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PEACEMAKING AND PEACEBUILDING THROUGH OPPONENT NON-ECONOMIC AND ECONOMIC HOMOGENIZATION

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Abstract

This paper presents a two-agent butter-and-gun neoclassical model of conflict with game-theoretic flavor. When each agent-opponent contemplates individual welfare independently and as if the conflict has been decided in its favor, the optimum outcome is attained when they become alike in tastes over peace and war regardless income distribution. The algebra suggests that this is a matter of putting oneself in the rival's shoes, of sufficing each with half the butter and presumably leave the richer agent its gun superiority unexploited. This is what both agents realize that has to be done if they act in a decentralized fashion. But, why should the richer opponent dismiss voluntarily its comparative advantage in guns? Therefore, beyond the matter of homogeneity in preferences (non-economic homogenization), the conflict cannot be resolved unless cooperation towards income-equality (economic-homogenization) induced military equilibrium takes place under the auspices of a peace promoting entity. Peacemaking involves the non-economic homogenization referring to a culture of peace, and peacebuilding alludes to the economic homogenization towards inter-agent social-justice.

Keywords: Conflict, Culture of Peace, International income inequality alleviation

JEL classification: D74, D63, D51

1. Introduction

According to Waltz (2000, p. 8): "If one asks what may cause war, the simple answer is 'anything.' " And, Wallensteen (2002, p. 6) too, writes that: "The causes of war remain, to this day, fundamental questions for peace research." They are two only from the vast majority of authors who do not discern between "cause of war" and "reason to go to war". The cause is one and is known from antiquity, from Plato, 427-347 B.C., Phaedo, verse 66b: "*All wars are made for the acquisition of material goods*". Once this cause is taken away, once there is global satisfaction of material goods, a clear global state of peace comes up in Coulomb's (2004) sense. Or, speaking of conflict in general and not just of war, an a-conflictual, in Coulomb's sense again, international state of affairs is established as soon as the economics of it are settled. Consequently, the heart of a study in conflict resolution should be the study of the economic underpinnings of the particular conflict examined each time as follows.

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Tracing the origin of conflict in economics is in the spirit of the Marx, Keynes, List, and the German historical school approach to conflict (see e.g. Coulomb, 2004). For Plato, such an approach is self-evident and might be termed uniformly, Platonian or *homo-economicus* approach, adopted by this paper too, as follows: According to welfare economics, allocations should be equitable and fair, i.e. efficient and envy-free. The emergence of a conflict might be attributed to the violation of one or more of these desiderata. Fairness in consumption relates to the structure of individual preferences in the act of exchange while equality refers to the relative income position of the trading parties. So, a conflict is expected to arise once individual tastes and resource constraints do not favor the satisfaction of the desiderata. And, so in turn, the resolution of the conflict should be targeting agent-turned-opponent heterogeneity in tastes and income.

This exactly is the line of reasoning towards conflict resolution by this paper. It is Platonian rather than Mercantilist or Classical-Neoclassical. For Mercantilists, conflict is the result of the pursuit of international power while Classicals-Neoclassicals maintain that conflict originates in ruling class misperception of the national interest. In any case, it would just be irrational to engage in international confrontation(s) if not for economic ultimately reasons. It is noteworthy that going over the various modern literature surveys in the field (see e.g. those by Wallensteen, 2002; Spolaore, 2009; Bove, 2011; and Coyne and Pellillo, 2011), one realizes that the literature focuses on the circumstances that prompt conflict-inducing changes in tastes and incomes, though the point from the viewpoint of action is this precisely change; and they not only miss it, but pass it by and go directly to the issue of the confrontation *per se*! This is the reason why Waltz (2000), for example, above, says that the source of war can be "anything".[1] The study of this "anything" is certainly useful, but when a peacemaking entity is called for to help, the sober reality for it is that there has been such a change in attitudes and economic power that triggers confrontation, and something has to be done about it.

