{(\beta + 1)^2}, i = 1,2 \quad (38)$$

[27] It is simple to demonstrate that the second order conditions are the same as in expression (23.b).

Since $\delta_1 > \delta_2$ it is simple to verify that $U_1^{ins} > U_2^{ins}$, that is, the agent which has to receive the larger part of the income will get a higher payoff than the contender.

Recall the level of payoffs of the symmetric equilibrium in the continuing conflict scenario denoted by (10). Since within this last framework the equilibrium is no longer symmetric, two settlement conditions are to be derived. Then, agent 1 will prefer to settle under an institution if and only if $U_1^{ins} > U_1^{cc}$. In a similar way agent 2 will settle if and only if $U_2^{ins} > U_2^{cc}$. Therefore, the settlement conditions for both parties are:

$$\frac{(4h - n_1 - n_2)(\beta(\delta_i - 1) - \delta_i)}{(\beta+1)^2} > \frac{\beta(n_1 + n_2)}{4}, i = 1,2 \qquad (39)$$

Manipulating and re-writing inequality (39) it is possible to find the critical value for the membership fee. Given $\delta_1 \neq \delta_2$ critical values clearly differ. Then, for both parties the critical values of h are:

$$h_1^{uf} < \frac{(\beta-1)(n_1+n_2)[4\delta_1 + \beta(\beta+3)]}{16(\beta(\delta_1 - 1) - \delta_1)} \qquad (40a)$$

$$h_2^{uf} < \frac{(\beta-1)(n_1+n_2)[4\delta_2 + \beta(\beta+3)]}{16(\beta(\delta_2 - 1) - \delta_2)} \qquad (40b)$$

Note that the superscripts '*uf*' and '*f*' hereafter will denote the 'unfair' and the 'fair' scenarios respectively. Both critical values depend on the fraction of the 'pie' each party can retain. In particular, they differ and $h_1^{uf} > h_2^{uf}$. The party with a higher fraction of the contestable output is likely to bear the burden of a higher membership fee to join a trade institution. Recall condition (28), namely the settlement condition under a fair institution. Comparing (40a,b) and (28) it is possible to say that :

$$h_2^{uf} < h^f < h_1^{uf} < \frac{n_1 + n_2}{4} \qquad (41)$$

namely the room for settlement under unfairness is lesser than the foregoing fair scenario. In fact, a settlement between parties under an

institution will take place if only if the exogenous membership fee is fixed below the critical value for the party with a lower fraction of the contestable output.

Recall also that the equilibrium level of 'guns' of the party with a lower 'share' of the contested income is higher than the opponent. Is this environment more peaceful than continuing conflict? That is, is the level of guns for both contenders lower than in continuing conflict scenario? Comparing (37) with (9) it is possible to say that:

$$z_2^{ins} < z_1^{ins} < z_i^{cc}, \text{if and only if } h < \frac{n_1 + n_2}{4} \tag{42}$$

Then, alike in the foregoing section when the *membership fee* is below the level of 'guns' parties would choose in the continuing conflict scenario, whatever the 'share' of the 'pie' each party can retain, the institutional scenario can be considered 'more peaceful' than the continuing conflict for both parties.[28]

To summarize formally the findings of this section it might be said that two opponents will settle under an unfair trade institution if and only if:

$$\begin{matrix} U_1^{ins} > U_2^{ins} > U_*^{cc} \\ z_2^{ins} < z_1^{ins} < z_*^{cc} \end{matrix} \Leftrightarrow \begin{cases} \beta \in (0,1) \\ h < \dfrac{(n_1 + n_2)(\beta - 1)\left[4\delta_2 + \beta(\beta + 3)\right]}{16\left[\delta_2(\beta - 1 - \beta)\right]} \end{cases} \tag{43}$$

This section confirmed the 'core' outcomes of the basic model: with the existence of a trade institution two risk-neutral agents can compete for a higher utility than in a continuing conflict scenario. That is, within this framework they are predicted to settle under an institution despite its unfairness. More precisely:

(i) both parties arm less than in 'continuing conflict' scenario and retain a higher payoff than in continuing conflict scenario. Such 'unfair' division of the expected gains from

[28] See footnote 25.

exchange under an agreement also make parties better off, but the party which is supposed to retain a lower part is predicted to arm more than the opponent;

(ii) both parties are willing to transfer 'one-way' a certain amount of resources to join a trade institution. Consider the critical value of the membership fee as a proxy for the 'willingness to settle' of each agent. The point of interest is that that party which retains a higher fraction of the contested output and arm more also has a lower willingness to settle than the opponent.

