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BEYOND DETERRENCE AND DECLINE TOWARDS A GENERAL UNDERSTANDING OF PEACE ECONOMICS

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ABSTRACT

The aim of this short article is to provide elements for a general discussion on peace economics and its potential contribution to economics and economic policy. I first present a discussion on deterrence equilibria and consequent allocation of resources. Eventually I expound five economic channels through which military expenditures turn to be detrimental for economic development. Finally some elements to build a framework for a peaceful economic policy are presented.

Key words: peace; war; development; military expenditures; butter, guns and ice-cream

JEL Classification: H56; D74; F51; F53.

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1. INTRODUCTION

The aim of this short article is to provide elements for a general discussion on peace economics and its potential contribution to general economics and economic policy. In particular, a general understanding of peace economics can result into a change of perspective on crucial aspects of economic development. Therefore, to an extent, it also contributes to the widespread debate on measures of human well-being alternative to GDP. In fact, albeit not suggesting a clear-cut new tool of measurement, this article aims to provide novel insights and interpretations that can reconstruct a framework of reasoning intended to contribute effectively to a process of societal and economic development in the long run.

As point of departure we may consider the very fabric of societies, namely the institutions. In recent years economists have paid an increasing attention to institutions governing socio-economic life and societal development. As it is widely acknowledged, by institutions, we mean the set of norms governing the evolution of economic life as well as the distribution of both income and power among agents. As 'set of norms' institutions are predicted to shape agents' behaviour and consequently also to favour the production of expectations about behaviour of agents. Then, at a certain point in time, the institutional setting of a society can be considered the very fabric of future economic development. Whereas this idea is widely accepted, less agreement has been reached on the sources of institutions. In what follows, the conceptual approach of this work is that conflict and peace are to be considered as institutions, namely as social norms in themselves. Therefore, they shape long-run development of societies and stability of polities. Stated differently, dealing with peace and conflict ought to become a crucial theme for economists and policy-makers who are willing to secure a prosperous development of societies in the long-run. In this respect, it is worth citing the first lines in the preface of North et al. (2009) «[...] *The absence of a workable integrated theory of economics and politics reflects the lack of systematic thinking about the central problem of violence in human societies. How societies solve the ubiquitous threat of violence shapes and constraints the forms that human*

interaction can take [...]». The lack of systematic research on different aspects and sources of either collective or individual violence have actually led economists to underestimate the impact of unproductive burden of conflicts either actual or potential at both micro and macro levels. Peace economics attempts to fill this gap and eventually to go beyond in order to design economic policies able to reinforce the existence of long-lasting peaceful scenarios.

The article proceeds as follows: in the next section a discussion on deterrence equilibria and consequent allocation of resources is presented; in a third section, I expound five economic channels through which military expenditures turn to be detrimental for economic growth; eventually, some elements to build a framework for a peaceful economic policy; the last section summarizes and presents insights for further research.

2. DETERRENCE, BUTTER AND GUNS

Economic agents, either individual or organizations, are likely to be involved in interactions other than exchange of goods for money. In fact, behavior of agents is by no means bounded to market interactions but it involves a large spectrum of activities that are inherently economic because of the resources employed and the impact on human welfare. Peace and conflict do belong to this category. Yet, they do exist at both micro and macro-level. In the first case, they are the set of non-market interactions operated by individuals whereas the latter involve mainly the interplay between nation-states.

In particular, in what follows I take into consideration conflict and peace at macro-level, namely the international relations between nation-states. In this respect, since the Cold War the idea of deterrence has been espoused as guiding principle of international relations between nation-states. Needless to say, the bipolar global conflict between US and Soviet Union had shaped the context in which the deterrence theory was born and developed. Briefly stated, the deterrence theory implies that a state implements a policy of deterrence to dissuade the government of another state from the use of military force to pursue its own foreign policy goals. In order to do that, the first relies upon investments in its own military force and related credibility. Then, it is not a case that theory of deterrence has been developed in the Cold War and it has been eventually studied following a game-theoretic approach. This also descended from

¹ North et al. (2009), p.xi

fascination and simplicity of clear-cut non-cooperative game theory and related Nash equilibrium which proved to be an elegant and powerful analytical tool for a large bundle of human interactions. Furthermore, the desirable property of a Nash-equilibrium is its stability. So it made it particularly fitting with the desired property of a deterrence system. The best-known reference on that is the outstanding seminal work by Thomas Schelling in Schelling (1960) and Schelling (1966). The following well-known line suggests the spirit of the deterrence: «...military strategy is very often not [...] the efficient *application* of force but the *exploitation of potential force*...»². Deterrence takes shape in the presence of credible threats. In order to make threats credible, agents are predicted to accumulate weapons so in fact generating an arms race. An arms race implies some dynamics and can be defined as: *the competitive resource constrained dynamic process of interaction between two states or coalition of states in their acquisition of weapons*». (see Intriligator, 1975; Anderton 1989; Isard 1988, Brito and Intriligator 1984).