In the next section, we investigate what exactly has to be done ideally, that is, within the context of a simple but illuminating two-agent butter-and-gun neoclassical model with game-theoretic flavor *a la* Garfinkel and Skaperdas (2000). When each agent-opponent contemplates individual welfare independently and as if the conflict has been decided in its favor, when opponents engage in exchange determined to subdue their rival in a non-cooperative fashion, the optimum outcome is attained when they become alike in tastes regardless income distribution. The algebra suggests that this is a matter of putting oneself in the rival's shoes, of sufficing each with half the butter *and* presumably leave the richer agent its gun superiority unexploited. This is what both agents realize that has to be done if they act in a decentralized fashion. But, why should the richer opponent dismiss voluntarily its comparative advantage in guns? Therefore, beyond the non-economic matter of homogeneity in preferences over peace and war, the conflict cannot be resolved unless cooperation towards income-equality induced military equilibrium, cooperation for economic homogeneity, takes place under a peacekeeping entity, too. The concluding section discusses the connection between the pursuit of non-economic homogenization by such an entity with peacemaking, while peacebuilding lies in the inter-agent social justice advanced by economic homogeneity.

[1] For example, Huntington' hypothesis that: "conflicts occur between groups from different civilizations" (Huntington 1996, 137), is falsified by historical and empirical evidence (Fletcher and Iyigun 2009). A reason to go to war may very well be cultural differences; but it is a reason invoked upon to cover a long-standing and escalating economic conflict as the cause of war.

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2. The Agents

Consider two agents, 1 and 2, whose utility derives from butter, B, and guns, G, they produce. Agent $i = 1,2$, which may be an individual or collective entity, has its own butter, B_i, but claims also $a_i B_j$, $0 < a_i < 1$, of j's, $j \neq i, j = 1,2$, butter. That is, part $a_1 B_2 + a_2 B_1$ of total butter $B = B_1 + B_2$ is contestable *a la* Garfinkel and Skaperdas (2000). There is clearly a conflict of interest because the total butter constraint will be satisfied if $a_i B_j = -a_j B_i$. It is this conflict which rationalizes the production of guns; conflict, which in the context of this type of analysis, should be ascribed to inequality and/or envy. The question now is whether there can still be Pareto efficiency. According to theory (see e.g. Brams and Taylor, 1995) the answer is in the affirmative. But it is shown right away that the conditions under which such an answer deserves merit are highly questionable.

Let $B_1 = b_1 B$ and $B_2 = b_2 B$, with $b_2 = 1 - b_1$, so that $B_i = (b_i + a_i b_j)B$. Assume same production technologies for B and G regardless agent identity. And, suppose that the non-substitution theorem holds (see e.g. Kuga, 2001) so that both agents are price-takers, facing the same relative price q of G in terms of B, which is taken to be the *numeraire* good. Agent i is called for to maximize its utility,

$$U_i = \left[(b_i + a_i b_j)B\right]^{\varepsilon_i} G_i^{1-\varepsilon_i} \quad (1)$$

subject to the constraint that

$$(b_i + a_i b_j)B + qG_i = M_i \quad (2)$$

where M is income and ε is the fraction of it spent on B. That is, each agent plans as if the conflict has been decided in its favor; this is the common knowledge rationality characterizing opponents. The solution to this interaction problem should comprise by extension a general equilibrium once no other agents are assumed in this analytical framework. It is easily shown in the Appendix that such equilibrium presupposes the satisfaction of the following conditions:

$$b_1 = \frac{1-a_1}{2-(a_1+a_2)} \Leftrightarrow b_2 = \frac{1-a_2}{2-(a_1+a_2)} \quad (3)$$

$$\frac{\varepsilon_1}{\varepsilon_2} = \frac{M_2}{M_1}, \quad (4)$$

and

$$\frac{G_1}{G_2} = \frac{M_1 - \varepsilon_2 M_2}{M_2 - \varepsilon_1 M_1}. \quad (5)$$