(iii) The level of initial endowments does not matter. Only the predicted fractions of the 'pie' do. Then, the driving force for agents is represented by the re-distributive mechanism.

CONCLUSIONS

This work attempted to develop a theory of integrative action which takes the existence of conflict into account from the start. The main original results I would claim for this work are two-fold.

First, I show how a peaceful settlement can occur *in the shadow of conflict*[29] under an institutional set of rules. Although the relationship between trade and conflict has been controversial among scholars, relatively little attention has been paid to the impact of institutional framework underpinning the expansion of economic interactions. Only a few studies of international economic relations deal with the question of whether an institutional setting fosters an easing of tensions amongst members. Most of them, however, do not consider the existence of resources allocated to 'guns'; this would imply that in a broader view all the literature on economic integration can be broadly meant as a literature on security and formation of peaceful environment since 'peace' is simply considered as a positive externality of economic integration. Differently from the existing literature, in this work 'peacefulness' does not appear to be a mechanical benign externality of trade interactions; the reductions of resources allocated to 'guns' take shape under an institutional setting. The existence of an institutional scenario requires that actors would be willing to devote resources for preventing and solving conflicts. Moreover, given the perfect information, both parties

[29] This expression is borrowed from Anderton and Carter (1999).

giving up a certain amount of resources also signal their willingness to settle to the opponent.

This is in the spirit of integrative relationships, as described by Kenneth Boulding. Indeed, the modelling proposed in the fourth section of the paper is a novel tentative formalization of Kenneth Boulding's idea of integrative relationship. The cornerstone of integrative relationships are 'one-way' transfers (or 'grants' in Boulding's definition). Through a crucial extension of CSF, formal key of Hirshleifer-style models of conflict, the emergence of institutions is modelled.

The results of the model provide interesting findings and insights on the role of institutions. On the one hand, the optimal choice of 'guns' in an 'institutional scenario' is lower than in 'continuing conflict' scenario; that is, this state of the world is more 'peaceful'. On the other hand, the opponents are both better off under an institution. Even if a certain amount of resources is still diverted to guns, final payoffs are higher than in the 'continuing conflict' scenario. Therefore, both opponents are willing to 'one-way' transfer a certain amount of resources to provide for a settlement of conflict under a trade institution. In formal terms, this result has been obtained through the modification of the CSF in its ratio form. At the same time, the choice of the ratio form for the CSF rules out any possible equilibrium which could be defined as 'total peace', namely when there is no investment in guns for both parties.

In the last section, a crucial modification to the basic model is taken into account. It shows that even if the settlement is predicted to be 'unfair', both parties arm less than in the 'continuing conflict' scenario and also gain a higher payoff. Such an 'unfair' division of the expected gains from exchange under an agreement also makes parties better off with respect to continuing conflict; in the meanwhile, the party which is supposed to gain a lower amount is predicted to arm more than the opponent. The above results hold irrespectively of the level of initial endowments. Only the predicted fractions of the 'pie' accruing to the parties matter. Then, the driving force for agents' decisions is represented by the re-distributive mechanism.

Even if the 'core' goal of this work is devoted to studying the emergence of institutions, interesting insights emerge analysing the impact of trade policies on conflict in an anarchic world. The findings of the second section contribute to a enduring debate among scholars: the existence of a causal relationship between trade and

conflict. In the 'obstructed trade' state of the world the extended model allows for two different equilibria areas, which I label (i) peaceful settlement; (ii) weak conflict. These two different equilibria link with different combination of the destructiveness parameter and the parameter measuring the impact of trade policies upon the level of conflict.