In the demise of the Cold War, the rational study of conflict and its equilibria has evolved. Following Hirshleifer (1988), Grossman (1991) and Skaperdas (1992), a growing number of scholars have produced a flow of general equilibrium models of continuing conflict to depict non-cooperative scenarios in which rational agents struggle on the redistribution of potential income. The basic idea of this strand of literature is that rational agents – at a given point in time - are endowed with some positive resources (say labor and capital) endowments and some technological capabilities to be allocated to for both productive and military activities, respectively denoted as ‘butter’ and ‘guns’. Then, while struggling over the distribution of a joint output, they also make a choice in the allocation of a positive endowment of resources between butter and guns. The resulting social state is then shaped by the existence of conflict and it is pareto-inferior to a social state with no conflict. The chosen levels of resources invested by rational agents exclusively in productive or predatory activities determine the social outcome of the conflict. In particular, positive investments in military capabilities determine also the redistribution of a contested joint output. That is, differently from classical game-theoretic models, the Hirshleifer-style models provide insights to predict patterns of economic development. In particular, Hirshleifer

² Schelling (1960), p.5, italics in the original.

and his epigones apply the machinery of game theory to model conflict in a general equilibrium setting so predicting the outcome of a continuing conflict³.

Deterrence systems, arms races and models of continuing conflict all fall into the general category of threat systems as theorized by Boulding (1963). Threat systems can be punctually defined as interactions between rational agents characterized by the existence of credible threats. Threat systems have remarkable effects on economic development. They influence the allocation of resources so affecting the development path in the long-run. In fact – as noted above - they can be finally interpreted as roots of institutions so shaping societal outcomes. Two points need to be highlighted. First, stability of threat systems is by no means a necessary outcome. That is, stable deterrence equilibrium is not necessarily the sole predictable outcome of a dyadic rivalry. In fact, theoretical models of arms races predict stable equilibria only in the presence of a specific set of assumptions. Contrariwise, the classical study by Richardson (1960) predicts instability of arms races that finally can result into a war by means of a system of differential equations. A similar unstable result can be obtained by means of a classical game-theoretic approach. Greif (2007) for example explains the deterrence equilibrium established in medieval Genoa between rival clans. Such equilibrium was characterized by mutual deterrence. The clans continuously increased their military strength. In the long run this equilibrium actually became unstable precipitating Genoa into social unrest. Then, in the presence of unstable equilibria, uncertainty over political stability increases so depressing investments of economic agents. Furthermore, it is almost pleonastic to affirm that instability of a threat system posits the risk of a severe destructive outcome. In the presence of an actual conflict the scenario turns to be dominated by destructive forces. Both human and physical capital are destroyed. Finally, societies are worse off not and future economic development turns to be severely affected [see Smith (2014); Gates et al. (2012); Stiglitz and Bilmes (2008)].

In fact, albeit not descending necessarily into a war, threat systems imply a heavy investment in weapons and military equipment so inflating the investment into unproductive activities of societies. In any case, this can lead to a long-lasting economic decline. To fully understand this, we have to refer to the classical resource diversion argument. In particular, it was Paul Samuelson who first labeled productive and unproductive activities ‘butter’ and ‘guns’ respectively. In coining the terms, Samuelson

³ See among others Grossman and Kim (1995), Neary (1997), Anderton et al. (1999), Dixit (2004), Baker (2003), Munster (2007). See in particular De Luca and Sekeris (2013), that analyzes deterrence enriching a Hirshleifer-style model of continuing conflict.

had the experience of Nazi Germany in mind, where the government was actually committed to increasing military expenditures ('guns') at the expense of civilian production ('butter'). That is, the tradeoff between butter and guns was considered a matter of economic policy. More properly, it has to be generalized taking into account the theoretical distinction between productive and unproductive activities that dates back to Physiocrats and also to Adam Smith. Such distinction evolved from the original Physiocrat script but the underlying concept is still valid: there are economic activities that can produce individual profits but that are not inherently productive and not contribute to the general welfare of the society. A brilliant and concise definition has been provided by Bhagwati (1982): «[...]they represent ways of making a profit (i.e., income) by undertaking activities which are directly unproductive; that is, they yield pecuniary returns but do not produce goods or services that enter a utility function directly or indirectly via increased production or availability to the economy of goods that enter a utility function. Insofar as such activities use real resources, they result in a contraction of the availability set open to the economy[...]»⁴. The argument can be generalized by referring to the discussion expounded in Baumol (1990). In that article, Baumol explained how historical patterns of development depended heavily upon the balance between productive and unproductive activities and on the payoffs rewarded to them within different societies. Interestingly, he mentions the Earlier Middle Ages as a historical period in which acquisition of wealth was managed essentially by means of military activities. Economic development and human welfare were undermined by that. In this respect, particularly he remarks that innovation in warfare cannot contribute to economic development more than innovations developed in manufacturing sector.

The general discussion posited by Bhagwati and Baumol enriches the classical tradeoff between civilian and military activities. In brief, they both consider a set of unproductive activities that is larger than that subset including the military expenditures only. Please consider rent-seeking. It is a striking example in this respect. It is pervasive in many aspects of economic life and it is often a crucial component of productive sectors. Albeit not directly destructive it is detrimental for economic development. Consequently, it might be possible to maintain that albeit non-military some are also inherently unproductive. In general, rent-seeking activities are competitive but they are not subject to the free play of market forces. Then, they are

⁴ Bhagwati (1982), p. 989.

contested by rational actors by exerting irreversible outlays (either licit or illicit) or by means of actual efforts⁵.