Relationship (3) is one about the optimal butter distribution, (4) explains that this distribution should be "respecting" individual preferences and relative income status, too, and (5) suggests that the production and consumption of guns should be taking notice of what the opponent does

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about it. These conditions are reasonable; Pareto efficiency can be fostered even in the presence of envy and/or inequality induced conflict.
But, their reasonableness is not as innocuous as at first glance appears to be. Note that (3) implies that:

$$b_1 + a_1 b_2 = b_2 + a_2 b_1 \qquad (6)$$

and this in turn that:

$$b_i + a_i b_j = 1/2. \qquad (7)$$

That is, Pareto efficiency resolves the conflict by distributing the butter equally. The distribution is a fair one because it is also proportional and envy-free (see e.g. Brams and Taylor, 1995). Nevertheless, given (7), $M_1 \neq M_2$ implies that more are the guns that the richer agent would produce. And, given that both agents are identical except for gun possession, the richer one would prevail in an armed conflict over the other agent, and war indeed will be waged. Consequently, the allocation should be not only fair but equitable too, if confrontation is to be avoided. Equality imposes from (4) and (5) the equality of M's and G's too, and hence, an income redistribution. Indeed, such a redistribution and agent homogenization are advanced in a context of price-taking and identical production agents, too; it is an overall context which cannot logically prompt conflict.

Note that (7) does imply that agents have under fairness the same in effect preferences over B and hence, the ε's should be equal. It is a homogenization of preferences not of how one consumes one's bread, but of the preferences over bread and arms, over peace and war. This by itself might be attributed to the reluctance of the agents to stretch the conflict adopting accordingly a "fill the rival's shoes" attitude towards it. But, income-and-gun inequality dictates caution to the weaker party. Fairness involves agent homogenization, which the agents can attain *willingly by themselves* by working towards fairness *in a decentralized, non-cooperative manner*. So, if the origin of the conflict was agent heterogeneity, the matter would be easily resolved. But, equitability necessitates income redistribution as well, which cannot be carried through willingly if non-cooperation is the case; and the redistribution is a must because income inequality does remain a source of confrontation. In fact, if agents cooperate, "talk to each other", this too, can give rise to (7) as the Shapley value of a bargaining game, but only under identical security levels, which in turn presupposes identical M's.

A Shapley value can obtain under different M's and security levels too, but it would not satisfy fairness. It would be an unstable state of affairs, having failed to address neither heterogeneity nor inequality as conflict sources. In a second-best context, non-cooperation would be preferable to cooperation, since fairness at least might be achieved. Therefore, cooperation should be addressing both conflict sources, because neither fairness alone nor equality by itself suffices to resolve the conflict. It should be cooperation under the coercion of some inter-agent authority, because there is no *a priori* reason why the rich agent should accept an income redistribution and disarmament at its expense.[2]

[2] This digression on cooperative game theory makes it clear that "independence" means not bargain, not cooperation, not sit down around the table, but interaction in a non-cooperative game a la Garfinkel and Skaperdas (2000). And, as soon as, the agents contemplated are the only ones, the subsequent equilibrium is by extension a

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3. The Arbitrator

Let us contemplate at the outset on the two basic factors, influencing the perspective under which the mediator might be viewing its task in the context certainly of our modeling here. First, the mediator does not have at its disposal any particular policy means to use to accomplish its task. A policy instrument that might be used towards that end is the tax system of each agent. Let τ_i be the ith tax rate so that: $qG_i = \tau_i M_i$ and

$$\left(b_i + a_i b_j\right)B = (1-\tau_i)M_i \Rightarrow \tag{7}$$

$$\frac{\left(b_i+a_i b_j\right)B}{(1-\tau_i)} = M_i. \tag{8}$$

(6) can be given rise if $M_i = M_j$ and $\tau_i = \tau_j$. Uniform taxation takes care of the part of preference homogenization, which is something upon which an arbitrator may capitalize. Also, the utility functions become: $U_i = (1-\tau_i)^{\varepsilon_i}\tau_i^{1-\varepsilon_i}M_i$, and even if the arbitrator had Samuelson-Bergson social welfare indifference curves in mind, with optimization condition:

$$\frac{(1-\tau_i)^{\varepsilon_i}\tau_i^{1-\varepsilon_i}}{\left(1-\tau_j\right)^{\varepsilon_j}\tau_j^{1-\varepsilon_j}} = \frac{M_i}{M_j}, \tag{9}$$

the left-hand fraction would become equal to one and $M_i = M_j$ if equality $\tau_i = \tau_j$ and preference homogenization were present.

This is the second important factor of which an arbitrator should be aware, namely that the need for an egalitarian inter-agent world against conflict does not presuppose a Rawlsian view of the world; only that the outcome be Rawlsian in the sense of neoclassical fairness-cum-equality. Indeed, solving the original, utility functions for B, equating the resulting expressions, and solving for U_i in terms of U_j, the following two derivatives obtain:

$$\frac{\partial U_i}{\partial U_j} = \frac{\varepsilon_i U_i}{\varepsilon_j U_j} \text{ and } \frac{\partial^2 U_i}{\partial U_j^2} = -\frac{\varepsilon_i U_i}{\varepsilon_j U_j^2}. \tag{10}$$

That is, U_i is a bad (as opposed to good) for j's welfare, the social welfare indifference curves have the shape of a bad in the $U_i - U_j$ space, mediator-supervised agent communication takes the "bad" away, and the specific new "regular" form that these indifference curves assume does not matter to the extent that the outcome is Rawlsian.

To motivate the necessity of a supra-agent authority in real life, note that it is not only the matter of income redistribution that requires coercion by a third-party, by an arbitrator, mediator. It is also the need for preference homogenization by itself. A practician in the field might endorse our

general one.

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conclusions thus far (or rather the spirit of these conclusions given the restrictive assumptions under which they obtain), but not without noticing their distance from real-life as to non-economic homogenization as well. In reality, there are great many reasons why an individual agent might want and/or have to act in isolation from the others. One reason which is readily related to this paper is Galtung's (1969) *structural violence*, "when basic human needs are not met and life spans are shortened because of inequalities in the way political and economic structures of a society distribute resources" (Christie et al. 2001, p. 12). For us here the society is the inter-agent one, and once structural violence has emerged, it might also provoke unwillingness to "homogenize" as Marcus Aurelius, 121-180 A.D., Meditations, Book 6, would suggest: "*The best revenge is to be unlike him who performed the injury.*" Therefore, the management of such structural-violence induced unwillingness to "homogenize" or the same, the peacemaking needed to pursue social justice through the income homogenization too, or the same, to pursue peacebuilding, (concepts cast by Christie et al. 2001, p. 13), have to be assigned to some "supra-agent" authority acting on both agents even coercively when needed. Indeed, as Bove (2011, p. 80) shows: "Regardless of differences in endowments … each side devotes equal effort to coercive appropriative activities and as a result achieves equal level of final resources".

In view of such considerations that provoke in addition the involvement of the element of time, t, in arbitrator decisionmaking, the problem of an infinitely lived inter-agent authority becomes one of minimizing the quadratic policy cost, C, function:

$$C = \int_0^{\infty} \left[h\left(M_i - \frac{M_1+M_2}{2}\right)^2 + n_1\dot{\tau}_1^2 + n_1\dot{\tau}_1^2 \right] e^{-rt}\, dt \qquad (11)$$

subject to:

$$M_1 + M_2 = \frac{qG_1}{\tau_1} + \frac{qG_2}{\tau_2} \qquad (12)$$

where r is the discount rate, the dot above the policy instrument τ_i denotes time derivative while $h > 0$ and $n_i > 0$ capture the relative costs associated with having the policy target variable, M_i, away from its goal, $(M_1 + M_2)/2$, on the one hand, and changing the instrument, τ_i, on the other. Taxes are raised to produce guns and hence, the cost of tax-rate adjustment reflects the costliness of adjustment of the armaments. Also, the inter-agent mechanism is infinitely lived, because once it is dismantled, conflict will resurge. And, as soon as pacification today is as important as pacification tomorrow and *vice versa*, $r = 0$.