An interesting outcome occurs: under some parameter values parties do not settle. In fact, parties engage in an enduring conflict, but at a low level of 'guns'. This equilibrium, which I define 'weak conflict' appears to fit the case of boycotts and embargoes. In such a case both sender and target country are negatively affected, because of trade disruption. Under different parameters values, parties prefer to settle and exchange in a more 'peaceful' environment.

Finally, this work is of course little more than an exciting start, but much remains to be done. There is a large agenda for future research, mainly concerning how to relax some simplifying assumptions I employed throughout the work: (i) only two party interaction; (ii) full information; (iii) a not-decisive technology of conflict; (iv) no distinction between offensive and defensive technologies; (v) agents as unitary actors; (vi) risk-neutrality of both actors; (vii) no definition of market structure and prices.

REFERENCES

Amegashie A. J., (2005), A contest Success Function with a Tractable Noise Parameter, *Public Choice*, (forthcoming)

Anderson J. E., Marcouiller D., (2002), Insecurity and the Pattern of Trade: An Empirical Investigation, *The Review of Economics and Statistics*, vol. 84, no.2, pp.342-352

Anderton C. (2000), An Insecure Economy under Ratio and Logistic Conflict Technologies, *Journal of conflict Resolution,* vol. 44, no. 6, pp. 823-838.

Anderton, C. H., Anderton R. A., Carter J., (1999). Economic Activity in the Shadow of Conflict. *Economic Inquiry*, vol. 17, n. 1, 166-17.

Arrow, K., (2000), The Basics Economics of Arms Reduction, *Peace Economics, Peace Science and Public Policy*, vol. 6, no. 3 , pp.12-26.

Baldwin D. A., (1973), The Power of Positive Sanctions, *World Politics*, vol. 24, no.1, pp. 19-38.

Baldwin, D.A. (1985), *Economic Statecraft*, Princeton University Press, Princeton.

Bazillion, R. J., (1990), Economic Integration and Political Sovereignty: Saxony and the *Zollverein*, 1834-1877, *Canadian Journal of History*, vol. 25, no. 2, pp. 189-213.

Benoit (1973), *Defence and Economic Growth in developing countries*, Lexington, Lexington Book.

Boulding, K. E., (1962), *Conflict and Defense: A General Theory*, Harper & Brothers, New York.

Boulding, K. E., (1963), Towards a Pure Theory of Threat Systems, *The American Economic Review*, *Papers and Proceedings,* vol. 53, no. 2, pp. 424-434.

Boulding, K. E., Pfaff M., Horvath J., (1972), Grants Economics: A Simple Introduction, *American Economist*, vol. 16, no.1, pp.19-28.

Boulding, K. E., (1973), *The Economy of Love and Fear*, Wadsworth Publishing Company, Belmont.

Caruso, R., (2003), The Impact of Economic International Sanctions, *Peace Economics, Peace Science and Public Policy*, vol. 9, no. 2 , pp. 1-34.

Cipolla, C. M., (1965), *Guns and Sails in the Early Phase of European expansion 1400-1700*, Collins Sons & Co., London.

Clark, Derek J., Riis C. (1998),Contest Success Functions: An Extension, *Economic Theory*, vol. 11, pp. 201-204.

Cooper R. N., (1972), Trade Policy is Foreign Policy, *Foreign Policy*, no. 9, pp. 18-36.

Cooper R. N., (1973), (ed.), *A Reordered World, Emerging International Economic Problems*, Potomac Associates, Washington D.C.

Cooper R. N., (1987), Trade Policy as Foreign Policy, in Stern R.M. (ed.), *US Trade Policies in a Changing World Economy*, MIT press, Cambridge.

Dasgupta, A., and Nti, K.O. (1998). Designing an Optimal Contest, *European Journal of Political Economy,* vol. 14, pp. 587-603.

Dixit A. (1987), Strategic Behaviour in Contests, *The American Economic Review*, vol. 77, no.5, pp. 891-898.

Dixit A., (2004), *Lawlessness and Economics, Alternative Modes of Governance*, Princeton University Press, Princeton.

Garfinkel M. R., (1994), Domestic Politics and International Conflict, *The American Economic Review*, vol. 84, no.5, pp. 1294-1309.