If we generalize rent-seeking in a general equilibrium setting, we do capture the basic idea of Hirshleifer-style models of continuing conflict and the consequent allocation of resources to butter and guns. The main limitation of this class of models, however, is that they analyze an oversimplified economy in which there is only one productive sector which generates the joint output that eventually is the cake to be redistributed by means of guns. In brief, the sole sector of the economy is not subject to market forces by definition. With this in mind, it is possible to enrich a Hirshleifer-style conflict model in order to capture a 'dual' economy where duality here refers to the distinction between the contested activities and the productive and entrepreneurial activities that are subject to market forces.

The novelty with respect to classical Hirshleifer-style models would be that of considering some productive activities that contribute to the final income of agents without being contested. In fact, in reality, we can take into consideration that rival parties have some income and wealth secure from conflict that generate a positive income stream. Indeed, parties do not have to choose exclusively between butter and guns.

Let me summarize and simplify the line of reasoning. We can consider a dual economy characterized by two sectors. In a first sector, hereafter named *uncontested sector*, each party holds secure property rights over the production of some goods. This security of property may descend from institutional guarantees, or could be the effect of geographic or technological barriers to would-be predators. Such secure production can assure the holder of a predictable income stream. In a second sector, termed the *contested sector*, agents struggle in order to appropriate the maximum possible fraction of a contestable output. With a contested-uncontested distinction, it is possible to state that there are at least three possible allocations of resources, namely (i) guns, (ii) butter, and (iii) ice-cream. Needless to say, butter and guns denote the classical trade-off between production and appropriation. Ice-cream denotes all the productive activities which are not under threat of appropriation that have to be allocated to the uncontested sector. In other words, all the business activities which are subject to forces of free market and are not directly affected by the existence of a conflict. Hence, there must be a relationship between the choice of resources to be allocated to conflict and the choice of resources to be allocated to secure production. The opportunity cost of

⁵ On the impact of rent-seeking of powerful groups on growth see Tornell and Lane (1999).

conflicts would be related not only to the contested production but also to the production of goods which are not subject to appropriation (see Caruso, 2012 for an analytical treatment).

Interpreting economies as dual economies characterized by both unproductive and unproductive/destructive forces makes clear that patterns of long run-development would depend on the balance between butter, guns and ice-cream. That is, the uncontested sectors have to be enlarged in order to prevent the society from investing excessive resources into violent and military capabilities. In this respect, it is worth noting that even if butter and guns can provide some short-term economic boost, they are not to secure prosperity and development in the long run. In reality, whereas deterrence and threat systems can exhibit economic growth in the short run, only peace and enlargement of the set of productive activities can set the pace for a long-run development. This ought to be the overarching objective of economic policy.

3. MILITARY EXPENDITURES AND DEVELOPMENT

As noted above, the plausible scenario emerging from a threat system would be characterized by continuing reliance on the use of force either potential or actual. That is, if considering states and jurisdictions, it would be characterized by the use of military force, namely the 'guns'. It has been argued that this is detrimental for economic development. This leads necessarily to mention briefly the discussion on the impact of military expenditures on economic development. In fact, the debate has been lasting for years. A recent survey by Dunne and Tian (2013) supports strongly the idea of a negative effect of military expenditure on economic growth. In general, the classical foundations of the debate are: (i) military expenditures employ resources that could be employed in more productive uses. (ii) They crowd-out civilian investment and production of goods. In what follows, I present some additional refined arguments to deepen the overall impact of military expenditures on long-run economic growth. Evidently there are different channels through which the detrimental impact of military expenditures on economic development takes shape even in times of peace. Consider then the following five points: (i) distortion in human capital accumulation; (ii) delay in innovation; (iii) loss of productivity; (iv) increase in corruption; (v) increase of public debt.

The first channel envisioned is the distortion in human capital accumulation. This is evident in countries where military conscription is in place. In fact, the military draft affects youth in a period of life that individuals would otherwise devote to education, or first work experiences. The draft likely delays or interrupts this process so determining a reduction of human capital available in the economy. Keller et al. (2009) show that military draft discouraged enrollment in higher education for OECD countries. In the end, this does constitute a serious obstacle for development in the long run. In the aftermath of the Cold War, many OECD countries have abolished conscription but it is still in place in many countries⁶ among which most low-income countries. In order to evaluate properly the impact of military conscription we can refer also to Cipollone and Rosolia (2007) that have studied the effect of an exemption from military conscription granted to few cohorts of males subsequent to an earthquake. That is, the need of reconstruction determined the exemption of males from military conscription. This exemption determined an increase of boys' high school graduation rates by more than 2 percentage points. In addition, girls' graduation rate increased by the same amount due a peer-effect. In sum, the beneficial impact on schooling has been substantial. Needless to say, in the light of this, it is reasonable to say that countries with a conscripted army tend to exhibit a lower growth-rate than countries with an all-volunteer force.