So, rewritting $M_i = m_i M$, with $m_i + m_j = 1$ and $M = M_1 + M_2$, we obtain by solving the Euler equation the second order differential equations:

$$n_i\ddot{\tau}_i - h\left(m_i - \frac{1}{2}\right)\left(\frac{qG_1}{\tau_1} + \frac{qG_2}{\tau_2}\right)\frac{qG_i}{\tau_i^2} = 0, \qquad (13)$$

from which we obtain the equilibrium, $m_i = 1/2$, from the intertemporal perspective now, given at long-run equilibrium, $\ddot{\tau}_i = \dot{\tau}_i = 0$. Setting $t = 0$ and noting that at the optimum, $\tau_1 = \tau_2 = \tau$, one obtains from the standard solution method regarding (13):

$$\tau_1 - \tau = A \quad \text{and} \quad \tau_2 - \tau = A\frac{G_2 n_1}{G_1 n_2} \qquad (14)$$

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where A is some arbitrary constant. That is, the tax-rate time derivatives will not be zeroed, the τ's will have to be continually adjusted so as to be closing some proportion of the gap between the current and the optimal τ's, unless the ratio of the tax adjustment costs equals the ratio of armaments: $(n_1/n_2) = (G_1/G_2)$. Indeed, at steady state, $m_i = 1/2$, $\tau_1 = \tau_2 = \tau$, and $(n_1/n_2) = (G_1/G_2) = 1$. The satisfaction of this triplet describes fully the mission and scope of a supra-agent organization within the particular context of this paper. It is the mission of peacebuilding in connection with international income and armament differences, and of peacekeeping in connection with an international concession for peace, based hopefully on cultural identity respect and not on coercion and hence, on disrespect of individual preferences, to ensure such a concession.

4. Concluding Remarks

The coercion of the stronger on the weaker is now replaced by the would-be coercion of the peacemaking and peacebuilding entity on both of them. But, does this "would be" stand any chance at all to be nurturing a viable arrangement in the long-run? Indeed, there are two reasons why our equilibrium should not be designated as a coercive one. Firstly, if the supra-agent organization forges a coercive regime, such a regime cannot last forever because simply is at stake with human nature; sooner or later, it will collapse. And, second, methodologically, only two players have been modeled and so the existence of such an organization must have been endorsed presumably by both of them willfully. Indeed, only if agents realize that the supra-agent authority is indispensable to their welfare, that is, form lexicographic preferences for it, and are farsighted rather than myopic in their decisionmaking, this organization and the equilibrium pursued by it will be stable as, for instance, Houba et al. (2013, 2014) would suggest. Viable and sustained conflict resolution is synonymous to secular and vigorous peacekeeping authority, endorsed by all interested parties.

This paper confers to these considerations increased appeal, because its peacebuilding point of view derives from a formal modeling of the gap in the relevant literature according to which: "Whereas scholars have examined primarily the relationship between individual inequality and conflict, we argue that horizontal inequalities between politically relevant ethnic groups and states at large can promote ethnonationalist conflict", (Cederman et al. 2011, p. 478). This paper offers a theoretical framework to the empirical argument advanced to fill this literature gap regarding the nexus between economic heterogeneity and war and peace. And, as to its peacekeeping conclusion, it offers a theoretical foundation of what "culture of peace" means, aiding the efforts to define this term, albeit recent only efforts (De Rivera, 2004). Modern-day globalization is cited as a chance towards such a culture once it "embrace[s] a wider domain beyond economics… driven by the imperative of social justice and the integrity of national cultures" (Anwar, 2008, p. 3), that is once it respects the "fractionalization" of the world. Indeed, non-economic homogenization really means unanimous preferences for peace rather than fostering one universal cultural identity.