Garfinkel, M. R., Skaperdas S., (2000), Conflict without Misperceptions or Incomplete Information: How the Future Matters, *Journal of Conflict Resolution*, vol. 44, no. 6, pp. 793-807.

Garfinkel, M. .R., Skaperdas S., (2001), Contract or War? On the Consequences of a Broader View of Self-Interest in Economics, *The American Economist,* vol. 44, no.1, pp. 5-16.

Garoupa Nuno R., Gata Joao E., (2002), A Theory of International Conflict Management and Sanctioning, *Public Choice*, vol. 110, pp. 41-65

Genicot G., Skaperdas S., (2002), Investing in Conflict Management, *Journal of Conflict Resolution*, vol. 46, no.1, pp. 154-170.

Hamilton E. J., (1948), The Role of Monopoly in the Overseas Expansion and Colonial Trade of Europe before 1800, *The American Economic Review,* vol. 38, no. 2, Papers and proceedings, pp. 33- 53.

Hirschman A.O., (1945/1980), *National Power and the Structure of Foreign Trade*, University of California Press, Berkeley.

Hirshleifer, J., (1987), *Economic Behaviour in Adversity*, Wheatsheaf Books Ltd, Brighton.

Hirshleifer, J., (1988), The Analytics of Continuing Conflict, *Synthese*, vol. 76, no. 2, pp. 201-233. reprinted by Center for International and Strategic Affairs, CISA.

Hirshleifer, J., (1989), Conflict and Rent-Seeking Success Functions, Ratio vs. Difference Models of Relative Success, *Public Choice*, no. 63, pp.101-112.

Hirshleifer, J., (1991), The Paradox of Power, *Economics and Politics*, vol. 3 , pp. 177-200.

Hirshleifer, J., (1994), The Dark Side of the Force, *Economic Inquiry*, vol. 32, 1-10.

Isard W., (1988), *Arms Races, Arms Control, and Conflict Analysis, Contribution from Peace Science and Peace Economics*, Cambridge University Press, New York.

Krugman, P., Helpman E., (1989), *Trade Policy and Market Structure*, The MIT press, Cambridge.

Landes, D.S., (1999), *The Wealth and Poverty of Nations, Why some Are so Rich and Some so Poor*, Abacus, London.

Lopomo G., Ok E., (2001), Bargaining, Interdependence, and the Rationality of the Fair Division, *Rand Journal of Economics*, vol. 32, no.2, pp. 263-284.

Mansfield E.D., Pollins B. M., (2003), (eds.), *Economic Interdependence and International Conflict, New Perspectives on an Enduring Debate*, The University of Michigan Press, Ann Harbor.

Mansfield E.D., Pevehouse J.C., (2000), Trade Blocs, Trade Flows, and International Conflict, *International Organization*, vol. 54, pp. 775-808.

Mansfield E.D., (2003), Preferential Peace: Why Preferential Trading Arrangements Inhibit Interstate Conflict, in Mansfield E.D., Pollins B. M., (eds.), *Economic Interdependence and International Conflict, New Perspectives on an Enduring Debate*, The University of Michigan Press, Ann Harbor.

Neary H. M., (1997), Equilibrium Structure in an Economic Model of Conflict, *Economic Inquiry*, vol. 35, no. 3, pp.480-494.

Noh, S. J., (1999), A General Equilibrium Model of Two Group Conflict with Endogenous Intra-Group Sharing Rules, *Public Choice*, vol. 98, pp.251-267.

O'Keeffe M., Kip V. W., Zeckhauser R. J. (1984), Economic Contests: Comparative Reward Schemes, *Journal of Labor Economics*, vol.2, no.1, pp.27-56.

Perroni C., Whalley J., (1994), The New Regionalism: Trade Liberalization or Insurance?, NBER working paper no. 4626.

Polachek, S. W., (1980), Conflict and Trade, *Journal of Conflict resolution*, vol. 24, no.1, pp. 55-78.

Polachek, S. W., (1992), Conflict and Trade: An Economics Approach to Political Interactions, in Isard W., Anderton C.H., (eds.), *Economics of Arms Reduction and the Peace Process,* North Holland, Amsterdam.