Second, as military spending includes activities of R&D, the detrimental impact is even more complex to be uncovered. In fact, there is widespread argument of potential spin-off of military technology into civilian economy. Albeit its popularity this idea has not produced any compelling evidence. There are several aspects to be considered. First, at a certain point in time, the supply of researchers, scientists and engineers is fixed so posing a clear-cut opportunity cost problem. Scarce human resources are allocated to military research rather than developing innovation and efficiency in civilian economy. In such a case, the tradeoff between military and civilian investments is evident. Moreover, military R&D is dominated by secrecy that eventually would increase the delay in any innovation. That is, the favorable argument of civilian spin-offs often does not take into consideration properly the aspect of timing.

Needless to say, both distortion in human capital accumulation and diversion in R&D activities are likely to determine a significant loss of productivity in the long-run. Productivity is a key aspect of economic development. In this respect, a brilliant narrative account is Baumol (1986) that studies the long-run productivity from 1870-

⁶ An accurate description of military service per country is at: https://www.cia.gov/library/publications/the-world-factbook/fields/print_2024.html [last access october 2014]

1979. Within a detailed exploration of labor productivity growth, he clearly explains the peak in postwar years: [...] *This encourages reinterpretation of the postwar growth period as one of the temporary catch-up, merely making up for opportunities previously foregone*⁷[...]. In particular, it is interesting to note that Japan and Germany increased their labor productivity respectively by 2480 and 1510 percent from 1870 to 1979 with the highest rates in the post World War II. That is, productivity increased after the war but also after years of excessive military expenditures . With respect to Japan, Klein (1961) had explained that the severe cut in military spending had enhanced a high growth rate in the postwar period: [...] *The Japanese military economy of the late 1930's led to a form of economic expansion, but its contribution to growth has probably been much less than has the peacetime nature of the economy of the 1950's. The best manpower has been made available to agriculture and industry.* [...]⁸. That is, productivity losses have been associated with a heavy military spending. Punctually Marwah and Klein (2005) estimated that military spending had determined a loss in productivity in Southern American countries in the period 1971-1991. Caruso and Addesa (2012) highlight that the same detrimental effect on productivity took place in Italy from 1988 to 2008.

An additional concern related to military spending is the positive association with higher level of corruption. Gupta et al. (2001) empirically investigated this relation for 120 countries from 1985-1998. The results highlight that corruption is positively associated with higher military spending as a share of both GDP and total government spending, as well as with arms procurement in relation to GDP and total government spending. An increase in corruption may be predictable if considering that military spending is often characterized by governmental monopsony. In fact, a limited number of public officials have a significant power in allocating authorizations and contracts. Furthermore, due to national security concerns, military procurement is often less transparent than other sectors. This makes corruption easier.

Lastly, another source of concern is the increasing debt related to military spending. In fact, military spending is financed through taxes or by issuing public debt. In general, taxes depress economic activity and public debt does constitute a burden for future economic growth (Reinhardt et al. 2012). Paleologou (2013) explores the impact of military spending on general government debt in EU countries by means of a dynamic panel data model. Results suggest impact of military expenditures on the share of general government debt in the EU is substantial. Smyth and Narayan (2009)

⁷ Emphasis added.

⁸ Klein (1961), p. 291;

analyze the impact of military spending on external debt in Middle East from 1988 to 2002. They found that external debt is elastic with respect to military outlays in the long run whereas it is inelastic in the short-run. The most interesting study is perhaps Williamson (1984). He estimates that in England between 1761 and 1820 the capital formation share would have been almost 5% higher in the absence of war and the national income would have grown by 0.6 per year faster. This evidence is notably surprising because that period is usually referred to as the 'first industrial revolution'. So, in spite of the famous labelling, growth figures were actually rather weak. In fact, Williamson argues that the enormous debt issued to finance the wars had finally crowded-out civilian accumulation. Macro-economic imbalances due to military expenditures may also spillover. Caruso and Di Domizio (2014) analyze the relationship between US military spending, and its spillover effect on European economies over the period 1988-2013. Results show that the US increase in military outlays had a spillover in European scenario raising the level of public debt.

4. TOWARDS A PEACEFUL ECONOMIC POLICY

It has been argued that a threat system is detrimental for economic development. But how can we define a peaceful economic policy? Hereafter, I continue my analysis stating that: by 'peaceful economic policy' we can mean an economic policy that increases 'ice cream' at expense of both 'butter' and 'guns'. That is, it has to increase significantly the opportunity cost of a threat system so fostering a stable economic development in the long-run. Needless to say, what emerges from the previous discussion is that a cut in military spending ought to be considered a paramount policy. At the time this article is being written, it appears to be even a more urgent priority. The data provided by SIPRI shows an increasing trend in world military spending in the latest years. In fact, between 2001 and 2013 world military spending increased by 49% in constant terms. In this respect US, driven by the war on terror under the Bush Jr. administration (2001-2009), had recorded the crucial increase of 76.4% eventually followed by an overall decrease by 14% in the following years until 2013. Yet, in the period 2001-2013, Russian Federation increased its military spending by 151.8% , China by 277.3% and India by 71.6%. Major sources of concern also descend from behaviors of many low-income countries. In fact, sub-saharian African countries have increased military spending by 85% in the same period and north African countries by 172.2 as response of Arab authoritarian regimes against the so-called Arab spring.