In the recent past, Soviet Union with its Warsaw Treaty Organization (WTO) might had been successful towards secular conflict resolution among the participants if their relations were not based on violence, on coercion towards one single identity. Also, the United Nations, whose very

foundation lies in identity respect, is far from satisfying the prerequisites for a successful supra-national organization, simply because it was not established as breeding grounds for a "culture of peace", for global preferences for peace as well (De Rivera, 2004).[3] And, the League of Nations was founded neither on identity respect nor on such cultural grounds. The same is true for regional institutions like the Arab League or the Pan American Union. Much closer to an organization promoting economic and non-economic homogenization is the European Union with its Eurozone and inside NATO (Hentaller et al., 2012) though the matters of the Greek debt and Syrian refugees indicate that there is room for considerable improvement. Without peace promoting mechanisms, one way to alleviate the pessimism surrounding real-life conflict resolution might be to see agents as players who randomize over the pure strategies of war and peace in a sequence of plays. This sequence is known to converge to a pure strategy - *a la* convergence of any sequence of triangles inscribed in circle to equilateral triangle, for three players, (McMartin, 2010) - to permanent peace, presumably, but it is not certain that this will be manifesting prudency and not the aftermath of a global holocaust.

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[3] A "United Nations II" would be needed in addition, to handle international income redistribution. 30 out of the 100 monetary units earned by country X on the basis of its resources might have to be transferred to country Y, having produced on the basis of its own resources 10 monetary units. The term "resources" captures all what can corroborate production, (physical capital, age of capital, land, types of land, labor, types of labor, climate, culture, gender, religion, etc.), and the transfer would be one of resources for the sake of a peace based on mutual respect (lasting peace) and not on ephemeral colonization.

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Appendix

The equality of the marginal rates of substitution gives:

$$\frac{G_1}{G_2} = \frac{\varepsilon_2(1-\varepsilon_1)}{\varepsilon_1(1-\varepsilon_2)} \qquad (A1)$$

From the first-order conditions:

$$G_i = \frac{(1-\varepsilon_i)(b_i+a_i b_j)}{q\,\varepsilon_i} B \qquad (A2)$$

Inserting $(A2)$ in $(A1)$, and solving for b_1, expression (1) in the text obtains given that $b_2 = 1 - b_1$. Relationship (1) may be rewritten as: $2b_1 - a_1 b_1 - a_2 b_1 = 1 - a_1 \Rightarrow b_1 - a_1 b_1 - a_2 b_1 + a_1 = 1 - b_1 \Rightarrow b_1 - a_1 b_1 - a_2 b_1 + a_1 = b_2 \Rightarrow b_1 - a_1(1 - b_2) - a_2 b_1 + a_1 = b_2$ and hence, (4) in the text obtains. From (4): $b_1 - b_2 = a_2 b_1 - a_1 b_2 \Rightarrow b_1 - (1 - b_1) = -a_1 b_2 - a_1 b_2 \Rightarrow b_1 + a_1 b_2 = 1/2$, and repeating these calculation having replaced b_1 by b_2, (5) in the text obtains:

Inserting $(A2)$ in the budget constraints and solving for B yields:

$$B = \frac{\varepsilon_i M_i}{(b_i+a_i b_j)}, \qquad (A3)$$

from which the ratio for the two agents gives:

$$\frac{\varepsilon_1}{\varepsilon_2} = \frac{(b_1+a_1 b_2)M_2}{(b_2+a_2 b_1)M_1}, \qquad (A4)$$

This ratio becomes expression (4) in the text given (6). And, inserting (4) in $(A1)$ and manipulating terms, condition (5) obtains. Finally, $(A3)$ and $(A2)$ produce that:

$$G_i = \frac{(1-\varepsilon_i)M_i}{q}. \qquad (A5)$$