Polachek, S. W. (1994), Peace Economies: A Trade Theory Perspective*, Peace Economics, Peace Science and Public Policy*, Vol. 1, no. 2, pp. 12-15.

Polachek, S. W. (1999), Conflict and Trade: An Economics Approach to Political International Interactions, *Peace Economics, Peace Science and Public Policy*, Vol. 5, No. 2.

Reuveny R., (2000), The Trade and Conflict Debate: A Survey of Theory, Evidence and Future Research, *Peace Economics, Peace Science and Public Policy*, vol.6, no.1, Article2.

Reuveny R., Maxwell J. W., (2001), Conflict and Renewable Resources, *Journal of Conflict resolution*, vol. 45, no.6, pp.719-742.

Rosen S., (1986), Prizes and Incentives in Elimination Tournaments, *The American Economic Review*, vol. 76, no.4, pp. 701-715.

Schelling T. C., (1960), *The Strategy of Conflict*, Harvard.

Schiff M., Winters A. L., (1997), Regional Integration as Diplomacy, World Bank working paper

Skaperdas, S., (1992), Cooperation, Conflict, and Power in the Absence of Property Rights, *The American Economic Review*, vol. 82, no.4, pp.720-739.

Skaperdas, S., (1996), Contest Success Functions, *Economic Theory*, vol. 7, pp. 283-290.

Smith A., (1776), *An Inquiry into the Nature and Causes of the Wealth of Nations*, re-printed (1993), edited with an introduction and notes by Kathryn Sutherland, Oxford University Press, Oxford.

Skogh G., Stuart C., (1982), A Contractarian Theory of Property Rights and Crime, *Scandinavian Journal of Economics*, vol. 84, no.1, pp. 27-40.

Staiger, R.W., (1995), International Rules and Institutions for Trade Policy, in Grossman G., Rogoff K., *Handbook of International Economics, vol. III*, pp. 1495-1551, Elsevier Science B.V.

Tobin, J., (2002), Macroeconomic Strategy in Wartime, *Ecaar Newsnetwork*, vol.14 , no.1

Tullock, G., (1980), Efficient Rent Seeking, in Buchanan, J. M., Tollison R., D., Tullock G., (eds.), *Toward a Theory of the Rent-*

seeking Society, Texas A&M University, College Station, pp. 97-112.

Appendix

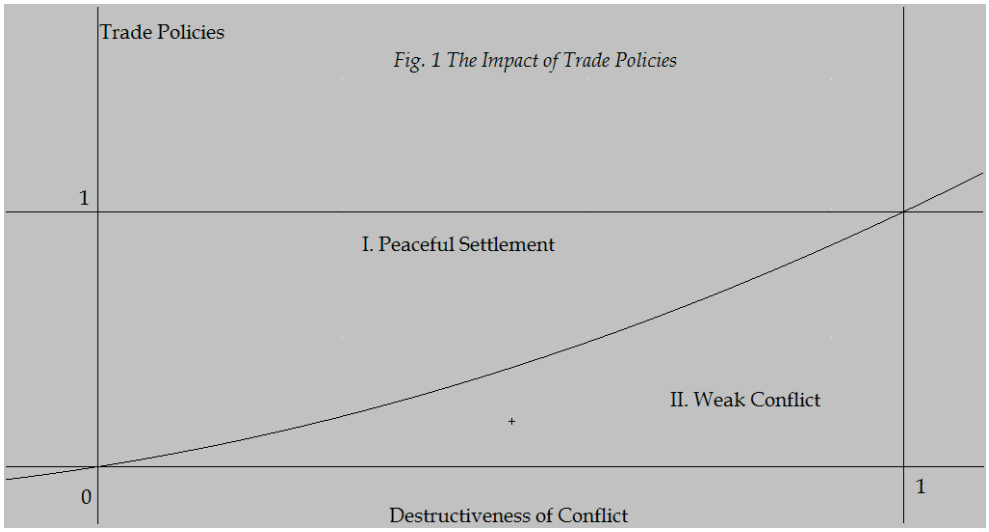

Fig. 1 The Impact of Trade Policies