Following the argument expounded above, it is clear that a reversal in military spending has to be advocated. In this respect, it must be noted that such reversal would not be possible in the absence of an effective international cooperation. International organizations like UN have to be re-invigorated in order to prevent states from developing and acquiring weapons at no cost within international community. In this respect, proliferation on nuclear weapons is still a serious threat to world peace (see Intriligator, 2011).

However, albeit essential, the problem is by no means limited to an extensive cut in military spending. In fact, a cut in military outlays would refer only to a counterfactual state of the world wherein conflict had not taken shape. That is, we can investigate what would have been the economic output in the absence of some factors. In our discussion, therefore, we may want to investigate what could have been the economic performance of a country in the absence of conflict and related factors like military expenditures. For 1960 to 2000, Caruso (2003) estimates the loss of potential gains from international trade for the United States because of sanctions. In the absence of extensive sanctions, trade volumes between the United States and the unilaterally target countries would have been larger by 59 percent whereas volumes of other G7 countries with US-targeted countries would have been larger by 51 percent. Abadie and Gardeazabal (2003) propose a synthetic control methodology to assess the impact of conflict on the economy. They use conflict in the Basque regions as case study. They found that per capita GDP in the Basque Country declined about 10 percentage points relative to a synthetic control region without conflict. Put differently, in the absence of conflict, Basque regions would have capable to show an additional 10% growth rate for 80s and 90s.

A counterfactual philosophy is also behind the only one measure of peace available, namely the Global Peace Index (GPI), developed by the Institute for Economics and Peace (IEP), in Sydney. It is a combined score consisting of measurements of 23 internal and external indicators mostly related to the absence of violence and threat to peace. This includes, for example, factors such as violent crime, levels of military expenditure. Relating the GPI to economic indicators, Brauer and Tepper Marlin (2010) compute an increase in world economic output by about 9 percent, for the year 2007, consequent on a simulated counterfactual state of complete absence of violence.

Nevertheless, a peaceful economic policy needs a novel definition of goals and tools that go beyond a negative measure. That is, counterfactual exercises have to be accompanied by related positive measures that can be used as clear-cut objectives of a

peaceful economic policy. Further research is needed on this point. In what follows I propose elements for a framework of thinking rather than a precise definition. They can be taken into consideration to develop a positive measure of peace. They can be listed as follows: (i) democracy; (ii) trade relations and institutional cooperation; (iii) investments in education and health. The three pillars listed are to be considered as crucial items included in the policy agendas of both national government and international organizations.

The first aspect is related to the types of polities, namely on the institutional regime of states. In fact there is compelling evidence that public policies strongly depend on type of government. Mulligan et al. (2004) discuss in details the differences between democracies and nondemocracies in public spending. Empirical evidence over the years 1960-1990 shows that nondemocracies spend more in military than democracies. Recent and more compelling evidence is in Bove and Nisticò (2014) that show a higher degree of military involvement in policy-making increases military spending. Interestingly, results presented are particularly stimulating because they are based upon the idea that influence of military apparatus varies widely across polities. Therefore, the type of government surely matters but it is rather the complex institutional machinery that finally influences the decision-making in military. Finally, it can be maintained that the need of security is by no means the sole reason to increase military spending. That is, apart from security issues, military spending is determined because of internal political economy considerations. On the one hand, this aspect needs to be taken into account when considering measures for producing a reliable measure of peaceful development in the long-run. On the other hand, this shed new light on the relationship between democracy and economic development. That is, one reason of why democracies appear to foster development in the long-run is also the lower level of military expenditures. In recent years, diffusion of democracy has been one of the intriguing topics in the aftermath of the Cold War.

Other crucial aspects of a peaceful economic policy are trade openness and economic globalization. In fact, a vast literature had demonstrated that peace and international economic integration between democratic countries are positively associated [Polachek et al. (2011); Hegre et al. (2010); Reuveny (2000)]. The argument echoes the Kantian liberal peace and it is structurally different from deterrence's underlying theoretical construction. Whereas deterrence is grounded on the idea of a zero-sum game, trade and economic integration are based on the idea of positive-sum game. In sum, albeit non-cooperative, rational agents are capable to recognize the incentives to trade

instead of engaging in a continuing conflict. Polachek (1980) provides a 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, a rational government 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. So not surprisingly the establishment of a free trade area was among the policies suggested in the unheard proposal produced in Keynes (1919/1971) in the aftermath of the First World War I.

Nowadays, although this idea constituted the backbone of European integration after the World War II, is becoming a neglected issue in the public discourse because protectionist pressures have been inflamed after the great financial crisis occurred in 2008. Policies followed public discourse. Bussière et al. (2011) find that actual protectionist measures have risen in the latest years. The G8 countries, for instance, have implemented or announced 186 new protectionist measures between November 2008 and December 2009. US accounted with 52 measures. In Europe, France, Germany, Italy and UK counted respectively for 23, 39, 28 and 27. Notably India and Russia count for 46 and 48 respectively. Kee et al. (2013) explains that rise in protectionism has taken different shapes. In particular, some countries – Russia, China and Turkey - have raised their tariffs significantly whereas US and EU relied more upon antidumping measures. Then, also with regard of economic integration, there is a compelling urgency to re-launch international cooperation and liberalization. In fact, economic interdependence is more beneficial if it is managed under the umbrella of a legitimate institution [Caruso (2006); Mansfield and Pevehouse (2000)]. Particularly, in Caruso (2006) I developed an analytical model of conflict in which rational parties have to choose to be engaged in a continuing conflict or to settle and exchange under the umbrella of an institution. In any case, parties rationally invest in guns, but the latter scenario would be more peaceful because the aggregate level of guns would be lower. A stable Nash equilibrium can be reached if and only if the cost (broadly defined) of joining an institution is not prohibitive. Moreover, the model also shows that results in terms of peacefulness hold even if the settlement between parties does produce unequal gains within certain boundaries. That is, even in the presence of unequal gains from trade, countries may still prefer rationally to settle at a lower level of guns rather than

being engaged in a destructive conflict. In brief, the model suggests that a reasonable level of unequal benefits from trade is acceptable if and only if the parties share some institutional arrangement. This is inherently a crucial issue because the emergence of unequal gains from trade is commonly used by adversaries of liberal theory, to highlight risks and deficiencies of economic integration. This aspect is also emphasized by Dumas (2011) that mentions it as one of the core principle of a peacekeeping economy. In this respect, it might be argued that the role of WTO becomes crucial. In particular, the role of the Dispute Settlement System is the most relevant.

In sum, commitment to foster trade liberalization has to be in the policy agenda of governments committed to peace. Yet, as highlighted above, strengthening of trade relations has to be focused on ‘ice-cream’ and not ‘butter’ and related ‘guns’. That is, trade openness and trade integration first have to target enlargement of markets for entrepreneurial and innovative activities rather than supporting trade of commodities and goods that inflate rivalry either between countries or within them between competing groups. In fact, since the seminal work by Collier and Hoeffler (1998), a large flow of studies have shown empirically that civil wars are mainly caused by the violent competition for appropriation of rents related to exports of natural resources. In fact, enhancement of trade of uncontested sectors is strongly and positively related to productivity. On the one hand, productivity is a powerful engine of trade [see Wagner (2007) and Bernard and Jensen (2004) for firm-level evidence]. On the other hand, trade liberalization has been found to have a significant on productivity growth.

In this respect, in our framework, it is necessary to mention investments in human capital through education and health. I use the term ‘investment’ in order to remind the point raised by Nordhaus (2000) that explains how «...*their contribution to economic welfare is misclassified because they are largely treated as consumption rather than investment...*»⁹. Education, interpreted as an investment in human capital is commonly recognized as the main source of improvement in labor productivity. Hence, improvement of education at all levels is needed. This is particularly true in war-torn and less developed societies. However, in less-developed societies investments in education do not suffice. In particular, it is common knowledge that malnourishment has a detrimental impact on both current and future productivity. A starving (or ill-nourished) labourer is less productive than a well-nourished labourer. Moreover, ill-nourished children will develop fewer cognitive skills which have to be translated in productive activity in the future. In recent years, several studies have shown a

⁹ Nordhaus (2000), p.261

compelling evidence on the positive impact of health on productivity (see Strauss and Thomas, 1998). In many regions, public policies of education and health cannot be postponed.

6. CONCLUSIONS

This article has given a sketch of peace economics and its potential contribution to design of peaceful development in the long-run. It has been argued that the problem under investigation is inherently institutional. That is, peace is an institution in itself that shapes behavior and expectations of economic agents so fostering prosperity and development in the long-run. Stated differently, in the eyes of economists peace is an institutional scenario in which secure productive activities – the ice-cream – exceed both unsecure and contested activities – butter – and the unproductive activities – the guns - . In addition, it has been argued that international cooperation and trade relations have to be strengthened and balanced. In sum, if we want to elaborate a definition along the lines presented in this article we would say that: *in economic terms peace can be defined as an institutional setting that favors productive at expense of unproductive activities thanks to democratic governance, balanced economic interdependence with other polities and long-lasting productivity growth in the long-run determined by investments in education and health.*

In such a way, peace differs substantially from deterrence that plausibly generates equilibria in which guns are likely to be increased at the expense of butter and ice-cream. Peaceful economic policies can be designed to reach equilibria characterized by a peaceful allocation of resources. As scientific discipline, the crucial role of peace economics is that of providing evidence on costs and losses associated with unproductive burden of threat systems (deterrence, continuing conflict and arms races). Secondly, peace economics has to normative by contributing either to strengthen or to design effective institutions. Then, in sum, peace economics is aimed at designing economic policies that would increase uncontested productive activities – the ‘ice-cream’ - at expense of contested productive ‘butter’ and destructive activities (‘guns’). Yet peace economics has to propose models which go beyond deterrence and arms race but emphasizes cooperation in order to minimize the unproductive burden of the economy. Implicit in this line of reasoning is that peace economics takes the positive study of conflicts as point of departure and eventually aims to be a normative science as emphasized in Isard (1994), Arrow (1995), Coloumb et al. (2008) and Caruso (2010). With this in mind, it is now possible to highlight a proper definition of peace economics

drawing from the one developed in Brauer and Caruso (2013): « [...] *Peace economics concerns the economic study and design of political, economic, and cultural institutions, their interrelations, and their policies to prevent, mitigate, or resolve any type of latent or actual destructive conflict within and between societies [...]*».

Finally, what can be maintained is that peace is by no means disentangled from economics and political economy. Further societal progress can be pursued if we include peace and its correlates among the factors we have been focusing on over the years.

REFERENCES

- Abadie A., Gardeazabal J., (2003), The Economic Costs of Conflict: A Case Study of the Basque Country, *The American Economic Review*, **93**, 113-132.
- Anderton C.H., Anderton R. A., Carter J. (1999), Economic Activity in the Shadow of Conflict, *Economic Inquiry*, **17**, 166-179.
- Anderton C.H., (1989), Arms Race Modeling, *Journal of Conflict Resolution*, **33**, 346-367.
- Arrow K.J., (2000), The Basic Economics of Arms Reduction, *Peace Economics, Peace Science and Public Policy*, **6**, 3.
- Arrow K.J., (1995), Some General Observations on the Economics of Peace and War, *Peace Economics Peace Science and Public Policy*, **2**, 2.
- Baker M.J. (2003), An Equilibrium Conflict Model of Land Tenure in Hunter-Gatherer Societies, *Journal of Political Economy*, **111**, 124-173.
- Baumol W.J., (1990), Entrepreneurship: Productive, Unproductive, and Destructive, *The Journal of political economy*, **98**, 893-921.
- Baumol W.J., (1986), Productivity Growth, Convergence and Welfare: What the Long-Run Data show, *The American Economic Review*, **76**, 1072-1085.
- Bernard A.B., Jensen J.B., (2004), Why Some Firms Export, *The Review of Economics and Statistics*, **86**, 561-569.
- Bhagwati J.N., (1982), Directly Unproductive, Profit-seeking (DUP) activities, *The Journal of Political Economy*, **90**, 988-1002.
- Boulding K.E. (1963), Towards a pure theory of threat systems, *The American Economic Review, papers and proceedings*, vol. 53, no.2, p. 424-434.

Bove V., Nisticò R., (2014), Military in politics and budgetary allocations, *Journal of Comparative Economics*, in press, DOI: 10.1016/j.jce.2014.02.002

Brauer J., Caruso R., (2013), Economists and Peacebuilding, in Roger Mac Ginty (ed.), *Handbook of Peacebuilding*, Routledge, London, ch.11. pp. 147-158

Brauer, J., Tepper Marlin J. (2010), A Method to Compute a Peace Gross World Product by Country and by Economic Sector, pp. 13-30 in B.E. Goldsmith and J. Brauer, (eds.) *Economics of War and Peace: Economic, Legal, and Political Perspectives*. Bingley, UK: Emerald Group.

Brito D.L., Intriligator M., (1984), Can Arms Races Lead to the Outbreak of War? *Journal of Conflict Resolution*, **28**, 63-84

Bussière M., Perez-Barreiro E., Straub R., Taglioni D., (2011), Protectionist Responses to the crisis: Global Trends and Implications, *World Economy*, **34**, 826-852

Caruso R., Di Domizio M., (2014), Military Spending and Budget Deficits: on the Impact of US military Spending on European Public Debt (1988-2013). Mimeo (available upon request).

Caruso R., Francesco A., (2012), Country Survey: Military expenditure and Its Impact on Productivity in Italy, (1988-2008). *Defence and Peace Economics*, **23**, 471-484

Caruso R., (2012), Differentials in Property Rights in a two-sector Economy, *Revue d'Economie Politique*, **122**, 257-278

Caruso R., (2010), On the nature of Peace Economics, *Peace Economics, Peace Science and Public Policy*, **16**, 2.

Caruso R., (2006), A Trade Institution as a Peaceful Institution? A contribution to Integrative Theory, *Conflict Management and Peace Science*, **23**, 53-72.

Caruso, R. (2003), The Impact of International Economic Sanctions on Trade: An Empirical Analysis, *Peace Economics, Peace Science and Public Policy*, **9**, 1.

Cipollone, P. and Rosolia, A. (2007) Social interactions in high school: lessons from an earthquake. *The American Economic Review*, **97**, 948–965.

Collier P., Hoeffler A., (1998), On economic causes of Civil War, *Oxford Economic Papers*, **50**, 563-573.

Coulomb F., Hartley K., Intriligator M., (2008), Pacifism in Economic Analysis: A historical perspective, *Defence and Peace Economics*, **19**, 373-386

De Luca G., Sekeris P.G., (2013), Deterrence in Contests, *Economica*, **80**, 171-189

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

Dumas J.L., (2011), *The Peacekeeping Economy*, Yale University Press, New Haven.

Dunne J.P., Tian N., (2013), Military Expenditure and Economic Growth: A Survey. *The Economics of Peace and Security Journal*, **8**, 1.

Gates S., Hegre H., Nygård H. M., Strand H., (2012), Development consequences of armed conflict, *World Development*, **40**, 1713–1722

Gupta S., De Mello L., Sharan R., (2001), Corruption and Military spending, *The European Journal of Political Economy*, **17**, 749-777.

Greif A., (2007), *Institutions and the Path to the Modern Economy, Lessons from Medieval Trade*, Cambridge University Press, New York.

Grossman H. I. And Kim M. (1995), Swords or Plowshares? A Theory of the Security of Claims to Property, *The Journal of Political Economy*, **103**, 1275-1288

Grossman H.I. (1991), A General Equilibrium Model of Insurrections, *The American Economic Review*, **81**, 912-921.

Hegre H., O'Neal J.R., Russett B., (2010), Trade does promote Peace: new simultaneous estimates of the reciprocal effects of trade and conflict, *Journal of Peace Research*, **47**, 763-774.

Hirshleifer J., (1991), The Technology of Conflict as an Economic Activity, *The American Economic Review, Papers and Proceedings*, **81**, 130-134.

Hirshleifer J. (1988), The analytics of Continuing Conflict, *Synthese*, **76**, 201-233.

Intriligator M.D., (2011), Peace Science and Peace Economics Can Help Win the Fight against Nuclear Proliferation, *Peace Economics Peace Science and Public Policy*, **16**, 1-10.

Intriligator M.D. (1975), Strategic Considerations in the Richardson model of Arms Races, *Journal of Political Economy*, **83**, 339-353

Isard, W., (1994), Peace Economics: A Topical perspective, *Peace Economics, Peace Science, and Public Policy*, **1**, 6-9

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

Kee H.L., Neagu C., Nicita A., (2013), Is Protectionism on the Rise? Assessing National Trade Policies during the Crisis of 2008, *The Review of Economic and Statistics*, **95**, 342-246.

Keller K., Poutvaara P., Wagener A., (2009), Military Draft and Economic Growth in OECD countries, *Defence and Peace Economics*, **20**, 373-393

Keynes J.M., (1919/1971), *The Economic Consequences of Peace*, McMillan, New York.

Klein L.R., A model of Japanese Economic Growth, 1878-1937, *Econometrica*, **29**, 277-292

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

Marwah K., Klein L.R., (2005), Lost Productivity and Defense Burden of the Southern Cone of Latin America: a Page from History, *Peace Economics, Peace Science and Public Policy*, **11**, 1.

Mulligan C.B., Gil R., Sala-i-Martin X., (2004), Do Democracies Have Different Public Policies than Nondemocracies? *The Journal of Economic Perspectives*, **18**, 51-74.

Munster J. (2007), Simultaneous Inter and Intra-Group Conflicts, *Economic Theory*, **32**, 333-352.

Neary H. M. (1997), Equilibrium Structure in an Economic Model of Conflict, *Economic Inquiry*, **35**, 480-494

Nordhaus W.D., (2000), New Directions in National Economic Accounting, *The American Economic Review Papers and Proceedings*, **90**, 259-263.

North D.C., Wallis J.J., Weingast B.R., (2009), *Violence and Social Orders, A Conceptual Framework for Interpreting Recorded Human History*, Cambridge University Press, Cambridge.

Paleologou S., (2013), A dynamic panel data model for analyzing the relationship between Military expenditure and government debt in the EU, *Defence and Peace Economics*, **24**, 419-428.

Polachek S.W., Seiglie C., Xiang J., (2011), Globalization and International Conflict: Can Foreign Direct Investment Increase cooperation among Nations? In Garfinkel M., Skaperdas S. (eds.) *The Oxford Handbook of the Economics of Peace and Conflict*, Oxford University Press, New York.

- Polachek, S. W., (1980), Conflict and Trade, *Journal of Conflict Resolution*, **24**, 55-78.
- Reinhardt C.M., Reinhardt V.R., Rogoff K.S., (2012), Public Debt Overhangs: Advanced-Economy episodes since 1800, *The Journal of Economic Perspectives*, **26**, 69-86.
- Reuveny R., (2000), The Trade and Conflict Debate: A Survey of Theory, Evidence and Future Research, *Peace Economics, Peace Science and Public Policy*, **6**, 1.
- Richardson L.F., (1960), *Arms and insecurity: A mathematical study of the causes and origins of war*, Boxwood Press.
- Schelling T.C., (1966), *Arms and Influence*, Yale University Press, New Haven.
- Schelling T.C., (1960), *The Strategy of Conflict*, Harvard University Press, Cambridge.
- Skaperdas S. (1992), Cooperation, Conflict, and Power in the Absence of Property Rights, *The American Economic Review*, **82**, 720-739.
- Smith R., (2014), The Economic Costs of Military Conflict, *Journal of Peace Research*, **51**, 245-256.
- Smyth R., Narayan P.K., (2009), A Panel Data Analysis of the Military expenditure-external debt nexus: Evidence from Six Middle Eastern Countries. *Journal of Peace Research*, **46**, 235-250.
- Stiglitz J.E., Bilmes L.J., (2008), *The Three Trillion Dollar War*, W.W. Norton, New York.
- Strauss J., Thomas D., (1998), Health, Nutrition and Economic Development, *Journal of Economic Literature*, **36**, 766-817.
- Tornell A., Lane P.R., (1999), The Voracity Effect, *The American Economic Review*, **89**, 22-46

Wagner J., (2007), Exports and Productivity: A Survey of the Evidence from Firm-level Data, *The World Economy*, **30**, 60-82.

Williamson J.G., (1984), Why British Growth So Slow During the Industrial Revolution, *The Journal of Economic History*, **44**, 687-712